DOI: https://doi.org/10.31351/vol30iss1pp76-80

Effect of Exclusive Breast Feeding on Infants Growth and Comparison with other Types of Feeding in Sulaimani City, Kurdistan, Iraq.

Sardar M. Weli*,1

*Nursing Department, Technical College of Health, Research Center, Sulaimani Polytechnic University, Sulaimani, Iraq.

Abstract

Breastfeeding (BF) serves as a complete nutritional source for the first six months of infant's life. Breast milk contains all essential nutrients that necessary for the physiological growth and development of infants. The aim of this study was to compare the physiological growth of infants including weight, length (height) and head circumference who were exclusively breastfed for 6 months and those who were given bottle-fed or mixed fed and to find percentage of exclusive breastfeeding among mothers who contributed in this study. This study was carried out in Sulaimani city/ Kurdistan region of Iraq and the cases were enrolled between the first of June 2018 and first of October 2019. Infants' weight, length (height) and head circumstances were measured at different age levels (At age two, six, nine and fifteen months). The results of this study found that among 198 mothers who were contributed in this study; 92 (46.5%) of mothers had EBF while 90 (45.5%) had mixed feeding and only 16 (8%) had exclusive formula feeding (EFF) in the first six months of baby's life. Infant's weight at age 2 months showed no differences between types of feeding. However, infants weight at ages 6 and 9 months were significantly higher in infants who breastfed compared to formula fed but no differences were found between exclusive breast feeding and mixed feeding. At age 15 months weights of babies were again no differences were found between all types of feeding. For length (height) parameter, infants who were exclusively breastfed for six months were significantly higher than those of formula fed at age 2, 6, 9 and 15 months. Regarding head circumferences no significant differences between types of feeding at age 2 months were showed. Nevertheless, at age 6 and 15 months were significantly high in infants who breastfed than formula fed. The present study concluded that infants who breast fed for first six months of life have a higher weight, height and head circumferences than infants who exclusively formula fed. The percentage of EBF among Kurdish mothers were similar with other governorates of Iraq but was low compared to the recommended rate of WHO.

Keywords: Breastfeeding, Bottle feeding, Infants' length, Infant's weight, Infant's head circumference.

تاثير الرضاعة الطبيعية الحصرية على نمو الأطفال ومقارنتها بأنواع أخرى من الرضاعة في مدينة السليمانية ، كردستان العراق

سردار محمد ولي*،١

*قسم التمريض، كلية الصحة التقنية ، مركز الابحاث ،جامعة السليمانية التقنية، السليمانية، العراق .

الخلاصة

الرضاعة الطبيعية هي بمثابة مصدر غذائي كامل للأشهر الستة الأولى من حياة الرضيع. يحتوي لبن الأم على جميع العناصر الغذائية الضرورية للنمو الفسيولوجي للرضع ونموهم. كان الهدف من هذه الدراسة هو مقارنة النمو الفسيولوجي للرضع بما في ذلك الوزن والطول ومحيط الرأس الذين تم إرضاعهم من الثدي حصريًا لمدة ٦ أشهر وأولئك الذين تم إطعامهم بالزجاجة أو الإطعام المختلط وإيجاد نسبة من الرضاعة الطبيعية الحصرية بين الأمهات اللواتي ساهمن في هذه الدراسة في مدينة السليمانية. أجريت هذه الدراسة في مدينة السليمانية / العراق وتم تسجيل الحالات بين أول حزيران ٢٠١٨ وأول أكتوبر ٢٠١٩. تم قياس وزن الرضع وطولهم ومحيط الرأس عند مختلف المستويات العمرية (في سن الثانية ، ستة وتسعة وخمسة عشر شهرا). وجدت نتائج هذه الدراسة أنه من بين ١٩٨ أمهات ساهمت في هذه الدراسة ٩٢ (٤٦,٥٪) من الأمهات لديهن تغذية طبيعية حصرية بينما ٩٠ (٤٥,٥٪) لديهم تغذية مختلطة و ١٦ (٨٪) فقط لديهم تغذية زجاجة الرضاعة حصرية في الأشهر الستة الأولى من حياة الطفل. لم يكن وزن الرضيع عند عمر شهرين اختلافات بين أنواع الرضاعة. ومع ذلك ، في سن ٦ و ٩ كانت مرتفعة بشكل كبير عند الرضع الذين يرضعون رضاعة طبيعية مقارنة بالصيغة التي يتم تغذيتها ولكن لم يتم العثور على اختلافات بين تغذية طبيعية حصرية والتغذية المختلطة. في عمر ١٥ شهرًا لم يتم العثور على اختلافات بين جميع أنواع التغذية. بالنسبة للطول ، كان الرضع الذين يرضعون رضاعة طبيعية حصريًا لمدة ستة أشهر أعلى بكثير من أولئك الذين تم تغذيتهم بأنواع أخرى من الرضاعة في سن ٢ و ٦ و ٩ و ١٥ شهرًا. فيما يتعلق بمحيط الرأس لم تظهر فروق ذات دلالة إحصائية بين أنواع التغذية في عمر شهرين. ومع ذلك ، في سن ٦ و ١٥ شهرًا كانت مرتفعة بشكل كبير عند الرضع الذين يرضعون من الرضاعة الطبيعية. خلصت الدراسة الحالية إلى أن الرضع الذين يرضعون رضاعة طبيعية خلال الأشهر الستة الأولى من العمر لديهم وزن ، وطول ، ومحيط الرأس أعلى من الرضع الذين يتغذون بشكل حصري على حليب الأطفال من الزجاجة. كانت نسبة تغذية طبيعية حصرية بين الأمهات الكرديات مماثلة مع مدن أخرى في العراق لكنها كانت منخفضة مقارنة بالمعدل الموصى به المنظمة الصحة العالمية.

