Physical growth of Khasi children availing ICDS scheme in Mawsynram Development Block, Meghalaya

R. Rodborne

Rimonbasukshisha Rodborne, Department of Anthropology, North Eastern Hill University, Shillong-793022. Email: Rimonbasuk Rodborne<rrimonbasuk@gmail.com>

ABSTRACT

The growth of children is considered as one of the most important indicators for understanding the health and wellbeing of a community or nation. The growth of children and youth are considered to be best suited for explaining the nutrition and health status of a community (WHO, 1976). The present study was conducted in Mawsynram Community Development Block (CRDB) of the East Khasi Hills district of Meghalaya, India. Anthropometric measurement of height and weight was carried out for studying the growth pattern of 549 children aged 2-6 years. In the present study we observed that boys were significantly heavier than girls across ages except for the 54 months age group. The total gain from 24 to 72 months of age was slightly greater in boys (5.42 kg) than in girls (5.39kg). Height increases with the increase in age for both boys and girls. The total gain in height from 2 to 6 years was lower in boys (24.66cm) than in girls (25.29cm). It is therefore obvious that boys had slower growth rates in height, on average, than girls. Body Mass Index of boys was above the 50th percentile of WHO standards whereas the girls were following slightly lower than 50th centile of these standards. The present study highlighted that the growth pattern of Khasi children availing ICDS scheme in Mawsynram CRDB has slightly improved although measures should be taken to improve the impact of the Supplementary Nutrition Programme of ICDS.

Keywords: Weight, Height, BMI, Growth, ICDS, Khasi

INTRODUCTION

The growth of children is considered as one of the most important indicators for understanding the health and well being of a community or nation. Although the paradigm of growth is very stable, its intensity and duration are rather sensitive to environmental agents and data on growth is a clear indicator that clearly reflects the economy, hygiene and cultural peculiarities (Bodzsar,2000). The study of growth is important in elucidating the mechanism of evolution. It is the alterations in the inherited pattern of growth and development which is responsible for the evolution of morphological characters moreover individual differences in the form and function in man arise through differential rates of growth of particular parts in relation to others (Shukla and Rastogi,1991). The growth of children and youth are considered to be best suited for explaining the nutrition and health status of a community (WHO,1976). Growth and maturation are maintained by the interactions of genes, hormones, and nutrients (Malina et al.,2004). It provides an indirect measurement of the quality of life of an entire population (De Onis and Blossner,2003).

Anthropometry is one of the best reliable techniques to access the growth and nutritional status of an individual or a population (Gorstein et al., 1994: Jelliffe, 1996). The internationally recommended way to assess malnutrition at population level is to take body or anthropometric measurements (e.g. weight and height). Based on combinations of these body measurements anthropometric indices are constructed. These indices are essential for the interpretation of body measurements as, for example, weight alone has no meaning unless it is related to an individual's age or height (WHO, 1995).

In Northeast India, few studies have been conducted among different populations on growth (Khongsdier, 1996; Khongsdier and Mukherjee,2003; Maken and Varte,2012 ; Longkumer, 2013).There is also dearth of information regarding growth pattern of Khasi children aged 2 to 6 years of Meghalaya except a study conducted by the Department of Anthropology, NEHU in collaboration with the Department of Social welfare, Government of Meghalaya (Khongsdier,2010).Therefore the present study attempt to understand the growth pattern of Khasi children in the age groups of 2 to 6 years.

MATERIALS AND METHODS

The present study was conducted in Mawsynram Community Development Block (CRDB) of the East Khasi Hills district of Meghalaya.It is bounded by Khatarshnong-Laitkroh Block on the east, Mawkyrwat Development Block on the west, Mawphlang Development Block on the north and ShellaBholaganj Development Block on the south.Mawsynram is about 16 km west of Sohra (Cherrapunjee) in the Khasi Hills district. Its total geographical area is 61,450 hectares. Mawsynram Block has a population of 45,262 in which 22,974 are males and 22,288 are females as per 2001 census with a density of 87 per sq. km. There are 6 numbers of P.H.C and 4 numbers of Dispensaries in the Block. Mawsynram is a popular tourist destination. It is the wettest place on earth with an annual rainfall of 11,872 millimeters.

Mawsynram CRDB is predominantly inhabited by the Khynriam and War Khasis. The main occupation of the War Khasis is horticulture. Some people are also engaged in business and services. Anthropometric measurements were carried out to study the growth pattern of 549 children aged 2-6 years. Anthropometric measurements, namely height and weight were taken on the children following the standard technique of Weiner and Lourie (1981).Body weight of each child was taken in minimum clothing with the help of weighing machine.An anthropometric rod in terms of centimeters was used for measuring the height of children.All data were managed and analyzed using SPSS/PC Software (Version 22).The differences between two means were tested by using the student's t-test.

