

CHAPTER-VI

DISCUSSION

As there is growth distribution in age changes and sex differences for the body size of the subjects in each and every measurement on the process of growing so it is important to find out the significance of the distribution of growth in between the two consecutive age groups and between the boys and the girls in the same age group considering it in term of statistical significance. In order to do so the t-test has been used to arrive at an appropriate interpretation.

The distribution of growth differences in boys between the age groups (table: 25) had shown highly statistical significance in the age group of 10-11 years followed sequentially by age groups of 13-14, 15-16, 8-9, 12-13, 14-15, 16-17, 11-12 and lastly by 9-10 years. There were no growth differences in the age group 17-18 years. Of all the measurements, the ponderal and linear measurements especially the weight, biacromial diameter, height and sitting height showed the highly significant differences in growth in all age groups, followed by the growth girths sequentially shown significant differences by the chest, hip, waist, calf and lastly by mid-upper arm circumference, and the least by skinfold thicknesses where the highest is shown by subscapular, triceps, suprailiac and lastly by biceps and calf skinfold.

The distribution of growth differences in girls between the age groups (table: 26) had shown highly statistical significance in the age group of 12-13 years followed sequentially by age groups of 10-11, 8-9, 9-10, 14-15, 17-18, 13-14, 11-12 and lastly by 15-16 years. There was no growth difference in the age group 16-17 years. Of all the measurements the ponderal and linear measurements sequentially by the weight, biacromial diameter, height and sitting height have got highly statistical significant differences in growth of all age groups followed by growth girth sequentially shown high significance by the hip, muac, chest, calf and lastly by waist circumference, and the least by skinfold thicknesses where the highest shown sequentially by subscapular, triceps, suprailiac, biceps and lastly by the calf skinfold.

The distribution of growth differences in age groups between boys and girls (table: 27) had shown highly statistical significance in the age group of 10 years

Sl. No	MEASUREMENTS	8-9 Years	9-10 Years	10-11 Years	11-12 Years	12-13 Years	13-14 Years	14-15 Years	15-16 Years	16-17 Years	17-18 Years
1	Weight	-4.181**	-1.417	-5.387**	-2.953*	-3.782**	-4.478**	-3.338*	-2.846*	-2.079*	-0.147
2	Height	-5.339**	-2.473*	-4.860**	-3.202*	-3.334*	-4.894**	-3.600**	-1.755	-1.306	-0.958
3	Sitting Height	-4.284**	-1.002	-5.169**	-1.954	-3.980**	-4.110**	-3.147*	-2.358*	-2.366*	-1.002
4	Biacromial Diameter	-3.480**	-1.500	-4.775**	-3.346*	-4.342**	-4.585**	-2.374*	-2.902*	-2.160*	-1.185
5	Chest Circumference	-3.662**	-0.531	-5.060**	-2.540*	-4.574**	-3.723**	-2.713*	-3.061*	-3.158*	0.692
6	Waist Circumference	-2.038*	0.175	-4.886**	-0.814	-2.896*	-2.496*	-1.855	-2.237*	-1.156	0.445
7	Hip Circumference	-3.042*	-0.419	-4.845**	-3.292*	-3.960**	-3.927**	-3.240*	-2.714*	-1.995	-0.765
8	MUAC	-1.690	-0.023	-3.972**	-0.776	-1.600	-2.501*	-1.952	-2.520*	-3.578**	1.101
9	Calf Circumference	-2.586*	-0.521	-4.944**	-1.787	-2.262*	-3.068*	-1.928	-2.826*	-1.969	1.003
10	Biceps Skinfold	-0.031	1.618	-2.216*	1.186	1.560	-0.861	0.919	-1.653	0.224	1.749
11	Triceps Skinfold	-0.513	3.065*	-3.030*	1.184	1.441	-0.978	1.243	-2.240*	-0.178	0.544
12	Subscapular Skinfold	-2.397*	2.871*	-2.368*	0.085	-1.392	-2.372*	-2.610*	-2.256*	-1.868	0.107
13	Suprailiac Skinfold	-0.574	2.362*	-2.258*	-0.974	-1.212	-0.779	-1.816	-0.948	-0.765	0.152
14	Calf Skinfold	-0.107	1.506	-2.253*	0.557	-1.257	0.692	0.656	-1.636	0.273	1.786

Table 25: Age Difference (t-values) for various measurements in Boys

Sl. No	MEASUREMENTS	8-9 Years	9-10 Years	10-11 Years	11-12 Years	12-13 Years	13-14 Years	14-15 Years	15-16 Years	16-17 Years	17-18 Years
1	Weight	-4.325**	-4.315**	-4.255**	-1.963	-5.184**	-2.704*	-3.163*	-0.936	-0.140	-2.207*
2	Height	-3.692**	-4.139**	-3.936**	-2.833*	-3.682**	-2.317*	-3.535**	-0.119	-0.100	-1.234
3	Sitting Height	-0.755	-4.484**	-3.979**	-2.060*	-4.761**	-2.342*	-3.229*	-0.510	-0.089	-1.655
4	Biacromial Breadth	-3.897**	-3.887**	-4.291**	-2.095*	-4.083**	-1.433	-4.714**	0.380	-0.286	-2.805*
5	Chest Circumference	-4.046**	-4.254**	-3.914**	-1.939	-5.685**	-1.711	-3.108*	-0.779	-0.447	-1.595
6	Waist Circumference	-3.261*	-1.959	-2.773*	-1.336	-4.313**	-0.759	-1.836	-0.494	-0.284	-1.420
7	Hip Circumference	-3.796**	-4.409**	-3.149*	-2.242*	-5.115**	-1.768	-3.996**	-1.580	0.067	-2.779*
8	MUAC	-2.313*	-3.163*	-3.452*	-0.992	-5.774**	-1.225	-2.687*	0.066	-0.527	-2.468*
9	Calf Circumference	-3.904**	-2.730*	-5.505**	0.077	-4.632**	-0.945	-3.441*	0.323	-0.013	-1.175
10	Biceps	0.198	-0.265	0.518	0.414	-3.271*	-0.739	1.807	-3.233*	1.108	-0.731
11	Triceps	-1.259	-0.420	-1.148	1.365	-4.341**	-2.603*	-1.256	-0.636	0.316	-1.758
12	Subscapula	-0.592	-1.596	-1.410	-0.335	-4.411**	-2.335*	-1.384	-0.723	-0.177	-2.053*
13	Suprailiac	-1.184	-0.520	-1.878	-0.654	-3.931**	-1.951	-0.784	-0.614	0.724	-3.869**
14	Calf Skinfold	-0.525	-0.402	-1.616	0.478	-4.233**	-1.106	-0.624	-0.723	0.068	-0.672

Table 26: Age Difference (t-values) for various measurements in Girls

Sl. No	MEASUREMENTS	8-8 Years	9-9 Years	10-10 Years	11-11 Years	12-12 Years	13-13 Years	14-14 Years	15-15 Years	16-16 Years	17-17 Years	18-18 Years
1	Weight	0.448	0.320	-2.653*	-2.301*	-1.250	-3.304*	-1.420	-0.554	2.070*	4.877**	2.816*
2	Height	-1.722	-0.502	-2.234*	-1.613	-1.022	-0.962	2.337*	3.792**	6.402**	8.737**	7.805**
3	Sitting Height	-1.090	1.404	-3.013*	-1.902	-2.022*	-2.455*	-0.136	1.086	3.950**	7.872**	6.295**
4	Biacromial Breadth	0.035	0.144	-2.458*	-2.886*	-1.776	-1.759	1.892	0.877	4.934**	8.999**	6.794**
5	Chest Circumference	2.183*	1.759	-2.296*	-2.414*	-1.960	-5.197**	-3.186*	-3.771**	-1.202	1.483	-0.836
6	Waist Circumference	2.172*	1.447	-0.706	1.054	0.390	-1.539	0.076	0.156	2.270*	2.704*	1.084
7	Hip Circumference	-0.298	-0.941	-4.685**	-3.409*	-2.906*	-5.652**	-4.250**	-4.494**	-3.082*	-0.858	-3.301*
8	MUAC	-0.258	-0.790	-3.789**	-1.640	-1.242	-5.258**	-2.621*	-2.318*	0.124	3.301*	-0.310
9	Calf Circumference	-0.425	-0.673	-2.467*	-2.888*	-0.640	-2.707*	-0.439	-2.136*	0.957	2.968*	0.729
10	Biceps	-3.371*	-3.718**	-4.153**	-1.516	-2.377*	-7.035**	-6.656**	-6.713**	-6.344**	-5.032**	-8.852**
11	Triceps	-3.105*	-4.222**	-6.773**	-3.255*	-4.197**	-9.454**	-8.869**	-11.891**	-11.067**	-9.610**	-13.715**
12	Subscapula	-3.456*	-2.198*	-4.613**	-4.286**	-5.644**	-8.598**	-9.566**	-7.304**	-7.305**	-5.023**	-9.136**
13	Suprailiac	-1.323	-1.552	-4.599**	-3.601**	-3.919**	-6.833**	-7.544**	-6.356**	-6.042**	-4.539**	-8.488**
14	Calf Skinfold	-2.867*	-4.320**	-5.474**	-4.136**	-4.364**	-6.954**	-9.530**	-9.134**	-8.365**	-7.606**	-13.387**

Table 27: Sex Difference (t-values) for various measurements between boys and girls

Sex	Measurements	8-9 Years	9-10 Years	10-11 Years	11-12 Years	12-13 Years	13-14 Years	14-15 Years	15-16 Years	16-17 Years	17-18 Years
Boys	Normal	-0.96	1.56	-1.02	1.24	-1.46	-0.31	-1.01	-0.72	-1.01	2.91*
	Moderate	0.06	0.45	0.12	-1.32	0.13	0.40	1.19	0.07	-2.18*	3.10
	Severe	0.25	-0.99	-0.45	-	-	-	-0.40	-	-	-
Girls	Measurements	8-9 Years	9-10 Years	10-11 Years	11-12 Years	12-13 Years	13-14 Years	14-15 Years	15-16 Years	16-17 Years	17-18 Years
	Normal	-1.77	0.13	-0.52	0.68	-3.83**	-0.12	-0.70	0.53	0.81	-1.10
	Moderate	-0.88	-0.85	-1.74	-0.23	0.87	-0.62	-	-	-	-
	Severe	-	-	-	0.62	-	-	-	-	-	-

Table 28: t-values of BMI for Age in age groups of boys and Girls

Sex	Measurements	8-9 Years	9-10 Years	10-11 Years	11-12 Years	12-13 Years	13-14 Years	14-15 Years	15-16 Years	16-17 Years	17-18 Years
Boys	Normal	-1.41	0.72	-0.77	-1.81	2.08*	0.35	-1.66	1.43	1.66	-0.04
	Moderate	1.66	0.93	-1.86	1.04	-1.35	-1.03	2.45*	-0.05	-0.05	-0.61
	Severe	-1.34	1.09	0.47	-0.09	0.19	-1.47	0.87	-0.00	-1.35	0.99
Girls	Measurements	8-9 Years	9-10 Years	10-11 Years	11-12 Years	12-13 Years	13-14 Years	14-15 Years	15-16 Years	16-17 Years	17-18 Years
	Normal	0.52	-1.53	-0.18	2.55*	-0.03	-0.02	1.38	1.01	-1.59	-1.10
	Moderate	-2.10*	1.01	0.12	1.24	-1.78	0.99	-0.07	-0.65	0.52	-0.51
	Severe	0.42	-1.88	1.75	-0.10	-0.63	-0.30	-	-	0.58	0.95

Table 29: t-values of Height for Age in age groups of boys and Girls

Sex	Measurements	8-9 Years	9-10 Years	10-11 Years	11-12 Years	12-13 Years	13-14 Years	14-15 Years	15-16 Years	16-17 Years	17-18 Years
Boys	Normal	-0.45	1.21	-0.25	-2.70*	2.52*	-1.00	-1.11	0.41	0.23	1.67
	Moderate	0.48	0.69	-1.18	0.21	-0.05	-0.76	0.17	-1.29	1.72	1.14
	Severe	-0.04	0.39	0.39	-1.15	-0.20	0.76	1.32	-0.34	-0.63	0.51
Girls	Measurements	8-9 Years	9-10 Years	10-11 Years	11-12 Years	12-13 Years	13-14 Years	14-15 Years	15-16 Years	16-17 Years	17-18 Years
	Normal	0.96	-1.46	-.48	0.75	-1.82	-0.09	0.29	-0.07	0.83	-1.05
	Moderate	-0.37	-0.78	0.11	0.05	-0.00	-0.21	-0.16	0.05	-0.43	0.50
	Severe	1.09	-1.32	0.86	0.95	0.15	0.08	-1.17	0.45	1.43	-0.70

Table 30: t-values of Weight for Age in age groups of boys and Girls

Indices	Measurements	8-8 Years	9-9 Years	10-10 Years	11-11 Years	12-12 Years	13-13 Years	14-14 Years	15-15 Years	16-16 Years	17-17 Years	18-18 Years
BMI for AGE	Normal	0.32	-0.05	-1.60	-1.30	-1.67	-4.48**	-3.57**	-3.29*	-2.08*	-0.21	-4.42**
	Moderate	0.85	0.52	0.710	-0.23	0.53	1.74	0.24	0.10	-	-	2.16
	Severe	-	0.86	-0.62	-	-0.53	-	-	-	-	-	-
Height for AGE	Normal	-2.21*	-0.31	-2.32*	-1.97	2.36*	0.23	-0.10	2.81*	2.10*	-1.05	-1.90
	Moderate	1.49	-2.42*	-1.79	0.16	0.35	0.04	2.11*	-0.80	-1.63	-0.73	-0.63
	Severe	0.57	1.68	-1.46	-0.24	0.43	-0.38	0.76	-	-1.83	-0.34	-0.25
Weight for AGE	Normal	-0.79	0.40	-2.10*	-2.62*	1.21	-3.77*	-2.96*	-1.08	-1.65	-1.10	-3.69**
	Moderate	0.49	-0.36	-2.19*	-0.43	-0.50	-0.55	-0.01	-0.31	1.09	-0.97	-1.82
	Severe	-0.69	0.71	-1.64	-0.84	1.28	1.16	0.57	-4.27*	-1.73	0.59	-0.50

Table 31: t-values of BMI for Age, Height for Age and Weight for Age between boys and Girls in different age groups

followed sequentially by age groups of 17, 16, 13, 18, 15, 14, 11, 12, 8 and lastly by 9 years. Of all the measurements, the skinfold thicknesses have got highly statistical significant differences in growth of all age groups which were contributed highly by triceps, subscapular, calf, biceps and lastly by supriliac skinfold followed by the growth girths of the hip, chest, muac, calf and lastly by waist circumference, and the least by the ponderal and linear measurements of weight, height, sitting height and lastly by biacromial diameter.

