

A Comparative Study of Anthropometric Variables and Physical Fitness Variables of Residential and non- residential Tribal Players of Bastar, Chhattisgarh, India .

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Abstract: A cross sectional study of the anthropometric variables and physical fitness variables was carried out on 782 boys and girls, aged 12+ to 17+ years from Tribal residential and non-residential school of Bastar dist of Chhattisgarh. The study was aimed to compare stature, body weight, 50 m run, 10*4 m shuttle run and vertical jump to measure motor fitness components. Height and weight measurements showed increasing trend with age in both groups of boys and girls, but it is not uniform in all the ages. However, comparison revealed that, there was no difference in height and weight measurements in residential and non-residential boys and girl of all the age group but the motor fitness variables exhibited better scores for boys and girls of residential school.

Keywords- *Anthropometric & Physical Fitness Variables, Weight, Height, Tribal.*

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I. INTRODUCTION

Bastar, the land of tribes where about 70% of the total population comprises of tribals, which is 26.76% of the total tribal population of Chhattisgarh. The major tribes of the Bastar region are the Gond, Abhuj Maria, Bhatra etc. The tribes of Bastar region are known for their unique and distinctive tribal culture and heritage in all over the world. Each tribal group in Bastar has their own distinct culture and enjoys their own unique traditional living styles. Each tribe has developed its own dialects and differs from each other in their costume, eating habits, customs, traditions and even worships different form of god and goddess.

II. MATERIAL AND METHODS

Chhattisgarh is a state in Central India. 782 boys and girls of Tribal school aged 12+ to 17+ years were the sample of the present study. Present paper aims at assessing and comparing the Anthropometric Variables and Physical Fitness Variables of Residential group that is school children, who were sports person residing in school hostels and pursuing their school along with sports training and sports participation and non- residential was the second group consisted of tribal students who were day scholars and also taking part in sports training or sports competition. Anthropometric measurements weight, height and physical fitness variables speed, vertical jump, shuttle run were taken following standard techniques. Descriptive and comparative analysis of the data was done using SPSS package version.

Body weight:

Weighing machine was used for recording body weight. Weighing machine was placed on plain surface and the subject was made to stand on the center of platform bare foot without support. Extra clothing and shoes were removed. Body weight recorded in Kilogram. (Tanner 1962)¹

Stature :

Anthropometer was used to measure the height. The subject was made to stand upright barefoot and without raising the heel from the ground. Then the horizontal bar of the anthropometer was lowered until it touches the head. The measurement was taken carefully and the bar was not allowed to press the head. The reading to the nearest half cm was recorded. (Tanner1962)¹

Vertical Jump :

It tests the explosive strength of the leg and extensibility of hip. The subject reaches upward with a chalk in hand from the standing position and puts mark at maximum reach in the wall, then he squats and jumps as high as possible and marks the wall. The height of the jump is the measured distance between standing and jumping height.(Baumgartner & Jackson, 1995)².

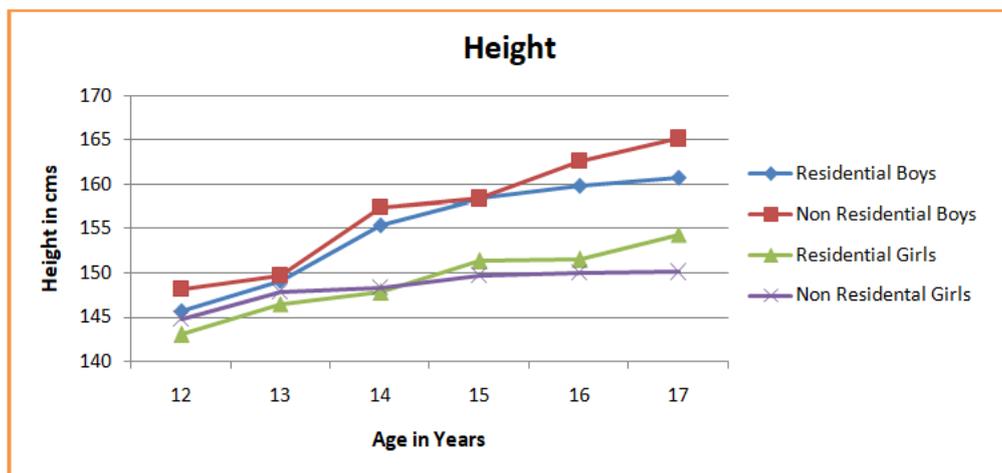
Shuttle Run :

Ten meter distance was marked, starting line was marked and two wooden blocks (2”*2”*4”) were placed at the other end. On signal “go” subject runs to the blocks, pick up one and returns to the stating line and places block behind the line; he then repeats the process for second block. The score for performer was the length of time required to complete the course. The time for the best trial was recorded. (Johnson and Nelson 1982)³.

