

The relation between types of feeding and infections in children less than two years of age

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ABSTRACT

Background: Human milk has evolved over many thousands of years to meet the specific needs of human infant just as the milk of all other mammals has evolved to meet the specific needs of their offspring's.

Objectives: To test the association between the types of feeding and the frequency of gastroenteritis and acute respiratory infections.

Patients and Methods: The sample consisted of 486 sick babies during the period from first of August 2019 to the 31st of December 2019. Data were collected from child mothers by using special questionnaire form. Statistical analysis using chi-square test (χ^2) used.

Results: It was seen that (52.3%) of children on B.F. and (26.1%) on bottle feeding and (21.6%) on mixed feeding. Gastroenteritis (G.E.) was less frequent in breast fed babies which was (42.5%). The same result was obtained regarding Acute Respiratory Infection (ARI) in which it was seen in (20.5%). It also show that the hospitalization in breast fed babies was (19.7%) while that in other types of feeding was (48.3%). Death rate of hospitalized children was (4%) for breast fed babies while with other type of feeding was (11.6%). younger mothers (age 15-24 years) tended to breastfeed their children more frequently than other age group. (49.2%) of illiterate mothers use BF, however, only (6.3%) of the highly educated mothers use B.F. as the main feeding method.

Conclusion: The rate of B.F. dropped as the Childs age increased and the rate of bottle feeding increase as the childs age increased. A high rate of G.E. and ARI among those using bottle and mixed feeding found. It seen that there is a relation between hospitalization and death due to infections and type of feeding , the older mothers are less likely to breastfeed than younger ones. On the other hand, the rate of BF decreases as the education level of the mother increase.

Keywords: Breast feeding, bottle Feeding, gastroenteritis, acute respiratory infections.

List of Abbreviations

BF: Breast feeding

G.E.: Gastroenteritis

ARI: Acute respiratory infections

INTRODUCTION

Definitions:

Breast Feeding (BF): The child has received breast milk direct or expressed from the mother.

Exclusive Breast Feeding (EBF): an infant receives no other food or drink or even water, besides breast milk.

Bottle Feeding: infant who received only infant formula.

Mixed Feeding: mothers who breast fed their children together with any formula Supplementation.⁽¹⁾

Breast milk meets the infant's needs by providing nutrients appropriate to the infant's developmental stage, as well as growth factors, antimicrobial peptides, and proteins to support their developing immune system.⁽²⁾ The American Academy of Pediatrics (AAP) and the World Health Organization (WHO) recommend that infants should be exclusively breastfed or given breast milk for 6 months. Breastfeeding should be continued with the introduction of complementary foods for 1 year or longer, as mutually desired by mother and infant⁽³⁾

While a rise of BF initiation rates has been recorded in recent years, there is still widespread concern that BF is not exclusive and is discontinued prematurely.⁽⁴⁾

Breastfeeding has a significant role in improving nutrition, education, maternal and child health, and a universal B.F. could prevent annual deaths of 823,000 children under the age of 5 years⁽⁵⁾, it is unquestionably protects against death

and disease. Studies conducted in low and middle-income countries have clearly demonstrated that exclusively breastfed infants are protected against morbidity and mortality with only 12% of the risk of death compared with those who were not breastfed.⁽⁶⁾

There are numerous bioactive components of breast milk that contribute to the overall immunological activity of breast milk, including antibodies, non-specific anti-infective agents, probiotics and white cells, inhibitors of microbiological activity, probiotic bacteria and prebiotic factors, and human cells, leucocytes and lymphocyte. These components of breast milk provide the mechanism for protection against infection, particularly in the first few months and throughout the breastfeeding period.⁽⁷⁾

Breastfeeding has been shown to be a protective factor for several infectious, atopic and cardiovascular diseases as well as for leukemia, necrotizing enterocolitis, celiac disease, and inflammatory bowel disease. It also has a positive impact on neurodevelopment, reducing the risk of attention deficit disorder, and generalized developmental and behavioral disorders. Lactation can decrease the risk of sudden infant deaths syndrome by 36% and prevent 13% of infant mortality worldwide.⁽⁸⁾

Breastfeeding is demonstrated to be beneficial in infancy and early childhood in regards to multiple respiratory and gastrointestinal illnesses⁽⁹⁾, in one study it demonstrated that it protects infants against 50% of all diarrhea episodes and a third of respiratory infections in infants who are not breastfed.⁽¹⁰⁾

PATIENTS AND METHODS

Four hundred eighty six sick babies seeking medical advice from Alqayyara general hospital and Al-Qayara primary health center in the south of Mosul city were enrolled in this observational cohort study during the period from first of August 2019 to the 31st of December 2019.

