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Impact of infant feeding patterns on growth parameters in term infants during the first four months of life in Al-Batool teaching hospital in Diyala, Iraq

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Abstract

Aim of study: To identify the association between the different types of feeding on the growth parameters (weight, height and head circumference) in the first four months of life.

Patients and methods: 100 infants were enrolled in this study. We collected the sample from the infants attending Al-Batool teaching hospital in Baquba'a city in Diyala province in the period from September 2022 to December 2022.

Results: 14% of them was breastfeed, 66% was bottle feed and 20% was mixed feed. There was significant statistical difference between the types of feeding and the growth parameter ($P < 0.005$).

Conclusion: There is strong association between the type of feeding and the growth parameters and we found a decrease in all parameters in bottle fed infants in comparison to other types.

Keywords: breastfeeding, bottle feeding, growth parameters.

Introduction

Normal growth needs appropriate nutrition, in the first months of birth, breastfeeding is the most important feeding method which has value both immunologically and psychologically, in addition to providing adequate nutrition, breastfeeding has familial, social and infantile significance, in the first year, especially the first 6 months, when infants have rapid growth, regular anthropometric measurements are appropriate for growth monitoring (1).

With social development, infant feeding knowledge and childcare skills of the parents have been continuously improving and thus there may be some changes for the growth performance of differently fed infant, a birth cohort in Hong Kong, China suggested that breast feeding may only have short-term effects on physical growth, the Longitudinal Study of Chinese Breastfeeding Infants Growth and Development showed both weight and length did not display substantial differences between exclusively and non-exclusively breastfed infants from birth to 4 months (2).

Numerous studies from high-income countries over the past few decades have shown that continued breastfeeding for ≥12 mo is associated with slower growth (in particular, lower weight gains) after the first 2–3 mo of life, this robust finding was the main basis for a WHO expert committee report recommending new infant growth standards based on infants following WHO feeding recommendations, the expert committee report led to the WHO's Multicentre Growth Reference Study and the WHO's current child growth standard, more recent publications have also reported an association between prolonged breastfeeding and slower weight gain during infancy (3).

Benefits of breastfeeding for the mother include less blood loss following delivery, better uterus shrinkage, weight loss and less postpartum depression, it

also increases the time before menstruation and fertility returns, known as lactational amenorrhea, long term benefits may include a decreased risk of breast cancer, cardiovascular disease and rheumatoid arthritis, breastfeeding is less expensive for the family than infant formula (4).

The low prevalence of exclusive breast feeding (EBF) in most developing countries is attributed to various maternal and child-related factors such as place of residence, sex, age of the child, number of births and space between children, mother working outside home, maternal age and educational level, economic status, mothers' domestic work burden, access to mass media, maternal healthcare access and use, and maternal knowledge on infant and young child feeding practices (5).

Aim of study

Our aim in this study is to compare the effect of the 3 types of feeding (breastfeeding, bottle feeding and mixed feeding) on the growth parameters of the infant in the first 4 months of life.

Patients and methods

This is cross-sectional study conducted in Al-Batool teaching hospital for pediatrics and gynecology. A sample of 100 infants was enrolled in this study with age ranged from 3 days to 4 months. We collected the sample by filling a prepared written questionnaire in the period from September 2022 to December 2022. It contained questions about age, infant gender, weight, height, head circumference and the type of feeding. We used the electronic balance to measure the weight of the infants and we expressed the values in kilogram for simplification. We used scaled tape measure to measure both the height and the head circumference. We measured the height from the cranium to the toes and we expressed the values by centimeters. We measured the head circumference from the frontal area to the occiput and we use centimeters to express the values. The privacy of the patents was assured and no incentives was given to them.

Statistical analysis

The data analysis was done by Statistical Package for Social Sciences (SPSS) version 26. We expressed the qualitative data by frequencies and the quantitative data such as weight and length by arithmetic mean. Chi square test was used to identify the association between feeding types and the growth parameters.

Results

100 infant was enrolled in the study. Their age ranged from 1 day to 4 months as in table 1.

Table 1. Age groups in our study.

Age group	infant gender		Total
	male	female	
1-7 days	4	1	5
8-14 days	3	0	3
15-30 days	3	4	7
1-2 months	19	8	27
2-3 months	10	12	22
3-4 months	24	12	36
Total	63	37	100

They were 63 males (63 %) and 37 females (37%). Their type of feeding is in table 2,

Table 2. Types of feeding for the first 4 months.

Type of feeding	Frequency	Percentage
Breastfeeding	14	14%
Bottle feeding	66	66%
Mixed feeding	20	20%
Total	100	100%

Table 3.The weight of infants.

Weight	Frequency	Percentage
2-2.5 kg	6	6 %
2.6-2.9 kg	3	3 %
3-3.9 kg	21	21 %
4-4.9 kg	28	28 %
5-5.9 kg	22	22 %
6-6.9 kg	17	17 %
More than 7 kg	3	3 %
Total	100	100%

Table 4.The height of infants.