III. RESULT AND DISCUSSION

Table no 01: Descriptive & Comparative Statistics of Height of Tribal Boys and Girls

Age	Residential				Non Residential				T Stat	P
	N	Mean± SE	SD	CV	n	Mean± SE	SD	CV		
Boys										
12	40	145.71 ± 2.13	13.42	9.21	30	148.08 ± 1.67	9.15	6.18	0.84	NS
13	42	149.03 ± 1.42	9.17	6.16	30	149.73 ± 2.51	13.71	9.16	0.27	NS
14	32	155.32 ± 1.42	8.03	5.17	31	157.37 ± 0.88	4.87	3.09	1.23	NS
15	37	158.41 ± 0.98	5.92	3.74	30	158.4 ± 1.26	6.86	4.33	0.01	NS
16	34	159.81 ± 0.82	4.75	2.97	30	162.55 ± 1.19	6.48	3.99	1.95	NS
17	38	160.73 ± 0.86	5.30	3.30	31	165.13 ± 0.86	4.75	2.88	3.60	P<0.001
Girls										
12	30	142.99 ± 1.36	7.44	5.21	30	144.78 ± 1.45	7.90	5.46	0.91	NS
13	30	146.5 ± 1.03	5.64	3.85	30	147.82 ± 0.96	5.22	3.54	0.95	NS
14	33	147.76 ± 0.96	5.50	3.72	30	148.35 ± 1.12	6.12	4.13	0.41	NS
15	38	151.3 ± 0.89	5.45	3.61	30	149.62 ± 1.22	6.65	4.45	1.15	NS
16	32	151.43 ± 0.84	4.74	3.13	30	149.95 ± 1.11	6.05	4.04	1.08	NS
17	32	154.33 ± 0.83	4.68	3.03	32	150.07 ± 0.96	5.42	3.62	3.37	P<0.005



In case of weight mean scores and standard deviation were 145.71 cm, 13.42 & 148.08 cm, 9.15 for the age group 12+ years for RT boys and NRT boys respectively and 160.73 cm and 5.30 for RT boys & 165.13 cm, 4.75 for NRT boys for the age group of 17+ years. The standard deviation of the body weight measurement exhibited the highest value 13.42 kg cm for the age group of 12+ years and the lowest value recorded was 4.75

cm for 16+ years among RT boys whereas among NRT boys it was maximum at 13+ years the value being 13.71 kg and minimum value of 4.75 cm at 17+ years age.

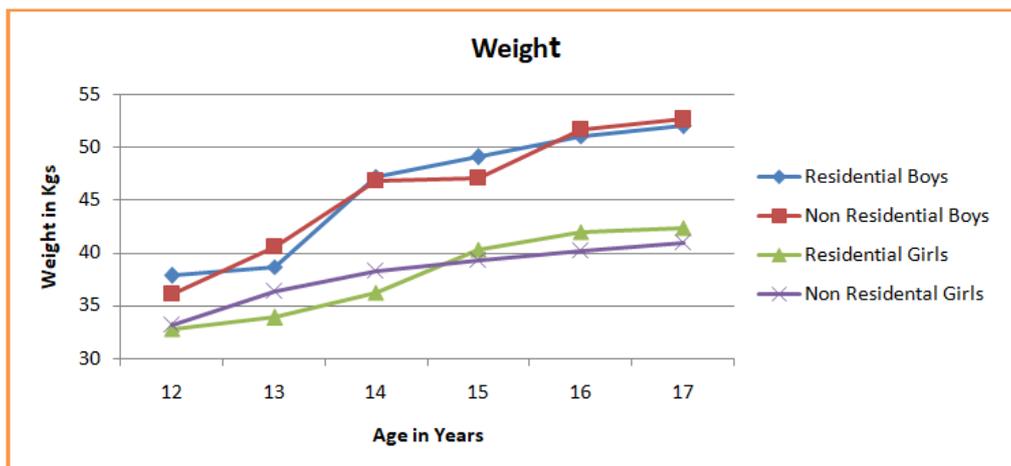
The maximum difference between two successive ages is 6.29 and 7.64 kg among RT and NRT boys between 13+ and 14+ years of age which correspond to indicate adolescent growth spurt. Body weight of RT girls when compared with NRT boys insignificant difference was found in all the age groups except at 17 years.

