

Original Research Article

Difference in weight gain among breast-fed and mix-fed infants at 6 weeks

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ABSTRACT

Background: Breastfeeding practice protects children from a large number of illnesses, increases IQ and improves a strong bond between mother and infant. Body weight is an important sign of a baby's growth and development. The relationship between breastfeeding and body weight is crucial for the wellbeing of neonates.

Methods: This cross-sectional study was conducted at Department of Paediatrics, ASCOMS, Jammu for a period of 06 months. In the study 200 neonates were included and divided into two groups on the basis of self-reported feeding mode (breast-feeding and mix-feeding). History on maternal parameters and infant parameters at birth and 06 weeks were noted on a pre-designed proforma. The data was recorded in Microsoft excel sheet and was analysed by SPSS 20.0 version.

Results: It has been observed in our study that none of the maternal parameters significantly differed among the two feeding modes (Breast fed and mix-fed). Out of 100 breastfed infants 45% had weight 4.0-4.2 kg, 32% had weight 4.2-4.4 kg, 14% had weight >4.4 kg and 9% had weight <4 kg. Out of mix-fed infants 48% had weight 4.0-4.2 kg, 28% had weight 4.2-4.4 kg, 10% had weight >4.4 kg and 14% had weight <4 kg. Further, the weight gained by infants at 06 weeks after birth slightly differed with breastfed infants having slightly more weight gain as compared to mix-fed infants.

Conclusions: The current study found slight difference in weight gain between infants who were exclusively breastfed and those who were mix-fed at 06 weeks of life.

Keywords: Breast feeding, Mix-fed, Weight gain

INTRODUCTION

Human breast milk is adapted to the infant's needs, contain all necessary nutrients and is the most appropriate milk for the human infant among the different kinds of milks. Practice of Breast-feeding has practical and psychological advantages for both mother and infant.¹⁻³

Breastfeeding practice protects children from a large number of illnesses, increases IQ and creates a strong bond between mother and infant. It decreases the risk of breast cancer for mothers and lowers the high costs of healthcare for families and societies.⁴⁻⁶ A large number of health benefits of exclusive breastfeeding to the infant

and mother have been recognized in evidence-based research studies.⁷⁻⁹ Breast feeding is an important determinant of a child's nutritional status that eventually influences his/ her growth and development. Body weight is an important index of a baby's growth and development. The relationship between breastfeeding and body weight is crucial for the well- being of neonates. Weight gain in the first month of life in exclusively breast-fed infants is reported to be 18-35 g.^{10,11}

Despite studies showing substantial evidence in favour of breastfeeding, there isn't a consensus among medical professionals about the weight increase of breastfed and formula fed newborns.^{12,13} Infants who are breastfed have

different growth patterns than those who are fed formula and by the age of 12 months, formula-fed children weigh 400–600 g more on average than breastfed infants do.^{14,15} Accordingly, the present cross-sectional study assesses the difference in weight gain among babies who were exclusively breastfed and those who were mix-fed at 6 weeks of life.

To assess the difference in weight gain among infants who were exclusively breastfed and those who were mix-fed at 6 weeks of life.

METHODS

The study was designed as a cross-sectional comparative study to assess the difference in weight gain among babies who were exclusively breastfed and those who were mix-fed at 06 weeks of life and was conducted at Department of Paediatrics, ASCOMS, Jammu for a period of 06 months from 1st November, 2023 to 30th April, 2024 after obtaining ethical permission from institution with reference no. ASCOMS/IEC/2024/Meeting-I/FM/32.

In the study 200 neonates were included after obtaining written informed consent for the study. Histories on perinatal parameters such as maternal age, parity, infant gender, infant size at birth (weight, height, head circumference), 1 min Apgar Score were noted on a pre-designed proforma.

When the mothers and their babies came for the postnatal checkup and immunization at 06 weeks the anthropometric measures (weight, length and head circumference) of these babies were again recorded by trained staff.

Inclusion criteria

Term infants of 6 weeks of age.

Exclusion criteria

Infants whose parents/guardians refused to participate. Preterm and low birth weight infants. Infants with congenital defects, infections, neurological disease, endocrine disease.

Anthropometric measures

The weight of the babies was measured in kilograms using an electronic weighing scale, with the baby wearing no clothes or diapers.