الكلمات المفتاحية: الرضاعة الطبيعية ،زجاجة الرضاعة ، طول الرضيع ، وزن ارضيع ، محيط الرأس للرضيع.

*Corresponding author E-mail: Sardar.weli@spu.edu.iq
Received: 30/7 /2020
Accepted: 6/ 9/2020

Introduction

Exclusive breast feeding (EBF) means that the infant gets only breast milk and no other foods are given. Breastfeeding (BF) serves as a complete nutritional source for the first six months of infant's life. Breast milk contains all essential nutrients that necessary for the physiological growth and development of infants. It is important for the growing of infant's brain and develops cognitive function in children due to its constituents of essential fatty acids. These fatty acids are not available in other types of milk [1, 2]. The breast milk has more health benefits and nutritional advantageous than other type of milks. It offers children a rapid growth by development, maintenance and maturation of tissues and organs [3]. Exclusive breast feeding(EBF) for at least 4 months can reduce the risk of many allergic diseases such as asthma, atopic dermatitis and suspected allergic rhinitis up to 2 years old [4]. The initial milk produced by mothers called colostrum contains a large amount of immunoglobulin, this is important to protect the newborns until their immune system working suitably. Colostrum act as laxative and cover gastrointestinal tract and prevent jaundice by inhibit bilirubin build up [5]. EBF or predominant BF during 6 months of life protects infants from diarrhea and acute respiratory diseases [6]. In addition, breastfeeding has progressive effects on infant's cognitive development and emotional stability and prevent infants from chronic diseases and infants were not likely to be overweight later in life. On the other hands, breast feeding has beneficial effects for mothers; it reduces their risk of chronic diseases, such as hypertension, hyperlipidemia, and type 2 diabetes and protects them against onset of breast and ovarian cancers [7; 8]. According to a study in America, black women have a higher rate of breast cancer than white women because they have a lower rate of breast feeding [9]. This study was conducted in health units in Sulaimani city to determine the physiological growth of infants including weight, length (height) and head circumference who were exclusively breastfed for 6 months and those who were given bottle-fed or mixed fed and to find a percentage of exclusive breastfeeding among those mothers who contributed in this study.

Methods

Location and participants

This study was carried out in Sulaimani city/ Kurdistan region of Iraq. One hundred ninety eight healthy and full term infants were included in this study. The criteria for entry to this study: all babies were visiting child health care units in Sulaimani city on a regular basis for vaccinations at age two, six, nine and fifteen months. Same infants were used to measure their weight, length (height) and head circumferences at different age level. Infant's mothers were asked about feeding their babies either exclusive breast feeding (infants get only breast milk and no other foods are given) or exclusive bottle feeding (infants receive only bottle milk and not breast milk) or mixed feeding (infants get both breast milk and bottle milk) during first 6 months of infants life.

