

Effect of Breast Feeding Versus Formula Feeding On Surgical Wound Healing Among Infants during the First Six Months of Age

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Abstract

Background: Breast milk has antimicrobial and healing properties that actually can help the wound healing. Surgical infants are at much higher risk for malnutrition as a result of increased metabolic demands from surgery, nutrient losses, and sepsis. **Aim of the study** was to assess the effect of breast feeding versus formula feeding on surgical wound healing in infants during the first six months of age. **Subjects and Methods : Research design** :Descriptive comparative. **Setting:** The Pediatric surgical Unit at the surgery hospital and out Pediatric surgical clinic at Zagazig University hospital. **Subjects:** sample comprised 90 infants (45study and 45 controls) .**Tools of data collection: Two tools** were used: questionnaire interview sheet and Observation sheet for the infant's wounds. **Results:** It revealed that :In breastfed infants boys were 73.3% ,while 26.7 % were girls .Also in the formula fed infants boys were 75.6% ,while 24.4% were girls .As general statistically significant difference was found between physical assessment and type of feeding as there was 46.7% of infants had rapid respiration in artificial feeding while 11.1in breast feeding, also occurrence of wound healing during the first ,second and third visits was 46.7%,73.3 %,93.3% in breast fed infants while 31.1% ,20.0%,57.8%in formula feeding .**Conclusion:** Breast fed infants had rapid wound healing ,less wound infection and receiving more number of daily feeds .**Recommendation:** Health educational classroom to encourage mothers during admission period at hospital to maintain exclusive breast feeding until six months of infant age.

Key words: Infants, breast feeding, formula feeding, wound healing

Introduction

Human milk is a living biological fluid with many qualities .It is the ideal feeding pattern for infant's .It provides optimal nutrition and health protection for the infant during the first 6 months of infants' life. Breast feeding is important for brain, nervous system, intellectual, neurological, psychomotor, and social development of children. It reduces the risk of infections. Moreover it is an important public health strategy for improving infant and child morbidity and mortality, improving maternal morbidity, and helping to control health care costs ^(2&3).

Infant formulas are designed to be a substitute for breast milk. It should be monitored for signs and symptoms of intolerance. More over each step in the formula mixing process or each

manipulation required for the feeding is another opportunity to introduce bacteria to the formula. So Caregivers should be educated on preparing formula in hygienic manner ⁽⁴⁾. Infant formula may cause cronobacter infection if prepared in un correct way. Cronobacter is a serious infection that has been associated with the use of powdered commercial infant formula ⁽⁵⁾.

Adequate nutrition is required to avoid such chronic wound that's consider to be significant cause of morbidity and mortality as nutrition deficiencies impede the normal processes that allow progression through stages of wound healing. Malnutrition has also been related to decreased wound tensile strength and increased infection rates. In addition

to malnourished patients can develop pressure ulcers, infections, and delayed wound healing that result in chronic non healing wounds ^(6&7).

Breast milk contains numerous substances which are not contained in infant formula and Composed in such a way that all the baby's nutritional and fluid requirements are met during the first half-year of life it contains proteins, fats, and carbohydrates that are easy for infants to digest ⁽⁸⁾. It is also lower in sodium than most formula and supplies beneficial intestinal bacteria that reduce risk of contamination and allergies breast milk is convenient, always the correct temperature, available when needed less expensive than the cost formula milk aren't able to replicate antibodies that mother's produce. These antibodies are known to safeguard against sudden infant death syndrome(SIDS), ear infection, diarrhea, pneumonia, leukemia, and other infectious diseases infants who breast fed are less likely to develop chronic health condition such as obesity and type 2diabetes ⁽⁹⁾.

Wound healing is a natural restorative response to tissue injury. Healing is the interaction of a complex cascade of cellular events that generates resurfacing, reconstitution, and restoration of the tensile strength of injured skin Healing is a systematic process, it is explained in terms of 4 overlapping classic phases: hemostasis, inflammation, proliferation, and maturation. While platelets play a crucial role in clot formation during hemostasis, inflammatory cells debride injured tissue during the inflammatory phase. Epithelialization, fibroplasia, and angiogenesis occur during the proliferative phase. Meanwhile, granulation tissue forms and the wound begin to contract. Finally, during the maturation phase, collagen forms tight cross-links to other collagen and with protein molecules increasing the tensile strength of the scar ⁽¹⁰⁾.

Nurses play an important role in preventing complication that may

occur from a surgical wound, such as infection and pressure ulcers. They can be prevented with good nursing care. Nurses must frequently turn patients and examine common wound sites, such as the back and the hip bones. Scrupulous handling and care of wounds helps prevent contamination and possible infection. Good nutrition also helps wounds heal. Education -- always a big part of nursing care -- teaches patients and families how to avoid complications from wounds. More over nurses must spread the awareness among families about the importance of follow up after discharge ⁽¹¹⁾.

Significant of the study

Infants undergoing a surgery 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 infants, oral feeding, breast or formula milk, enteral, or parenteral feeding. Breast milk is preferable as it has antimicrobial and healing properties that actually can help the wound healing. There for this study will be conduct to identify the effect of breast feeding versus formula feeding on surgical wound healing among infants during the first six months of age.

Aim of the study

The aim of the study was:

Identify the effect of breast feeding versus formula feeding on surgical wound healing among infants during the first six months of age.

Research questions:

- 1- Is there any effect of breast feeding on healing of surgical wound?
- 2- Is there any effect of bottle feeding on healing of surgical wound?

Subjects and methods

Research design

Descriptive comparative design was used to assess the effect of breast feeding versus formula feeding on surgical wound healing in infants during the first six months of age.