Similarly in case of girls weight mean scores and standard deviation were 142.99 cm, 7.44 and 144.78 cm, 7.90 for the age group 12+ years for RT girls and NRT girls respectively and 154.33 cm, 4.68 for RT girls & 150.07 cm, 5.42 for NRT girls for the age group of 17+ years. The standard deviation of the height measurement exhibited the highest value 7.44 cm for the age group of 12+ years and the lowest value recorded was 4.74 for 16+ years among RT girls whereas among NRT girls it was maximum at 12+ years the value being 7.90 cm and minimum value of 5.22 cm at 13+ years age.

The maximum difference between two successive ages is 3.67 cm among RT girls between 14+ and 15+, where as the difference was 3.04 cm among NRT girls between 12+ and 13+ years of age which correspond to indicate adolescent growth spurt. Body weight of RT girls when compared with NRT girls insignificant difference was found in all the age groups, except in the age group 17+.

Table no 02: Descriptive & Comparative Statistics of Weight of Tribal Boys and Girls

Age	Parisar				Non Parisar				T Stat	P
	n	Mean± SE	SD	CV	N	Mean± SE	SD	CV		
Boys										
12	40	37.82 ± 1.49	9.40	24.85	30	36.1 ± 1.24	6.78	18.77	0.85	NS
13	42	38.67 ± 1.33	8.60	22.24	30	40.6 ± 1.38	7.53	18.55	0.99	NS
14	32	47.16 ± 1.32	7.47	15.83	31	46.81 ± 0.81	4.46	9.53	0.23	NS
15	37	49.05 ± 0.97	5.91	12.04	30	47.12 ± 0.79	4.30	9.12	1.50	NS
16	34	51 ± 0.88	5.13	10.06	30	51.67 ± 0.86	4.67	9.03	0.55	NS
17	38	51.98 ± 0.91	5.59	10.75	31	52.62 ± 0.99	5.49	10.42	0.48	NS
Girls										
12	30	32.8 ± 1.16	6.33	19.29	30	33.17 ± 1.01	5.50	16.58	0.24	NS
13	30	33.87 ± 0.85	4.63	13.65	30	36.37 ± 1.16	6.32	17.37	1.75	NS
14	33	36.19 ± 0.87	4.96	13.69	30	38.24 ± 1.01	5.49	14.36	1.56	NS
15	38	40.35 ± 0.74	4.51	11.17	30	39.32 ± 0.83	4.54	11.53	0.93	NS
16	32	42.02 ± 0.91	5.13	12.21	30	40.2 ± 0.84	4.60	11.44	1.47	NS
17	32	42.31 ± 0.67	3.76	8.88	32	40.96 ± 0.78	4.41	10.75	1.33	NS



In case of weight mean scores and standard deviation were 37.82 kg, 9.40 & 36.1 kg, 6.78 for the age group 12+ years for RT boys and NRT boys respectively and 51.98 kg, 5.59 for RT boys & 52.62 kg, 5.49 for NRT boys for the age group of 17+ years. The standard deviation of the body weight measurement exhibited the highest value 9.40 kg for the age group of 12+ years and the lowest value recorded was 5.13 kg for 16+ years among RT boys whereas among NRT boys it was maximum at 13+ years the value being 7.53 kg and minimum value of 4.30 kg at 15+ years age.

The maximum difference between two successive ages is 8.49 kg among RT boys and 6.21 kg among NRT boys between 13+ and 14+ years of age which correspond to indicate adolescent growth spurt. Body weight of RT boys when compared with NRT boys insignificant difference was found in all the age groups.

Similarly in case of girls weight mean scores and standard deviation were 32.8 kg, 6.33 & 33.17 kg, 5.50 for the age group 10+ years for RT girls and NRT girls respectively and 42.31 kg, 3.76 for RT girls & 40.96 kg, 4.41 for NRT girls for the age group of 17+ years. The standard deviation of the body weight measurement exhibited the highest value 6.33 kg for the age group of 12+ years and the lowest value recorded was 3.76 kg for 17+ years among RT girls whereas among NRT girls it was maximum at 13+ years the value being 6.32 kg and minimum value of 4.41kg at 17+ years age.

The maximum difference between two successive ages is 4.16 kg among RT girls between 14+ and 15+, where as the difference was 3.2 kg among NRT girls between 12+ and 13+ years of age which correspond to indicate adolescent growth spurt. Body weight of RT girls when compared with NRT girls insignificant difference was found in all the age groups.

Table no 03 : Descriptive & Comparative Statistics of Speed Test (50 M)of Tribal Boys and Girls.