Data collection and methods

Healthy infants were enrolled between the first of June 2018 and first of October 2019. The infants' weight, length (height) and head circumferences were measured at different age levels (At age two, six, nine and fifteen months). Infant's weights were measured by digital baby weighting scale. Infant's length is measured from the top of their head to the bottom of one of their heels. It's the same as their height, but height is measured standing up, whereas length is measured while the baby is lying down. Ruler and vernier caliper were used to measure length (height). Head circumferences were measured by using a flexible tape measure. Wrap the tape around the forehead to the widest part of the back of the head.

Data analysis

Data was entered into statistical package for social sciences "SPSS" version 26 for storage and statistical analysis. One way ANOVA was applied to test the differences, with a P value of 0.05 or less considered as significant.

Results

Among 198 mothers who were contributed in this study; 92 (46.5%) of mothers had exclusive breast feeding (EBF) while 90 (45.5%) had mixed feeding and only 16 (8%) had exclusive formula feeding (EFF) in the first six months of baby's life, Table 1.

Table 1. Distribution of infants according to the type of feeding.

Type of feeding	No (%)
Exclusive breast feeding (EBF)	92(46.5%)
Exclusive formula feeding (EFF)	16(8 %)
Mixed feeding	90(45.5%)
Total	198 (100%)

The results indicated that infant's weight at age 2 months were significantly no differences between types of feeding. However, at ages 6 and 9 infant's weight were significantly higher ($p < 0.05$) in infants who breastfed compared to formula fed but significantly no differences were found between EBF and mixed feeding. At age 15 months weights of infants were again no significant differences were found between all types of feeding, Table 2.

Table 2. Distribution of the infant's weight according to age and type of feeding.

Infant's age (Months)	Infant's weight		
	Exclusive breast feeding (EBF) No. 92(46.5%)	Exclusive formula feeding (EFF) No. 16(8 %)	Mixed feeding No. 90(45.5%)
Two	5.642 ± 0.355 A	4.213 ± 0.253 A	5.397 ± 0.414 A
Six	8.432± 0.383 A	6.55±0.29 B	7.789± 0.409 A
Nine	9.353 ± 0.314 A	7.638± 0.239 B	8.889± 0.237 A
Fifteen	10.634 ± 0.372 A	8.581± 0.337 A	9.861± 0.351 A

Values are presented as means ± SD
Different letters denote significant differences between groups (P<0.05).

For height parameter, infants who exclusively breastfed for six months were significantly higher (p <0.05) than those of formula fed at age 2, 6, 9 and 15 months .But no significant differences were found between breasts and mixed fed, Table 3.

Table 3. Distribution of infant's length according to age and type of feeding.

Infant's age (Months)	Infant's length		
	Exclusive breast feeding (EBF) No. 92(46.5%)	Exclusive formula feeding (EFF) No. 16(8 %)	Mixed feeding No. 90(45.5%)
Two	60.086 ± 3.661 A	55.938 ± 2.175 B	56.253 ± 2.916 AB
Six	68.129 ± 2.871 A	64.625±1.668 B	65.066 ± 2.728 AB
Nine	73.011±1.964 A	66.875±1.821 B	68.099±2.017 AB
Fifteen	78.28± 2.482 A	74.563±1.094 B	76.000±2.124 AB

Values are presented as means ± SD
Different letters denote significant differences between groups (P<0.05).

Regarding to head circumference the results found no significant differences between types of feeding at age 2 months. Nevertheless, at age 6 and 15 months' infant's head circumferences were significantly higher (p <0.05) in infants who breastfed than formula fed. No significant differences were found between exclusively breasts fed and mixed fed, Table 4.

Table 4. Distribution of infant's head circumference according to age and type of feeding.

Infant's age (Months)	Infant's head circumference		
	Exclusive breast feeding (EBF) No. 92(46.5%)	Exclusive formula feeding (EFF) No. 16(8 %)	Mixed feeding No. 90(45.5%)
Two	40.505±0.963 A	38.375±0.719 A	40.121±0.976 A
Six	44.667±0.742 A	41.938±0.772 B	43.637±0.863 AB
Fifteen	47.452±0.745 A	44.563±1.094 B	45.967±0.781 AB

Values are presented as means ± SD
Different letters denote significant differences between groups (P<0.05).