Study setting: The study was conducted at two settings

- 1-The Pediatric surgical Unit at Zagazig University Hospital

2- Out pediatric surgical clinic at Zagazig University Hospital

Study subjects:

The subjects of this study were composed of two main groups:

Group 1: All available infant who received breast feeding and had a surgery.

Group 2: All available infant who received formula milk feeding and have a surgery **and infants in both groups who fulfilled the following criteria:**

Sex: Both sexes, **Age:** full term infant up to six month of age, Infant undergoing a surgery, infants without medical problem (diabetic disease & heart disease)

Tools for data collection

Two tools were used in this study:

Tool I: questionnaire interview sheet:

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

Part A: Personal characteristics of the studied subjects

- Personal characteristics of the studied infant including their name, age, gender, weight, birth order and clinical data including type of surgery, hours and the complication after surgery.

- Personal characteristics of infants' mothers including their age, occupation, education, income, history of pregnancy and type of labor

Part B: Infant's food consumption pattern - Infant's food consumption pattern during the first six months of infants life , preoperative and postoperative feeding such as, number of feeds / day, type of milk (artificial or breast milk), and route of feeding

Part C: Anthropometric measurements for the studied infants

- Anthropometric measurements sheet was used on the 3rd, 7th and 14days after the surgery to assess infants growth parameters as weight, height, as well as head, and chest circumference

Part D: Physical assessment of the studied infants.

- Physical assessment of the infants: it was done by the researcher and included assessment of infants face(

normal ,pale), eyes (normal ,unclear conjunctiva), mouth (gums: bleeding ,stomatitis, bad odor) and vitalsign(pulse:tachycardia,bradycardia,irregular),respiration(tachypnea,bradyapnia,irregular)and body temperature (hypothermia ,hyperthermia)

Tool II: Observation sheet for the infant's wound.

It included surgical wound healing criteria as normal healing, wound redness (surrounding some of the sutures or all the sutures, wound discharge (purulent or not purulent, around the stitches from the wound or from the drain), swelling, bleeding (occurred from the site of sutures due to separation of one or more sutures)and bad odor.

Content Validity &reliability

The structured interview sheet were developed after thorough review of the related literature and then reviewed by three experts (two professors from the faculty of nursing and one from the faculty of medicine). In the present study the overall reliability of tools was cronbach alpha (0.703) , acceptable.

Field work

Data collection took a period of one a year and three months starting from December 2016 until February 2018. The data were collected at four days of the week (Sunday, Monday, Tuesday, and Thursday) from 9:00 am to 2:00pm.The researcher interviewed the mothers of the infants and asked about name of infants and other question also made Physical assessment for the infant after surgery .In addition to the researcher took anthrombometric measurement to make Physical assessment by using weighting scales, length boards, and tape measures are used to obtain measurements of weight, length, chest circumference , head circumference. The time used for finishing each interview ranged between 20- 30 minutes according to mothers physical and mental readiness. .

Pilot study:

It was carried on 10% of surgical infants to assess the

applicability of the data collection tool, arrangement of items, estimate the time needed for filling the sheets with the collected data and feasibility of the study and acceptance to be involved in the study.

Administrative and ethical consideration

An official permission to conduct the study was directed from the faculty of nursing to the manager of surgical hospital and another for the manager of the out pediatric surgical clinic hospital. All ethical issues were taken into consideration during all phases of the study:

-Research approval was obtained from ethical committee before starting the study.

-Consent was taken from every mother and data was collected through interviewing the mothers individually, reassured that the information obtained will be confidential, and used only for the purpose of the study.

Statistical analysis:

Collected data was coded, computed and statistically analyzed using SPSS (statistical package of social sciences) and Microsoft Excel software. Qualitative data was presented as frequency and percentage, quantitative data was presented by mean \pm SD, the following tests were used to test differences for significance; Differences between frequencies (qualitative variables) and percentages in groups were compared by Chi-square test. Differences between parametric quantitative independent groups by t test in non-parametric by Man Whitney. In order to identify the independent predictors of the scores of wound problem and physical assessment problem multiple linear regression analysis was used.

-P value was set at <0.05 for significant result

Results

Table (1) shows Characteristics Of mothers Of Studied Infants. It was found that 80% of mothers in both the study and control group was over 25 years with mean age 26.4 ± 3.6 and 27.2 ± 4.5 respectively. Also 97.8% of

mothers were housewife in the studied group compared to 84.4% of control group. In addition to 48.9% of studied mother had finished their secondary school education compared to 31.1% of control group as well as 57.8% of mothers in both studied and control groups had insufficient income

Characteristics of studied Infants as shown in **table (2)** demonstrates that 68.9% of studied group age were more than 4 months compared to 66.7% of control group with mean age 4.2 ± 1.9 and 4.6 ± 2.0 for both study and control group respectively. In addition to 73.3% of studied infants were male compared to 75.6% of control group. As well as 42.2% of studied infant were second births or more compared to 26.7% of control group. There was also 55.6% of studied infant were more than 6 kg compared to 51.1% of control group with mean weight 6.3 ± 1.9 and 5.8 ± 2.1 for the study and control group respectively.

Table (3) indicates the surgical history of studied infant. It was found that 51.1% of studied group had colon surgery compared to 60.0% of control group. As regard surgery duration, it was found that 53.3% of studied group had more than 3 hours in the surgery compared to 48.9% of control group with mean 2.9 ± 0.6 and 2.9 ± 0.5 hours for study and control group respectively. In addition to there was 50.0% of studied group had complication after surgery due to technique of surgery compared to 81.8% of control group. It was found also that 100% of infant in the studied group had improvement after surgery compared to 82.2% of control group.

