

**GROWTH PATTERNS IN
BREASTFED BABIES DURING
FIRST SIX MONTHS OF LIFE**

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ABSTRACT

Growth of exclusively breastfed 126 normal newborns in urban slums and those delivered at Nehru Hospital, Medical College, Gorakhpur were studied upto six months of age. The average weight of both boys and girls was almost equivalent to the 25th percentile of NCIJS standard upto 3 months but fell below these standards thereafter. The average length in both boys and girls was between 25th and 50th percentile of NCHS data. The average head circumference in girls was between 25th and 50th percentile of NCHS data at all ages but in boys it was between 10th and 25th percentile at 4, 5 and 6 months of age. The average weight, length, head and chest circumference in both boys and girls were comparable to ICMR standards. The observations indicate that exclusive breastfeeding should be promoted for adequate growth of infants during first six months of life.

Key words: *Growth, Breastfeeding.*

Breast milk is the natural means for maintenance of life of different species and their offsprings. It is the nature's and mothers' gift to the infants. Breast-milk is still the best in early months of life, though the controversies persist about the duration and adequacy of breastfeeding. In most of the developing countries average growth of infants in height and weight is satisfactory upto 3-4 months of age and after that falls off sharply(1,2). On the other hand studies from India indicate that breastmilk of mothers from low socio-economic group may contain enough calories to sustain growth of their infants for first 4-6 months of life(3,4). We report the growth parameters fed exclusively on breast-milk upto six months of age.

Material and Methods

This study was conducted from January to December 1985 in two different population groups of Gorakhpur: (i) newborns from urban slum area, and (ii) newborns delivered and followed in Nehru Chikitsalaya, B.R.D. Medical College, Gorakhpur. Only normal newborns having birth weight of more than 2.5 kg and without any congenital anomaly or illness and who were exclusively breastfed were included. Mothers in urban slums areas put their babies at breast on the second or third day, while in hospital-delivered cases breastfeeding was

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started immediately, usually within one hour after delivery.

Anthropometric measurements (weight, length, head circumference, chest circumference and mid-arm circumference) were recorded within a week after birth in community areas with the help of anganwadi workers and within 24 hours in hospital delivered newborns. Bar balance weighing machine (least count 10 g), provided by UNTCEF, was used for recording the weight. Other measurements were recorded by standard methods(5). These infants were regularly followed up at an interval of one month for six months to record anthropometric measurements. At each visit mothers were reinforced to breastfeed their infants for first six months of their life. Anthropometric measurements of these infants were compared with NCHS (National Centre for Health Statistics USA) (5) and ICMR (Indian Council of Medical Research, Delhi) standards(6).

Results

Of 126 infants (52 in community and 74 in hospital), included in this study, 76 were followed for a period of 6 months. The follow-up of 52 infants (31 boys and 21 girls) in community was 100% but in hospital delivered 24 infants (15 boys and 9 girls) it was only 32.4%. Of the 76 infants 46 were boys and 30 girls. The weight and length of children along with its comparison with NCHS and ICMR curves are shown in Figs. 1 & 2. The measurements of head circumference, chest circumference and mid-arm circumference are given in Table I.

Discussion

The mean weight of both male and female infants in our study was lower than the 50th percentile of National Centre for Health Statistics (NCHS) data USA(5). The

mean weight was almost equivalent to the 25th percentile of NCHS data upto the age of three months but it was below this standard thereafter. However, the average

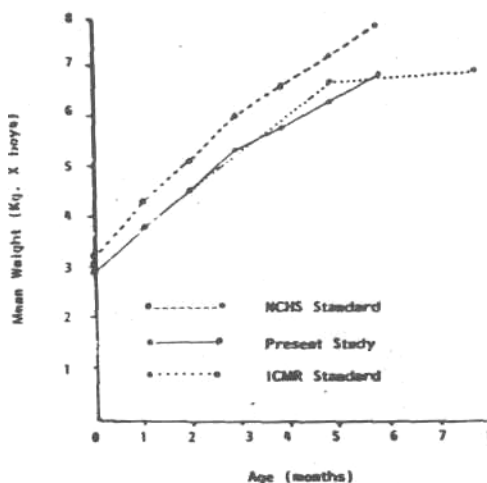


Fig. 1a. Mean weight curve of boys.

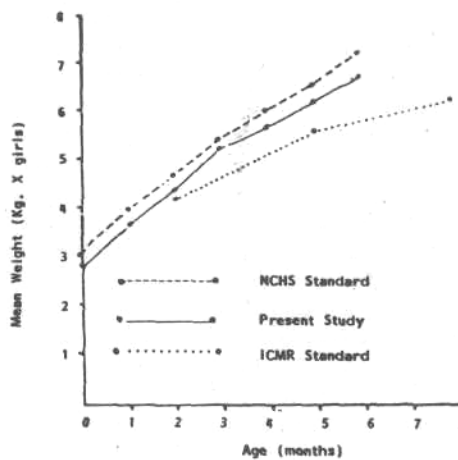


Fig. 1b. Mean weight curve of girls.

