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Weight gain pattern of Low Birth Infants exclusively fed on mothers' milk during the first six months of life

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Abstract

The birth weight of an infant is the single most important determinant. Nearly 15-20% of babies are born with low birth weight globally. A baby who is very small at birth may have trouble in feeding, gaining weight and low immunity. The aim of the study is to assess weight gain pattern of Low Birth Infants exclusively fed on mothers' milk during the first six months of life. A prospective observational cohort study was conducted between January 2016 to December 2016. Five hundred and eleven Low birth weight infants those born in tertiary care hospital of Raigad district were enrolled in the study. Based on their birth weight these infants were categorized into three subgroups-I (44 infants), subgroup-II (132 infants) and subgroup-III (335 infants). Follow up of these infants were done during regular visits to well-baby clinics and home visits over a period of six months at monthly interval. All Low birth weight babies born of singleton pregnancy without any gross congenital malformations during period of six months and their mothers were included in the study.

The mean birth weight in Subgroup-I was 1.3 kg, in subgroup-II was 1.8 kg and subgroup-III was 2.29kg. The mean weight of all LBW infants exclusively fed on mothers' milk was observed to be constantly below 5th percentile at birth and during six months follow up as compared to WHO standard growth curve. However, infants in all subgroups gained weight within the trajectory of their own birth weight which was seen less than 5th percentile of WHO standard growth chart. Infants in Subgroup-I & II showed better weight gain during first month and there after consistent increase in weight during six months with an average daily weight gain of 10-20gms. Hence, it is important for Low birth weight infants to be fed on exclusive mothers' milk either direct or Extracted Breast Milk.

Keywords: Low birth weight (LBW), growth, exclusive breastfeeding, weight, growth percentiles

1. Introduction

The birth weight of an infant is a reliable index of intrauterine growth and also a sensitive predictor of newborns chances of survival [1]. Low birth weight (LBW) has been defined as birth weight less than 2.5 kg, regardless of gestational age; preferably measurement being taken within first hour of life [2]. Low birth weight is one of the most serious challenges in maternal and child care in both developed and developing countries. Infants born with a Low birth weight present distinct 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 infants [3]. Growth of these infants, especially head circumference has connection with 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 Low birth weight accounts for 30- 40% of live births, out of which 60-70% being term intrauterine growth retardation and the rest are preterm [5].

Further Low birth weight is a prospective marker of mothers' nutritional and health status [6]. The aim of our study was to study and compare the weight gain pattern of Low birth weight infants exclusively fed on mothers' milk during the first six months of life.

Methodology

A prospective cohort study was conducted between Jan 2016 to December 2016. Five hundred and eleven Low birth weight infants were included in the study. They were further categorized into three subgroups based on their birth weight.

Infants having congenital malformation were excluded in this study. Follow up of these babies was done during regular home visit and their visit to well-baby clinic at monthly interval until completion of six months. Growth parameters like weight, length, head circumference and chest circumference were recorded during each visit. Also type of feeding was recorded.

Soon after birth, babies were weighed naked on electronic weighing scale to the nearest of +5 grams. Supine length was measured to the nearest of 0.5cm using infant meter. Head Circumference measured as the maximum circumference of the head with a non-stretchable measuring tape placing above the supraorbital ridges and over the occipital protuberance to the nearest of 1mm. chest circumference was taken at the level of nipples using non-stretchable tape to the nearest of 1mm. to assess the linear growth pattern in these three subgroups, they were given a progress card on discharge and mothers were asked to report every monthly + 7 days until six months of age during which primary immunization was also completed. However, six months follow up was completed considering their corrected age in all subgroup especially preterm babies. All babies were fed on mothers' milk. However, out of 511 neonates 44 (8.65%) babies having birth weight of 1001-1500 gms received mothers milk (EBM) through katori spoon during first month and grouped as Subgroup-I, in Subgroup-II 132 (25.82%) babies were born with birth

weight of 1501-2000 gms and in Subgroup-III there were 335 (65.53%) babies with birth weight of 2001-2500 gms. The weight gain and growth pattern of these babies was assessed and compared during follow up.

All the observations in this study was analyzed statistically. The mean, standard deviation and other factors were calculated with the help of computer. The significance of difference in the observation in these three subgroups were determined by Man Whitney test and chi-Square test and p-value of < 0.05 is taken as significant.

Results

Corrected age in Preterm babies was considered for six months follow up. The distribution of infants in Table-1 showed, very low birth weight infants in Subgroup-I were less as compared to low birth weight infants in subgroup-II & III.