Discussion

The present study investigated the effects of different types of infants feeding (exclusive breast (EBF) feeding, mixed feeding and exclusive formula feeding (EFF)) during first six months of life on many parameters that are related to growth of infants include weight, length (height) and head circumference at two, six, nine and fifteen months age of infants in Sulaimani city. The percentage of EBF, mixed feeding and EFF among participants were 46.5%, 45.5% and 8% respectively. These percentages are approximately similar to studies done in Baghdad. They found that 48%, 41% and 11% were EBF, mixed feeding and EFF (10). In addition, a study in Misan city showed that EBF among mothers was 45.6% which was less than the recommendation of WHO [11]. Nevertheless, another study in Baghdad showed that the rate of exclusive breast feeding was very high in the first few month of life (64.6%) but declined rapidly to (28.3%) at age 6 months due to milk insufficiency in mothers. Other factors such as mother's age, job and education level played role to determine EBF among Iraq's mothers [12]. On the other hand, breast feeding were very high 77.2% and 76.2 among Syrian and Jordanian women respectively [13].

The current study established that weights of infants were significantly higher in EBF than EFF at age six and nine months but at age 15 no differences were found between EBF with EFF. This is in parallel with a study that confirmed EBF results in sufficient weight gain in infants of low birth weight [(14)]. Another study reported that infant's malnutrition was prevented by the role of breastfeeding and it also prevents overweight and obesity [(15)]. 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 [(16)]. The present study found that infants who exclusively bottle fed were significantly lower weight at age six and nine months compared to EBF. This finding is consistent with a study done in Ethiopia showed that infants terminated from EBF before six months of age were more likely to get diseases such as acute respiratory diseases, fever and diarrhea which are associated with increased underweight and wasting in infants [(17)]. However, this is inconsistence with a study done previously which suggested that bottle feeding associated with infant's weight gain because bottle feed is more concentrated and mothers encouraged infants to finish the bottle [(18)]. Another study in Brazil also explained that children who were bottle-fed were at high risk to be overweight and obesity at age 12-24 months [(19)].

The height of exclusively breast fed infants was significantly higher compared to bottle fed and mixed fed infants. This result is in agreement with a study done on Malawian infants. They confirmed that infants who were breastfed until 6 months age were longer and heavier than non-exclusively breastfed infants [(20)]. This may be due to the rates of diarrhea, fever, respiratory and gastro intestinal infections among non-exclusively breastfed infants which is higher than EBF [(6)]. However, this finding is disagreeing with a study in Iran and they found no significant differences between weight and height of infants who were breastfed and bottlefed between 4 and 6 months [(21)].

The current study found that head circumferences of exclusively breast fed infants were higher compared to exclusively bottle fed infants at age six and fifteen months. One study done in Bu-Ali Sina hospital in Iran found significant differences between infants who breastfed with those of formula fed at 6 months of age, however they also found that no differences at age 9 and 12 months [(22)]. In addition, other study showed that exclusive breast feeding for at least 4 months associated with increase in head circumferences and head circumferences were low in infants who were exclusively breast fed for less than 30 days [(23)]. Additionally, a study on Turkish infants during 6 months of life showed that head circumferences were higher in breast fed infants compared to formula fed and mixed fed infants [(24)].

Conclusion

The present study concluded that infants who exclusively breast fed for first six months of life have a higher weight, length (height) and head circumferences than infants who exclusively formula fed. But no significant differences were found between exclusive breast fed and mixed fed. The percentage of EBF among Kurdish mothers were similar with other governorates of Iraq but was low compared to the recommended rate of WHO.

Acknowledgments

I would like to express my special thanks to staffs of Shahid Hama-Rash and Shahid Shamal health units in Sulaimani for their kind help and cooperation. I would also like to thanks Razhan, Rozhgar, Baxan and Zryan (Technical College of Health/ Sulaimani Polytechnic University students) for their help in collecting some of the data.

References

1. Jedrychowsk W, Perera F, Jankowski J, Butscher M, Mroz E, Flak E, Kaim I, Lisowska-Miszczyk I, Skarupa A, Sowa A. Effect of exclusive breastfeeding on the development of children's cognitive function in the Krakow prospective birth cohort study. Eur J Pediatr 2012; 171(1): 151-158.

2. Elyas L, Mekasha A, Admasie A, Assefa A. Exclusive Breastfeeding Practice and associated factors among mothers attending private pediatric and child clinics, addis ababa, ethiopia: a cross-sectional study. International Journal of Pediatrics 2017; 20(17): 8546192.

3. Salami LI. Factors Influencing Breastfeeding Practices in EDO State, Nigeria. African Journal of Food Agriculture Nutrition and Development 2006; 6(2): 1-13.

4. Kull I, Wickman M, Lilja G, Nordvall SL, Pershagen G. Breast feeding and allergic diseases in infants - a prospective birth cohort study. Arch Dis Child 2002; 87: 478- 481.