Table (4) shows total physical assessment of studied infants throughout study visits. It was found that total abnormal physical assessment at visit 1 was 62.2% of studied group compared to 82.2% of control group. Meanwhile at visit 2 the total abnormal physical assessment was 22.2% for studied group compared to 51.1% of control group. In addition to at visit 3 the total abnormal physical assessment was 11.1% of studied group compared to 28.9% of control group. It was found

that there was statistical significant difference as P value was <0.05 throughout three study visits.

Assessment of wound condition among studied infants shows in **table (5)**. It was found that at visit one the normal healing was 46.7% and 31.1% of studied & control group respectively. Also it was found that infection of wound was 20.0% and 40.0% of both groups respectively and there was statistical significant difference as P value was =0.04. As well as the redness of wound was 53.3% and 64.4% of both groups respectively. In addition to at visit 2 and visit 3 this table clarified statistical significant difference for normal healing of wound, infection of wound, redness, and secretion as P value was <0.05

Correlation matrix of scores of wound and physical assessment problems throughout the Study was portrayed at **table (6)**. It was found that there was correlation between wound problem and physical assessment problems. And There was statistical significant difference duration respectively, also the table illustrates that artificial feeding, complications after surgery and working mother were the statistical significant independent positive predictor of this score. They explain 34% of the variation in this score, while none of the other infants and women's characteristics had significant influence on this score 34% of the variation in this score, while none of the other infants and women's characteristics had significant influence on this score

Discussion

Nutrition is very important for growth and development of infant, in addition to it plays an important role in promoting wound healing. Nutritional status influence wound healing. As surgical wounds requires energy, vitamin, mineral and protein requirements for promoting healing Grieger⁽¹²⁾,. 1 added that breast milk is the preferable and the best source of nutrition for infant with surgery, as it contains high and balanced concentrations of protein, fat, and carbohydrate Sophie, et al,⁽¹³⁾ WHO⁽¹⁴⁾, stated that exclusive breastfeeding

throughout the three visits as P <0.05 and P<0.01 respectively.

In multivariate analysis, **table (7)** demonstrates the score of wound problems at visit one. It was found that duration of surgery, working mother, age of infant, complication after surgery and cesarean labor these independent variables were positive predictor on wound problems score at visit 1, there was statistical significant as P<0.001. Conversely independent negative predictor were No. of feeding after surgery and income, there was statistical significant as P<0.05. None of the other infants and women's characteristics had significant influence on this score. In addition to at visit 2 it indicates the most influencing factors that can lead to increasing the wound problems score. It was found that artificial feeding and surgery duration were the statistically significant independent positive predictor of this score. As P <0.001, <0.05 for artificial feeding and surgery

for the first six months has many benefits for the infant and mother. Chief among these is protection against gastrointestinal infections and malnutrition, which are observed not only in developing countries but also industrialized countries. It is also an important source of energy and nutrients in children aged 6–23 months. It can provide half or more of a child's energy needs between 6-12 months, and one-third of energy needs between 12-24 months. Breast-milk is also a critical source of energy and nutrients during illness,

Characteristics of studied mothers and infant

Regarding to mothers education almost of them were house wife and half of them had insufficient income this may be due to they had only moderate education so their chances was weak for having a job and their income wasn't enough as they went to the government hospital this wasn't matched with Hussain & Khan⁽¹⁵⁾, who conduct a study about Assessment of the Nutritional Status of Bottle-Fed Infants and the

Prevalence of Infections, Allergy and Diarrhea among Bottle Fed Infants and Its Comparison with Exclusively Breast Fed Infants Aged 0-6 Months, in Pakistan. He founded that most of infants were 1-2 months old. The majority of their mothers were highly educated and belonged to high income family but agree with the present study as majority of the infants were boys

Regarding to Characteristics of studied mothers and infant in the present study there was no significant difference founded between these characteristics and breast feeding this may back to that all mothers had the same emotion toward breastfeeding but the circumstances of life as working obligated them to choose the bottle feeding. This was supported with Nguyen⁽¹⁶⁾ who conduct a study about Factors Associated With Breastfeeding Intent Among Mothers Of Newborn Babies In Da Nang, Viet Nam. He found that no significant differences in the mother's age, employment status, parity, the infants 'birth weight' number of babies or mode of delivery. And two thirds of mothers had a Cesarean section while in the present study more than one half had Cesarean section.

In addition to Lau⁽¹⁷⁾ who conduct a study about Maternal, Infant Characteristics, Breastfeeding Techniques, and Initiation: Structural Equation Modeling Approaches, In Singapore. He supported the present study as he found that, maternal age, gestations, and birth weight of infant, had no significant impacts on breastfeeding techniques or exclusive breastfeeding initiation.

The present study showed statistically significant differences between the mothers' occupation and exclusive breast feeding. House wife mothers were more likely to exclusive breast fed their infant than working mothers. This may attribute to worked mothers were away from the home and from their infants which make the breast feeding difficult. This was supported by

Mohamed et al.,⁽¹⁸⁾ who conduct a study about, Barriers of Initiation and Exclusive Breast Feeding Among Infants, In Assuit. They found that there was statistically significant differences between the mothers' occupation and exclusive breast feeding

Regarding mothers education and income of family the present study was go on line with Mohamed et al.,⁽¹⁸⁾ as he found no significant differences between exclusive breast feeding and mothers' education. but disagree regarding income as the present study found it had no significant difference, in contrary he found that less family income were more likely to breast fed their infants exclusively than family with high income.