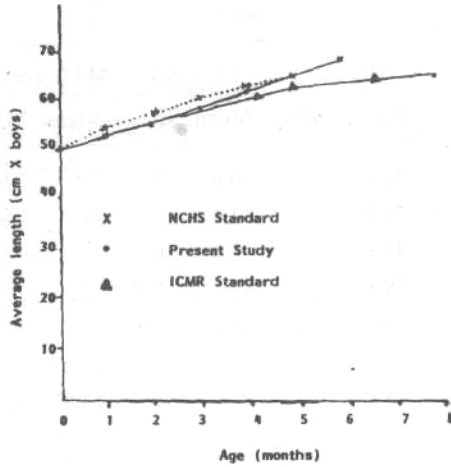


Fig. 2a. Average length curve of boys.

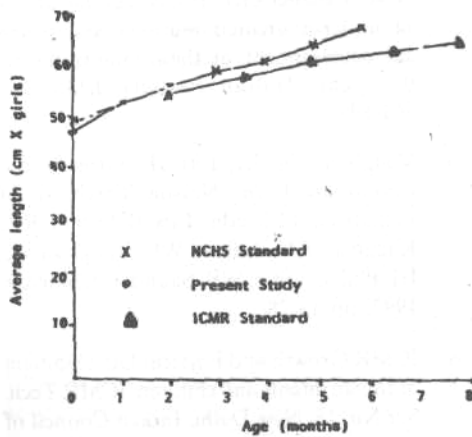


Fig. 2b. Average length curve of girls.

weight in our study corresponds to the ICMR standard(6). Statistically the difference in weight gain as compared to NCHS growth charts in girls was not significant

from two to five months when plotted on the percentile chart ($p > 0.05$) but it was significant at one and six months of age ($p < 0.05$), while in cases of boys these values were highly significant at all ages ($p < 0.001$). The mean weight of most of the infants were above the baseline for under nutrition of ICMR growth charts.

The average length in boys and girls was either equivalent to the 50th percentile or between the 25th and 50th percentile of NCHS data. The values of ICMR were also comparable to our study. Statistical evaluation revealed that in early infancy the average growth in length was better in both boys and girls in this study and the NCHS values for length are well applicable on the infants of our population. The average head circumference of female infants was either comparable to the 50th percentile or between 25th and 50th percentile of NCHS data for all ages, while it is between 10th and 25 percentile at four, five and six months of age in case of boys. However, the values are comparable to ICMR values.

Statistical evaluation suggests that the values of 50th percentile of NCHS data are applicable only in female infants of four, five and six months of age. The average gain in head circumference was comparable in 9 male infants and 13 female infants to the NCHS chart.

The average chest circumference in both male and female infants in our study was comparable to the ICMR values. There is no available standard of NCHS for chest circumference.

The skull circumference/chest circumference ratio was more than one in both male and female infants which shows normal pattern of growth in Indian children(6). The average mid-arm circumference in our

TABLE I— *Head Circumference (HC), Chest Circumference (CC), Midarm Circumference (MAC) of Boys and Girls*

Age (mo)	Boys						Girls					
	HC (cm)		CC (cm)		MAC (cm)		HC (cm)		CC (cm)		MAC (cm)	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
0	34.5	1.1	32.9	1.4	10.1	0.8	32.6	1.0	30.6	1.3	9.8	0.8
1	37.1	0.9	34.8	1.3	10.9	0.9	35.9	1.0	32.9	1.3	10.7	0.8
2	37.8	0.8	36.0	1.2	11.3	0.7	37.3	1.2	35.8	1.6	11.4	0.8
3	39.2	0.8	37.2	1.3	12.1	0.7	38.8	1.1	37.1	1.3	12.1	0.8
4	40.2	0.7	38.6	1.1	12.7	0.7	40.0	1.3	38.4	1.2	12.6	0.9
5	41.3	0.6	39.3	1.0	13.1	0.6	41.1	1.1	39.5	1.2	13.0	0.9
6	41.3	0.7	40.4	1.2	13.6	0.8	42.1	1.1	40.4	1.3	13.5	0.8

study is higher than that presented by Manjrekar *et al.* in his study for all ages(4). The average mid-arm circumference values are not available in ICMR as well as in NCHS data.

We conclude that breastfed infants grow normally and their average weight, length, head and chest circumference are comparable to ICMR standards. It is, therefore, suggested that breastfeeding should be promoted in the interest of child health.

REFERENCES

1. Waterlow JC, Asworth A, Griffith M. Faltering in growth in the less developed countries. *Lancet* 1980, 1: 1176-78.
2. Waterlow JC, Thomson AM. Observations on the adequacy of breastmilk. *Lancet* 1979, 11: 23-42.
3. Gopalan C. Effect of nutrition on pregnancy and lactation. *Bull WHO* 1962, 26: 203-211.
4. Manjrekar C, Vishalkshi MP, Begum NJA, Padama GN. Breastfeeding ability of under-nourished mothers and physical development of their infants during 0-1 year. *Indian Pediatr* 1985, 22: 801-809.
5. Vaughan, VC III, Litt JF. Growth and development. *In: Nelson Textbook of Pediatrics*, 14th edn. Eds Behrman RE, Kliegman RM, Nelson WE, Vaughan VC III. Philadelphia, WB, Saunders Company 1992, pp 13-28.
6. ICMR Growth and Physical Development of Indian infants and children. ICMR Tech. Ser No. 18, New Delhi, Indian Council of Medical Research 1984, pp 58-63.