The significant differences of Z-Score in different age groups of boys and girls, and also between boys and girls in the same age groups are shown as follow:

According to the table of BMI for age (table: 28), there were no significant differences occurring in boys except in 17-18 years and 16-17 years of normal and moderate condition respectively, and no subjects of age groups 12, 13, 16, 17 and 18 years in severe condition. In girls, a highly significant difference occurred in normal condition of the age group 12-13 years, there were no subjects in age groups of 15, 16, 17, and 18 years in moderate condition of wasting, and in severe condition there were no subjects of wasting except the age groups of 11 and 12 years.

The height for age (table: 29) of the subjects had shown that in boys, there was a significant difference in the age group of 12-13 years of normal condition and 14-15 years in moderate condition of stunting, no significant differences occurred in the age groups of severe condition. In girls, a significant difference occurred in the age groups of 11-12 years and 8-9 years in normal and moderate condition respectively, there were no significant differences which occurred in severe conditions of stunting.

The t-test of the weight for age (table: 30) has shown that in boys, there were significant differences in the normal category of the age groups of 11-12 and 12-13 years and no significant differences occurred in all the age groups of underweight conditions. Similarly, in the girls also no significant differences occurred in all age groups of the normal and underweight conditions.

The t-test between the boys and girls (table: 31) had shown that in the BMI for age, a highly significant difference occurred in age groups of 13, 14 and 18 years, and a significant difference in age groups 15 and 16 years in normal category, and also no significant differences in the wasting conditions. In height for age, a significant

difference occurred in age groups of 8, 10, 12, 15 and 16 years in normal condition, and also in age groups of 9 and 14 years in moderate condition of stunting, there was no significant difference occurring in severe condition. In the weight for age, a highly significant difference occurred in the 18 years, and a significant difference in age groups 10, 11, 13, and 14 years in normal category, and also a significant difference in age groups of 10 and 15 years in moderate and severe conditions respectively.

MEAN Z-SCORE

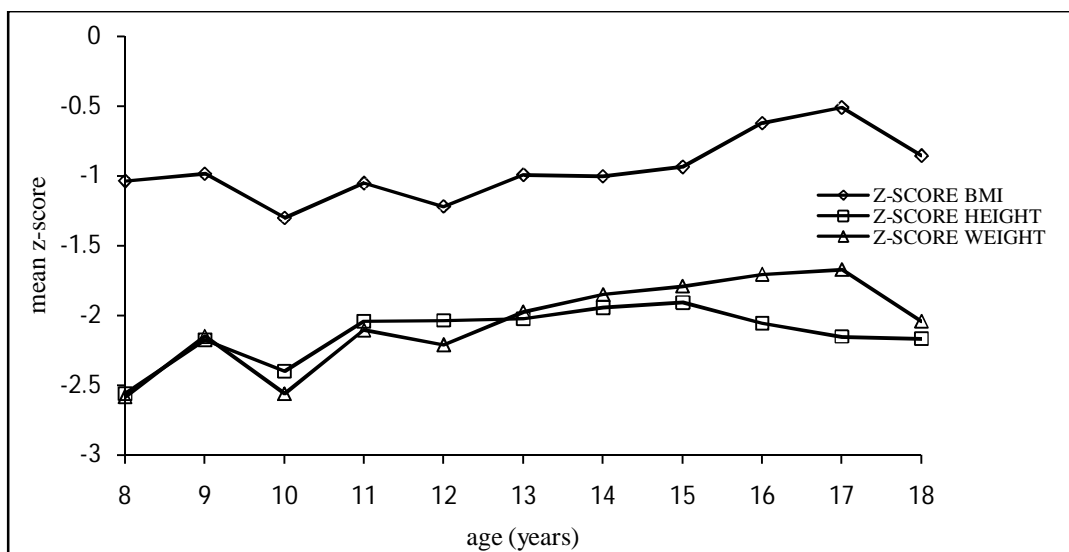


Figure 16: A Mean Curve on BMI for Age, Height for Age and Weight for age in Boys

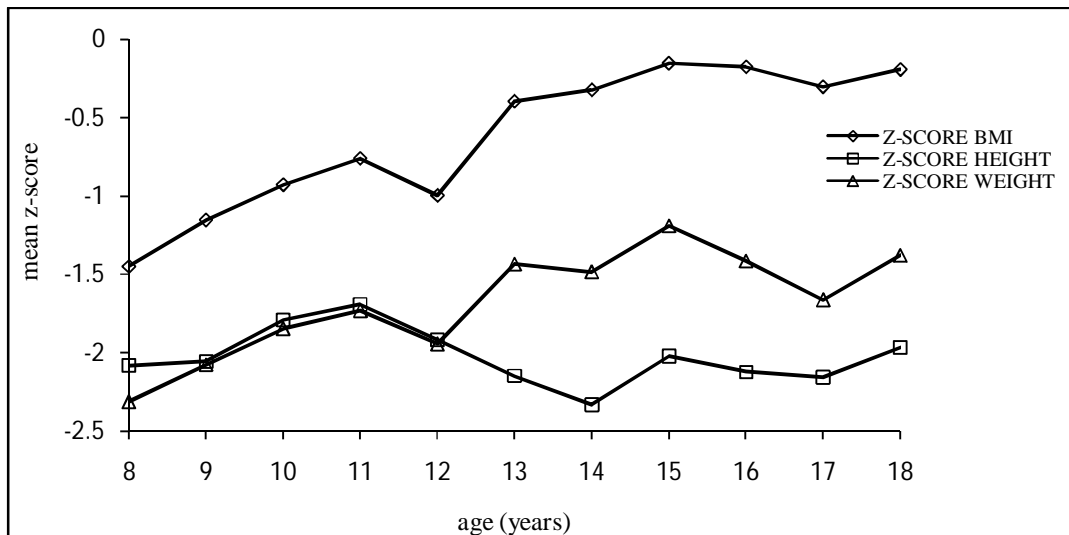


Figure 17: A Mean Curve on BMI for Age, Height for Age and Weight for Age in Girls

SEX	AGE	N	Z-SCORE BMI		Z-SCORE HEIGHT		Z-SCORE WEIGHT	
			MEAN	STD	MEAN	STD	MEAN	STD
Boys	8	32	-1.036	0.969	-2.561	0.857	-2.582	1.087
	9	39	-0.983	1.101	-2.178	0.801	-2.150	1.093
	10	34	-1.300	0.958	-2.400	0.795	-2.560	0.971
	11	39	-1.051	0.789	-2.040	0.911	-2.104	0.925
	12	41	-1.217	0.935	-2.036	1.198	-2.210	1.167
	13	42	-0.990	0.750	-2.023	0.917	-1.974	0.841
	14	41	-1.001	0.894	-1.942	0.730	-1.851	0.983
	15	34	-0.935	1.007	-1.907	0.947	-1.790	1.186
	16	46	-0.621	0.814	-2.056	0.881	-1.705	1.119
	17	31	-0.508	0.780	-2.152	0.659	-1.672	0.776
	18	38	-0.853	0.663	-2.166	0.770	-2.041	0.911
Girls	8	41	-1.448	0.936	-2.081	1.074	-2.310	1.057
	9	45	-1.153	1.111	-2.056	0.954	-2.075	1.057
	10	48	-0.928	0.850	-1.794	1.081	-1.845	0.966
	11	64	-0.761	0.820	-1.693	1.193	-1.731	1.125
	12	42	-0.996	1.034	-1.919	0.893	-1.943	1.243
	13	52	-0.396	0.892	-2.148	0.973	-1.435	1.115
	14	47	-0.323	0.915	-2.333	0.840	-1.484	1.224
	15	41	-0.154	0.778	-2.024	0.553	-1.191	0.838
	16	42	-0.178	0.725	-2.124	0.591	-1.415	0.975
	17	40	-0.304	0.691	-2.159	0.733	-1.662	1.027
	18	44	-0.194	0.799	-1.967	0.886	-1.379	1.046

Table 28: Mean, STD of BMI for Age, Height for Age and Weight for age in Different Age Groups of Boys and Girls

The mean Z-Score in boys was found to be normal (>-2) respectively in the age groups of 8-18, 14-15 and 13-17 years in the BMI for age, height for age and weight for age where as in the other age groups, the indices were found to be ‘undernutrition’ (<-2) (table: 28 and figure: 16).

The mean Z-Score in girls was found to be normal (>-2) respectively in the age groups of 8-18 years, 10-13 and 17 years, and 10-18 years in the BMI for age, height for age and weight for age whereas in the other age groups, the indices were found to be ‘undernutrition’ (<-2) (table: 28 and figure: 17).

Influences of different factors of socio-economic and age on the ‘undernutrition’

Wasting

Sex	Factors	B	S.E.	Wald	df	Sig. (p< 0.05)	Exp(B) (OR)	95% C.I. for EXP(B)	
								Lower	Upper
Boys	Age	-0.043	0.052	0.673	1	0.412	0.958	0.864	1.062
	Occupation	-0.148	0.247	0.358	1	0.550	0.863	0.532	1.400
	Education	-0.181	0.351	0.267	1	0.605	0.834	0.419	1.659
	Family Size	0.242	0.388	0.388	1	0.533	1.274	0.595	2.726
	Income	0.019	0.224	0.007	1	0.933	1.019	0.657	1.581
	Constant	-1.392	0.974	2.043	1	0.153	0.249		
Girls	Age	-0.376	0.077	23.636	1	0.000	0.687	0.590	0.799
	Occupation	0.292	0.234	1.549	1	0.213	1.339	0.846	2.119
	Education	-0.065	0.339	0.037	1	0.848	0.937	0.482	1.821
	Family Size	-0.414	0.471	0.775	1	0.379	0.661	0.263	1.662
	Income	-0.610	0.232	6.892	1	0.009	0.544	0.345	0.857
	Constant	3.522	1.099	10.274	1	0.001	33.852		

Table 32.1: Effect of Socio-Economic Factors on Wasting Condition in Boys and Girls through Logistic Regression

Factors	B	S.E.	Wald	df	Sig. (p< 0.05)	Exp(B) (OR)	95% C.I. for EXP(B)	
							Lower	Upper
Age			23.342	10	0.010			
Age (8)	2.819	1.083	6.777	1	0.009	16.754	2.007	139.867
Age (9)	2.228	1.115	3.994	1	0.046	9.283	1.044	82.555
Age (10)	1.486	1.124	1.746	1	0.186	4.418	0.488	40.020
Age (11)	0.618	1.180	0.274	1	0.601	1.854	0.184	18.731
Age (12)	1.301	1.148	1.284	1	0.257	3.674	0.387	34.865
Age (13)	1.284	1.144	1.259	1	0.262	3.612	0.383	34.019
Age (14)	0.659	1.255	0.275	1	0.600	1.933	0.165	22.629
Age (15)	-0.112	1.439	0.006	1	0.938	0.894	0.053	15.018
Age (16)	-17.538	6077.971	0.000	1	0.998	0.000	0.000	.
Age (17)	-17.306	6286.846	0.000	1	0.998	0.000	0.000	.
Occupation	0.230	0.245	0.881	1	0.348	1.259	0.778	2.036
Education	0.010	0.374	0.001	1	0.978	1.010	0.485	2.104
Family Size	-0.367	0.473	0.602	1	0.438	0.693	0.274	1.750
Income			7.099	2	0.029			
Income (High)	1.281	0.482	7.050	1	0.008	3.601	1.399	9.269
Income (Middle)	0.725	0.445	2.648	1	0.104	2.064	0.862	4.941
Constant	-4.034	1.331	9.180	1	0.002	0.018		

Table 32.2: Table 32.1: Effect of Age and Household on Wasting Condition in Boys and Girls through Logistic Regression

It is seen from the table (table: 32.1) that, the wasting was not significantly associated in boys with the socio-economic factors and age, whereas in girls it had shown a negative association in age ($B=-0.376 \pm 0.077$, $p<0.05$) and income ($B=-0.610 \pm 0.077$, $p<0.05$). The age groups of 8 years ($B=2.819 \pm 1.083$, $p=0<0.05$) and 9 years ($B=2.228 \pm 1.115$, $p=0<0.05$) showed a positive association and the prevalence of wasting of 16.754 times in 8 years ($CI=2.007-139.867$, $p<0.05$) and 9.283 times in 9

years (CI=1.044-82.555, $p < 0.05$) when compared to the highest age group. The income of the HIG showed a positive association ($B = 1.281 \pm 0.482$, $p < 0.05$) and the prevalence of 3.601 times (CI=1.399-9.269, $p < 0.05$). After adjusting, the age in girls still showed the significant association. It evidently implied the need of proper attention in the low age groups or the preadolescence age groups (table: 32.2).

Stunting

Sex	Factors	B	S.E.	Wald	df	Sig.	Exp(B) (OR)	95% C.I.for EXP(B)	
								Lower	Upper
Boys	Age	-0.084	0.033	6.435	1	0.011	0.920	0.862	0.981
	Occupation	0.167	0.155	1.161	1	0.281	1.182	0.872	1.602
	Education	0.012	0.220	0.003	1	0.956	1.012	0.657	1.559
	Family Size	-0.160	0.246	0.422	1	0.516	0.852	0.526	1.381
	Income	0.057	0.142	0.165	1	0.685	1.059	0.803	1.398
	Constant	0.992	0.625	2.516	1	0.113	2.697		
Girls	Age	0.020	0.030	0.435	1	0.510	1.020	0.962	1.081
	Occupation	0.048	0.136	0.127	1	0.721	1.050	0.805	1.369
	Education	0.085	0.179	0.227	1	0.634	1.089	0.766	1.548
	Family Size	-0.340	0.243	1.969	1	0.161	0.711	0.442	1.145
	Income	0.117	0.125	0.876	1	0.349	1.124	0.880	1.435
	Constant	0.069	0.534	0.017	1	0.897	1.072		

Table 33.1: Effect of Socio-Economic Factors on Stunting Condition in Boys and Girls through Logistic Regression

Factors	B	S.E.	Wald	df	Sig.	Exp(B) (OR)	95% C.I.for EXP(B)	
							Lower	Upper
Age			10.509	10	0.397			
Age (8)	1.001	0.516	3.767	1	0.052	2.720	0.990	7.472
Age (9)	0.658	0.476	1.914	1	0.166	1.931	0.760	4.905
Age (10)	0.803	0.493	2.651	1	0.103	2.232	0.849	5.866
Age (11)	0.141	0.462	0.093	1	0.760	1.151	0.466	2.845
Age (12)	0.156	0.454	0.117	1	0.732	1.168	0.480	2.846
Age (13)	-0.063	0.458	0.019	1	0.891	0.939	0.382	2.306
Age (14)	-0.039	0.456	0.007	1	0.932	0.962	0.394	2.350
Age (15)	0.172	0.482	0.128	1	0.721	1.188	0.462	3.058
Age (16)	-0.024	0.448	0.003	1	0.956	0.976	0.405	2.348
Age (17)	0.116	0.492	0.055	1	0.814	1.123	0.428	2.947
Occupation	0.171	0.174	0.966	1	0.326	1.187	0.843	1.671
Education	-0.026	0.244	0.011	1	0.915	0.974	0.604	1.571
Family Size	-0.101	0.255	0.156	1	0.693	0.904	0.548	1.491
Income	0.058	0.144	0.165	1	0.685	1.060	0.799	1.406
Constant	-0.433	0.575	0.568	1	0.451	0.648		

Table: 33.2: Table 32.1: Effect of Age on Wasting Condition in Boys and Girls through Logistic Regression

Table 33.1, had shown no significant association of different socio-economic factors in the stunting condition of both boys and girls ($p>0.05$), except the age in boys, where a negative association was shown ($B=-0.084 \pm 0.033$, $p<0.05$) with 0.920 times ($CI=0.862-0.981$, $p<0.05$) of prevalence of stunting. But no particular age was associated with stunting ($p>0.05$), this could be the reason of the genetic influences in each and every age group (table: 33.2).