Males were (54.3%) and females were (45.7%). Data were collected from child mothers by using questionnaire from (appendix) which includes information about child and any symptoms like diarrhea (was defined as the passage of 3 or more large loose or liquid stools per day, or more frequently than is normal for the individual) or others like Acute Respiratory Infections (ARI) which was defined as the presence of runny nose or cough for at least 2 consecutive days plus on one or more of the following signs independent on duration: respiratory distress, fever or hoarse cry.

One hundred sixty babies required admission to the hospital because of diarrhea and / or ARI and they were followed in the hospital in order to see the outcome. The informed consent was taken from every mother.

Statistical analysis using chi-square test (χ^2) used where p-value is not significant if it is > 0.05 , significant if < 0.05 , and highly significant if < 0.001 .

RESULTS

As shown in **table (1)** it was seen that (52.3%) of these children on B.F. and (26.1%) on bottle feeding and (21.6%) on mixed feeding.

The rate of B.F. dropped as the Child's age increased and the rate of bottle feeding increase as the child's age increased.

Table(1): Feeding pattern of children less than 24 months of age								
Type Of feeding	Child age in months							
	Less than 6 months		6-less than 12 months		12-less than 24 months		Total	
	No.	%	No.	%	No.	%	No.	%
Breast feeding	90	70.3	88	52.7	89	46.6	254	52.3
Bottle feeding	16	12.5	41	24.5	64	33.5	127	26.1
Mixed feeding	22	17.2	38	22.8	38	19.9	105	21.6
Total	128	100	167	100	191	100	486	100

Table (2) show that (54.7%) of children on BF were males and (45.3%) were females. This is similarly noticed for children using bottle or mixed feeding where (53.9%) were males and (46.1%) were females.

Table (2): Type of feeding used for children according to their sex						
Type of feeding	Sex				Total	
	Male		Female			
	No.	%	No.	%	No.	%
Breast feeding	139	54.7	115	45.3	254	52.3
Other feeding (bottle-mixed)	125	53.9	107	46.1	232	47.7
Total	264	54.3	222	45.7	486	100

It was clear that gastroenteritis (G.E.) was less frequent in breast fed babies than those with other types of feeding which was (42.5%) and (72%) child respectively, it showed highly statistical significant association ($P < 0.001$). The same result was obtained regarding Acute Respiratory Infection (ARI) in which it was seen in (20.5%) of breast fed babies and in (46.1%) of those on other types of feeding. (table3)

It also show that the hospitalization of children due to G.E. and ARI in breast fed babies was (19.7%) while that in other types of feeding was (48.3%), which is highly significant.

Death rate of hospitalized children was (4%) for breast fed babies which is lower than those with other type of feeding (11.6%) which is significant.

Table (3): The relation between type of feeding and infections, Hospitalization and the death rate in children less than 24 months of age					
Recent infections	Type of feeding				Statistical test
	Breast feeding Total=254		bottle-mixed Total=232		
	No.	%	No.	%	
Gastroenteritis					P < 0.001
Yes	108	42.5	167	72.0	
No	146	57.5	65	28.0	
Acute respiratory infections					P < 0.001
Yes	52	20.5	107	46.1	
No	202	79.5	125	53.9	
Hospitalization					P < 0.001
Yes	50	19.7	112	48.3	
No	204	80.3	120	51.7	
Death					P < 0.05
Yes	2	4.0	13	11.6	
No	48	96.0	99	88.4	
Total	50	100	112	100	

As shown in **table (4)** It was noticed that younger mothers (age 15-24 years) tended to breastfeed their children more frequently than other age group (47.2%) while the use of bottle or mixed feeding increase with increase of mothers age.

Table(4): Relation between feeding pattern and the age of the mothers					
Age of mothers (years)	Breast feeding		Other feeding (bottle-mixed)		Total
	No.	%	No.	%	
15-24	120	47.2	52	22.4	172
25-34	79	31.1	83	35.8	162
35-45	55	21.7	97	41.8	152
Total	254	52.3	232	47.7	486

It was seen that **(49.2%)** of illiterate mothers use BF, however, only **(6.3%)** of the highly educated mothers use B.F. as the main feeding method. The rate of BF decreases as the education level of the mother increase **Table (5)**.

Table(5): Type of feeding and educational level of mothers					
Education level of mothers	Breast feeding		Other feeding (bottle-mixed)		Statistical test
	No.	%	No.	%	
No formal education	125	49.2	81	34.9	P <0.001
Primary school	80	31.5	48	20.7	
Secondary school	33	13	38	16.4	
University and above	16	6.3	65	28.0	
Total	254	100	232	100	486

As shown in **table (6)**: It was seen that **(76.8%)** of the mothers had thought that B.F. protect against diseases and **(65.1%)**of mothers believe that bottle feeding can cause diseases.