Table 1: Distribution of LBW infants according to subgroups and weight category

Subgroup	Weight Category	Male		Female		Total	
		f	%	f	%	f	%
I	1001-1500 gms	21	4.1	23	4.5	44	8.65
II	1501-2000 gms	50	9.78	82	16.04	132	26.82
II	2001-2500 gms	145	28.37	190	37.18	335	65.53
Total		216	42.25	295	57.75	511	100

Table 2: Distribution according to Mean Weight and Monthly weight gain of LBW infants from birth till 6 months of age

Subgroup weight category	Mean Weight of LBW infants at monthly follow up						
	Birth	1mth	2mth	3mth	4mth	5mth	6mth
1.001-1.5 kg	1.3	2.1	2.45	2.7	2.90	3.4	3.6
Monthly gain of wt	-	0.80	0.35	0.25	0.20	0.45	0.20
1.501-2.0 kg	1.8	2.5	2.9	3.4	3.65	4.0	4.3
Monthly gain of wt	-	0.70	0.40	0.50	0.25	0.35	0.30
2.001-2.5 kg	2.29	2.7	3.3	3.9	4.3	4.7	5.1
Monthly gain of wt	-	0.41	0.6	0.60	0.40	0.40	0.40
p value		<0.001	<0.001	<0.001	<0.001	<0.001	<0.001

Mean weight and monthly gain in weight of LBW infants is shown in table 2. Infants in Subgroup-I (1.001-1.5 kg) and II (1.501-2.0 kg) exhibited better weight gain as compared to Sub group-III. Although there was consistent gain in weight

in later three months in all three subgroups. All infants showed weight gain throughout within their own birth weight trajectory albeit at slower pace by 6 months of age.

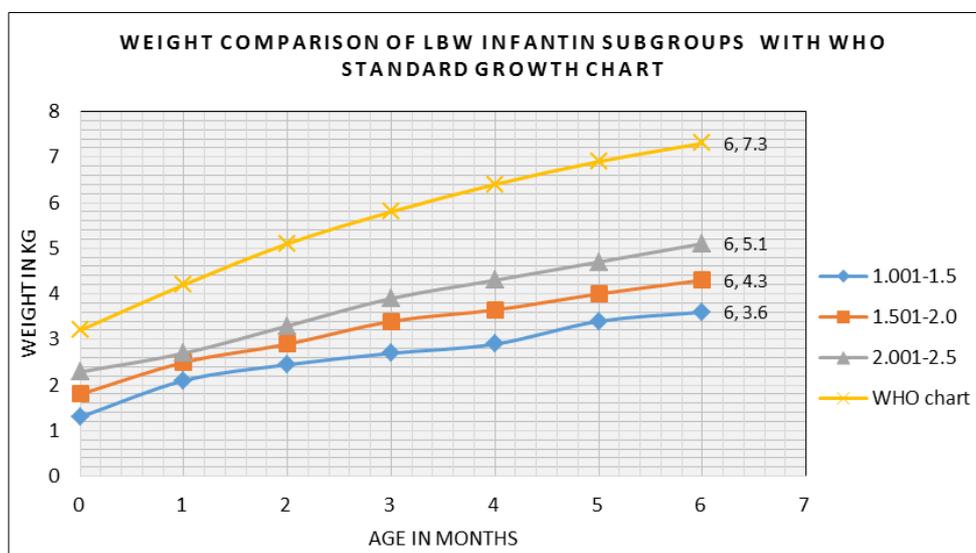


Fig 1: Comparison of weight of LBW infants from birth till 6 months of all subgroups with WHO standard chart

Fig 1 shows the growth pattern in relation to mean weight and comparison with WHO standard growth chart. The mean birth weight in Subgroup-I was 1.3 kg, in subgroup-II was 1.8 kg and Subgroup-III was 2.29 kg. The mean weight of LBW infants exclusively fed on mothers' milk was observed to be constantly below 5th percentile as compared to WHO standard growth chart.

Discussion

An Analysis of LBW infants fed on mothers' milk revealed that very low birth weight infants were having difficulty in sucking hence, these infants were fed with help of katori spoon. Whereas, LBW infants in subgroup-II & III were directly breast fed. 92%, 94.6 % and 91% infants were exclusive fed on mothers' milk during first three months in all three subgroups respectively which shows more than the national breast feeding rate ^[7]. Early initiations is extremely important for establishing successful lactation as well as for providing colostrum to the baby.⁸ However, the number of exclusive breastfed infants declined to 86%, 78% and 75% in subgroup I, II and III respectively. In this study, increased incidence of exclusive breast feeding is a reflection of our efforts educating and implementing hospital breast feeding policy and regular home visits.

In this study the mean weight in Subgroup-I was observed to be constantly below 5th percentile at birth and during 6 months follow up. The pattern of serial weight gain in this groups is in close agreement with serial follow up of a study by Borah M *et al.* ^[9] on growth among VLBW infants which reported shorter and lighter than full term infants. Although infants in subgroup II and III follow their own growth trajectory satisfactorily showing faster weight gain from birth till 6 months. This finding is also supported by the study conducted by Otaige B E *et al.* ^[10] who showed that exclusively breastfed infants have their own growth pattern and the growth in terms of weight in exclusively breastfed appears adequate for the first 6 months of life However, it disagrees with comparison with Standard chart.

A better weight gain of approximately 800 gms and 700 gms during first month of life was seen in subgroup I and II respectively. All LBW improved in weight gain through six months running near 5th percentile of WHO standard growth chart for normal babies. Our findings are similar to the study conducted by Singh D *et al.* ^[11] which showed Progressive decline in weight, length and head circumference of infants in Subgroup III to Subgroup II to Subgroup I. Thus growth faltering was observed in all three subgroups after three months of age. The initial good weight gain in all subgroups could be accounted for high percentage of exclusive breastfeeding even when mothers were having fairly poor nutrition, fair secretion of amount of milk as already has been observed by Ghai and Sandhu ^[12] although below expected respective WHO standard growth curves.

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