Underweight

The underweight of the subjects (table: 34.1) showed a significant association in age groups of both boys and girls ($p<0.05$) and socio-economic factors have not shown any significant association ($p>0.05$). In overall, the boys showed a negative association ($B=-0.138 \pm 0.034$, $p<0.05$) and it has got 0.871 times ($CI=0.815-0.931$, $p<0.05$) prevalence of underweight, and age groups of 8 years ($B=1.218 \pm 0.511$, $p<0.05$), 10 years ($B=1.167 \pm 0.497$, $p<0.05$) and 12 years ($B=0.990 \pm 0.467$, $p<0.05$) showed the positive association and have got respectively 3.379 times ($CI=1.240-9.207$, $p<0.05$), 3.214 times ($CI=1.214-8.510$, $p<0.05$) and 2.693 times ($CI=1.079-6.719$, $p<0.05$) prevalence of the underweight. The girls too, showed a negative association ($B=-0.118 \pm 0.032$, $p<0.05$) and 0.889 times ($CI=0.835-0.947$, $p<0.05$) prevalence of the underweight, and the 8 years ($B=1.259 \pm 0.466$, $p<0.05$) showed the positive association and 3.523 time ($CI= 1.412-8.789$, $p<0.05$) prevalence of the underweight. Even after adjusting the odd ratio (OR), the prevalence of underweight by age was still noticed, thus it can be said that, the underweight in the present study need the proper attention in these age groups of 8-18 years (table: 34.2).

Sex	Factors	B	S.E.	Wald	df	Sig.	Exp(B) (OR)	95% C.I.for EXP(B)	
								Lower	Upper
Boys	Age	-0.138	0.034	16.585	1	0.000	0.871	0.815	0.931
	Occupation	0.029	0.157	0.035	1	0.851	1.030	0.758	1.400
	Education	0.146	0.224	0.427	1	0.513	1.158	0.746	1.795
	Family Size	-0.036	0.251	0.020	1	0.887	0.965	0.590	1.579
	Income	-0.025	0.144	0.031	1	0.861	0.975	0.735	1.293
	Constant	1.382	0.632	4.786	1	0.029	3.983		
Girls	Age	-0.118	0.032	13.468	1	0.000	0.889	0.835	0.947
	Occupation	0.120	0.142	0.710	1	0.399	1.127	0.853	1.488
	Education	-0.062	0.189	0.107	1	0.743	0.940	0.649	1.361
	Family Size	-0.333	0.256	1.694	1	0.193	0.717	0.435	1.183
	Income	0.013	0.132	0.010	1	0.922	1.013	0.783	1.311
	Constant	1.572	0.570	7.607	1	0.006	4.817		

Table 34.1: Effect of Socio-Economic Factors on Underweight Condition in Boys and Girls through Logistic Regression

Sex	Factors	B	S.E.	Wald	df	Sig.	Exp(B) (OR)	95% C.I. for EXP(B)	
								Lower	Upper
Boys	Age			26.724	10	0.003			
	Age (8)	1.218	0.511	5.666	1	0.017	3.379	1.240	9.207
	Age (9)	0.428	0.474	0.814	1	0.367	1.534	0.606	3.887
	Age (10)	1.167	0.497	5.520	1	0.019	3.214	1.214	8.510
	Age (11)	0.308	0.466	0.436	1	0.509	1.360	0.546	3.391
	Age (12)	0.990	0.467	4.506	1	0.034	2.693	1.079	6.719
	Age (13)	0.171	0.465	0.135	1	0.714	1.186	0.477	2.951
	Age (14)	-0.230	0.471	0.238	1	0.626	0.795	0.316	2.001
	Age (15)	-0.222	0.498	0.198	1	0.657	0.801	0.302	2.127
	Age (16)	-0.351	0.469	0.559	1	0.455	0.704	0.281	1.766
	Age (17)	-0.143	0.508	0.080	1	0.778	0.866	0.320	2.346
	Occupation	-0.060	0.178	0.112	1	0.738	0.942	0.664	1.336
	Education	0.232	0.252	0.847	1	0.357	1.261	0.770	2.065
	Family Size	0.022	0.263	0.007	1	0.935	1.022	0.610	1.710
Income	-0.002	0.147	0.000	1	0.987	0.998	0.747	1.332	
Constant	-0.818	0.590	1.922	1	0.166	0.441			
Girls	Age			24.404	10	0.007			
	Age (8)	1.259	0.466	7.290	1	0.007	3.523	1.412	8.789
	Age (9)	0.689	0.476	2.093	1	0.148	1.991	0.783	5.063
	Age (10)	0.697	0.443	2.478	1	0.115	2.007	0.843	4.779
	Age (11)	0.339	0.425	0.637	1	0.425	1.404	0.610	3.230
	Age (12)	0.478	0.459	1.083	1	0.298	1.613	0.656	3.968
	Age (13)	-0.158	0.457	0.119	1	0.730	0.854	0.349	2.092
	Age (14)	0.008	0.468	0.000	1	0.987	1.008	0.402	2.523
	Age (15)	-0.898	0.556	2.610	1	0.106	0.407	0.137	1.211
	Age (16)	-0.064	0.482	0.018	1	0.894	0.938	0.365	2.410
	Age (17)	0.358	0.467	0.590	1	0.443	1.431	0.573	3.572
	Occupation	0.051	0.153	0.114	1	0.736	1.053	0.781	1.420
	Education	0.011	0.212	0.003	1	0.959	1.011	0.668	1.531
	Family Size	-0.298	0.262	1.297	1	0.255	0.742	0.444	1.240
Income	-0.008	0.135	0.004	1	0.952	0.992	0.761	1.292	
Constant	-0.197	0.582	0.114	1	0.736	0.821			

Table 34.2: Effect of Age on Underweight Condition in Boys and Girls through Logistic Regression

On comparing the BMI, height and weight of the present study with percentiles of the WHO and CDC it has revealed the following:

The BMI (table: 35), in boys, showed a normal (>18.5) from age groups 16-18 years and a low (<18.5) from 8-15 years, whereas in girls (figure: 18.2 and table: 35), they too showed a normal BMI (>18.5) from 14-18 years and a low (<18.5) from 8-13 years (table: 35), but the BMI of girls was higher than the boys from 10-18 years and a low in 8-9 years compared to that of the boys.

Sex	BMI for AGE						HEIGHT for AGE				WEIGHT for AGE	
	Age	10th WHO	10th CDC	50th WHO	50th CDC	Present Study	5th WHO	5th CDC	Present Study	5th CDC	10th CDC	Present Study
Boys	8	14.38	14.17	15.78	15.83	14.64	118.62	119.51	114.49	20.93	21.87	19.19
	9	14.57	14.34	16.03	16.15	14.92	122.38	123.47	120.39	22.59	23.64	21.63
	10	14.85	14.63	16.42	16.62	14.80	127.05	127.93	123.26	24.83	26.08	22.49
	11	15.27	15.02	16.94	17.20	15.53	132.07	132.43	129.85	27.52	29.05	26.18
	12	15.77	15.50	17.57	17.85	15.90	137.82	137.72	135.04	30.78	32.61	29.00
	13	16.32	15.99	18.25	18.47	16.67	143.84	143.61	140.71	34.26	36.35	33.01
	14	16.95	16.57	19.01	19.18	17.36	150.69	150.73	148.08	38.63	40.97	38.07
	15	17.57	17.13	19.76	19.85	18.15	156.01	156.52	154.00	42.95	45.43	43.04
	16	18.16	17.72	20.48	20.54	19.37	159.97	160.63	157.05	47.18	49.71	47.77
	17	18.69	18.32	21.10	21.23	20.17	162.49	163.00	159.05	50.69	53.23	51.02
	18	19.15	18.88	21.69	21.88	19.93	163.81	164.20	160.30	53.15	55.71	51.21
Girls	8	14.09	13.96	15.71	15.85	13.94	117.32	118.79	116.56	20.27	21.28	18.94
	9	14.38	14.20	16.09	16.31	14.65	122.47	123.21	120.96	22.34	23.57	21.44
	10	14.76	14.52	16.60	16.84	15.31	127.84	127.26	126.47	24.74	26.20	24.49
	11	15.30	14.95	17.27	17.49	16.19	134.23	132.67	132.33	27.94	29.65	28.35
	12	15.86	15.38	17.96	18.07	16.30	139.64	138.84	136.76	30.98	32.87	30.48
	13	16.54	15.90	18.79	18.73	18.13	144.85	145.70	142.13	34.57	36.58	36.62
	14	17.19	16.44	19.58	19.37	18.96	148.37	149.63	145.10	37.98	40.02	39.92
	15	17.66	16.92	20.20	19.91	19.81	150.26	151.19	148.75	40.66	42.65	43.83
	16	18.06	17.42	20.70	20.45	20.26	151.33	151.93	148.84	42.92	44.83	44.89
	17	18.33	17.84	21.02	20.89	20.31	151.83	152.27	148.94	44.39	46.25	45.05
	18	18.48	18.18	21.25	21.27	21.08	152.18	152.46	150.36	45.34	47.22	47.66

Table 35: Mean BMI, Height and Weight of the present Boys and Girls with the Percentiles Values of the WHO and CDC Reference Data

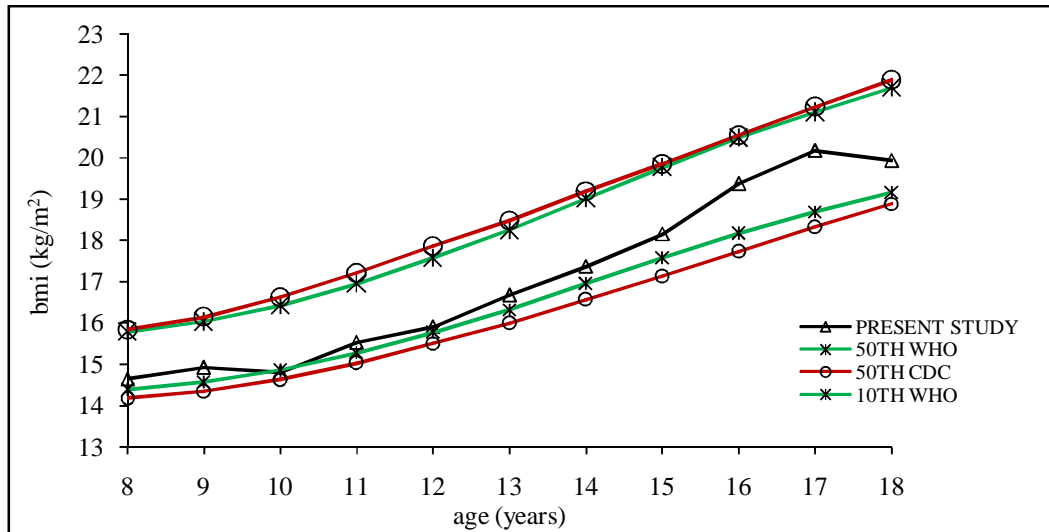


Figure 18.1: Comparing Curve between BMI of the present Boys and the 10th and 50th Percentiles of the WHO and CDC Reference Data

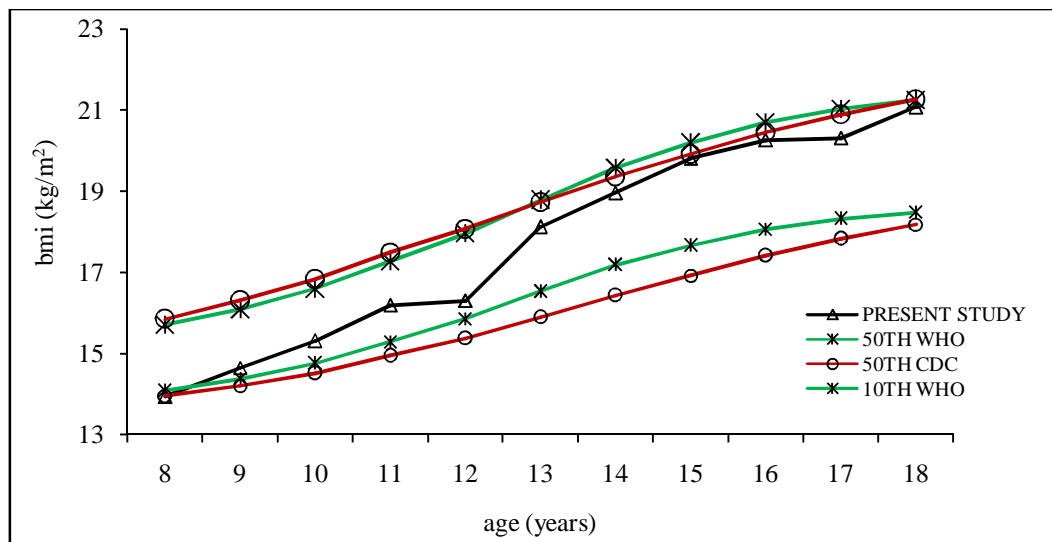


Figure 18.2: Comparing Curve between BMI of the present Girls and the 10th and 50th Percentiles of the WHO and CDC Reference Data

While comparing (table: 35, figure: 18.1 and figure: 18.2), to the reference percentiles of the WHO and CDC at the 10th and 50th, it was found that the boys were above the 10th percentile and below the 50th percentile except the 10 years at the 10th percentile of the WHO percentile which showed lower to that, and the girls' BMI showed above the 10th percentiles except at 8 years of age and below the 50th percentile of the WHO and CDC. In height, the subjects showed to be stunted under the 5th

percentile of the WHO and CDC percentile (figure: 19.1. figure: 19.2 and table: 35). Whereas in the weight, the boys were shown underweight below the 5th percentile in age groups of 8-14 years and from 15 to 18 years they were above the 5th percentile and below the 10th percentiles (figure: 20.1 and table: 35), whereas in girls they were underweight below the 5th percentile in age groups of 8-10 years and 12 years and above the 5th percentiles in age groups of 11 years and 13-18 years and lying below the 10th percentile except 13 years which showed more than that (figure: 20.2 and table: 35).