RESULTS

Body Weight

Table 1 shows the means, standard deviations and growth rates in respect of body weight for both boys and girls. It is observed that boys were significantly heavier than girls across ages, and the sex differences were not statistically significant except at 54 months of age. The mean values were also plotted against ages in Figure 1. It shows that boys were heavier than girls across ages.

The velocity growth rate for every six months reached its peak at the age of 36 months for boys and at the age of 60 months for girls as shown in Figure 2.

The total gain from 24 to 72 months of age was slightly greater in boys (5.42 kg) than in girls (5.39kg). The maximum gain in boys occurs at 36 months of age (1.58 kg), whereas in the

case of girls it was at age 60 months (1.88 kg). Overall, it indicates that there was a growth spurt or accelerated growth rate from 30 to about 36 months of age in boys. In the case of girls, the growth spurt occurred from about 54 to 60 months of age.

Table 1: Means, standard deviations and growth rates in weight of boys and girls

| AGE IN MONTHS	BOYS				GIRLS				t-value (2-tailed)
	N	MEAN	SD	VELOCITY	N	MEAN	SD	VELOCITY	
24	19	11.18	2.09	-0.05	19	10.69	1.26	-0.83	0.88
30	27	10.89	1.79	0.21	33	10.64	1.53	0.18	0.58
36	46	12.45	1.95	0.32	41	11.76	1.73	0.26	1.74
42	23	12.82	1.53	0.23	18	12.20	1.38	0.32	1.34
48	49	13.84	1.66	0.25	47	13.68	2.04	0.18	0.42
54	24	14.30	1.65	0.27	28	13.13	1.30	0.22	2.86*
60	39	15.44	2.23	0.24	31	15.01	1.63	0.39	0.90
66	13	15.76	1.71	0.19	16	15.47	0.99	0.18	0.57
72	46	16.60	2.52	0.14	30	16.08	2.05	0.10	0.94

*Significant at 5%
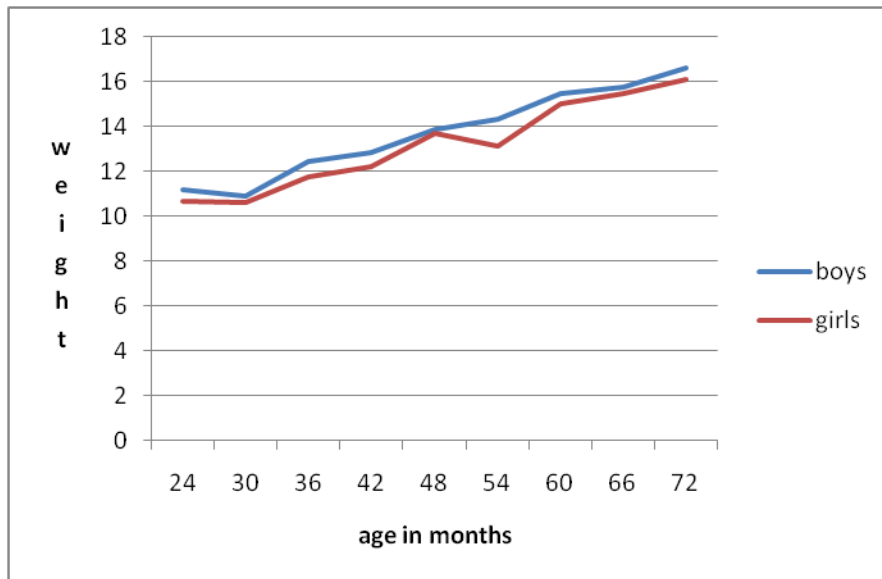
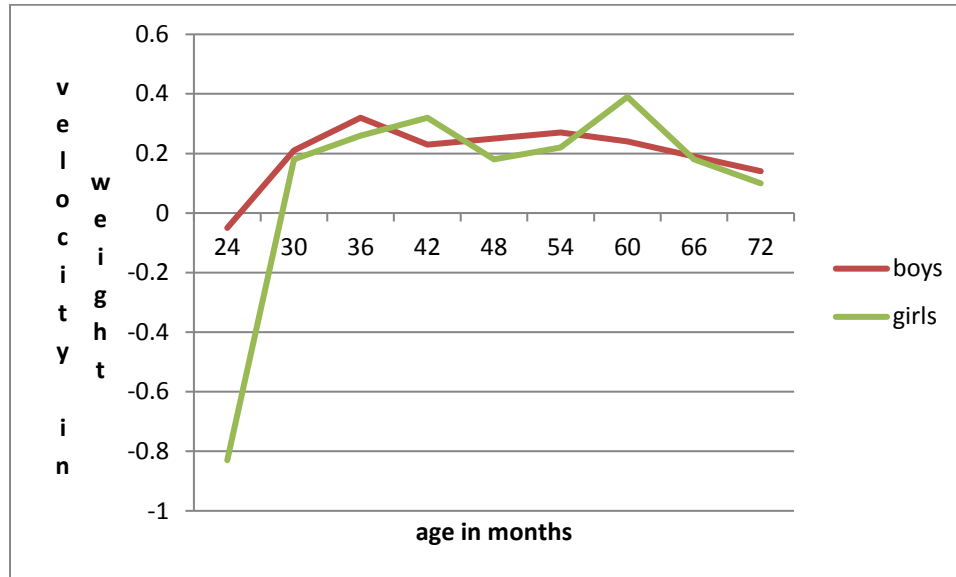Figure 1: Distance curves for weight of boys and girls.