Surgical history of studied infants.

The present study showed that complication after surgery is attributed to technique of surgery this may be due to that infants during the surgery may exposed to infection from the equipment (un sterilized field), the sutures of the wound may be loosed as it hadn't done as required or infants may had an undesired amount of anaesthesia this may be matched with Pawar⁽¹⁹⁾, who conduct a study about Common post-operative complications in children, In Indian, he found that most common complication was post-operative nausea and vomiting followed by respiratory complications leading to hypoxia. Post-operative shivering, agitation and delirium are seen more often in children anaesthetized with newer inhalational agents like sevoflurane and desflurane. Urinary retention in the post-operative period could be influenced by anaesthetic drugs and regional blocks.

Also, mothers care can affect on wound healing as mother haven't the needed knowledge that can help them on wound cleaning, and follow aseptic technique on caring the wound. In addition to infant with surgery after discharge their mothers didn't apply wound change or remove old dressing until the time of change on wound on

the clinic of surgery, so infants wound healing was delayed due to infection that occur at the site of surgery this was supported by Pramila & Chandni⁽²⁰⁾ who conduct a study about Knowledge of Mothers Regarding Home Care of Children undergone Cardiac Surgery with a View to Develop an Information Booklet, In Nepal. He found that The knowledge of mothers regarding home care of children undergone surgery was found to be insufficient to enable them to take care of their children

Physical Assessment of Studied Infants

Regarding respiration less than one quarter of infant had rapid respiration in the studied group compared to about half of infant in control group. This can be explained as bottle feeding negatively interferes with orofacial development and leads to loss of the labial seal, moreover, it favors an improper position of the tongue and changes the shape of the jaw. When infant is bottle-fed, the facial muscles are exercised in a different manner than during breastfeeding, and the child's tongue must function as a milk dispenser, making it hypotonic and unable to stay in the correct position at rest. This was supported by Lopes, et al.,⁽²¹⁾ who conduct a study about Association between breastfeeding and breathing pattern in children: a sectional study, in Brazil. He found that bottle feeding was a statistically significant risk factor for respiratory patterns because more than half of the children with a predominantly oral breathing pattern used a bottle feeding.

Salone, et al.,⁽²²⁾ reported that breastfeeding help infants having normal breathing through nasal breathing due to the physiology of this type of feeding, as it prevents air from entering through the mouth during feeding, forcing air to pass through the nose and stimulating all of the orofacial muscles. Moreover, the nutritional and immunological protection provided by human milk prevents or reduces the risk of respiratory infection (it cause nasal

obstruction and lead to mouth breathing). American Academy of Pediatrics,⁽²³⁾ stated that the WHO recommends exclusive breastfeeding until six months of age and complementary breastfeeding up to the age of 2 years or older. Children who are breastfed for a shorter period have been shown to present a higher risk for respiratory tract infections such as pneumonia, sinusitis, and otitis.

As regarding rapid pulse of infants the present study showed that half of infant who artificially fed had rapid pulse this may be due to the effort that is exerted by infants during bottle feeding and this was in agree with kul & Efe⁽²⁴⁾ who conduct a study about Efficacy of Breastfeeding on Babies' Pain During Vaccinations, in Turkey. They found that breastfeeding prevented increased heart rates in newborns more than control group.

Assessment of Wound Condition Among Studied Infant

The present study showed that normal healing of wounds occurred in almost of infant who breast fed compared to half of infant who artificially fed in the third visit. This can be explained as breast milk is considered to be a balanced diet that contains the needed element for nourishment that helps on wound healing especially proteins. Increased protein content of diet, leading to good lean body mass (LBM). Adequate protein stores result in decreased skin fragility, increased immune function with good healing. This was matched with Lönnerdal,⁽²⁵⁾ who conduct a study about Bioactive proteins in breast milk, In California, he found that breast milk contains a large quantity of proteins that have been shown to be bioactive. These bioactivities include enzyme activities, enhancement of nutrient absorption, growth stimulation, modulation of the immune system and defense against pathogens.

In addition to, no occurrence of infection, redness, secretion as well as swelling, bleeding and smelling

compared to one third of infants who artificially fed. This can be clarified according to American Academy of Pediatrics, (26)& Khodayar-Pardo (27), they added that the presence of defensives factors that present in human milk is like vaccine given to the infant. More over specific and innate immune factors present in human milk. Plasma cells in the mother's bronchial tree and intestine migrate to the mammary epithelium and produce IgA antibodies specific to antigens in the mother-infant dyad's immediate surroundings, providing specific protection against pathogens in the mother's environment. Also, innate immune factors in milk provide protection

This was in agreement with Hussain& Khan (28), who found in their study that bottle feeding relates to infectious morbidity compared with breastfed infants. This infectious morbidity may occur from improper preparation, uncleaning or use unsterilized water.

Correlates and predictors of wound problem, physical assessment problem and perception factors

As regarding infants who had complication after surgery, most of them had abnormal physical assessment such complication may include Infection or abnormal bacterial presence. This go in line with Guo & DiPietro (29), who conduct a study about Factors Affecting Wound Healing, In Chicago they mentioned that if an infection is present, as evidenced by purulent drainage or exudate, induration, erythema, there would be elevation in temperature.

Regarding infant's age, the result of present study revealed that young age lead to good wound healing. This can be clarified according to Hess& Cathy(30) who reported that wounds in older patients may heal more slowly than those in younger patients due to inadequate nutritional intake, altered hormonal responses, poor hydration, and compromised immune, circulatory, and respiratory systems, any of which

can increase the risk of skin breakdown and delay wound healing

In addition to Baharestani (31), mentioned that wounds in neonates and children typically exhibit faster rates of closure. Fibroblasts are present in greater numbers, collagen and elastin are more rapidly produced, and granulation tissue forms more quickly compared to adults.