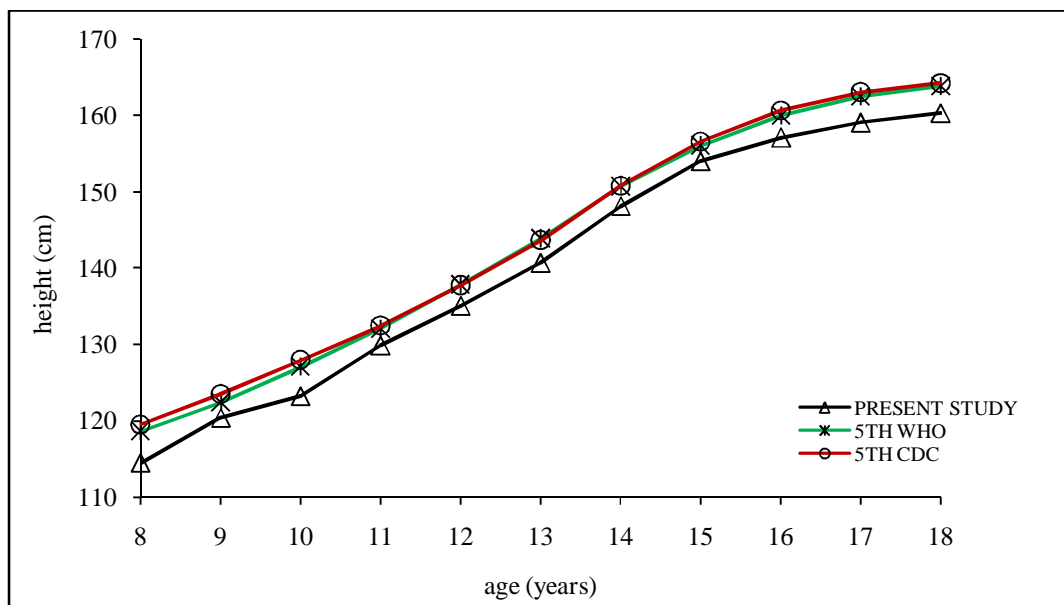


Figure 19.1: Comparing Curve between Height of the present Boys and the 5th Percentiles of the WHO and CDC Reference Data

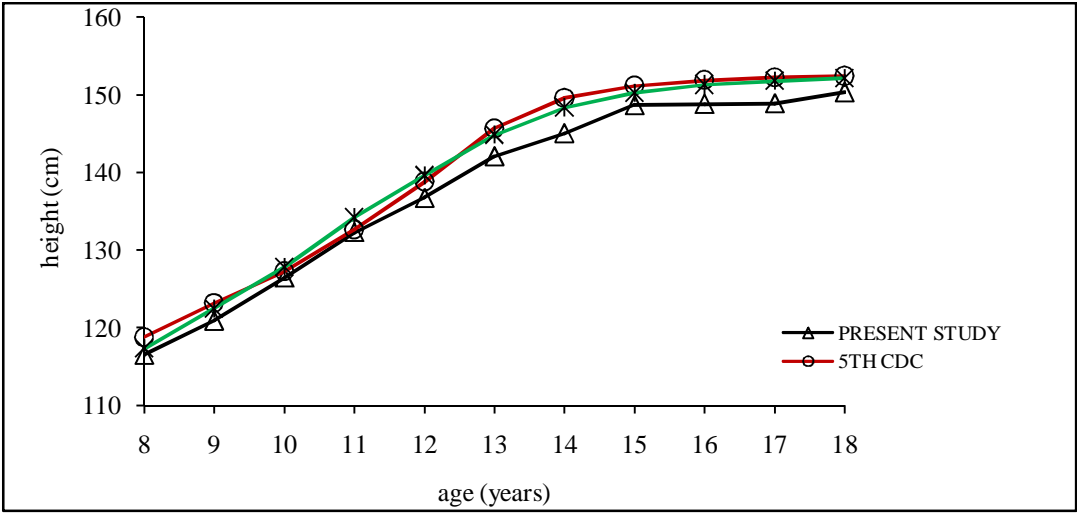


Figure 19.2: Comparing Curve between Height of the present Girls and the 5th Percentiles of the WHO and CDC Reference Data

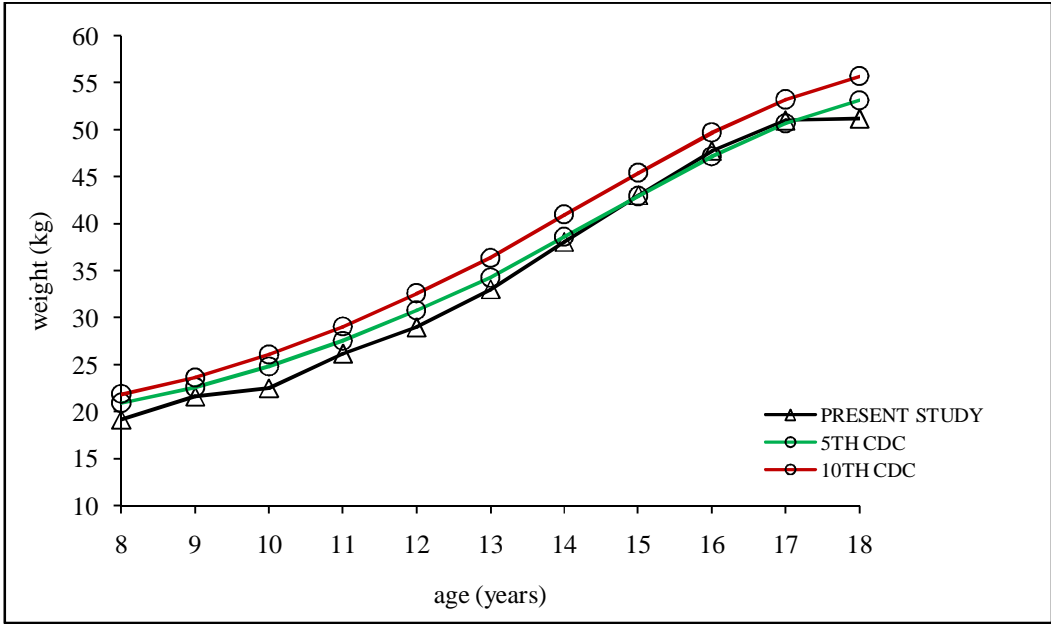


Figure 20.1: Comparing Curve between Weight of the present Boys and the 5th and 10th Percentiles of the CDC Reference Data

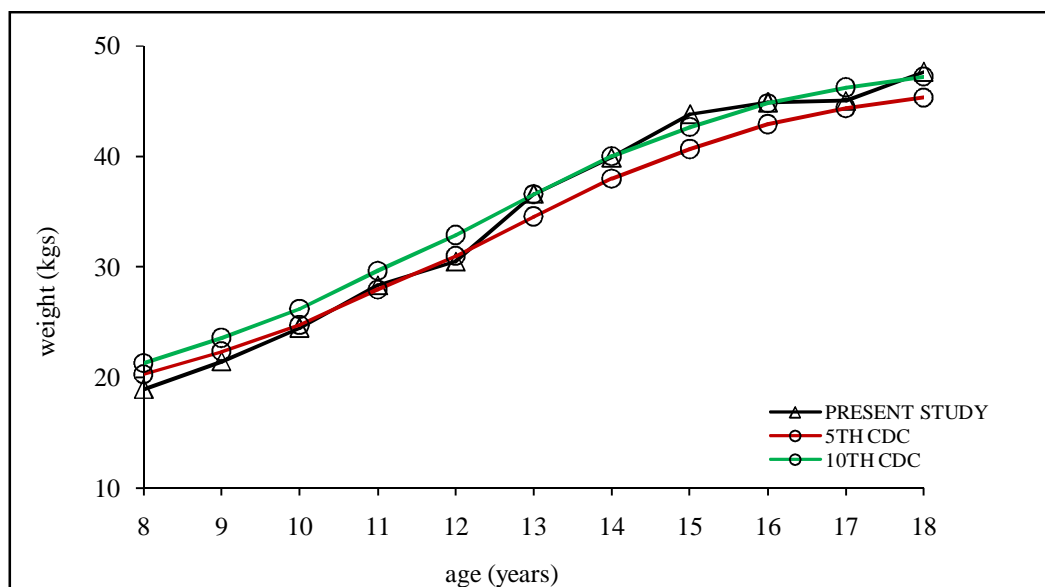


Figure 20.2: Comparing Curve between Weight of the present Girls and the 5th and 10th Percentiles of the CDC Reference Data

The present data were also compared with the Indian populations of plain tribal the Shabar of Orissa (Chakrabarty and Bharati, 2008), the North Eastern populations of Assamese Muslims (Begum and Choudhury, 1999), Khasi of Meghalaya (Das et. al., 2010), Niam Khasi boys and Khasi non-hybrid (NHB) girls (Khongsdier and Mukherjee, 2003, 2003), and also with the national data of ICMR (ICMR, 1972). The available age groups of the compared data were from 8 to 18 years except the Shabar and Khasi of Meghalaya from 10-18 years and 11-17 years respectively in both boys and girls. The different observations on the different available parameters on both boys and girls were shown in a tabulated form and figures and revealed as follow:

Age	BOYS					GIRLS			
	Present Study	Niam Khasi	Assamese Muslims	Shabar	ICMR	Present Study	Assamese Muslims	Shabar	ICMR
8	19.19	19.89	20.90	-	19.70	18.94	20.90	-	19.40
9	21.63	22.10	22.20	-	21.50	21.44	22.05	-	21.30
10	22.49	22.66	26.02	24.20	23.50	24.49	25.18	25.90	23.60
11	26.18	26.17	27.52	26.90	25.90	28.35	29.63	27.80	26.40
12	29.00	28.51	31.52	27.80	28.50	30.48	33.68	30.30	29.80
13	33.01	33.66	34.66	30.80	32.10	36.62	38.70	35.00	33.30
14	38.07	36.23	39.71	35.80	35.70	39.92	41.05	37.20	36.80
15	43.04	40.81	45.23	42.50	39.60	43.83	42.52	38.40	38.80
16	47.77	42.76	46.75	44.20	43.20	44.89	42.71	38.50	41.10
17	51.02	47.36	49.58	45.70	45.70	45.05	43.43	40.60	42.40
18	51.21	48.63	49.70	46.80	47.40	47.66	43.51	40.80	42.40

Table 36: Comparison in Mean Weight of the Present Boys and Girls with Other Populations

The mean weight of the present study was compared with the mentioned populations above, it was found that the present study showed lighter than the Shabar boys at the age 10 and 11 years for boys and 10 years for girls thereafter, the present study was heavier in all age groups; while in comparison to the ICMR data, they were also heavier in all age groups except the 8 years in both boys and girls and 10 years with the boys only; to Assamese Muslims, they were lighter in weight in age groups 8-15 years and 8-14 years in boys and girls respectively and becoming heavier in older age groups; to Niam Khasi boys, the present study was having a lighter weight in the age 8-10 and 13 years, and becoming heavier in the later age groups of 11-18 years (table: 36, figure: 21.1 and figure: 21.2).

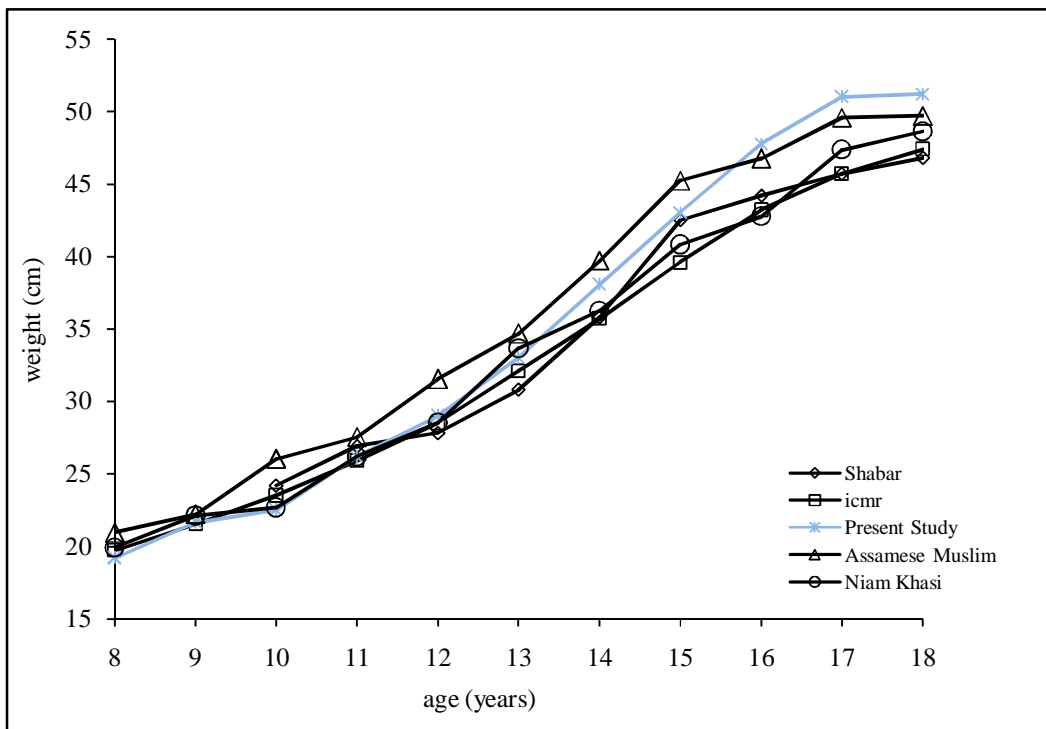


Figure 21.1: The Curve in Comparison of Weight in Boys with other Populations

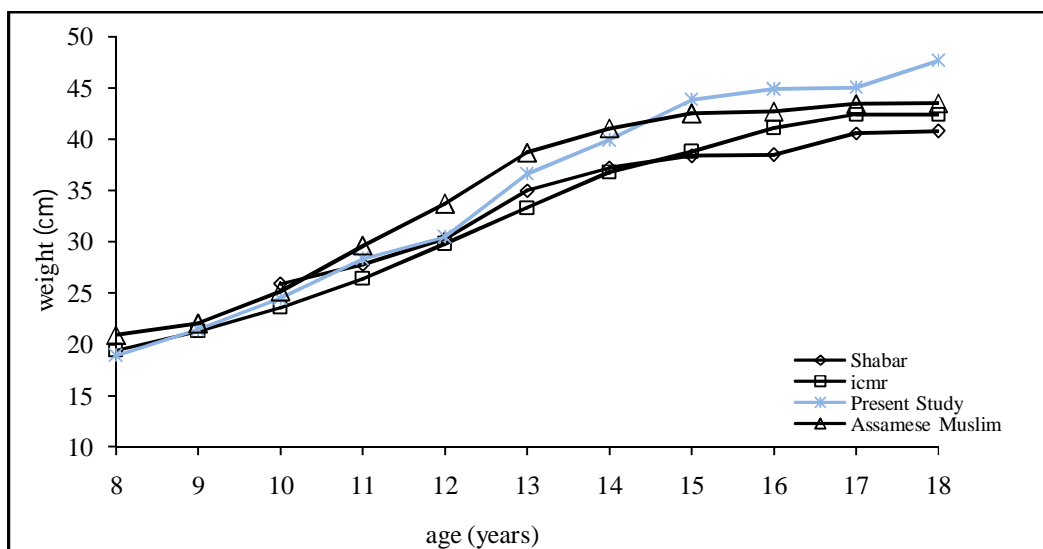


Figure 21.2: The Curve in Comparison of Weight in Girls with other Populations

Sex	Age	Present Study	Niam Khasi	Assamese Muslims	Shabar	ICMR
Boys	8	114.49	112.40	120.56	-	119.30
	9	120.39	117.26	124.58	-	123.70
	10	123.26	119.58	130.50	129.70	124.40
	11	129.85	123.38	135.69	137.00	133.40
	12	135.04	128.04	141.16	138.30	138.30
	13	140.71	136.39	144.20	140.70	144.60
	14	148.08	139.85	154.05	148.30	150.10
	15	154.00	143.25	159.30	155.90	155.50
	16	157.05	146.05	161.13	156.50	159.50
	17	159.05	148.84	162.11	157.50	161.40
	18	160.30	153.64	163.26	159.20	163.10
Sex	Age	Present Study	NHB Khasi	Assamese Muslims	Shabar	ICMR
Girls	8	116.56	109.96	119.97	-	118.20
	9	120.96	114.55	122.57	-	122.90
	10	126.47	117.64	129.48	131.60	128.40
	11	132.33	122.82	136.71	137.70	133.60
	12	136.76	130.93	142.70	138.90	139.20
	13	142.13	134.71	146.95	144.00	143.90
	14	145.10	139.76	148.45	144.50	147.50
	15	148.75	142.87	150.18	146.10	149.60
	16	148.84	145.43	150.51	146.90	151.00
	17	148.94	146.58	150.69	147.80	151.50
18	150.36	146.85	150.95	148.30	151.70	