Figure 2: Velocity curves for weight of boys and girls.

Height

The means, standard deviations and growth rates in respect of height are shown in Table 2. As expected, height increases with the increase in age for both boys and girls. The distance curve (Figure 3) shows that boys were taller than girls across age groups except at the age of 60 to 66 months. Applying t-test however, the differences between boys and girls in height are found to be statistically insignificant across age groups except at the age of 36 months. The velocity curve (Figure 4) indicates that boys experienced the maximum gain in height from 30 to 36 months of age, whereas girls experienced the maximum gain in height from 54 to 60 months of age. It is further seen that girls had a greater growth rate than boys at the age of 60 to 66 months and thereafter the growth rate was greater in the latter.

The total gain in height from 2 to 6 years was lower in boys (24.66cm) than in girls (25.29cm). It is therefore obvious that boys had slower growth rates in height, on average, than girls. According to Tanner (1992), the sex difference in height till adulthood is due mostly to the longer period of male growth. During the pre-pubertal growth, males have greater leg length relative to the trunk, because the legs are growing faster than the trunk at this time. Since we did not collect data on sitting height, we are not in a position whether or not to confirm such an observation in this population. But it is evident that growth rate was slower in boys.

Table 2: Mean, Standard deviations and growth rates in height of boys and girls.

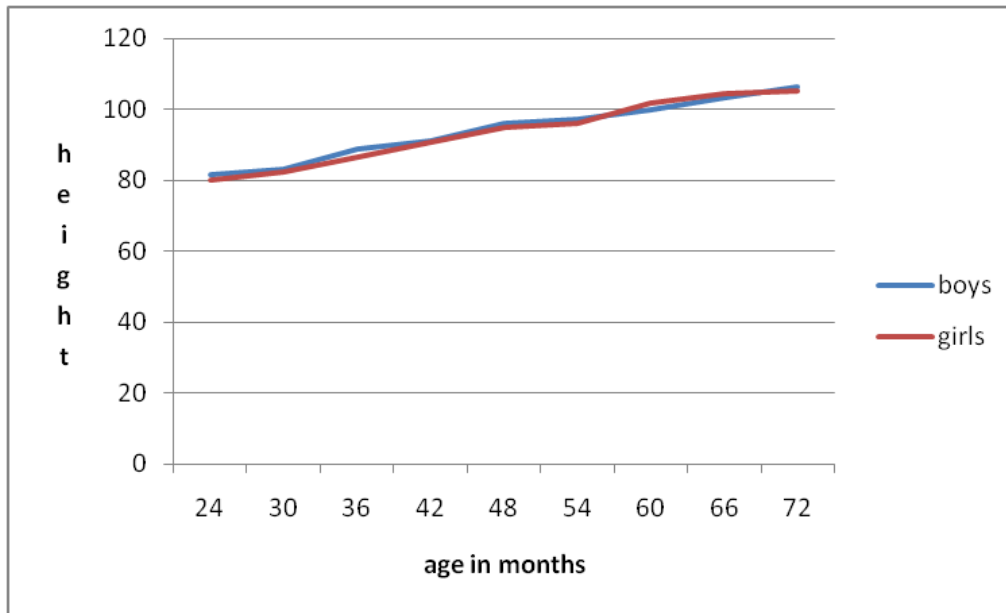| AGE IN MONTHS	BOYS				GIRLS				t-value (2-tailed)
	N	MEAN	SD	VELOCITY	N	MEAN	SD	VELOCITY	
24	19	81.65	5.13	0.24	19	80.09	3.72	0.39	1.07
30	27	83.10	4.99	1.22	33	82.40	4.98	1.08	0.54
36	46	88.99	4.95	1.32	41	86.58	5.48	1.39	2.16*
42	23	91.04	3.86	1.19	18	90.72	3.93	1.43	0.26
48	49	96.12	5.11	1.00	47	95.18	5.21	0.89	0.89
54	24	97.02	4.71	0.65	28	96.05	4.46	1.13	0.76
60	39	99.99	5.52	1.02	31	101.96	5.11	1.44	1.53
66	13	103.12	5.33	1.05	16	104.71	3.78	0.57	0.94
72	46	106.31	5.17	0.53	30	105.38	5.41	0.11	0.75