Their lengths were recorded in centimeters, which was measured in the supine position using an infant meter. Their head circumference (occipitofrontal circumference) was measured using a non-stretchable fiberglass tape and recorded in centimeters.

Feeding modes

200 subjects were divided into two groups on the basis of self-reported feeding mode used by mothers in the 06 weeks postpartum: an exclusive breast-feeding group and a mix-feeding group (breast-feeding and formula-feeding).

Statistical analysis

The data was recorded in Microsoft excel sheet and was analysed by SPSS 20.0 version. Continuous variables were expressed as Mean $\pm$ SD and categorical variables were summarized as frequencies and percentages.

RESULTS

The maternal socio-demographic characteristics were summarized in Table 1. The mean (SD) age of mothers was 29.95 $\pm$ 7.289, ranged 21-44 years. Majority 95 (47.5%) of the mothers were in the age group of 21-25 years and 5 mothers (2.5%) were aged more than 40 years.

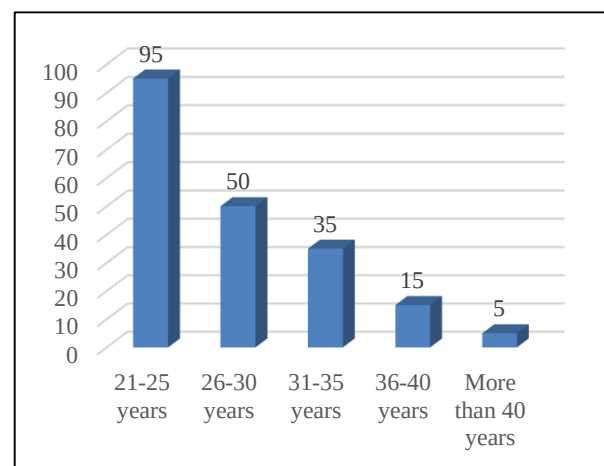


Figure 1: Mothers age.

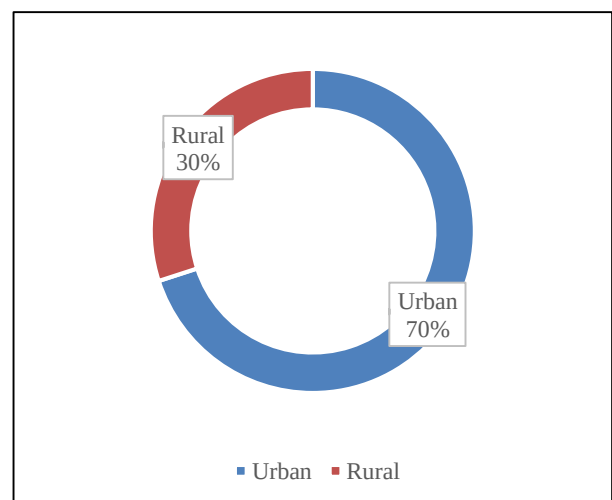


Figure 2: Type of residence.

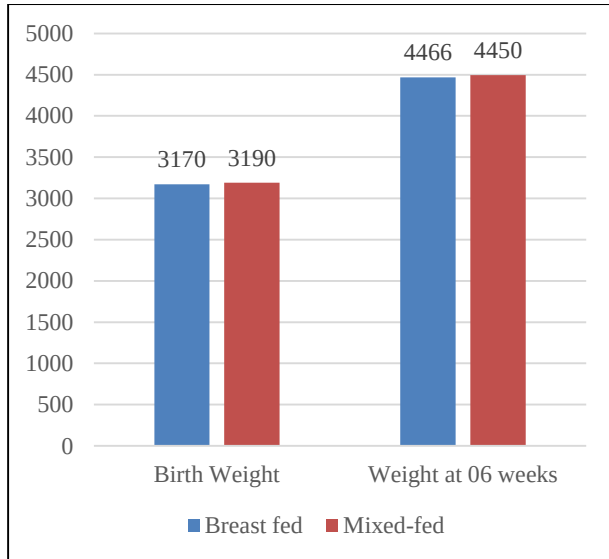


Figure 3: Infant weight at birth and 06 weeks.

A total 140 (70.0%) were of urban residence and the rest 60 (30.0%) were of rural residence. In term of education status 70 (35%) mothers had secondary education, 60 (30%) had bachelors/ master's degree, 50 (25%) mothers had primary education (2.5%) and 20 (10%) mothers were uneducated. In terms of economic status, 100 (50%) mothers were in middle income family, 60 (30%) mothers were in high income family and 40 (20%) were amongst low-income family. The mean (SD) age of babies was 8.56 months (5.578), ranged 1-28 months.