Age	Residential				Non Residential				T Stat	P
	n	Mean ± SE	SD	CV	n	Mean ± SE	SD	CV		
Boys										
12	40	8.65 ± 0.1	0.60	6.90	30	10.38 ± 0.17	0.89	8.51	9.83	w
13	42	8.33 ± 0.07	0.40	4.77	30	10.32 ± 0.11	0.60	5.79	17.05	P<0.001
14	32	8.26 ± 0.11	0.62	7.40	31	10.6 ± 0.22	1.19	11.18	9.92	P<0.001
15	37	8.35 ± 0.15	0.88	10.48	30	9.83 ± 0.25	1.36	13.80	5.40	P<0.001
16	34	8.37 ± 0.1	0.56	6.65	30	9.39 ± 0.13	0.71	7.51	6.50	P<0.001
17	38	8.37 ± 0.08	0.45	5.38	31	9.38 ± 0.16	0.89	9.45	6.14	P<0.001
Girls										
12	30	8.91 ± 0.11	0.56	6.24	30	9.25 ± 0.13	0.71	7.62	2.06	P<0.05
13	30	8.98 ± 0.11	0.56	6.17	30	9.25 ± 0.12	0.64	6.84	1.75	NS
14	33	8.77 ± 0.1	0.57	6.45	30	8.9 ± 0.13	0.68	7.55	0.87	NS
15	38	8.68 ± 0.12	0.71	8.13	30	9.48 ± 0.16	0.86	9.04	4.24	P<0.001
16	32	8.47 ± 0.13	0.73	8.57	30	8.86 ± 0.14	0.75	8.44	2.07	P<0.05
17	32	8.35 ± 0.08	0.43	5.13	32	8.77 ± 0.1	0.55	6.23	3.48	P<0.001

In case of 50 m dash mean scores ranged between 8.26s (14+) to 8.65s (12+)in RT boys and in case of NRT boys mean scores ranged between 9.38 (17+) to 10.6s (14+) . It means that best performance was observed at 14+ age in RTB and at 17+ in NRTB. There was significant difference observed between both the groups performance of RTB were recorded to be higher as compared to NRTB.

In case girls mean scores of 50 m dash ranged between 8.35s (17+) to 8.98s (13+) in RTG and in case of NRTG mean scores ranged between 8.77 (17+) to 9.48 (15+) . In both the groups best performance was observed at 17+years. RT Girls out performed NRTG in all the age group except 13+ and 14+.

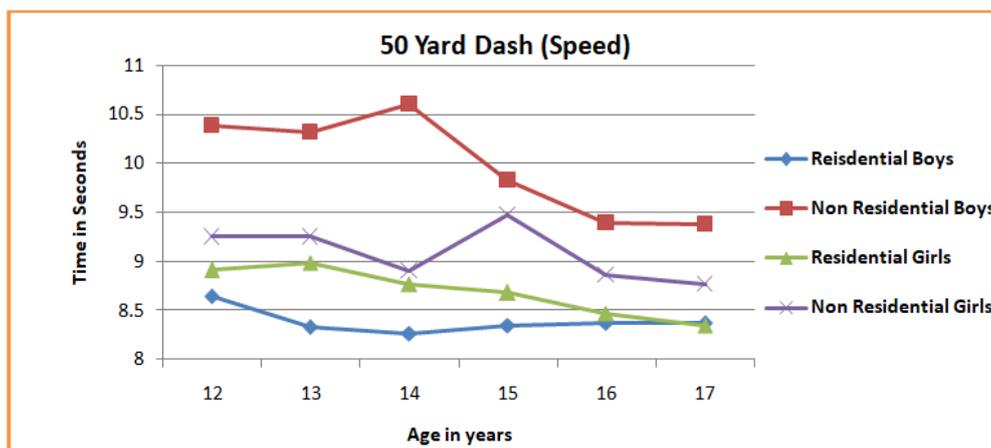
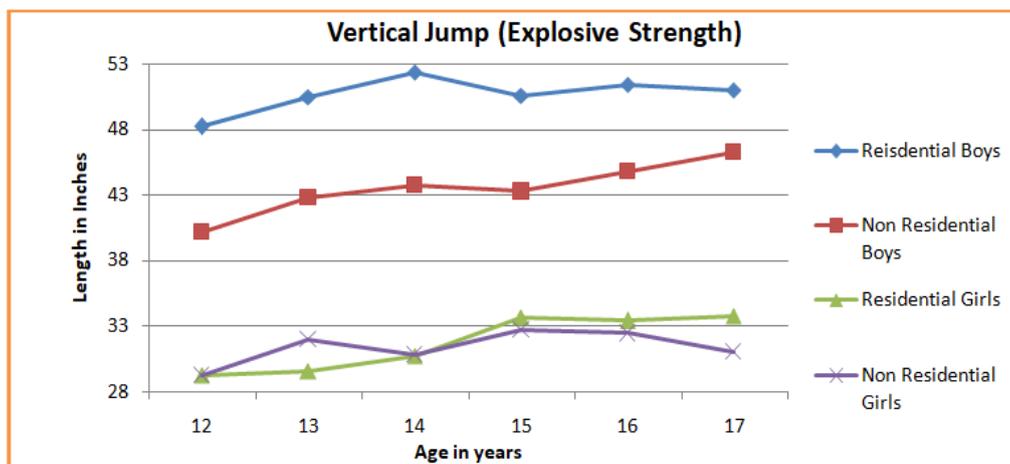