*Significant at 5%

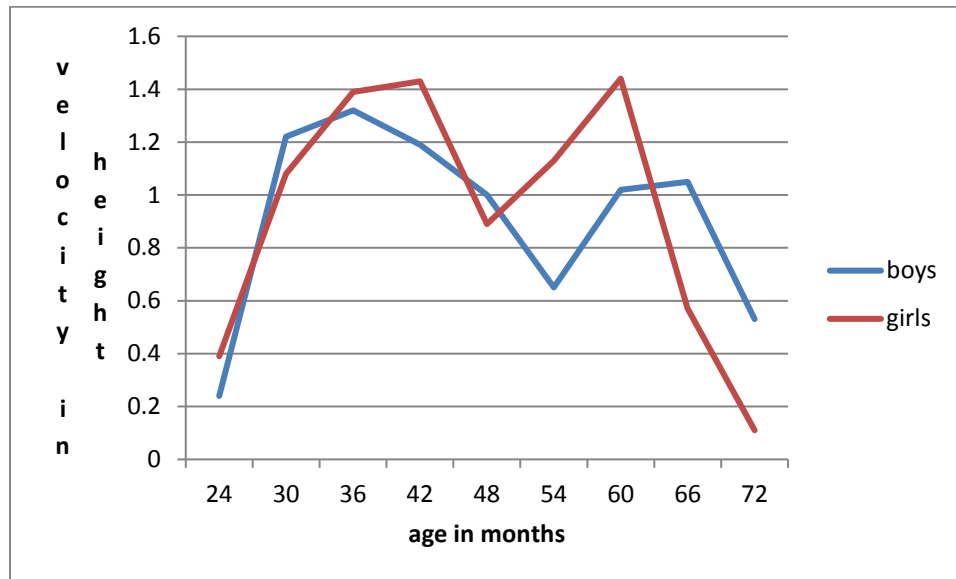Figure 3: Distance curves for height of boys and girls

Figure 4: Velocity curves for height of boys and girls.

Body Mass Index

Table 3: Mean, Standard deviation of BMI in both boys and girls

AGE IN MONTHS	BOYS			GIRLS			t-valued (2-tailed)
	N	MEAN	SD	N	MEAN	SD	
24	19	16.80	2.85	19	16.65	1.26	0.21
30	27	15.82	2.69	33	15.66	1.80	0.27
36	46	15.71	1.92	41	15.72	2.14	0.02
42	23	15.47	1.56	18	14.84	1.54	1.29
48	49	15.02	1.78	47	15.08	1.77	0.17
54	24	15.20	1.60	28	14.79	1.73	0.88
60	39	15.48	1.95	31	14.45	1.26	2.55*
66	13	14.80	0.72	16	14.14	1.11	1.85
72	46	14.65	1.58	30	14.47	1.40	0.51

*Significant at 5%

Table 3 shows the means, standard deviations in respect of Body Mass Index for both boys and girls. It is observed that the BMI of boys were greater than girls across ages, and the sex differences were not statistically significant except at 60 months of age.