Table 37: Comparison in Mean Height of the Present Boys and Girls with Other Populations

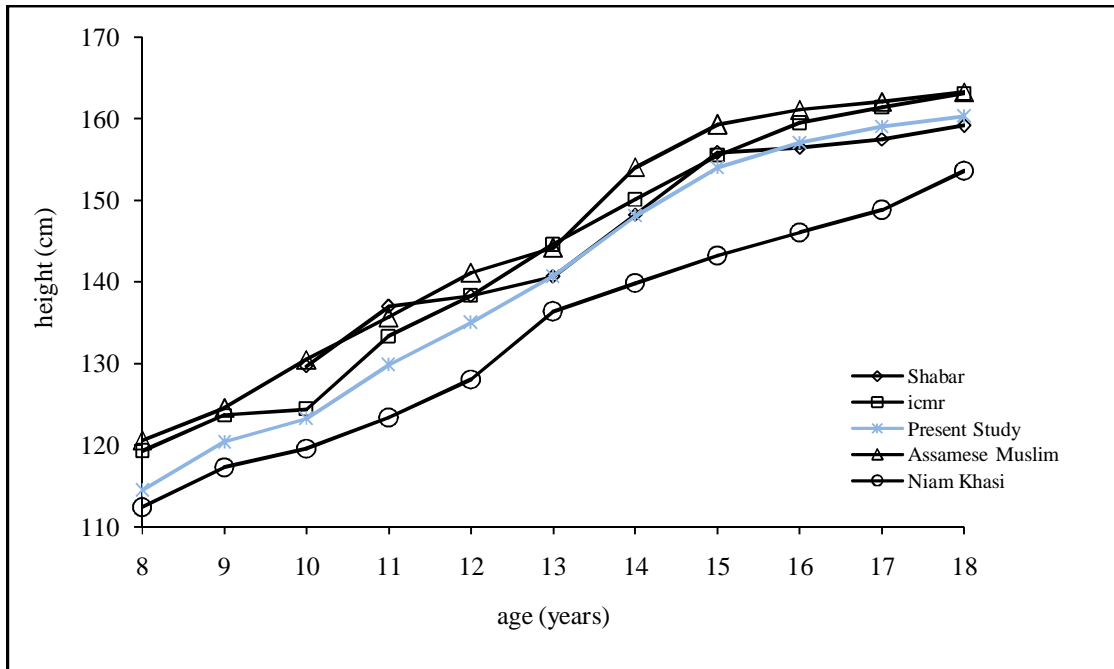


Figure 22.1: The Curve in Comparison of Height in Boys with other Populations

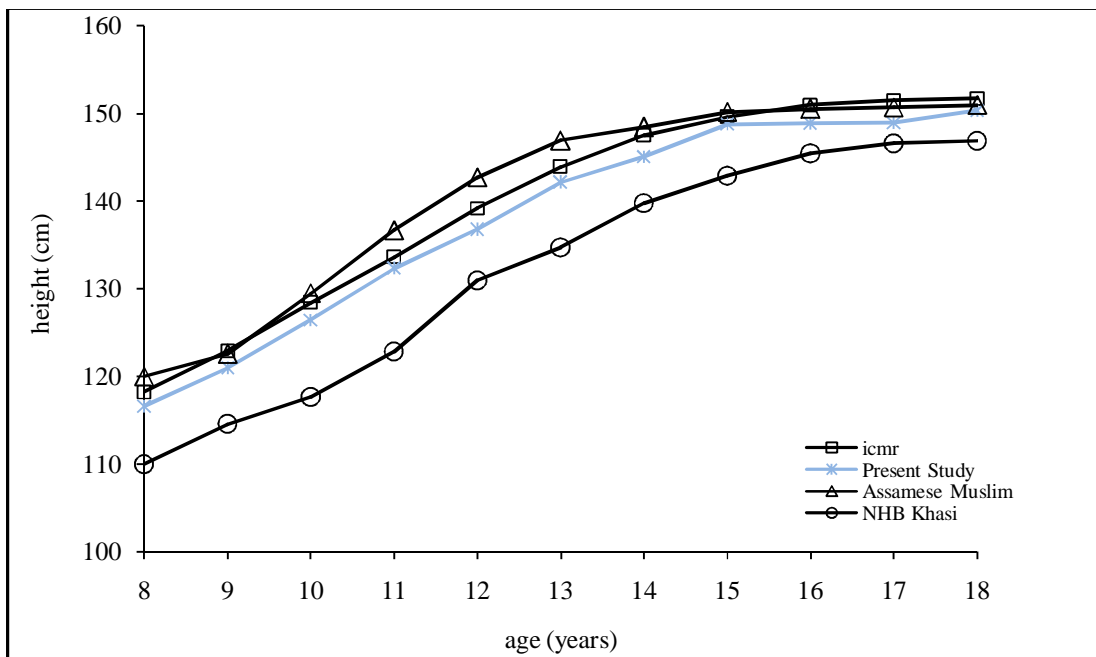


Figure 22.2: The Curve in Comparison of Height in Girls with other Populations

Table: 37, figure: 22.1 and figure: 22.2 have showed a comparison of the mean height where the present study displayed in all age groups of both boys and girls a shorter height to the Assamese Muslims and the ICMR data; where as to the Shabar

boys, they were also shown a shorter stature in age groups of 10-11 years and 15 years but a taller stature in older age groups from 16-18 years and a similar height in the age groups of 13-14 years. A similar trend of height was also observed in the girls, where the present girls were showing a short stature in all age groups than the Assamese Muslims and ICMR, whereas, to the Shabar the present study showed shorter in younger ages from 10 to 13 years thereafter the present study was taller from 14 to 18 years; to Niam Khasi boys and NHB Khasi girls, the present study showed taller in all age groups 8-18 years.

The sitting height of the present study was advanced in growing taller to the boys and girls of Shabar; and also to the NHB Khasi girls, the present girls were having a taller sitting height in all age groups 8-18 years. However, the present boys were shorter from age groups of 8-16 years and 8-13 years, and taller in 17-18 years and 14-18 years than the boys of Assamese Muslims and ICMR data respectively (table: 38, figure: 23.1). Where as in girls, in comparison with the Assamese Muslims, were shorter in age groups of 8-14 years and taller in older age groups of 15-18 years; while to the ICMR data the girls were shorter from age groups of 8-10 and 12 years and becoming taller in 11 and 13-18 years of age (figure: 23.2, table: 38).

Age	BOYS				GIRLS				
	Present Study	Assamese Muslims	Shabar	ICMR	Present Study	NHB Khasi	Assamese Muslims	Shabar	ICMR
8	62.09	63.82	-	63.80	62.83	57.98	63.16	-	62.90
9	64.59	65.05	-	65.60	63.47	60.91	64.49	-	64.80
10	65.14	68.15	63.70	67.50	67.06	61.41	67.51	65.30	67.10
11	68.48	69.76	67.00	69.50	69.98	64.20	70.80	66.10	69.50
12	69.99	72.85	68.20	71.40	71.64	67.95	73.72	68.50	72.20
13	73.35	74.41	69.30	74.20	75.27	69.14	76.20	71.70	74.60
14	76.84	79.31	72.70	76.80	76.95	72.88	77.09	71.90	76.80
15	79.88	82.52	75.80	79.80	79.00	74.69	78.39	72.50	77.90
16	82.18	83.24	76.50	82.00	79.26	76.55	78.57	71.70	78.80
17	84.19	83.74	78.70	83.70	79.31	77.30	78.61	72.20	79.20
18	84.87	84.35	80.90	84.40	80.41	77.29	78.85	74.20	79.20

Table 38: Comparison in Mean Sitting Height of the Present Boys and Girls with Other Populations

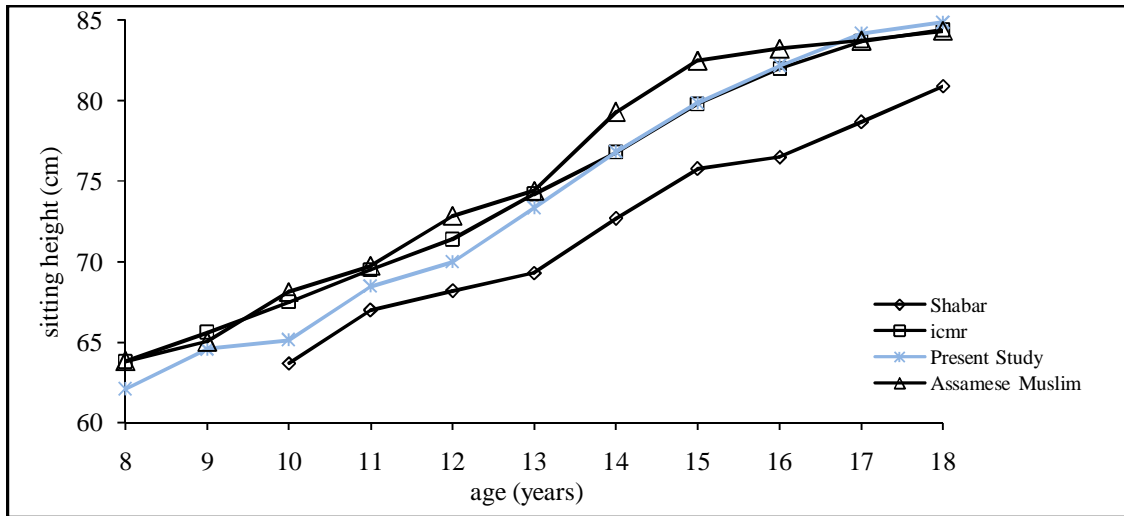


Figure 23.1: The Curve in Comparison of Sitting Height in Boys with other Populations

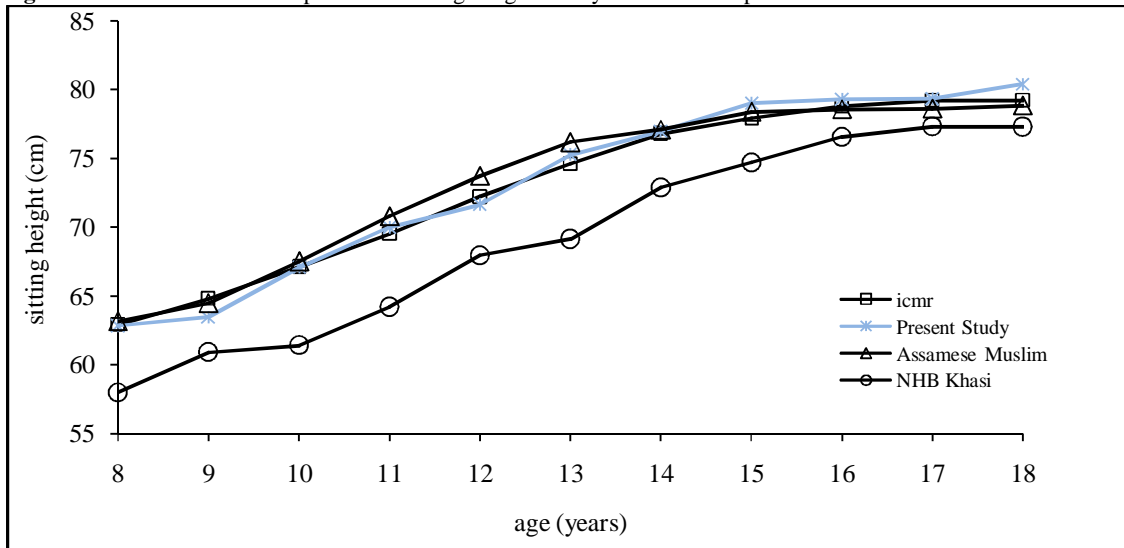


Figure 23.2: The Curve in Comparison of Sitting Height in Girls with other Populations

AGE	Present Study	Assamese Muslims	Shabar	ICMR	Present Study	Assamese Muslims	Shabar	ICMR
8	57.41	60.22	NA	55.50	56.22	58.82	NA	54.70
9	59.51	61.32	NA	57.30	58.48	59.58	NA	56.20
10	59.82	63.74	61.00	59.10	61.64	62.62	61.50	58.40
11	62.98	64.31	63.00	60.40	65.05	66.71	63.00	60.70
12	64.94	67.58	63.90	62.00	67.07	69.80	65.50	63.40
13	68.64	70.22	65.10	65.40	73.85	74.97	67.50	66.90
14	72.09	72.27	70.60	67.80	75.89	78.17	73.70	70.20
15	75.30	79.27	74.60	70.90	79.35	78.69	73.90	71.50
16	78.85	80.33	76.70	73.20	80.09	79.15	74.10	72.90
17	82.34	81.89	77.60	75.50	80.59	79.43	75.30	73.10
18	81.66	82.65	78.30	76.60	82.65	79.53	77.70	73.80

Table 39: Comparison in Mean Chest Circumference of the Present Boys and Girls with Other Populations

