

Weight gain pattern of exclusively breastfed low birth weight and normal weight babies during the first six months of life

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Abstract

To study and compare the weight gain pattern of Exclusively Breastfed Low birth weight and normal weight babies during the first six months of life in Neonatology Section of the Department of Pediatrics of Jawaharlal Nehru Medical College, Aligarh Muslim University, Aligarh. A prospective Study was conducted between June 2004 to December 2005. Three hundred and sixty three low birth weight babies cases) and 121 normal birth weight babies (controls) formed the basis of this study. Follow up of these babies was done during regular visits to well baby clinic over the next six months at monthly interval. All low birth weight babies born of singleton pregnancy in JN Medical college hospital without any gross congenital malformations during a period of six months and their mothers were included in the study. Controls were term appropriate for gestational age (AGA) babies born of singleton pregnancy without any complications.

The mean birth weight was 2.04 ± 0.36 kg in study group whereas it was 2.84 ± 0.29 kg in controls. The mean weight of exclusively breastfed babies in the study group was observed to be constantly below the 5th percentile at birth and also during the 6 months follow up. However in exclusively breastfed controls, the birth weight was at 10th percentile. On follow up, the weight was between 10th to 25th percentile in the first 3 months of life and then almost reached 25th percentile of NCHS in the next 3 months. An average daily weight gain of 19.83 grams and 22.79 grams was observed in study and control group respectively during the six months follow up. Exclusive breastfeeding is important to sustain better growth during first 6 months of life.

Key words: Low birth weight (LBW), Appropriate for gestational age (AGA), NCHS Centiles, Exclusive breast feeding
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Introduction

The birth weight of infant is the single most important determinant of its chances of survival, healthy growth and development [1]. Low birth weight has been defined as a birth weight of less than 2.5 kg, the measurement being taken preferably within the first hour of life, before significant postnatal weight loss has occurred [2]. Low birth weight is one of the most serious challenges in maternal and child care in both developed and developing countries. Babies born with a low birth weight present unique problems pertaining to their survival and subsequent growth and development. In addition to the high risk of mortality and morbidity, these babies show a pattern of growth different from normal term babies [3]. Growth of these babies, especially head growth has bearing on the neurodevelopmental outcome. Very low birth weight babies are at increased risk of poor long term growth and cognitive and language deficits. [4]. In India 30-40% of live births is constituted by low birth weight babies, 60-70% being term intrauterine growth retarded and the rest preterm [5]. Further low birth weight is a prospective marker of mothers nutritional and health status [6]. The objective of our study was to study and compare the weight gain pattern of Exclusively Breastfed Low birth weight and normal babies during the first six months of life.

Methods

A prospective Study was conducted between June 2004 to December 2005. Three hundred and sixty three low birth weight babies (cases) and 121 normal birth weight babies (controls) formed the study group. Babies having gross congenital malformations were not included in this study. Follow up of these babies was done during regular visits to well baby clinic over the next six months at monthly intervals. Anthropometric data like; weight, length, head circumference and chest circumference were recorded during each visit. Also the type of feeding given was recorded.

Babies were weighed naked, soon after birth on an electronic weighing scale (intelligent weighing scale) to the nearest of ± 5 grams. Supine length was measured to the nearest of 0.5cm using an infantometer. Head circumference was measured as the maximum circumference of the head with a non stretchable steel tape passing above the supraorbital ridges and over the maximum occipital protuberance to the nearest of 1mm. Chest circumference was taken at the level of nipples using non stretchable steel tape to the nearest of 1mm. To assess the linear growth pattern in study and control group, they were given a progress card on discharge and mothers were asked to report every month ± 7 days till six months of age during which primary immunization was also completed. However 6 months follow up could completed in 136 (37.5%) of the cases and 42 (34.7%) of controls. Out of 136 neonates in the study group, only 72 (52.9%) were exclusively breastfed for the 6 months while the comparable figure was 33 (78.6%) in the control group. The weight gain and growth pattern of these babies was assessed and compared during the follow up in well baby clinic.

All the observations in this study were evaluated statistically. The mean, standard deviations and certain other factors were calculated with the help of a computer. The significance of difference in the observations in the control group (normal weight babies) and in the study group (low birth weight babies) were determined by Mann Whitney Test and Chi Square Test and P value of <0.05 is taken as significant.

Observations

Completed 6 months follow up could be seen in 136 (37.5%) of the total 363 neonates in controls and 42 (34.7%) out of 121 in the controls as outlined in Table 1.

Table 1: Distribution of cases that completed six months Follow up

Group	Weight group	Male		Female		Total	
		No.	%	No.	%	No.	%
Study Group	2000-2499g	37	27.7	54	39.7	91	66.9
	1500-1999g	18	13.2	17	12.5	35	25.7
	1000-1499g	6	4.4	2	1.5	8	5.9
	<1000g	0	0	2	1.5	2	1.5
Control	≥ 2500 g	20	47.6	22	52.4	42	100

Table 2: Mean Weight and Monthly Gain from Birth up to 6 Months Weight (in kg) at monthly follow up (Mean \pm SD)