DISCUSSION

The present study indicates that weight and height increased with an increase in age for boys and girls across ages. Figure 5 and Figure 6 show the growth curves in weight when compared with the WHO growth curves. The boys of the present study were consistently placed above the 5th centile of WHO standards in weight whereas the girls were above the 5th centile but at some ages they even touched the 3rd centile. When compared with the study conducted in 2010 by the Department of Social welfare, Government of Meghalaya in collaboration with the Department of Anthropology, NEHU (Khongsdier, 2010)   it was found that boys weight were similar at 30 months of age, whereas for girls it was found to be higher in the present study. This is clearly indicative that growth curve in weight has slightly improved in the present study.
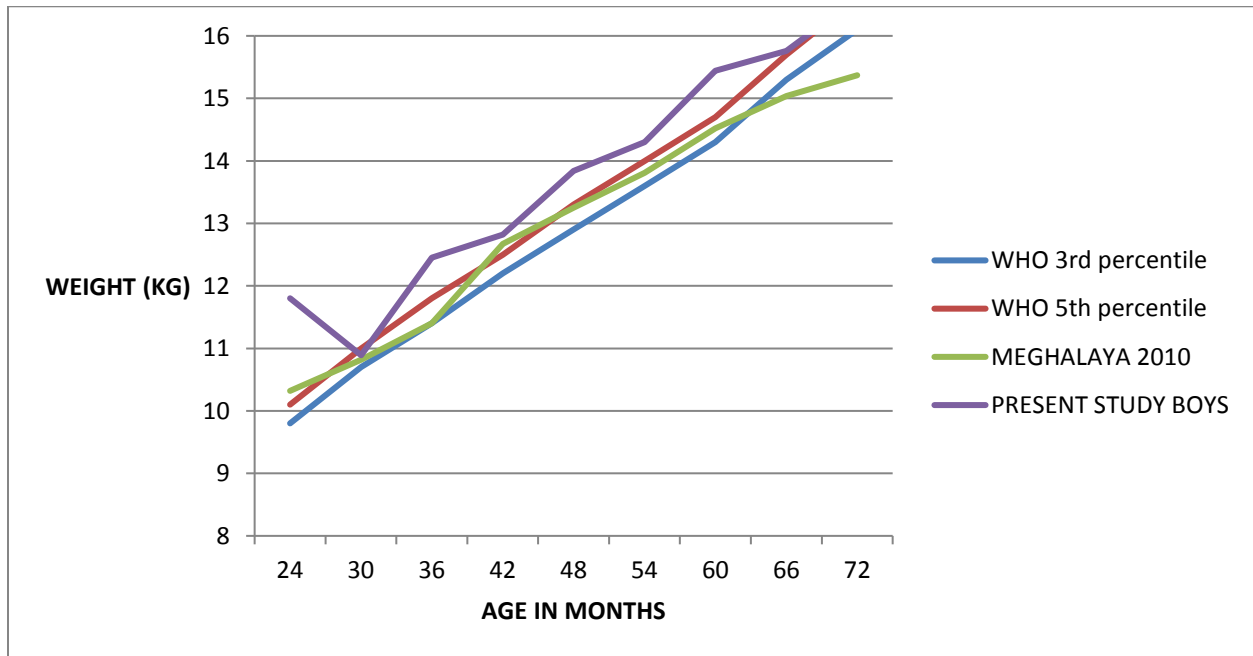

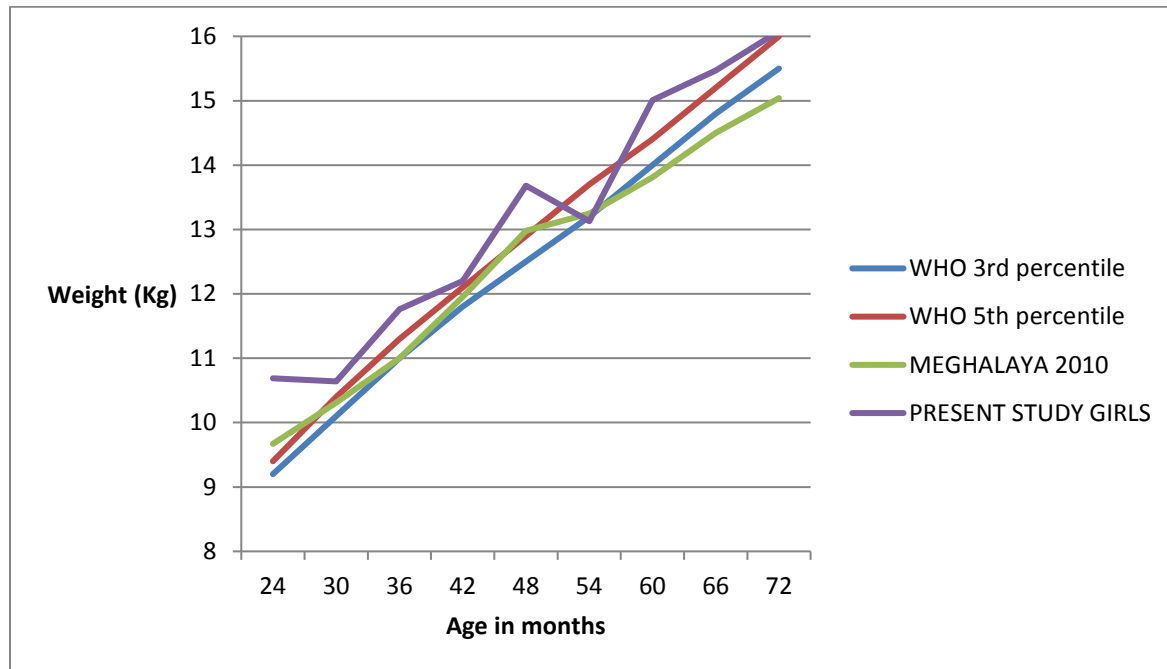Figure 5: Weight of boys compared to WHO growth references and Meghalaya 2010 study.