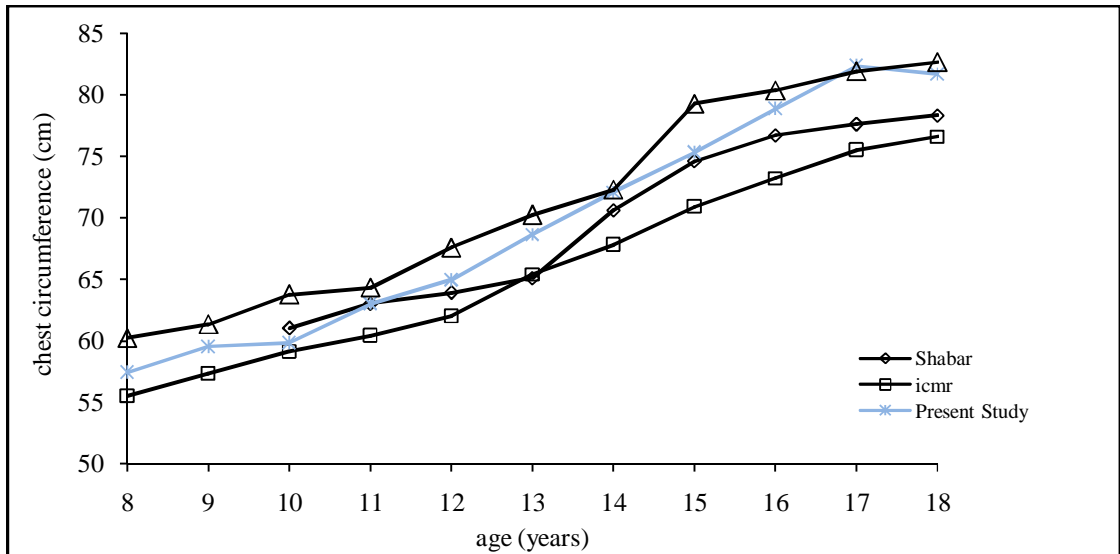


Figure 24.1: The Curve in Comparison of Chest Circumference in Boys with other Populations

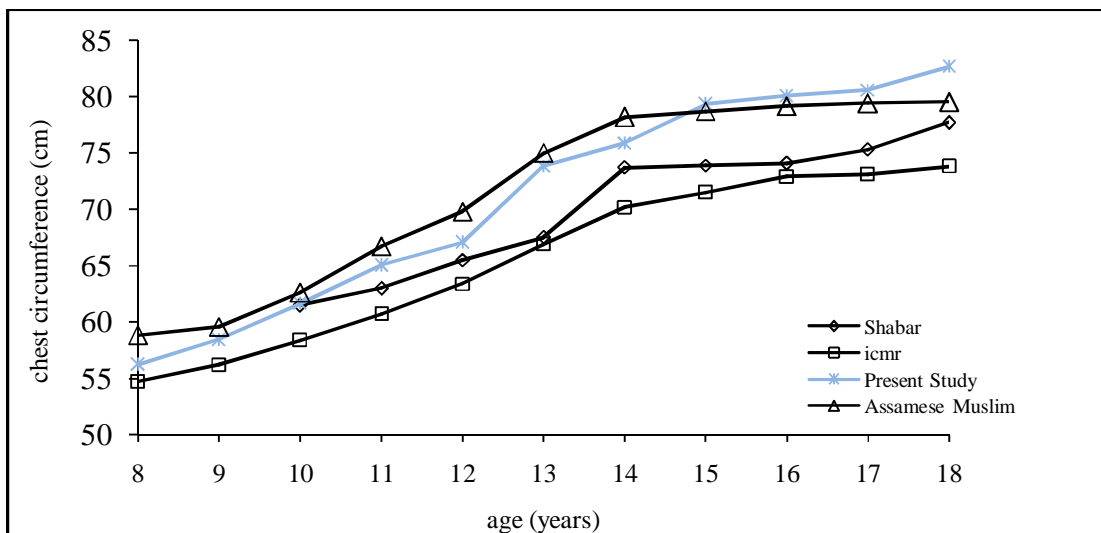


Figure 24.2: The Curve in Comparison of Chest Circumference in Girls with other Populations

The chest circumference in boys (table: 39, figure: 24.1 and figure: 24.2) of the present study was found to display a broader chest girth compared to the ICMR data in all the age groups from 8-18 years, however it was also observed to be smaller to the Assamese Muslims in all the age groups of 8-18 years except at the age 17 years where the present study showed a slightly broader chest girth. Whereas, the present study has a smaller chest girth than the Shabar boys on younger ages of 10-11 years but broader chest girth as they grow older from 12-18 years of age. Like the same growth differences in boys, even the present girls also showed a smaller chest girth in all the

age groups compared to the ICMR data and the Shabar but when compared to the Assamese Muslims it was smaller in the younger age groups from 8-14 years and broader in older age groups from 15-18 years.

The comparison in the waist circumference of the present study with the Shabar plain tribal boys and girls was showed that, the present study has bigger waist circumference in both sexes in all the compared age groups (table: 40, figure: 25.1 and figure: 25.2).

AGE	BOYS		GIRLS	
	Present Study	Shabar	Present Study	Shabar
8	52.93	-	51.33	-
9	54.34	-	53.44	-
10	54.23	52.70	54.72	52.9
11	57.35	54.10	56.61	53.7
12	57.95	54.80	57.62	55.0
13	60.00	56.70	61.08	57.0
14	61.77	58.40	61.71	57.7
15	63.57	61.60	63.41	59.1
16	65.92	64.00	63.85	60.0
17	67.05	64.00	64.13	60.0
18	66.67	64.10	65.66	60.2

Table 40: Comparison in Mean Waist Circumference of the Present Boys and Girls with Other Populations

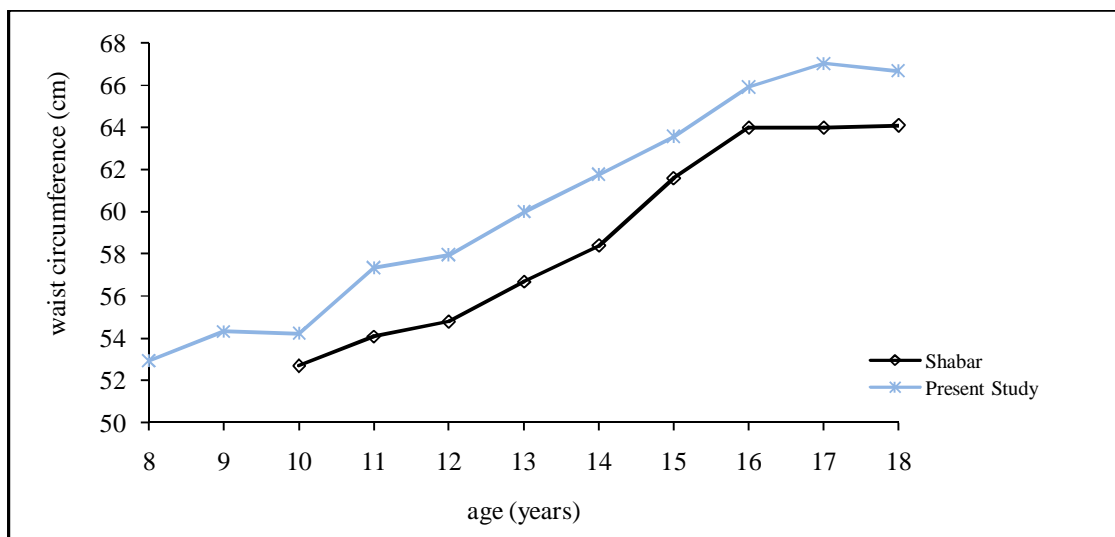


Figure 25.1: The Curve in Comparison of Waist Circumference in Boys with other Populations

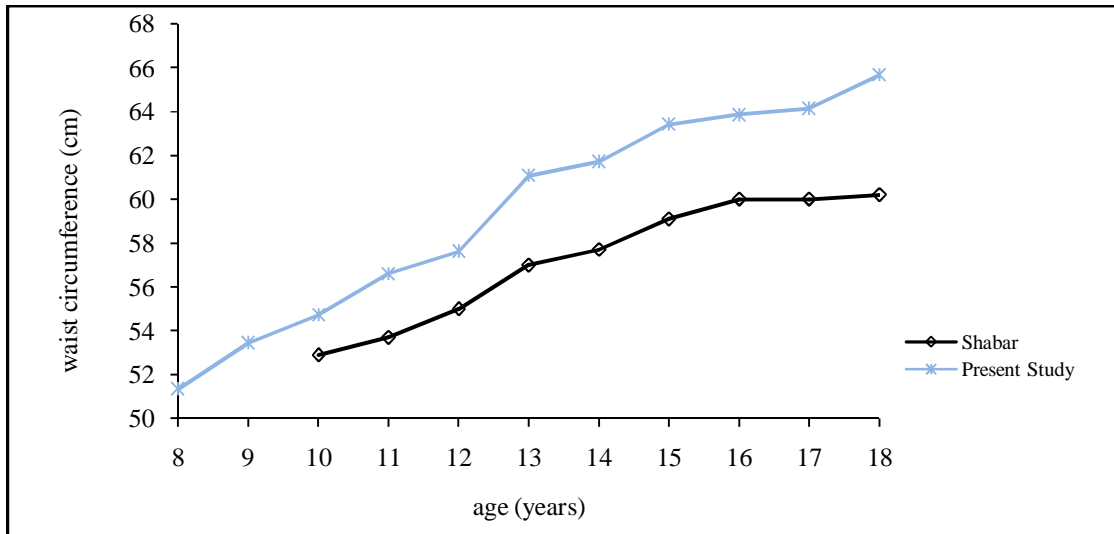


Figure 25.2: The Curve in Comparison of Waist Circumference in Girls with other Populations

The comparison table and figures (table: 41, figure: 26.1 and figure: 26.2) in the hip circumference of both boys and girls of the present study had shown a superior circumference to the Shabar in all age groups from 10-18 years except the 10 years of the present girls where a slightly small circumference was observed.

AGE	BOYS		GIRLS	
	Present Study	Shabar	Present Study	Shabar
8	57.77	-	58.01	-
9	60.19	-	60.90	-
10	60.50	60.30	64.62	64.70
11	64.25	63.00	67.90	65.00
12	67.22	63.30	70.59	67.50
13	70.82	66.20	77.36	73.20
14	74.70	71.10	79.55	75.90
15	78.74	75.30	83.59	76.40
16	81.96	76.00	84.87	76.80
17	83.98	76.80	84.81	78.30
18	84.62	77.70	87.41	78.80

Table 41: Comparison in Mean Hip Circumference of the Present Boys and Girls with Other Populations

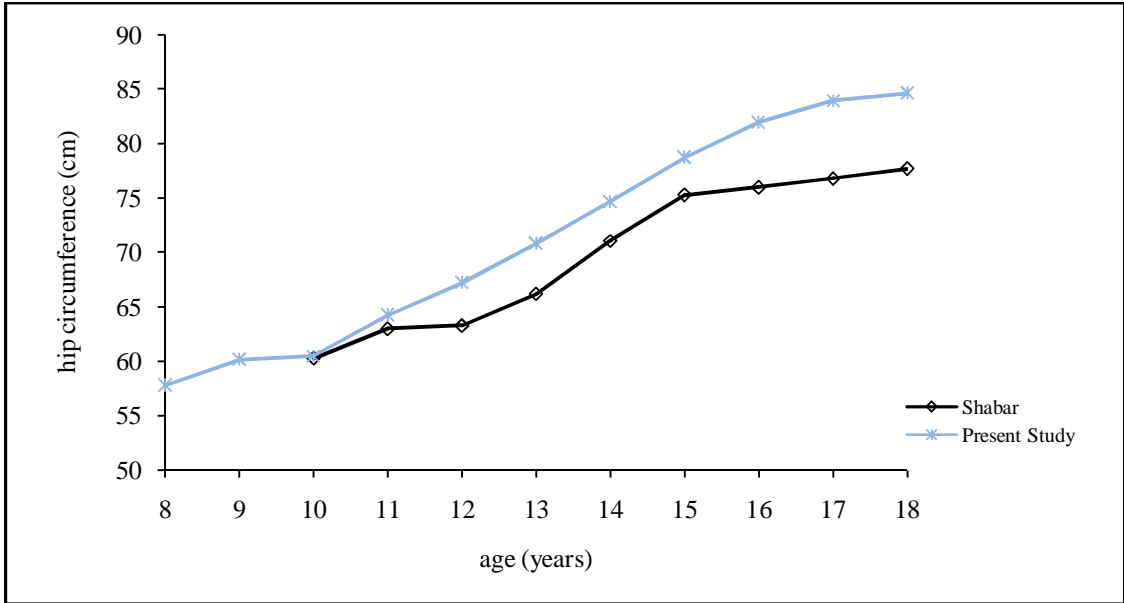


Figure 26.1: The Curve in Comparison of Hip Circumference in Boys with other Populations

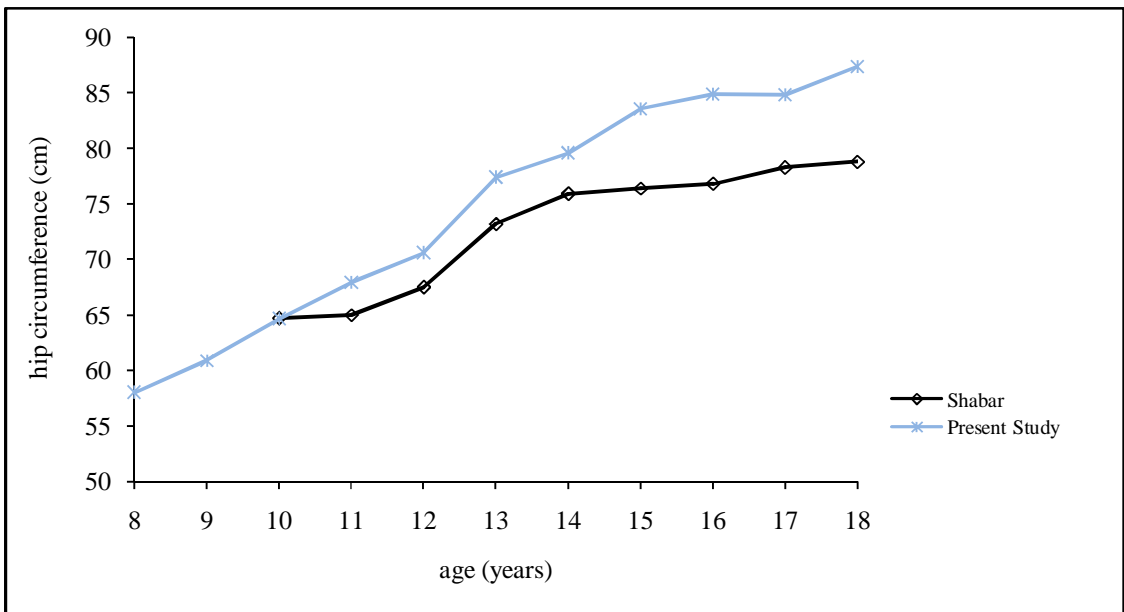


Figure 26.2: Curve in Comparison of Hip Circumference in Girls with other Populations