5. Donovan SM, Comstock SS. Human milk oligosaccharides influence neonatal mucosal and systemic immunity. Ann Nutr Metab 2016; 69(2): 42-51.

6. Mihrshahi S, Oddy WH, Peat JK, Kabir I. Association between infant feeding patterns and diarrhoeal and respiratory illness: A cohort study in Chittagong, Bangladesh. International Breastfeeding Journal 2008; 3(28): 1-10.

7. Gunderson EP. Breast-Feeding and diabetes: long-term impact on mothers and their infants. Curr Diab Rep 2008; 8(4): 279-286.

8. Kim SY. Breastfeeding can reduce the risk of developing diabetes. Korean J Fam Med 2018; 39: 271-272.

9. Anstey EH, Shoemaker ML, Barrera CM, O'Neil ME, Verma AB, Dawn M. Holman DM. Breastfeeding and breast cancer risk reduction:

implications for black mothers. Am J Prev Med 2017; 53(3): 40-46.
10. Makki S, AL-thamery DM. Source of information in regard of starting breast-feeding in Baghdad. J Fac Med Baghdad 2006; 48(4): 366- 369.
11. Aljawadi HF, Ali EA, Altimimi HA. Exclusive breast feeding incidence in the first six months of life and its associated factors. Mustansiriya Medical Journal 2017; 16(3): 62- 70.
12. Habib KD, Hurmiz WT, Tayeh NK. Patterns of infant feeding practices in the first six months of life in fatema AL- Zahra Hospital in Baghdad. The Iraqi Postgraduate Medical Journal 2018; 17(3): 211- 219.
13. Al-Akour NA, Khassawneh MY, Khader YS, Ababneh AA, Haddad AM. Factors affecting intention to breastfeed among Syrian and Jordanian mothers: a comparative cross-sectional study. International Breastfeeding Journal 2010; 5(6): 1-8.
14. Singh GC, Devi N, Mshl AV, Raman TS. Exclusive breast feeding in low birth weight babies. MJAFI 2009; 65: 208-212.
15. Scherbaum V, Leila M. Srour LM. The role of breastfeeding in the prevention of childhood malnutrition. World review of nutrition and dietetics 2016; 115: 82-97.
16. Ballard O, Morrow AL. Human milk composition: Nutrients and bioactive factors. Pediatr Clin North Am. 2013; 60(1): 49-74.
17. Nigatu D, Azage M, Motbainor A. Effect of exclusive breastfeeding cessation time on childhood morbidity and adverse nutritional outcomes in Ethiopia: Analysis of the demographic and health surveys. PLoS ONE 2019; 14(10): 1-12.
18. Li R, Magadia J, Fein SB, Grummer-Strawn LM. Risk of bottle-feeding for rapid weight gain during the First Year of Life. Arch Pediatr Adolesc Med 2012; 166(5): 431 436.
19. Contarato AA, Rocha ED, Czarnobay SA, Mastroeni SS, Veugelers PJ, Mastroeni MF. Independent effect of type of breastfeeding on overweight and obesity in children aged 12-24 months. Cad. Saúde Pública 2016; 32(12): 1-10.
20. Kuchenbecker J, Jordan I, Reinbott A, Herrmann J, Jeremias T, Kennedy G, Muehlhoff E, Mtimuni B, Krawinkel MB. Exclusive breastfeeding and its effect on growth of Malawian infants: results from a cross-sectional study. Paediatrics and International Child Health 2015; 35(1):14-23.
21. Khadivzadeh T, Parsai S. Effect of exclusive breastfeeding and complementary feeding on infant growth and morbidity. Eastern Mediterranean Health Journal 2004; 10(3): 289 294.
22. Gorohi F, Shiemorteza M, Nori MM. Comparison of height, weight and head circumference index and the incidence of infectious and gastrointestinal diseases in breast-fed and formula-fed Infants at 0 to 1 Year Old in Bu-Ali Sina Hospital. Biomedical & Pharmacology Journal 2018; 11(3): 1717-1730.
23. Ferreira HS, Junior AF, Assunc ML¸ Santos EA, Horta BL. Effect of breastfeeding on head circumference of children from impoverished communities. Breastfeeding Medicine 2013; 8(3): 294-301.
24. Donma MM, Donma O. The influence of feeding patterns on head circumference among Turkish infants during the first 6 months of life. Brain and Development 1997; 19(6): 393-397.