As regarding surgery duration and complication they also increase wound problem and delay wound healing. Long surgery duration may cause postoperative ileus, and complication as hemorrhage, postoperative fever and infectious complications increasing wound problem.

Thomas et al., (32) added that Late postoperative hemorrhage occurs several days after surgery usually due to infection damaging vessels at the operation site this lead to delayed wound healing. Kujath(33) stated that infectious complications are the main causes of postoperative morbidity in abdominal surgery

In addition to the decrease in number of feeding increase wound problem, this can be clarified as this enhance bowel motility after surgery, and it particularly counteracts postoperative paralytic ileus .This was matched with Fujii,etal (34) who conduct a study about Benefit Of Oral Feeding As Early As One Day After Elective Surgery For Colorectal Cancer: Oral Feeding On First Versus Second Postoperative Day, in japan. They found that very early feeding on postoperative day 1 after colorectal resection is safe and feasible. Time to flatus and defecation were significantly shorter in patients starting feeding on the first postoperative day than in those starting on the second postoperative day, very early oral intake enhanced the recovery of postoperative gastrointestinal movement. Rees et al., (35), who conduct a study about Delayed Postoperative Diet Is Associated With A Greater Incidence Of Prolonged Postoperative Ileus And Longer Stay In Hospital For

Patients Undergoing Gastrointestinal Surgery: Outcomes Of Delaying Nutrition After GI Surgery ,In Newzelanda They found that patient who had early feeding had better outcomes after gastrointestinal surgery versus those who delayed postoperative nutrition

Also cesarean labor may increase wound problem as it may delay initiation of breast feeding .Neonates born via c-section may be somewhat drowsy and lethargic, especially if the mother was exposed to anesthetics for a prolonged period of time during labor this mean that her milk may take a little longer to come in than in a vaginal birth. Mothers who deliver vaginally this promotes bonding, provides stimulation to bring the milk in sooner, releases the hormone oxytocin to help the uterus contract, provides the neonates with the advantages of colostrum.

The result of present study was matched with Hobbs et al.⁽³⁶⁾ who conduct a study about The Impact Of Caesarean Section On Breastfeeding Initiation, Duration And Difficulties In The First Four Months Postpartum ,In Canada .They found that cesarean -sections are associated with more breastfeeding difficulties, greater use of resources, and shorter breastfeeding duration compared to vaginal deliveries.

In addition to Shosha⁽³⁷⁾ who conduct a study about The Influence of Infants' Characteristics on Breastfeeding Attitudes among Jordanian Mothers .He found that Breastfeeding is the desired nutritional method for infants and the Positive attitudes toward breastfeeding were higher among women who delivered normally than women who delivered by cesarean section

Watt et al ., ⁽³⁸⁾ , They reported that delays in breastfeeding initiation accompanying C-section delivery are associated with maternal and infant separation, reduced suckling ability, decreased infant receptivity, and insufficient milk supply, which are predictive of shortened breastfeeding duration

Victora et al., ⁽³⁹⁾ ,he added that breastfeeding is very important for the infant as human milk is associated with infant health benefits, such as fewer childhood illnesses, lower blood pressure and cholesterol levels, lower prevalence of obesity, and improved intelligence.

The present study revealed that mothers working and decrease in mother's education lead to increase in physical assessment problem of infant. Regarding mothers working, the mother wouldn't have time for caring after her infant. As regarding mothers' education the degree of education would effect on mothers knowledge as mothers if they were highly or moderate educated this will reflect on their caring of their infant as they would appreciate the importance of time of cleaning the wound and follow up the wound after discharge this was matched with Pramila& Chandni ⁽⁴⁰⁾ ,They found that variables such as, education and occupation of mothers were significantly associated with level of knowledge on taking care of infant with surgery .

In addition to artificial feeding had significant difference as it lead to increase in physical assessment problem it can be clarified according to National Health and Medical Research Council ⁽⁴¹⁾,it reported that infant formula lacks many factors present in human milk, including numerous types of living cells, cholesterol, polyamines, free amino acids, enzymes and a wide range of other bioactive substances. Furthermore, the sterilization (pasteurization) processes used in manufacturing formula slightly modify the structure of the cow's milk proteins, with a consequent loss of any cross-species protection against infection. In addition to powder infant formula is not a sterile product and there are occasional infections of infants with Cronobacter sakazakii infants. sakazakii is invasive and has a high mortality rate.

Conclusion

Based on the finding of present study, it could be concluded that

breastfeeding had a better effect on surgical wound healing while formula feeding causes less normal wound healing ,more wound inflammation ,and more wound infection .

Recommendation

In the light of the findings of the current study, the following recommendation is suggested:

-Health educational classroom to encourage mothers during admission

period at hospital to maintain exclusive breast feeding until six months of infant age

-Continuous classroom for mothers at public health centers for breastfeeding through educational programs must be established as at Maternal and Child Health (MCH) centers during immunization .