AGE	BOYS				GIRLS			
	Present Study	Assamese Muslims	Shabar	Khasi	Present Study	Assamese Muslims	Shabar	Khasi
8	16.06	16.86	NA	-	16.13	16.88	NA	-
9	16.52	17.11	NA	-	16.74	17.22	NA	-
10	16.53	18.18	16.80	-	17.66	18.13	17.80	-
11	18.09	18.50	17.30	17.60	18.68	18.99	17.80	17.90
12	18.46	19.70	18.00	18.90	19.01	20.28	18.60	18.90
13	19.18	20.21	18.20	20.20	21.13	21.63	20.10	19.90
14	20.35	21.46	20.10	20.70	21.61	22.53	21.30	21.40
15	21.52	22.89	21.70	21.90	22.78	22.90	21.50	22.00
16	22.81	23.42	22.20	23.50	22.75	22.99	21.70	22.20
17	24.20	24.18	23.20	24.40	22.98	23.30	22.40	23.00
18	23.78	24.45	23.70	-	23.90	23.37	22.90	-

Table 42: Comparison in Mean Mid-Upper Arm Circumference of the Present Boys and Girls with Other Populations

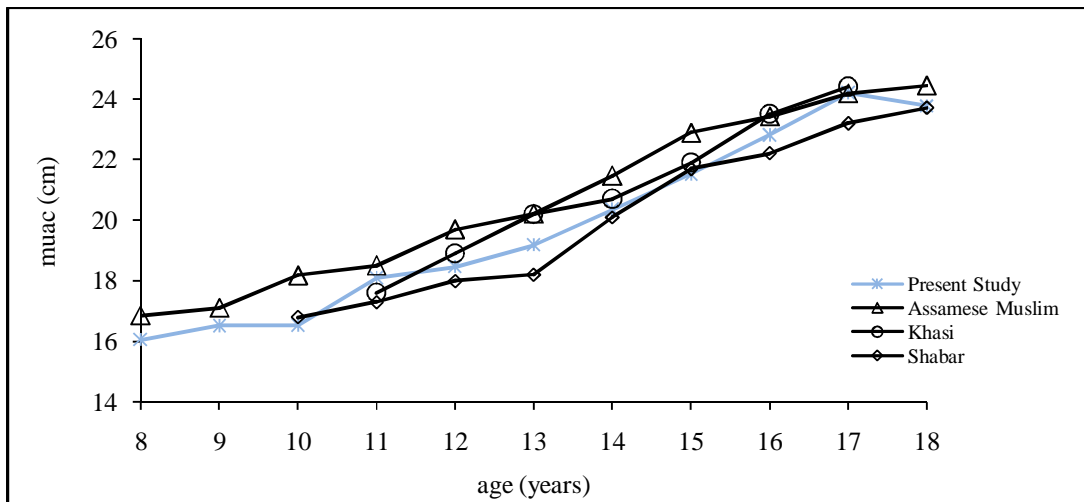


Figure 27.1: Curve in Comparison of Mid-Upper Arm Circumference in Boys with other Populations

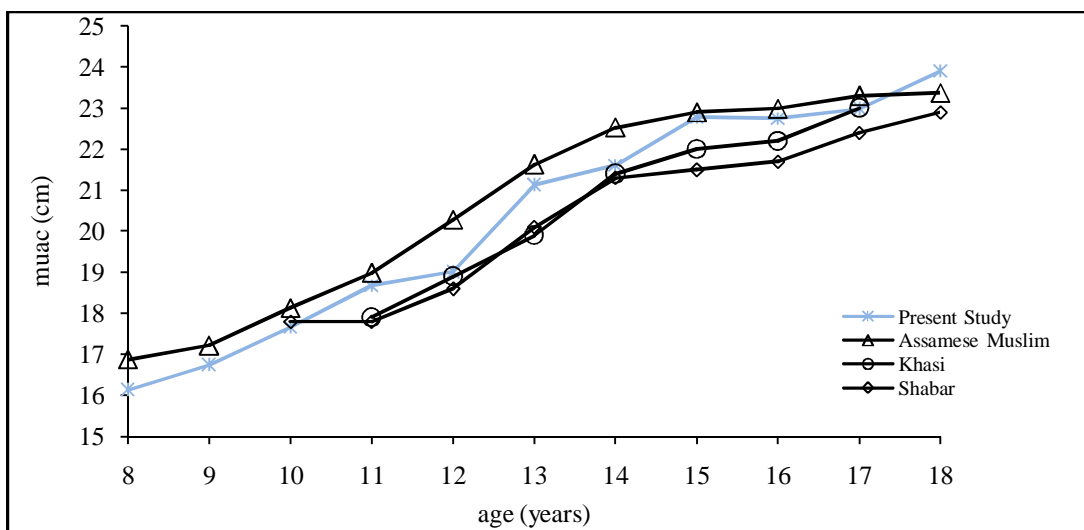


Figure 27.2: Curve in Comparison of Mid-Upper Arm Circumference in Girls with other Populations

Table: 42, figure: 27.1 and figure: 27.2 have shown the comparison in between the mean MUAC, and found that the present study has a smaller circumference to the Khasi boys in all age groups of 11-17 years, except the age group of 11 years in boys; whereas, in girls, they were to have a higher circumference than the Khasi except the 17 years of age. To the Assamese Muslims, a smaller MUAC was shown in all age groups except age 17 years in boys and 18 years in girls where a slightly bigger MUAC was shown; while comparing with the Shabar, the present boys were shown an advanced MUAC in age groups of 11-14 and 16-18 years and a smaller in age groups of 10 and 15 years, where as in girls, an almost an advanced MUAC to the Shabar girls in all the age groups from 11-18 years except at 10 years of age.

AGE	BOYS			GIRLS		
	Present Study	Assamese Muslims	Shabar	Present Study	Assamese Muslims	Shabar
8	22.50	23.22	-	22.65	22.82	-
9	23.59	23.41	-	23.82	23.34	-
10	23.79	24.97	24.20	24.74	24.47	24.80
11	25.68	25.44	25.20	26.83	25.88	24.80
12	26.47	26.93	25.40	26.80	27.31	27.00
13	27.68	27.55	27.90	29.06	28.16	27.20
14	29.32	28.83	28.10	29.57	29.35	28.40
15	30.38	30.46	28.80	31.51	29.40	28.70
16	31.83	30.69	29.70	31.34	29.51	28.90
17	32.73	31.22	30.50	31.34	29.61	29.70
18	32.21	31.38	30.60	31.85	29.70	29.70

Table 43: Comparison in Mean Calf Circumference of the Present Boys and Girls with Other Populations

The comparison of the calf circumference between the boys had shown that, the present study has a bigger circumference in the age groups of 9, 11, 13-14 and 16-18 years compared to the Assamese Muslims whereas when compared to the other age groups a smaller calf circumference was observed; while when compared to the Shabar, a smaller calf observed in age groups of 10 and 13 years and a bigger calf to the unmentioned age groups was observed. In girls, when compared to the Shabar, they possessed a bigger calf circumference in all age groups from 11-18 years except 10 and 12 years of age, whereas when compared to the Assamese Muslims a bigger calf circumference was observed in age groups 9-18 years except at the age group of 8 and 12 years (table: 43, figure: 28.1 and figure: 28.2).

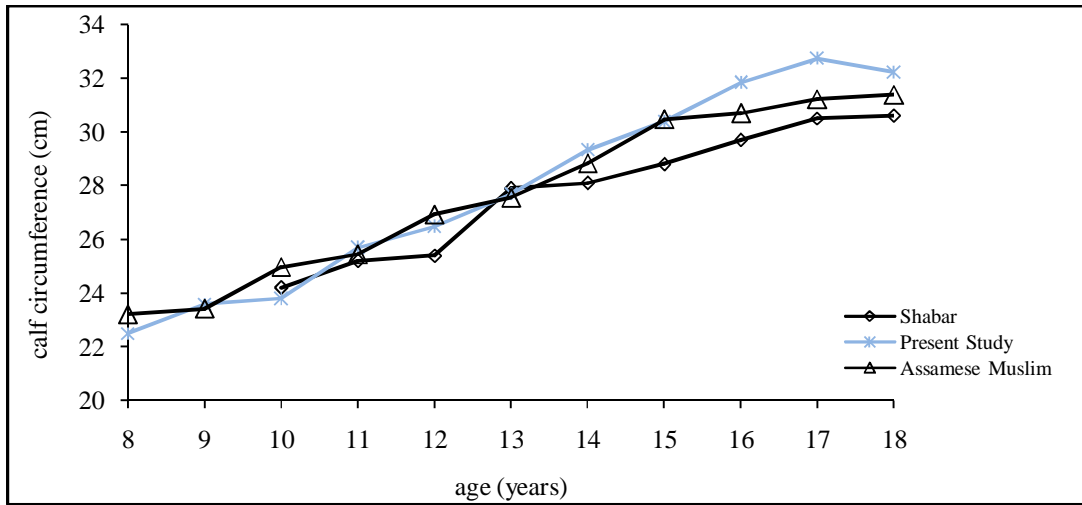


Figure 28.1: The Curve in Comparison of Calf Circumference in Boys with other Populations

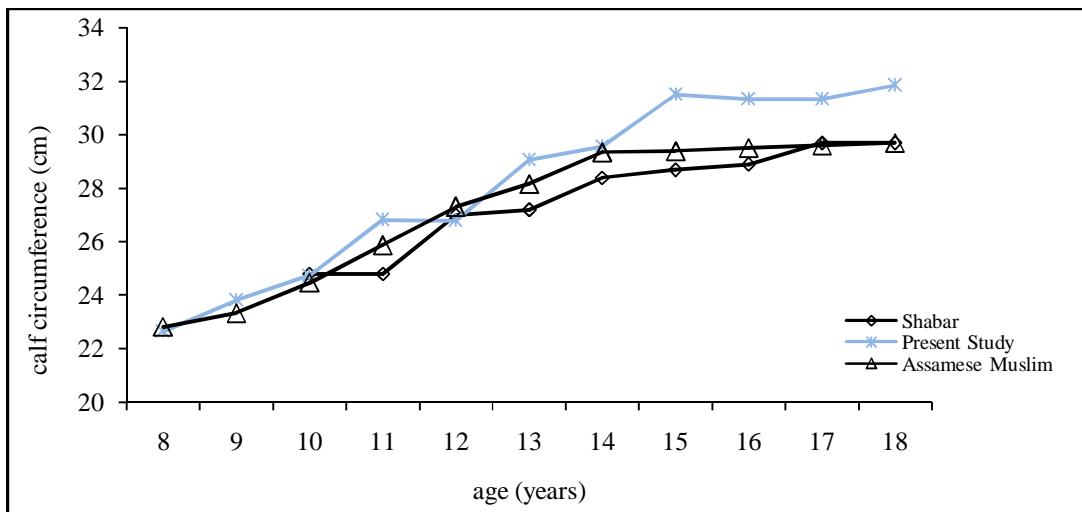


Figure 28.2: The Curve in Comparison of Calf Circumference in Girls with other Populations

AGE	BOYS		GIRLS	
	Present Study	Shabar	Present Study	Shabar
8	3.83	-	4.69	-
9	3.84	-	4.64	-
10	3.50	3.00	4.71	3.40
11	4.15	2.90	4.58	3.70
12	3.82	2.90	4.46	3.40
13	3.52	3.30	5.57	4.30
14	3.69	3.20	5.83	4.40
15	3.49	3.10	5.22	4.70
16	3.94	3.10	6.59	4.30
17	3.87	3.30	6.03	4.30
18	3.50	2.80	6.36	4.00

Table 44: Comparison in Mean Biceps Skinfold of the Present Boys and Girls with Other Populations

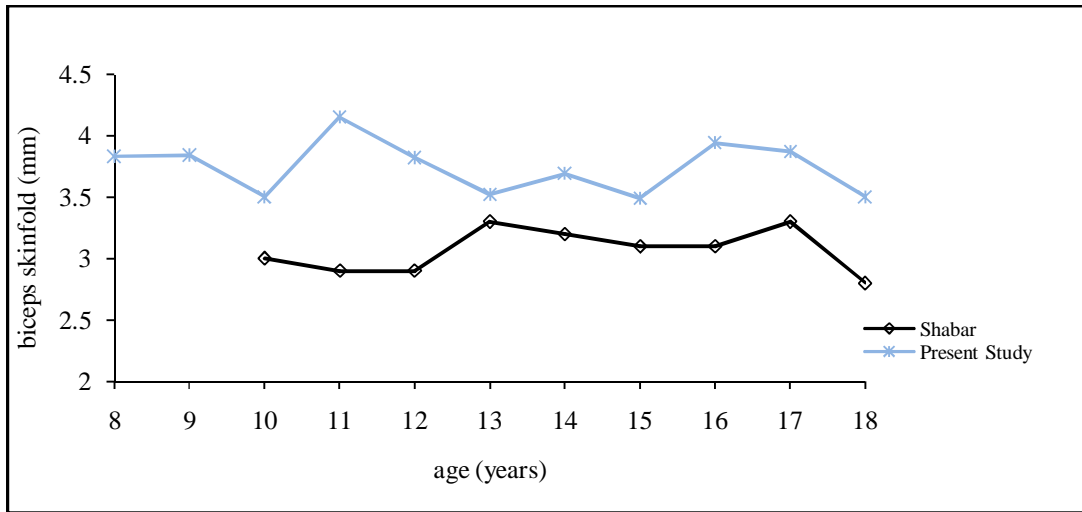


Figure 29.1: The Curve in Comparison of Biceps Skinfold in Boys with other Populations

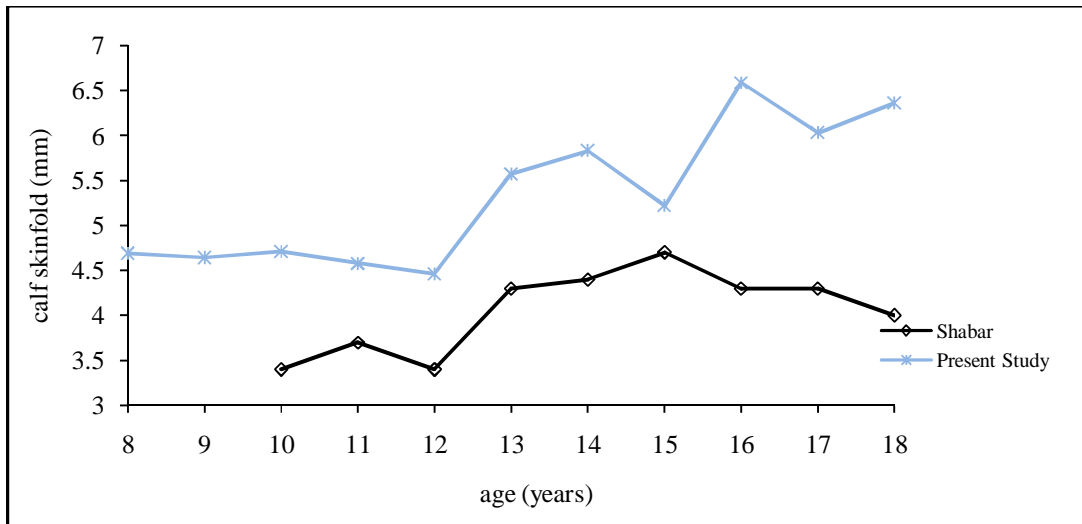


Figure 30.2: The Curve in Comparison of Biceps Skinfold in Girls with other Populations

AGE	BOYS			GIRLS		
	Present Study	Shabar	Khasi	Present Study	Shabar	Khasi
8	5.98	-	-	7.20	-	-
9	6.16	-	-	7.66	-	-
10	5.09	6.00	-	7.83	7.10	-
11	6.61	5.90	7.80	8.36	7.40	9.30
12	6.04	5.00	7.40	7.70	7.20	10.60
13	5.63	5.50	8.10	9.92	9.60	12.60
14	5.93	5.60	6.80	11.65	10.10	13.70
15	5.49	5.00	6.90	12.61	9.90	14.40
16	6.41	5.50	7.20	13.08	10.00	13.60
17	6.51	5.80	7.60	12.86	10.40	15.00
18	6.24	4.80	-	14.03	9.60	-

Table 45: Comparison in Mean Triceps Skinfold of the Present Boys and Girls with Other Populations

The mean biceps skinfold of the present study in both boys and girls was found to be in an advanced thickness skinfold when compared to the Shabar boys and girls respectively in all age groups from 10-18 years (table: 44, figure: 30.1 and figure: 30.2).