Height	Frequency	Percentage
40-45 cm	2	2%
46-50 cm	10	10%
51-55 cm	35	35%
56-60 cm	32	32%
61-65 cm	18	18%
66-70 cm	3	3%
Total	100	100%

Their mean head circumference length was 38.48 ± 2.48 cm. their mean number of feeding per day was 8.67± 2.19 cm.

There was significant association between the infant weight and the type of feeding as in table 5.

Table 5. Association between infant weight and the type of feeding.

Infant weight (in KG)	Type of feeding			Total	
	Breastfeeding	Bottle feeding	Mixed feeding		
2-2.5 KG	1	4	0	5	P< 0.05
2.6-2.9 KG	2	2	0	4	
3-3.9 KG	4	13	3	20	
4-4.9 KG	2	18	7	27	
5-6 KG	1	15	6	22	
6-7 KG	2	13	3	18	
more than 7 KG	2	1	1	4	
Total	14	66	20	100	

There was statistical significant between the height and the type of feeding as in table 6.

Table 6. Association between the height and the type of feeding.

Infant height	Type of feeding			Total	
	Breastfeeding	Bottle feeding	Mixed feeding		
40-45 cm	1	1	0	2	P< 0.05
46-50 cm	2	7	1	10	
51-55 cm	5	22	7	34	
56-60 cm	3	21	7	31	
61-65 cm	1	14	4	19	
66-70 cm	2	1	1	4	
Total	14	66	20	100	

And also there was significant association between the head circumference and the type of feeding as in table 7.

Table 7. Association between the head circumference and the type of feeding.

Head cir. in cm	**Type of feeding**			**Total**	
	Breastfeeding	**Bottle feeding**	**Mixed feeding**		
34.00	1	3	0	4	
35.00	1	6	1	8	
36.00	1	7	2	10	**P< 0.05**
37.00	2	10	4	16	
38.00	3	5	4	12	
39.00	1	9	1	11	
40.00	1	8	4	13	
41.00	1	10	2	13	
42.00	1	5	0	6	
43.00	2	1	2	5	
44.00	0	2	0	2	
Total	14	66	20	100	

Discussion

The present study investigated the effects of different types of infants feeding (exclusive breast feeding, mixed feeding and bottle feeding) during first four months of life on many parameters that are related to growth of infants include weight, length (height) and head circumference at Al-Batool teaching hospital in Diyala, Iraq. The percentage of exclusive breast feeding(EBF) , mixed feeding and bottle feeding among participants were 14%, 20% and 66% respectively.

We found significant association between the type of feeding and all the growth parameters we studied ($P < 0.005$) and we found a decrease in the all parameters in infants that bottle feed only. We believe most mothers in our study refrain from breastfeeding due to breast milk insufficiency and personal reasons such as work or cosmetic reasons because the think the breastfeeding will affect their general figure. A study concluded that the abandonment of exclusive breast feeding in the first three months is associated with sociodemographic and clinical variables and psychological factors such as insecurity and doubts of the mother during the process and the absence of a favorable close environment (6). After breastfeeding discomfort and nipple pain was also a cause for breastfeeding abandonment as in the findings of a study in Mexico (7).

Our findings are consistent with a study that confirmed EBF results in sufficient weight gain in infants of low birth weight (8). Another study reported that infant's malnutrition was prevented by the role of breastfeeding and it also prevents overweight and obesity (9). This may be explained by the effects of human milk composition which contain many growth factors that contribute to infant's health, growth and development. And also agrees with the finding of a study was conducted in Kurdistan in 2021 (10). Our findings contradict with those of Kramer and co-workers in Canada in 2004, the demonstrate the growth

accelerating effects of formula and other milks (versus breast milk) on weight and length gain throughout infancy, with a dose–response gradient and the largest associations observed at 3 to 6 months of age (11).

And also with study of *Baker et al.* They believed that short duration of breastfeeding and earlier introduction of complementary food were associated with additional weight gain during infancy(12).

Our findings agree with a study conducted in turkey that confirmed Breast feed babies grow faster than formula-fed babies within the first months of life, but later on, their growth rates slow down (13). And also agree with finding of a study found that only breastfeed infants were taller than bottle feed infants (14). And disagree with a study found that There was no significant difference in height and weight of the infants at birth and the end of the first months of life (15), and a study found that there were virtually no differences between exclusively and predominantly breast-fed infants and mixed feed in the first 6 month of life (16).

Our findings are consistent with the findings of a study confirmed that Exclusive breastfeeding for ≥4 months was associated with a larger HC (17). And also with finding of study demonstrate a decrease in the weight and head circumference an non breastfeed infants (18). And contradicts with the findings of the study found that Growth in head circumference does not differ by feeding mode (19). And also with a study conducted in Brazil (20).

The main limitations to the study was the uncertainty of the mothers in answering the questions and the size of the sample so we recommend conducting more studies about this topic in Iraq and especially Diyala province.

Conclusion and recommendation

There is significant association between the type of feeding and the growth parameters in the first months of life. We recommend conducting more studies about this topic and especially on the type of feeding and growth parameters.

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