Figure 6: Weight of girls compared to WHO references and Meghalaya 2010 study.

Figure 7 and Figure 8 show the growth curves of height in comparison with the WHO growth references for boys and girls, respectively. The growth curves of height were below the 3rd percentile of the WHO growth reference for boys and between 3rd and 5th centile for girls. The growth curves in children was found to be higher in the present study when compared with the study conducted in 2010 by the Department of Social welfare, Government of Meghalaya in collaboration with the Department of Anthropology, NEHU (Khongsdier, 2010). Thus this study shows that although there seem to be slight improvement in the growth curve of children when compared with study conducted in 2010, it is likely that the prevalence of stunting would be fairly high in the population. Nonetheless, the growth status of children covered under this study was clearly indicative of nutritional deprivation.
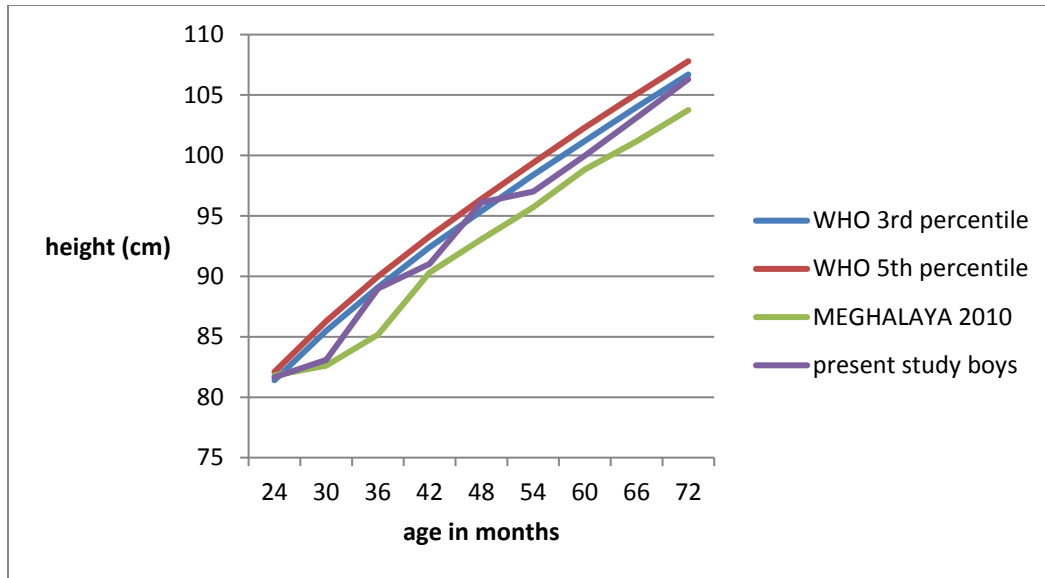
Figure 7: Height of boys compared to WHO growth reference and Meghalaya 2010 study.
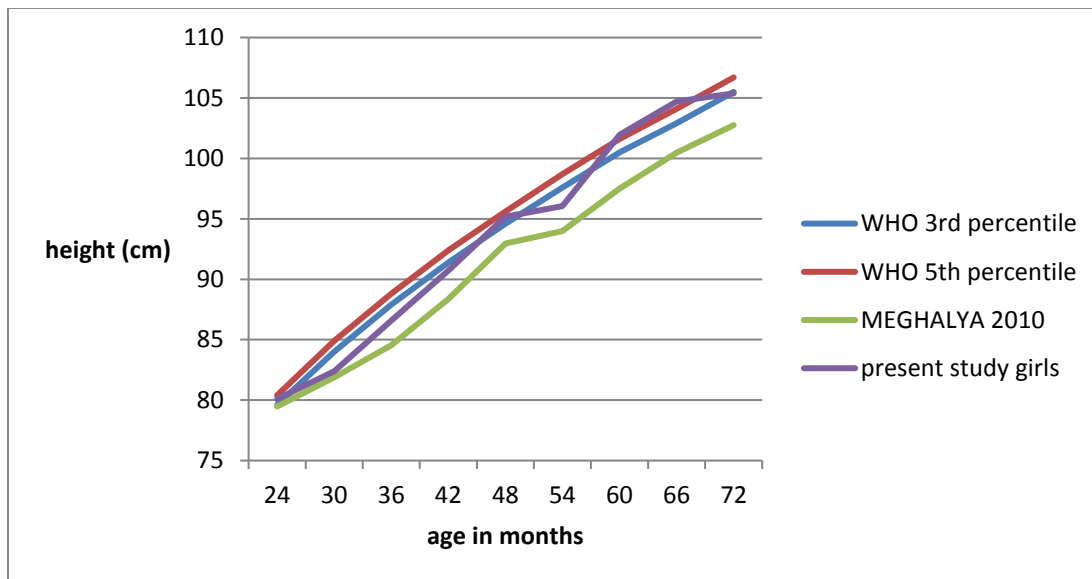

