

Growth of Breast Feed and Formula Feed Infants

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ABSTRACT

Background: Colostrum and Breast milk are the first source of nutrition of newborn, which are essential for the newborn's growth and development. In underdeveloped countries exclusive breastfeeding has played a major role in reducing mortality of infants by preventing diarrheal diseases and bacterial infections.

Aim: To ascertain the frequency of newborns who are breastfed exclusively by mothers and to get a comparison of gain in growth parameters of infants who are formula fed versus breastfed.

Methods: The cross-sectional study was conducted in Pediatrics Department, Mayo Hospital, and Lahore for six months after approval of synopsis. Study samples were selected using sampling method of non-probability purposive sampling. A written consent was taken from guardians or parents of newborns. Information like age of newborn, name, corrected gestational age, phone numbers was documented.

Results: In our study, 16.56±6.26 days was the mean age of infants and the average gestational age of babies was 38.52±0.97 weeks. The ratio of male to female infants was 1.3:1. The educated mothers were 273(68.3%) and uneducated mothers were 127(31.8%), 52.25% patients were on breast feeding and 47.75% patients were on formula feeding. The infants were followed at 10th, 14th week and 4th month of age and a significant differences in weight was seen between the study groups with p value <0.05

Conclusion: 52.3% of infants in our study were exclusively breastfed. Our study showed that there was better gain in weight in breastfed infants as compared to formula fed but the change in length was not statistically significant in the two groups.

Keywords: Formula feeding, Weight, length, infants, newborn, breastfed

INTRODUCTION

The first feeding sources of newborn are colostrum and breast milk, which provide nutrients, innate immunological components and growth enhancing factors, which are necessary for appropriate development and growth of infant. It has been shown by studies that major preventive factors for development of allergies in children is the time period for which the child is exclusively breastfed and when is weaning diet introduced¹.

Breast feeding is a major contributor to child wellbeing and healthy life. Lack of breast feeding in 1st 6-months of life is the most significant risk factor for infant mortality. Breast feeding is beneficial both for the mother and the infant improving infant's physical growth, immunity and neurological development².

As per WHO recommendation every infant in the first half of infancy should be given breast milk only and continued with breast milk for 2 years along with weaning diet from six months onwards. According to global data only 40% of children less than six months of age receive exclusive breastfeeding. Raising awareness and providing assistance to nursing mothers can help in increasing the rate of exclusive breastfeeding².

The recent breast-feeding incidence is found to be 81% in the UK (rise from 76% in 2005), while it was only 62% in 1990. In Pakistan the reported breastfeeding rate is about 48%⁴.

Earlier studies have not shown any significant statistical difference between growths trends of formula fed infants versus breastfed babies. They had similar gain in weight and length. Surprisingly babies fed formula had better growth in early infancy according to this study⁵.

In another study, babies who were exclusively breastfed had better increase in weight (6712 ± 626 grams) in comparison to formula fed babies(6356±667grams). The mean increase in length was also significantly better in breastfeeding babies (63.15±2.14 cms) versus formula fed (62.45±2.33cms) p<0.05⁶.

This study was conducted with aim to determine the growth trends and estimate the frequency of infants who are exclusively breastfed. Infants should be fed formula only when breast milk is not available due to unavoidable circumstances. Breast milk in all other scenarios is the best form of nutrition. So the purpose of my study is to determine the growth trends of infants among formula fed versus breast fed infants in our native population.

The objectives of this study were to ascertain the frequency of infants on breast feeding exclusively and get a comparison of their growth trends in terms of increase in weight & length with those on formula feed.

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MATERIAL AND METHODS

It is Cross sectional in design conducted in Pediatrics Department/ Vaccination Centre, Mayo Hospital, Lahore from December 2014 to May 2015. 382 infants were selected and sample size was based on confidence interval of 95%, error margin was 5%, expected rate of exclusive breastfed babies was taken as 54%. sampling method used was Non-Probability, Purposive

Inclusion Criteria

1. Neonates with age up to 28 days.
2. Either gender.
3. Born at Gestational age \geq 36weeks.

Exclusion Criteria

1. Babies having cleft palate or lip, having heart diseases since birth or with gross anomalies.
2. Twin babies.
3. Low birth weight ($<2.5\text{kg}$)
4. Clinically unstable newborns.
5. Infants breast fed exclusively but later on shifted to bottle/formula feed due to mother's health issues or next conception etc.

Data Collection Procedure: Initially 400 neonates who met criteria were selected for study from the Vaccination center, Pediatrics Department, Mayo Hospital Lahore, after getting informed consent from parents. Demographic data was recorded. The mothers were asked in detail about feeding history. The newborns were divided into two study groups based on whether they were formula fed or breastfed. An electronic weighing machine was used to weigh the newborns.