The maternal parameters of the study population are summarized in table 2. 156 (78%) subjects were primiparas. The mean duration of pregnancy was 37.7±2.2 weeks. The mean pre-pregnancy weight of the mothers was 55.5±6.2 kgs and mean pre-pregnancy BMI

was 22.4±3.2 kg. The mean gestational weight gain was 9.4±3.8 kgs and mean weight at 1-month post-partum was 58.8±7.4 kgs. Further, the mean post-partum weight loss was 5.4±1.8 kgs.

The study population was classified into the two groups on the basis of the feeding mode: breast-feeding 100 (50.0%) and mix-fed 100 (50.0%) groups. It has been observed in our study that none of the maternal parameters significantly differed among the two feeding modes. The infant parameters of the study population are summarized in table 3. The gender of 110 (55%) infants was male whereas 90 (45%) infants were females.

The mean Apgar score at 1 min was 9.7±0.3. The mean infant birth weight and height were 3180±380.4 g and 48.8±1.8 cm respectively. The mean birth Head circumference and chest circumference was 33.5±1.2 cm and 31.6±1.7 cm respectively. At 6 weeks out of 100 breastfed infants 45% had weight 4.0-4.2 kg, 32% had weight 4.2-4.4 kg, 14% had weight >4.4 kg and 9% had weight <4 kg. Out of mix-fed infants 48% had weight 4.0-4.2 kg, 28% had weight 4.2-4.4 kg, 10% had weight >4.4 kg and 14% had weight <4 kg. The mean infant weight and height at 06 weeks were 4458±430.8 g and 53.8±1.4 cm respectively. Further, the mean Head circumference and chest circumference at 6 weeks was 37.2±1.1 cm and 37.2±1.2 cm respectively.

The mean total weight gain in both groups was 1278.0±325.0 kg and the average weight gain/day was 30.42±7.6 g. The average daily weight gain was 30.85±9.3 g in the exclusive breast-feeding group and 30.00±9.4 g in the mix-feeding group. In our study it was observed that there was a slight increase in weight gain in breast-fed group as compared to the mix-fed group, but it was statistically insignificant.

Table 1: Maternal socio-demographic characteristics.

Characteristics	Frequency	%
Mother age group (in years)		
21-25	95	47.5
26-30	50	25
31-35	35	17.5
36-40	15	7.5
More than 40	5	2.5
Type of residence		
Urban	140	70
Rural	60	30
Mothers level of education		
Uneducated	20	10
Primary	50	25
Secondary	70	35
Bachelor/ Master's Degree	60	30
Economic status		
Low income	40	20
Middle income	100	50
High income	60	30

Table 2: Comparison of maternal parameters on the basis of feeding modes.

Parameters	Total Population (n=200)	Feeding mode group	
		Breast fed (n=100)	Mixed-fed (n=100)
Duration of pregnancy (weeks)	37.7±2.2	37.6±1.2	37.5±1.4
Primiparous	156 (78%)	66 (33%)	90 (45%)
Pre-pregnancy weight (kg)	55.5±6.2	54.2±5.4	55.4±6.1
Pre-pregnancy BMI	22.4±3.2	21.6±4.1	22.2±3.0
Delivery weight (Kg)	64.2±7.2	63.1±8.1	65.2±7.4
Gestational weight gain (kg)	9.4±3.8	9.2±3.4	9.8±4.1
Weight at 1 month postpartum (kg)	58.8±7.4	57.6±6.8	59.4±7.8
Postpartum weight loss (kg)	5.4±1.8	5.5±1.6	5.8±2.0

Table 3: Comparison of infant parameters on the basis of feeding modes.