-Providing information about advantage of breast feeding for all

Table (1) Characteristics of Mothers of Studied Infants

Characteristics	Group		x ² test	p-value		
	Study = (N = 45)				Control = (N = 45)	
	No.	%			No.	%
Age:						
• < 25	9	20.0	9	20.0	0.00	1.00
• 25+	36	80.0	36	80.0		
Range	20.0-35.0		19.0-37.0		t= 0.48	0.49
Mean±Sd	26.4±3.6		27.2±4.5			
Median	27.0		27.5			
Occupation:					fisher	0.06
• Housewife	44	97.8	38	84.4		
• Working	1	2.2	7	15.6		
Education :					4.22	0.24
• Illiterate	3	6.7	6	13.3		
• Basic	10	22.2	9	20.0		
• Secondary	22	48.9	14	31.1		
• University	10	22.2	16	35.6		
Income					0.00	1.00
• Insufficient	26	57.8	26	57.8		
• Sufficient	19	42.2	19	42.2		

Statistically significant at $p < 0.05$ chi-square test

Table (2) Characteristics of Studied Infants

Characteristics	Group				X ² Test	P-Value
	Study = (N = 45)		Control = (N = 45)			
	No.	%	No.	%		
Age(Month):						
< 4	14	31.1	15	33.3	0.05	0.82
4+	31	68.9	30	66.7		
Range	<1-6		<1-8		T=1.600	0.21
Mean±Sd	4.2±1.9		4.6±2.0			
Median	4.0		6.0			
Gender						
Male	33	73.3	34	75.6	0.06	0.81
Female	12	26.7	11	24.4		
Birth Order:						
1	10	22.2	13	28.9	2.44	0.49
2	19	42.2	12	26.7		
3	10	22.2	13	28.9		
4+	6	13.3	7	15.6		
Initial Weight (Kg) :						
<6	20	44.4	22	48.9	0.18	0.67
6+	25	55.6	23	51.1		
Range	3.0-8.0		2.0-11.0		T=1.44	0.23
Mean±Sd	6.3±1.9		5.8±2.1			
Median	6.0		6.0			
Pregnancy Events:						
Problems	0	0.0	6	13.3	Fisher	0.03*
Medications:	1	2.2	4	8.9	Fisher	0.36
Labor :						
Normal Vaginal	17	37.8	15	33.3	0.19	0.66
Cesarean	28	62.2	30	66.7		

(*) statistically significant at p<0.05

(t) student t-test

Table (3) Surgical History of Studied Infant

surgical data	group				x ² test	p-value
	study = (n = 45)		control = (n = 45)			
	no.	%	no.	%		
Surgery Type :						
• Colon	23	51.1	27	60.0	--	--
• Urinary System	6	13.3	2	4.4		
• Hernia	11	24.4	11	24.4		
• Tumor	3	6.7	2	4.4		
• Gastric	2	4.4	3	6.7		
Surgery Duration (Hours) :						
• <3	21	46.7	33	51.1	0.18	0.67
• 3+	24	53.3	22	48.9		
Range	2.0-4.0		2.0-4.0			
Mean±Sd	2.9±6.0		2.9±0.5		t=0.00	0.98
Median	3.0		3.0			
Had Complications	2	4.4	11	24.4	7.28	0.007*
• Complications Due To:@						
• Technique	1	50.0	9	81.8	fisher	1.00
• Nursing Care	1	50.0	0	0.0	fisher	0.15
• Mother Care	1	50.0	9	36.4	fisher	.42
• Improvement After Surgery	45	100.0	37	82.2	fisher	0.006*
Length Of Stay (Days) :						
• ≤7	11	24.4	9	20.0	0.26	0.61
• 8+	34	75.6	36	80.0		
Range	5-30		2-30			
Mean±Sd	10.6±4.5		13.3±6.3		u=6.53	0.01*
Median	10.0		13.0			

(*) statistically significant at p<0.05 (- -) test result not valid (u) mann whitney test

Table (4) Total Abnormal Physical Assessment Of Studied Infants Throughout Study Visits

Total Abnormal Physical Assessment	Group				X ² Test	P-Value
	Study = (N = 45)		Control = (N = 45)			
	No.	%	No.	%		
Visit 1	28	62.2	37	82.2	4.49	0.03*
Visit 2	10	22.2	23	51.1	8.09	0.004*
Visit 3	5	11.1	13	28.9	4.44	0.04*

(*) Statistically Significant At P<0.05

Table (5) Assessment of Wound Condition among Studied Infants

wound condition	Group				x ² test	p-value
	study = (n = 45)		control = (n = 45)			
	no.	%	no.	%		
First visit						
• Normal Healing	21	46.7	14	31.1	2.29	0.13
• Infection	9	20.0	18	40.0	4.29	0.04*
• Redness	24	53.3	29	64.4	1.15	0.28
• Secretions	0	0.0	1	2.2	fisher	1.00
• Swelling	1	2.2	0	0.0	fisher	1.00
• Bleeding	0	0.0	3	6.7	fisher	0.24
• Smelling	0	0.0	0	0.0	0.00	1.00
Second Visit						
• Normal Healing	33	73.3	9	20.0	25.71	<0.001*
• Infection	9	20.0	29	64.4	18.22	<0.001*
• Redness	10	22.2	28	62.2	14.76	<0.001*
• Secretions	2	4.4	13	28.9	9.68	0.002*
• Swelling	1	2.2	1	2.2	fisher	1.00
• Bleeding	0	0.0	1	2.2	fisher	1.00
• Smelling	0	0.0	3	6.7	fisher	0.24
Third Visit						
• NormalHealing	42	93.3	26	57.8	15.40	<0.001*
• Infection	3	6.7	12	26.7	6.48	0.01*
• Redness	2	4.4	13	28.9	9.68	0.002*
• Secretions	0	0.0	11	24.4	12.53	<0.001*
• Swelling	0	0.0	2	4.4	fisher	0.49
• Bleeding	0	0.0	1	2.2	fisher	1.00
• Smelling	0	0.0	5	11.1	fisher	0.06

(*) statistically significant at p<0.05

Table (6) Correlation Matrix Of Scores Of Wound And Physical Assessment Problems Throughout The Study.

	spearman's rank correlation coefficient					
	wound problems score			physical assessment problems		
	visit 1	visit 2	visit 3	visit 1	visit 2	visit 3
wound problems :						
visit 1				.261*	.268*	.300**
visit 2	.511**			.189	.338**	.314**
visit 3	.415**			.220*	.136	.150
physical assessment problems						
visit 1						
visit 2				.275**		
visit 3				.397**	.691**	

(*) statistically significant at p<0.05

(**) statistically significant at p<0.01

Table (7) Best Fitting Multiple Liner Regression Model For The Wound Problems Score At 3 Visits.