An infantometer was used to measure the length in (cms). All mothers were counselled for follow up visit in vaccination clinic regularly at 6, 10 and 14 weeks of age and then later at the age of 4 months. Weight and Length of infant were documented similarly on each visit on a predesigned Performa.

Data Analysis: SPSS Version 20 was used to analyze the statistical data. Quantitative data including weight, length, newborn age, gestational age, were shown as standard deviation and mean. Qualitative data was shown in the form of percentage and frequency. T-test was used to compare the two groups. P-value was considered as significant if less than <0.05 .

RESULTS

In current study, the total number of cases was 400. The babies mean age was (16.56 ± 6.26) days (with range 7-27days). While infants mean gestational age was (38.52 ± 0.97) weeks (range 37- 40 weeks). The percentage of males among infants was 57% while females were 43% with male to female ratio of (1.3:1), 255 (63.8%) neonates came from low Socioeconomic status (SES), 120(30%) neonates presented from middle SES and 25(6.3%) neonates belonged to upper SES. The number of educated mothers was 273(68.3%) and uneducated mothers were 127(31.8%). Table 1

Table 1: Baseline characteristics of neonates

N	400
Age (days)	16.56 \pm 6.26
Gestational age (weeks)	38.5 0.97
Gender	
Male	228 (57%)
Female	172 (43%)
Social economic status	
Low	255 (63.8%)
Middle	120 (30%)
High	25 (6.3%)

Group(B) it was $(64.59 \pm 0.86 \text{ cm})$. The difference in lengths was not statistically significant between the two groups at various followup visits i.e 28 day of life, 6, 10, 14 weeks & four months (p-value=0.81, 0.41, 0.41, 0.12, 0.12) shown in Table 2.

Table 2: Comparing weight and length at follow up visits in the two groups

		Breast feed	Formula feed	p-value
Weight	28 th day	3225.36 \pm 448.07	3265.97 \pm 442.41	0.363
	6 th week	4729.67 \pm 840.604	4761.78 \pm 870.302	0.708
	10 th week	6830.14 \pm 1290.163	5989.53 \pm 1233.265	0.000
	14 th week	6830.14 \pm 1290.163	5989.53 \pm 1233.265	0.000
	4 month	7825.36 \pm 1251.683	6876.96 \pm 1105.866	0.000
Length	2B nd day	51.57 \pm 0.86	51.55 \pm 0.86	0.81
	6 th week	55.88 \pm 1.73	56.02 \pm 1.69	0.41
	10 th week	59.88 \pm 1.73	60.02 \pm 1.69	0.41
	14 th week	62.46 \pm 0.85	62.59 \pm 0.89	0.12
	4 month	64.46 \pm 0.86	64.59 \pm 0.88	0.12

DISCUSSION

The American Academy of Pediatrics (AAP), World Health Organization (WHO) and American Dietetic Association (ADA) have strong recommendation to consider breastfeeding as the best source of nutrition for babies. Breast feeding decreases risk of infections, allergies, and simultaneously provides a strong defense against a number of chronic conditions. Our study results demonstrated that there was significant difference in weight gain at 10th, 14th week and 4th month among the breast fed and newborns fed formula. Breast fed babies had a

mean weight of $(7825.36 \pm 1251.68\text{gms})$ at 4 months while formula fed newborns had mean weight of $(6876.96 \pm 1105.86\text{gms})$ with (p-value <0.001).

According to results of our study, difference in length between the two study groups was not statistically significant. At 4th month, the mean length of babies in breast feeding group was $(64.46 \pm 0.66 \text{ cms})$ while in 2nd group it was $(64.59 \pm 0.66\text{cms})$ with p- value=0.12

According to Agostoni et al in first 12 months of life, Italian newborns fed breast milk exclusively had different growth pattern compared with formula fed infants. Genetic

conditions, intrauterine environment also affect growth indices⁷.

Contrarily, Ahmed et al did not find any significant difference between breastfeeding infants and formula fed infants when he compared their length, weight, chest and head circumference in follow up visits⁸.

Another study proved similar findings in terms of no statistically significant difference between newborns fed with breast milk or those who were top fed in reference to their length or weight⁵.

According to another study better weight gain was seen in newborns who were breast fed exclusively than their counterparts who were formula feeding, (Breast fed babies 6712 ± 626.5grams vs. Formula fed infants 6356 ± 667grams), similarly, the mean increase in length was more in breast fed babies (63.15±2.14 cms) in comparison to formula feeding newborns(62.45±2.33 cms) p<0.05⁶.

An Egyptian study demonstrated that newborns lost 14 percentiles in their weight for age from time of birth till six months if they were given only breast milk while babies fed with formula lost 18 percentiles⁹.