Parameters	Total population (n=200)	Feeding mode group	
		Breast fed (n=100)	Mixed-fed (n=100)
Male	110 (55%)	60 (30%)	50 (25%)
1 min apgar score	9.7±0.5	9.8±0.4	9.7±0.5
Birth			
Weight (g)	3180±380.4	3170±350.8	3190±390.5
Height (cm)	48.8±1.8	49.0±1.4	49.2±1.8
Head Circumference (cm)	33.5±1.2	33.4±1.3	33.6±1.1
Chest circumference (cm)	31.6±1.7	31.5±1.4	31.7±1.8
At 06 weeks of life			
Weight (g)	4458±430.8	4466±425.5	4450±420
Height (cm)	53.8±1.4	53.5±1.2	54.0±1.8
Head circumference (cm)	37.2±1.1	37.3±1.0	37.3±1.1
Chest circumference (cm)	37.2±1.2	37.1±1.1	37.0±1.3

DISCUSSION

According to WHO 2008 report, Appropriate infant and young child feeding (IYCF) practices include exclusive breastfeeding in the first 6 months of life. Breastfeeding not only brings many health benefits to mothers and babies, but also has important social development implications.

The benefits of breastfeeding for women and children are well recognized in many respects, but little consensus exists for the growth performance of infants being fed by different modalities. The aim of our study was to assess the weight gain among breastfeeding and mix- feeding infants at 06 weeks of life.

In our study the mean (SD) age of mothers was 29.95±7.289, ranged 21-44 years and majority 95 (47.5%) of the mothers were in the age group of 21-25 years. Further, 140 (70.0%) were of urban residence. In terms of education status, majority 70 (35%) mothers had secondary education, 60 (30%) had bachelors/ master's degree, 50 (25%) mothers had primary education. In terms of economic status 100 (50%) mothers were in middle income family, 60 (30%) mothers were in high income family and 40 (20%) were amongst low-income

family. The findings of our study are in accordance with the study conducted by Nasir, et al.¹⁶ It was found in our study that 156 (78%) subjects were primiparas. The mean duration of pregnancy was 37.7±2.2 weeks. The mean pre-pregnancy weight of the mothers was 55.5±6.2 kg and mean pre-pregnancy BMI was 22.4±3.2 kg. The mean gestational weight gain was 9.4±3.8 kgs and mean weight at 1-month post-partum was 58.8±7.4 kgs. Further, the mean post-partum weight loss was 5.4±1.8 kgs. The findings of our study are in accordance with the study conducted by Ebina S et al, 2013.¹⁷

The study population was classified into the two groups on the basis of the feeding mode: breast-feeding 100 (50.0%) and mix-fed 100 (50.0%) groups. It has been observed in our study that none of the maternal parameters significantly differed among the two feeding modes. Raju DM et al, 2023 in a similar study also found that maternal characteristics were similar among different feeding groups.¹⁸

In our study it was found that the gender of 110 (55%) infants was male whereas 90 (45%) infants were females. The mean Apgar score at 1 min was 9.7±0.3. The mean infant birth weight and height were 3180±380.4 g and 48.8±1.8 cm respectively. The mean birth Head

circumference and chest circumference was 33.5 ± 1.2 cm and 31.6 ± 1.7 cm respectively. At 6 weeks out of 100 breastfed infants 45% had weight 4.0-4.2 kg, 32% had weight 4.2-4.4 kg, 14% had weight >4.4 kg and 9% had weight <4 kg. Out of mix-fed infants 48% had weight 4.0-4.2 kg, 28% had weight 4.2-4.4 kg, 10% had weight >4.4 kg and 14% had weight <4 kg.

The mean infant weight and height at 06 weeks were 4458 ± 430.8 g and 53.8 ± 1.4 cm respectively. Further, the mean Head circumference and chest circumference at 6 weeks was 37.2 ± 1.1 cm and 37.2 ± 1.2 cm respectively. It has been observed that none of the infant parameters significantly differed among two feeding modes. The mean total weight gain was 1278.0 ± 325.0 kg and the weight gain/day was 30.42 ± 7.6 g.

The daily weight gain was 30.85 ± 7.5 g in the exclusive breast-feeding group and 30.00 ± 7.2 g in the mix-feeding group. In our study it was observed that although there was a slight increase in weight gain in breastfed group at 6 weeks as compared to mix-fed group which is statistically insignificant. The weight gained by infants at 06 weeks after birth did not differ significantly with the feeding modes; this finding was consistent with that a previous study conducted by MacDonald PD et al, 2003.¹⁹

The limitation of this study was a small sample size, single centre study and short study period.

CONCLUSION

The current study found no significant difference in weight gain between infants who were exclusively breastfed and those who were mix-fed at 06 weeks of life but breastfeeding should be encouraged because both the mother and the child benefit from breastfeeding in terms of health and development.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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