Wound Problems Score At 3 Visit	Un Standardized Coefficients		Standardized Coefficients	T-Test	P-Value	95% Confidence Interval For B	
	B	Std. Error				Lower	Upper
Constant	-.99	.53		1.845	.069	-2.05	.08
Age	.11	.04	.24	2.597	.011	.02	.19
Surgery Duration	.49	.14	.31	3.461	.001	.21	.78
Complications	.58	.23	.24	2.557	.012	.13	1.03
No. Of Feeding After surgery	-.07	.03	-.21	2.361	.021	-.13	-.01
Working Mother	.76	.27	.25	2.848	.006	.23	1.29
Income	-.33	.16	-.19	2.056	.043	-.65	-.01
Cesarean Labor	.32	.16	.18	2.020	.047	.00	.63
constant	-1.95	0.65		3.026	0.003	-3.24	-0.67
Artificial feeding	1.18	0.21	0.50	5.616	<0.001	0.76	1.59
surgery duration	0.44	0.19	0.21	2.283	0.025	0.06	0.82
Constant	-.64	.28		2.279	.025	-1.20	-.08
Artificial feeding	.71	.19	.35	3.819	<0.001	.34	1.08
Complications	1.19	.26	.41	4.608	<0.001	.68	1.70
Working Mother	.62	.31	.17	1.958	0.53	1.24	.01

Variables entered and excluded: infant gender, birth order, mother age, education, income, number of feeding since birth , surgery, duration, group

References

- 1-Lessen R&Kavanagh K: Position of the academy of nutrition and dietetics: promoting and supporting breastfeeding, *J Acad Nutr Diet.* 2015 ,115(3):444-449.
- 2-Di Mauro A, Neu J, Riezzo G, et al.;Gastrointestinal function development an ,microbiota. *Ital J Pediatr* , 2013,p39-15,available at : <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3615966/pdf/1824-7288>
- 3-WHO : WHO and UNICEF issue new guidance to promote breastfeeding in health facilities globally,2018,Available at ;<http://www.who.int/mediacentre/news/releases/2018/promote-breastfeeding-globally/en>
- 4-Green CK : What's in the Bottle? A Review of Infant Formulas. *Nutr Clin Pract* , 2016,31(6):723-729.
- 5-Kalyantanda G, Shumyak L& Archibald LK:Cronobacter Species Contamination of Powdered Infant Formula and the Implications for Neonatal Health, *Frontiers in Pediatrics*, 2015,3(56) available at: <https://www.cdph.ca.gov/Programs/CFH/DCAH/CDPH%>
- 6-Stechmiller, J K :Understanding the Role of Nutrition and Wound Healing, *nutrition in clinic practice*,2010,(25) 1.
- 7-Misa M:Nutritional Assessment and Status of Hospitalized Infants,*Journal of Pediatric Gastroenterology and Nutrition*, 2017 ,65 (3) , p 338–342
- 8-National Breastfeeding Committee: Differences in the composition of breast milk and industrially produced infant formula and follow-on formula and their effects on the health of infants 2012 , available at: <http://www.bfr.bund.de/cm/349/differences-in-the-composition-of-breast-milk-and-industrially-produced-infant-formula-and-follow-on-formula-and-their-effects-on-the-health-of-infants>
- 9-Victora CG, Bahl R, Barros A J D , França G V A, Horto S , Julia Krasevec J, Murch S, Mari Jeeva Sankar MJ, Walker N &Rollins NC:Breastfeeding in the 21st century: epidemiology, mechanisms and lifelong effect , *Lancet* , 2016, 387: 475–90
- 10-Simon P E, & Meyers A D, *Skin Wound Healing.* 2016,Available at: <https://emedicine.medscape.com/ accessedon> 30january at 3:45 pm
- 11-Perkins SH :Role of Nurses in Wound Healing , 2018,Available at: <http://work.chron.com/role-nurses-wound-healing-21089.html>.Accessed at 16May 2018 at 12:00pm
- 12-Grieger L:5 Nutrition Tips to Promote Wound Healing, 2015,Available at :<https://www.eatright.org/health/wellness/preventing-illness/nutrition-tips-to-promote-wound-healing>.accessed on4April at 3:00Am.
- 13- Sophie H : Human milk composition and infant growth ,*J-Current Opinion in Clinical Nutrition & Metabolic Care*,2018,21 (3):200–206
- 14-WHO:WHO and UNICEF issue new guidance to promote breastfeeding in health facilities globally,2018Available at: <http://www.who.int/mediacentre/news/releases/2018/promote-breastfeeding-globally/en>.Accessedon3march2018at12:00pm
- 15-Hussain Z& Khan N :Assessment of the Nutritional Status of Bottle-Fed Infants and the Prevalence of Infections, Allergy and Diarrhea among Bottle Fed Infants and Its Comparison with Exclusively Breast Fed Infants Aged 0-6 Months.*J Pediatr Neonatal Care*,2017 ,6(4).
- 16- Nguyen P T, Tran H T, Thai TT, Foster K, Roberts C L& Marais B J: Factors associated with breastfeeding intent among mothers of newborn babies in Da Nang, Viet Nam , *International breastfeeding journal. Biomed centra*, 2018 ,13(2).
- 17-Lau Y, Htun TP, Lim PI, Ho-Lim S &Klainin-Yobas P : Maternal, Infant Characteristics, Breastfeeding Techniques, and Initiation: Structural Equation Modeling Approaches ,(NCBI)National Center for Biotechnology Information, 2015,10(11).
- 18-Mohamed SH, Zaki NA&MohamedA T :Barriers of Initiation and Exclusive Breast Feeding Among Infants , *Journal of Nursing and Health Science (IOSR-JNHS)* (2016),5(2): 01-10.
- 19-Pawar D: Common post-operative complications in children ,*Indian J Anaesth* , 2012,56(5):496-501
- 20-Pramila P& Chandni M :Knowledge of Mothers Regarding Home Care of Children undergone Cardiac Surgery with a View to Develop an Information Booklet ,*An Official Journal of NMC, Birgunj, Nepal*, 2017,2(1), p,38-43
- 21-Lopes TS, Moura LF& Lima MC:Association between breastfeeding