Figure 8: Height of girls compared to WHO growth reference and Meghalaya 2010 study.

Figure 9 and Figure 10 show the Body Mass Index in comparison with the WHO growth references for boys and girls, respectively. The BMI curves of boys were above the 50th percentile at most of the age groups. The BMI curves of girls from 24 to 36 months were above the 50th percentile, but drifted downwards towards 25th percentile from 42 months. Therefore more efforts should be done in monitoring the BMI of both boys and girls in the present study.
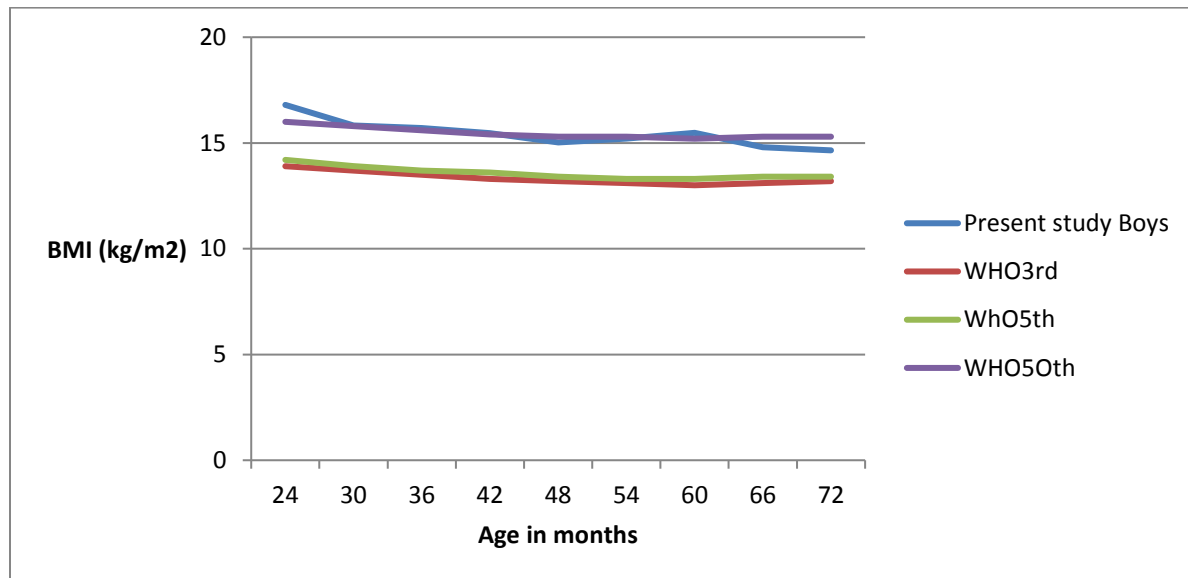
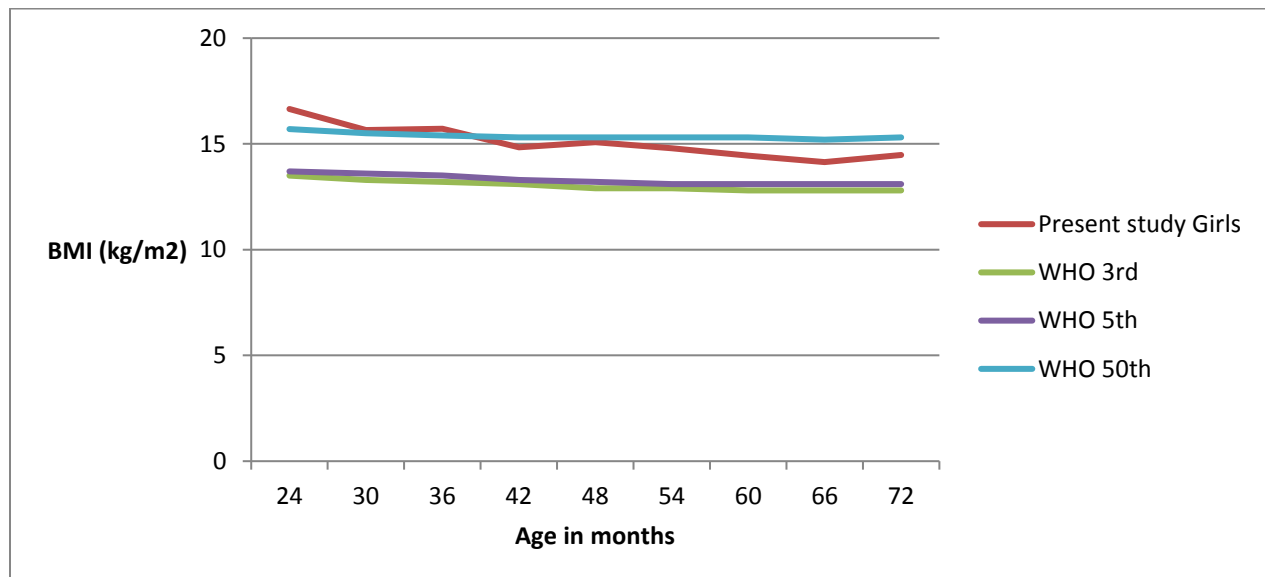Figure 9: Body Mass Index of boys compared to the WHO reference.