	Weight (in kg) at monthly follow up (Mean \pm SD)					
	Birth	1 m	2 m	3 m	4 m	5 m
Study group	2.04 \pm 0.36	2.62 \pm 0.45	3.29 \pm 0.47	3.93 \pm 0.54	4.51 \pm 0.63	5.07 \pm 0.69
Controls	2.84 \pm 0.29	3.49 \pm 0.32	4.21 \pm 0.34	4.97 \pm 0.36	5.67 \pm 0.38	6.19 \pm 0.74
Monthly gain of	-	0.58	0.67	0.64	0.58	0.56

study group (kg)						
Monthly gain of controls (kg)	-	0.65	0.72	0.76	0.7	0.52
P value	-	<.001	<.001	<.001	<.001	<.001

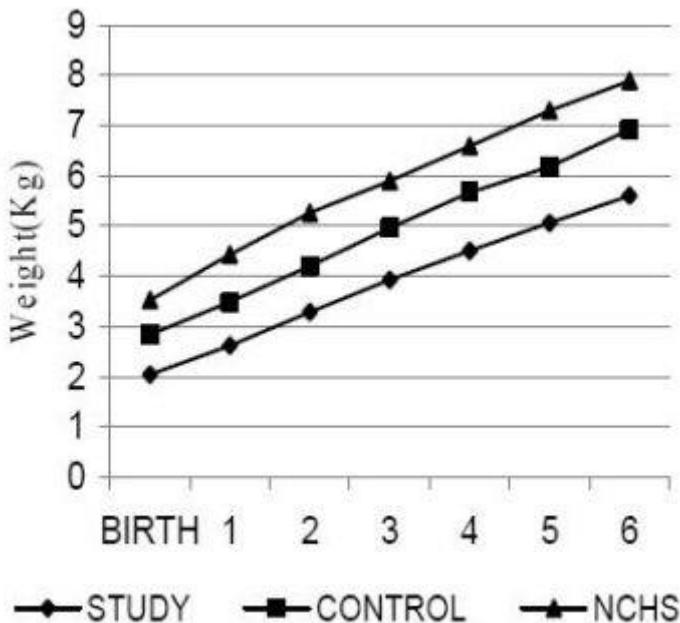


Figure 1: Comparison of weight in study and control group with NCHS (50th centile)

The growth pattern in relation to mean weight and comparison with NCHS norms in both study and control group is presented in table 2. The mean birth weight was 2.04 ± 0.36 kg in study group whereas it was 2.84 ± 0.29 kg in controls. The mean weight of exclusively breastfed babies in the study group was observed to be constantly below the 5th percentile at birth and also during the 6 months follow up. However in exclusively breastfed controls, the birth weight was at 10th percentile. On follow up, the weight was between 10th to 25th percentile in the first 3 months of life and then almost reached 25th percentile of NCHS in the next 3 months. An average daily weight gain of 19.83 grams and 22.79 grams was observed in study and control group respectively during the six months follow up.

Discussion

An analysis of the breastfeeding pattern at 3 months of age reveals that 86% and 85.7% of babies were exclusively breastfed in study group and controls respectively, whereas partial breastfeeding was given only in 5.9% and 4.8% respectively. The number of exclusively breastfed infants declined to 52.9% and 78.6% at 6 months in study group and controls respectively. In 1996, study by Abdur-rahiman, Ahmad [7] on effects of maternal nutritional status on the outcome of pregnancy, showed that exclusive breastfeeding was given in 80% of babies during first 4 months which declined to only 10% at six months of age. The increased incidence of exclusive breastfeeding in our study is a reflection of our efforts towards implementing a hospital breastfeeding policy.

The mean weight of babies in the study group ($2.04 \pm .36$ kg) was observed to be constantly below the 5th percentile at birth and during the 6 months follow up. The pattern of serial weight gain in this group is in close agreement with serial follow up of a slum population from Mysore city observed by Manjrekar et al [8]. However in exclusively breastfed controls, the birth weight was at 10th percentile. On follow up, the weight was between 10th to 25th percentile in the first 3 months of life and then almost reached 25th percentile of NCHS in the next 3 months. These findings were similar to a 30th percentile range seen by Ghosh et al [9] in babies born to mothers belonging to upper

socioeconomic group and 25th centile and below observed by Mathur et al [10] in his study on growth pattern in breastfed babies during first 6 months of life which are comparable to our figures in control group. This finding is also supported by the study by otaige BE etal [11] who showed that exclusively breastfed infants have growth patterns comparable with the NCHS standards and that the growth in weight of ex-clusively breastfed infants appears adequate for the first 6 months of life.

A better weight gain of approximately 630 grams per month and 710 grams per month was seen in study and control group in the first 3 months. The weight gain decreased in both study and controls after 3 months, being about 560g per month and 650g per month respectively in next 3 months. Thus growth faltering was observed in both study group and controls after 3 months of age, though more pronounced in the study group. The initial good weight gain in both study group and controls could be accounted for the high percentage of exclusive breast feeding during the first 3 months when even mothers with fairly poor nutrition secrete fairly adequate amount of milk as already has been observed by Ghai and Sandhu [12]. An average daily weight gain of 19.83 grams and 22.79 grams was observed in study and control group re-spectively during the six months follow up. This average daily weight gain of 19.83 grams in our study in low birth weight group is comparable to the mean velocity of weight gain of 19.78g/day for all neonates for the first 4 months in a study conducted by Mathur, Seth, Misra [13].

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