Table (6): Attitude of mothers toward type of feeding used and it is relation to diseases				
Attitude of mothers	Breast feeding		Bottle feeding	
	No.	%	No.	%
Protection against diseases	195	76.8	8.0	3.4
Cause diseases	4.0	1.6	151	65.1
Does not know	55	21.6	73	31.5
Total	254	100	232	100

Table (7) shows that inadequate breast milk was the most common cause for discontinuation of breast feeding reported by **(35.4%)** of mothers. Mothers illnesses was the second common cause.

Table (7) : Reasons for discontinuing breast feeding and using the bottle feeding		
Reasons	Children less than 24months age on bottle feeding	
	No.	%
Inadequate breast milk supply	45	35.4
Sickness of the mother	31	24.4
Sickness of the baby	22	17.3
Subsequent pregnancy	18	14.2
Baby dislike breast	11	8.7
Total	127	100

DISCUSSION

The rate of BF in children under 6 months of age is (70.3%) which is very important in such age group to protect them from infections (diarrhea and ARI) ; nearly similar result were reported by Saldan PC who state that BF is high in the first days of life (90%), decreasing to 70% at the age of 6 months.⁽¹¹⁾

Two hundred fifty four children less than 24 months of age (52.3%) were breastfed in this study, a relatively same results (62.5%) were conducted by Adem A.⁽¹²⁾, while a higher result reported in Ethiopia (87.4%) which may indicate improved exclusive breastfeeding practice in this area.⁽¹³⁾

The present study shows a high rate of gastroenteritis in (72%) patient and ARI in (46.1%) patient among those using bottle and mixed feeding, where as G.E. occur in (42.5%) patient and ARI occur in (20.5%) patient in those who were breastfed where P-value is highly significant(P-value < 0.001). The high rate of infections among artificially fed babies can be explained on the basis of poor hygienic conditions and feeding errors in addition to the decline in the level of immunity of such children as the easy digestion of breast milk and its contained macrophages that prevent infections . All these evidences support the positive association between artificial feeding and the development of gastroenteritis and ARI. This is similar to result with a study done in Egypt.⁽¹⁴⁾

The present study show that there is a relation between hospitalization due to infections and bottle or mixed feeding, this finding was the same that found by Størdal K.⁽¹⁵⁾ In a study in Spain, it was found that 30% of hospital admission as a result of ARI and gastroenteritis would have been avoided for each additional month of BF.⁽¹⁶⁾

The study show that there is a relation between type of feeding and death due to gastroenteritis and / or ARI. The number is lower among children on BF which is two (4%) deaths compared with those on other type of feeding, 13 deaths (11.6%). A similar result were reported by Sankar, MJ.⁽⁶⁾

With regard to maternal age, older mothers are less likely to breastfeed than younger ones in our population. These results are consistent with Colombo L. study⁽¹⁷⁾, this is probably because BF for young mothers is the first new experience and they want to discover its effectiveness.

The present study reveals that illiterate mothers prefer B.F. more than artificial feeding, on the contrary of that, mothers with high level of education prefer bottle and mixed feeding. This is in agreement with the finding of Atimati, A.⁽¹⁸⁾ and Ijaz S⁽¹⁹⁾. This is probably because illiterate mothers are mostly housewife's and they have time to BF their babies in contrast with those who are more educated who are mostly busy with their jobs.

The study showed that (76.8%) of the mothers believe that B.F. protects against diseases and (65.1%) of the mothers think that bottle feeding can cause diseases among children. Same result obtained by Ijaz S⁽¹⁹⁾ and Mundagowa, P.T.⁽²⁰⁾

The present study showed that (35.4%) of the mothers using bottle feeding claimed that inadequate breast milk was the most common reason for discontinuing BF The same results (36%) were reported by Ramiro González et al.⁽²¹⁾

CONCLUSIONS

BF proved to be of particular importance in the protection against infections in the first 24 months of life. No sex difference was seen in respect to feeding type. Bottle or mixed fed babies required hospitalization due to G.E. and / or ARI more than breast fed babies and have higher rate of death. Younger mothers (15-

24 years) and mothers with no formal education prefer BF as the main source of nutrition. In respect to mother's attitude towards the feeding type, **76.8%** of all mothers believe that BF protects against diseases and that **65.1%** of the mothers believe that bottle feeding can cause diseases.

It is necessary to educate the mothers about the critical importance of exclusive BF in the first 6 months of life and encourage increasing the duration of BF to the end of the second year and to concentrate and support local and national health programs that promotes BF.

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