- and breathing pattern in children: a sectional study. *J Pediatr (Rio J)*, 2014,90:396–402.
- 22-Salone L R, Vann D F & Dee DL :Breastfeeding: an overview of oral and general health benefits ,*J Am Dent Assoc*, 2013,144, pp 143-151
- 23-American Academy of Pediatrics :Breastfeeding and the use of human milk ,*Pediatrics*, 2012, 129:827-841
- 24-Erkul M, Efe E :Efficacy of Breastfeeding on Babies'PainDuringvaccination,2017,12:110-115.
- 25- Lönnerdal B:Bioactive proteins in breast milk, *J Paediatr Child Health* 2013,49 (1) : 1-7.
- 26-American Academy of Pediatrics : Breastfeeding and the use of human milk ,*Pediatrics*, 2012, 129:827-841
- 27- Khodayar-Pardo P:Update on the bioactive agents Involved in the immune properties of breast milk, *journal of Human Nutrition and Food Science*, 2016,4(3), p,1088
- 28-Hussain Z& Khan N :Assessment of the Nutritional Status of Bottle-Fed Infants and the Prevalence of Infections, Allergy and Diarrhea among Bottle Fed Infants and Its Comparison with Exclusively Breast Fed Infants Aged 0-6 Months. *J Pediatr Neonatal Care*2017, 6(4).
- 29- Guo S & DiPietro LA: Factors Affecting Wound Healing ,*J Dent Res*,(2010),89(3) , p 219–229
- 30- HessT&Cathy BS,: Checklist for Factors Affecting Wound Healing, *Advances in Skin & Wound Care* , 2011,24 (4) , p 192
- 31- Baharestani M M:An Overview of Neonatal and Pediatric Wound Care Knowledge and Considerations , *ostomy wound manage* , 2007 ,53(6):34-55.
- 32- Thomas D, Wee M& Clyburn P: Blood transfusion and the anaesthetist: management of massive haemorrhage. *Anaesthesia*. 2010 ,65(11): 1153-1161
- 33- Kujath P :Complicated skin, skin structure and soft tissue infections - are we threatened by multi-resistant pathogens?, *European Journal of Medical Research*, 2010, 15:544-553.
- 34- Fujii T, Morita H, Sutoh T, Yajima R, Yamaguchi S, Tsutsumi, Takayuki S A, Kuwano H :Benefit Of Oral Feeding As Early As One Day After Elective Surgery For Colorectal Cancer: Oral Feeding On First Versus Second Postoperative Day,*Int Surg*, 2014, 99(3): 211–215.
- 35- Rees J, Bobridge K, Cash C & Coombes J :Delayed postoperative diet is associated with a greater incidence of prolonged postoperative ileus and longer stay in hospital for patients undergoing gastrointestinal surgery: Outcomes of delaying nutrition after GI surgery ,*Nutrition & Dietetics* , 2017,75(1) .
- 36-Hobbs AJ, Mannion CA, McDonald SW, Brockway M, Tough SC ,The impact of caesarean section on breastfeeding initiation, duration and difficulties in the first four months postpartum , *BMC Pregnancy Childbirth*.2016,16(90).
- 37- Shosha, G: The Influence of Infants' Characteristics on Breastfeeding Attitudes among Jordanian Mothers. *Open Journal of Nursing*, 2015, 5 (4),302.
- 38- Watt S, Sword W, Sheehan D, Foster G, Thabane L, Krueger P&Landy CK 2012,The effect of delivery method on breastfeeding initiation from the Ontario
- 39- Victora CG, Horta BL, Loret de Mola C, Quevedo L, Pinheiro RT, Gigante DP, Goncalves H& Barros FC: Association between breastfeeding and intelligence, educational attainment, and income at 30 years of age: a prospective birth cohort study from Brazil. *Lancet Glob Health*, 2015,3(4),p,199
- 40- Palmeira P, Sampaio M C: Immunology of breast milk *Rev Assoc Med Bras* , 2016,62(6):584-593.
- 41- National Health and Medical Research Council ,*Infant Feeding Guidelines*. Canberra: NationalHealth and Medical Research Council, 2012 ,Availableat:https://www.eatforhealth.gov.au/sites/default/files/content/The%20Guidelines/170131_n56_infant_feeding_guidelines.Accessed on3august 2018