Figure 10: Body Mass Index of girls compared to the WHO reference

Conclusion

The present study highlighted that the growth pattern of Khasi children availing ICDS scheme in Mawsynram CRDB has slightly improved although measures should be taken to improve the

impact of the Supplementary Nutrition Programme of ICDS. Therefore, the implementation of the ICDS Programme in the state should be maintained and strengthened.

REFERENCES

Bodzsar EB.2000. A review of Hungarian studies on growth and physique of children. *Acta. Biological Sczgediensis,* 44, pp: 139-153.

De Onis M, Blössner M .2003. The World Health Organization global database on child growth and malnutrition: methodology and applications, *International Journal of Epidemiology*, vol. 32, no. 4, pp: 518–526.

Gorstein J, Sullivan K, Yip R, de Onis M, Trowbridge F, Fajans P .1994. Issues in the assessment of nutritional status using anthropometry, *Bullentin of World Health Organization*, vol.72,pp: 272-283

Jellife DB.1996. *Assessment of the nutritional status of the community* .Monograph series No.53.WHO, Geneva.

Khongsdier R .1996.Growth pattern of the War Khasi children of Meghalaya. *Journal of Human Ecology*, Vol.7, no. 3,pp:175-180.

Khongsdier R, Mukherjee N. 2003. Growth and nutritional status of Khasi boys in Northeast India relating to exogamous marriage and socio-economic classes. *American Journal of Physical Anthropology* ,Vol.122,pp:162-170.

Khongsdier R. 2010. Evaluation study of the Supplementary Nutrition Programme in Selected ICDS Projects of Meghalaya.Department of Anthropology, NEHU, Shillong.

Longkumer T. 2013. Physical growth and nutritional status among Ao Naga children of Nagaland ,Northeast India. *Journal of Anthropology* ,Volume 2013, Article ID 291239, 6 pages, Available from http://dx.doi.org/10.1155/2013/291239

Maken T, Varte LR . 2012. Nutritional status of children as indicated by Z-scores of the Hmars :A tribe of Northeast India. *Antrocom online journal of Anthropology*,Vol.8,pp:213-227.

Malina RM, Bouchard C, Bar-Or O .2004. Physical activity as a factor in growth, maturation, and performance, in Growth, Maturation, and Physical Activity, *Human kinetics*, 2nd edition, pp:509–525

Shukla BR, Rastogi S.1991.*Physical Anthropology and human genetics –An introduction*. Plaka Prakashan, Delhi.

Tanner JM .1992. Human growth and development. In : *The Cambridge Encyclopedia of Human Evolution*, edited by S.Jones, R.Martin and D.Pilbeam,pp:98-105.Cambridge :Cambridge University Press.

Weiner JS, Lourie JA . 1981. *Practical Human Biology*. London: Academic Press.

WHO. 1976. New trends, and approaches in the delivery of maternal and child care in health services. WHO Technical Report Series 600, Geneva.

WHO.1995. Physical Status: The Use and Interpretation of Anthropometry. Report of a WHO Expert Committee. Technical Report Series No. 854. Geneva.