Dewey demonstrated no significant difference between linear growth patterns among different feeding groups the results being in agreement with ours. Head circumference growth was not affected by feeding type. Newborns who are breastfed apparently appeared weaker than those on top-feed at one year of age. It is favored by evidence that there is no plausible harm linked with the slower rate of gain in weight in newborns fed with breast milk compared with formula¹⁰.

Ziegler et al found little difference in growth (increase in length & weight) in first 6-8weeks of life among formula feeding or breastfeeding infants. However, after the age of two months till twelve months of age, babies fed formula show marked increase in length and weight as compared to formula fed neonates. Adipose tissue deposition is similar in first 4-5 months but after 6 months of life, exclusive breast feeding newborns appear weaker than their counterparts¹¹.

In our study, 208(52.25%) infants were breast fed while 192(47.75%) infants were on formula feed. In year 2010, HHS released Healthy People 2020, which gives guidelines for goals regarding breastfeeding for the year 2020. At 3 months the percentage of exclusive breast-fed babies were 46.2%, at 6 months 25.5%, 61.9% were ever given breast feed. The percentage of being breastfed decreased at 12 months to 34.1%¹².

The successful establishment of breast feeding has been 81% in UK as compared to being 76% in 2005 and in 1990, it was 62%³. the percentage of children being exclusively breastfed is 48% in infants less than 6 months of life in Pakistan according to Pakistan Health and Demographic Survey⁴.

Cai et al in their research found out that the incidence of babies getting exclusive breast milk under 6 months in

underdeveloped nations has gone up from 33% which was in year 1995 to 39% in the year 2010. Consistent increase seen across all the developing nations, and imminent rise observed in Central & West Africa¹³.

CONCLUSION

Our study showed that 52.3% of our newborns and infants are breast-fed exclusively. The weight gain was much better in breastfeeding infants as compared to formula feeding infants. However, the gain in length was not much different between the two study groups

REFERENCES

1. Minniti F, Comberiat P, Munblit D, Piacentini GL, Antoniazzi E, Zanoni L, et al. Breast-milk characteristics protecting against allergy. *Endocr Metab Immune Disord Drug Targets* 2014;14(1):9-15.
2. WHO. 10 facts on breastfeeding. 2014 [cited 2014]; Available from: <http://www.who.int/features/factfiles/breastfeeding/em>.
3. McAndrew F, Thompson J, Fellows L, Large A, Speed M, Renfrew MJ. Infant feeding survey 2010. Health and Social Care Information Centre 2012.
4. National Institute of Population Studies (NIPS) [Pakistan] and ICF. 2019. Pakistan Demographic and Health Survey 2017-18. Islamabad, Pakistan, and Rockville, Maryland, USA: NIPS and ICF.
5. Dewey KG, Heinig MJ, Nommsen LA, Pearson JM, Lonnerdal B. Growth of Breast-Fed and Formula-Fed Infants From 0 to 18 Months: The DARLING Study. *Pediatrics* 1992 June 1, 1992;89(6):1035-41.
6. Agostoni C, Grandi F, Gianni M, Silano M, Torcoletti M, Giovannini M, et al. Growth patterns of breast fed and formula fed infants in the first 12 months of life: an Italian study. *Arch Dis Child* 1999;81(5):395-9.
7. Agostoni C, Grandi F, Gianni M, Silano M, Torcoletti M, Giovannini M, et al. Growth patterns of breast fed and formula fed infants in the first 12 months of life: an Italian study. *Archives of disease in childhood* 1999;81(5):395-9.
8. Ahmed EM, Ibrahim IA, Hussein AAE-AM, Ahmed FA. Impact Of Breast Feeding Versus Formula Feeding On Surgical Wound Healing In Infants During The First Three Months Of Age. *IJSBAR* 2013;10(1):25-37.
9. Eissa A, El-Sherbini A, Khashaba A, El-Bakry M, ER AA. Breast feeding and infant growth a follow-up study in Menoufia Egypt. *POPULATION SCIENCES* 1990;9:69-75.
10. Dewey KG. Growth characteristics of breast-fed compared to formula-fed infants. *Neonatology* 1998;74(2):94-105.
11. Ziegler EE. Growth of breast-fed and formula-fed infants. 2006.
12. healthypeople.gov. U.S. Department of Health and Human Services. Healthy People 2020 Objectives. 2011 [cited 2015]; Available from: <http://healthypeople.gov/2020/topicsobjectives2020/pdfs/HP2020objectives>.
13. Cai X, Wardlaw T, Brown DW. Global trends in exclusive breastfeeding. *Int Breastfeed J* 2012;7(1):12.