The present study displayed, a thicker accumulation of fat in all age groups of 11-18 years in both boys and girls except the 10 years of age where a smaller fold were shown in comparison to the Shabar; whereas when compared to the Khasi of Meghalaya they showed a smaller fold in all age groups of 11-17 years in both boys and girls (figure: 31.1, figure: 31.2 and table: 45).

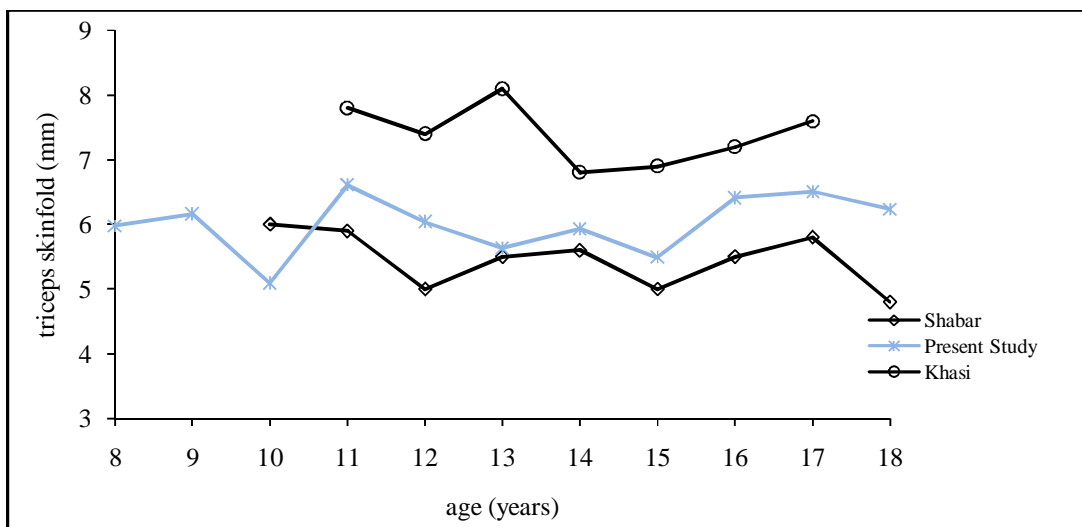


Figure 31.1: The Curve in Comparison of Triceps Skinfold in Boys with other Populations

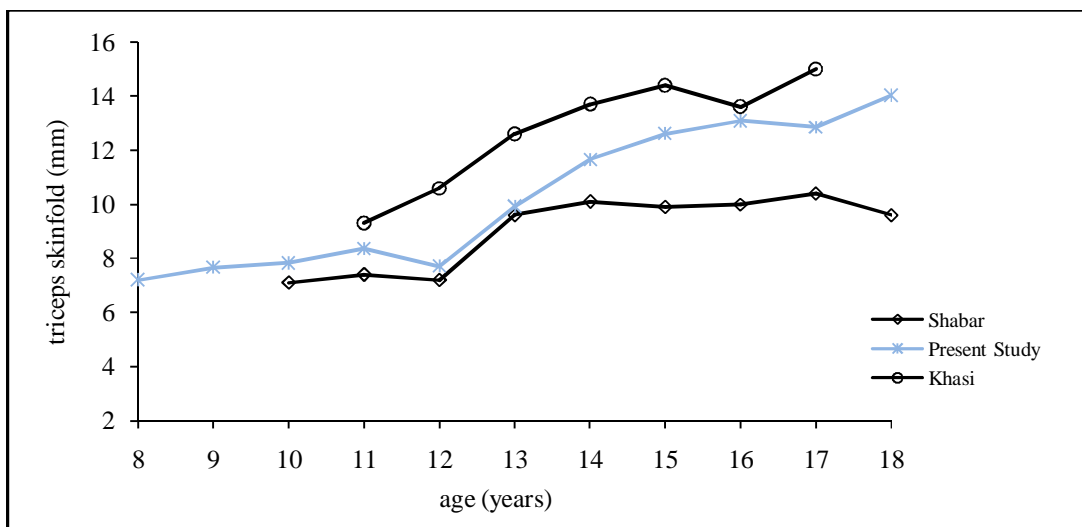


Figure 31.2: The Curve in Comparison of Triceps Skinfold in Girls with other Populations

AGE	BOYS		GIRLS	
	Present Study	Shabar	Present Study	Shabar
8	4.37	-	5.14	-
9	4.81	-	5.28	-
10	4.29	5.90	5.78	7.80
11	4.83	5.90	6.28	7.70
12	4.81	6.00	6.41	8.50
13	5.03	5.90	8.34	9.90
14	5.46	7.00	9.50	12.70
15	6.14	7.70	10.34	11.20
16	6.88	8.40	10.85	11.60
17	7.72	8.70	10.97	12.90
18	7.67	8.50	12.27	12.00

Table 46: Comparison in Mean Subscapular Skinfold of the Present Boys and Girls with Other Populations

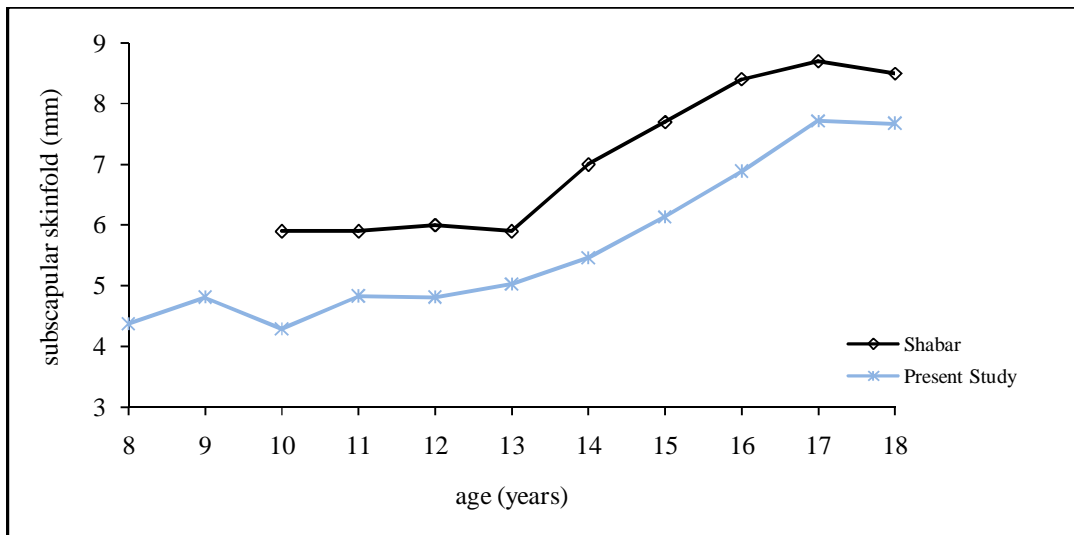


Figure 32.1: The Curve in Comparison of Subscapular Skinfold in Boys with other Populations

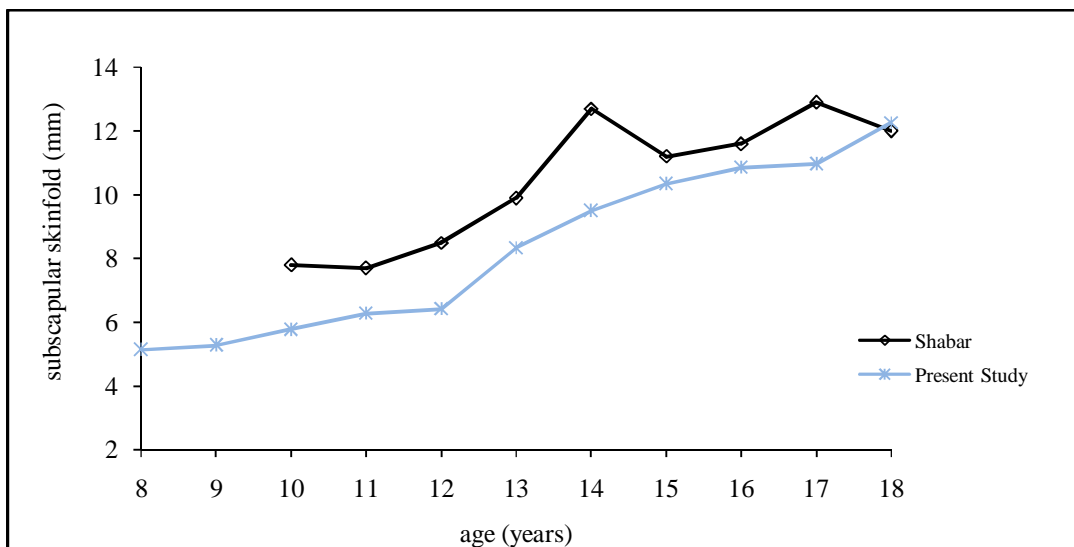


Figure 32.2: The Curve in Comparison of Subscapular Skinfold in Girls with other Populations

Table: 46 and figure: 32.1 have shown a comparison mean of subscapular skinfolds in boys, where the present boys had a low accumulation of fat when compared to the Shabar boys in all age groups of 10-18 years. However in girls (table: 46 and figure: 32.2), the present study also shown a low accumulation of fat in all age groups when compared to Shabar girls except the 18 years of age.

The comparison of the suprailiac skinfold between the present study and the Shabar (table: 47, figure: 33.1 and figure: 33.2) was found to be having a lesser accumulation of fat in age groups 10-16 years and more in the late age groups of 17-18 years in the boys, where as in girls a fold thickness was also observed to be lesser in the age groups of 10-15 years and 17 years and more in the age groups of 16 and 18 years.

AGE	BOYS		GIRLS	
	Present Study	Shabar	Present Study	Shabar
8	3.77	-	4.07	-
9	3.91	-	4.54	-
10	3.38	5.30	4.76	7.10
11	4.01	5.30	5.49	7.50
12	4.29	5.00	5.79	7.80
13	4.60	5.70	7.96	9.70
14	4.80	5.70	9.26	11.30
15	5.60	5.70	9.83	10.00
16	6.13	6.30	10.31	9.50
17	6.60	6.20	9.76	11.40
18	6.51	6.00	12.84	11.00

Table 47: Comparison in Mean Suprailiac Skinfold of the Present Boys and Girls with Other Populations

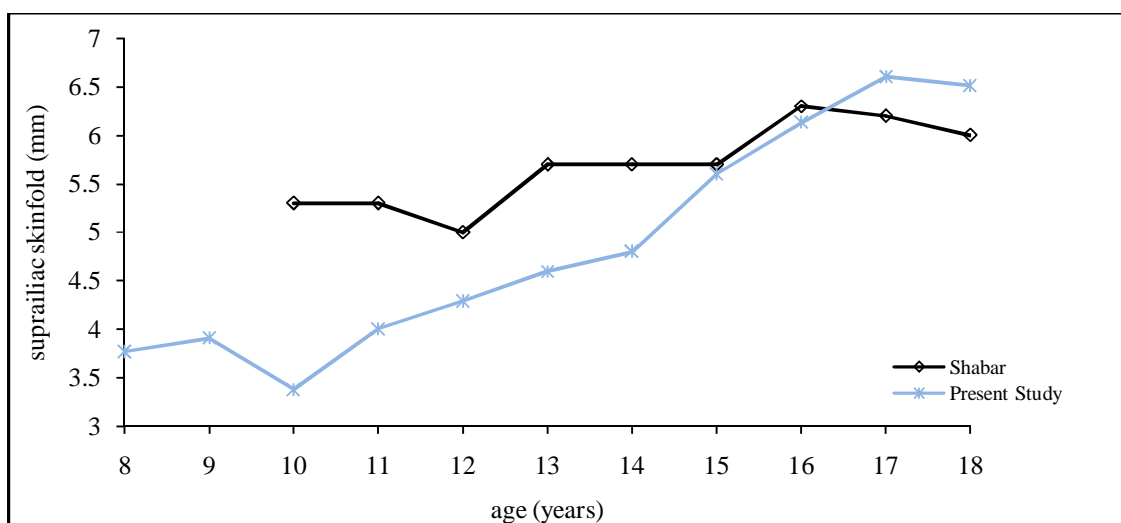


Figure 33.1: The Curve in Comparison of Suprailiac Skinfold in Boys with other Populations

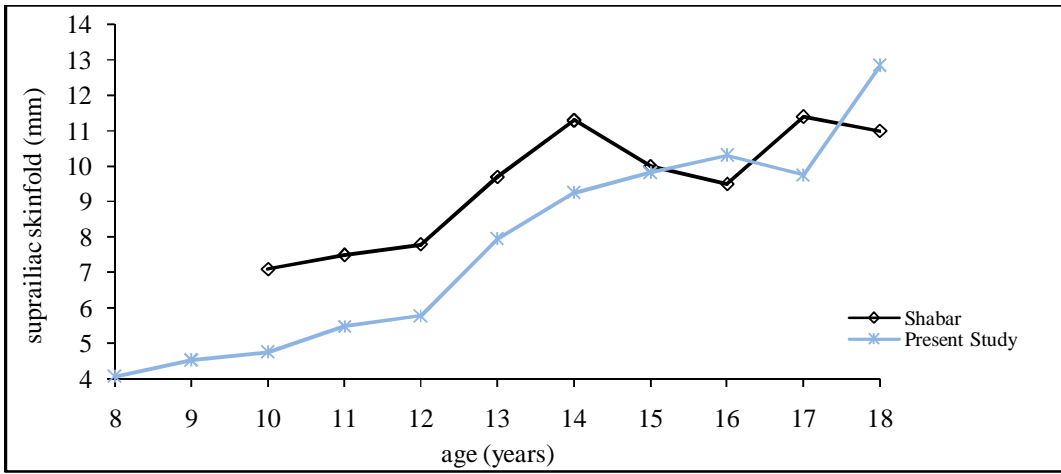


Figure 33.2: The Curve in Comparison of Suprailiac Skinfold in Girls with other Populations