Table no 04 : Descriptive & Comparative Statistics of Vertical Jump (Inches) of Tribal Boys and Girls.

	Age	Residential				Non Residential				T Test	
		n	Mean SE	SD	CV	n	Mean SE	SD	CV	T Stat	P
Boys	12	40	48.2 ± 0.66	4.12	8.54	30	40.2 ± 0.59	3.19	7.94	8.84	P<0.001
	13	42	50.5 ± 0.75	4.84	9.58	30	42.77 ± 0.77	4.22	9.86	7.06	P<0.001
	14	32	52.32 ± 0.68	3.82	7.30	31	43.71 ± 0.86	4.77	10.92	7.93	P<0.001
	15	37	50.57 ± 0.7	4.21	8.31	30	43.27 ± 0.89	4.85	11.21	6.61	P<0.001
	16	34	51.42 ± 0.62	3.61	7.01	30	44.77 ± 0.74	4.01	8.95	6.99	P<0.001
Girls	12	30	29.2 ± 0.83	4.55	15.57	30	29.27 ± 0.89	4.84	16.52	0.06	NS
	13	30	29.54 ± 0.95	5.18	17.51	30	32 ± 0.64	3.49	10.89	2.17	P<0.05
	14	33	30.7 ± 0.77	4.37	14.24	30	30.84 ± 0.73	3.99	12.92	0.13	NS
	15	38	33.66 ± 0.94	5.75	17.08	30	32.7 ± 0.75	4.07	12.45	0.78	NS
	16	32	33.38 ± 0.66	3.68	11.03	30	32.44 ± 0.71	3.86	11.90	0.99	NS
	17	32	33.72 ± 0.87	4.91	14.54	32	31.04 ± 1.01	5.70	18.37	2.03	P<0.05

n= number, SE = Standard Error, SD = Standard Deviation, CV = Coefficient of Variance, p = Probability and NS = Not Significant



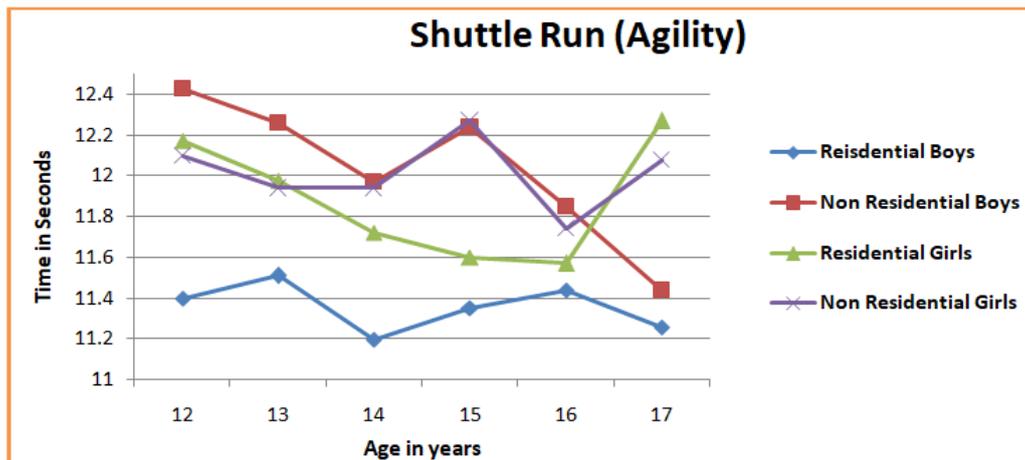
In case of vertical jump mean scores ranged between 48.2 in (12+) to 52.32in (14+) in RTB and in case of NRT boys mean scores ranged between 40.2 (12+) to 46.3 (17+) . The best performance was observed at 14+ age in RTB and at 17+ in NRTB. There was significant difference observed between both the groups performance of RTB were recorded to be higher as compared to NRTB.

In case girls mean scores of vertical jump ranged between 29.2 (12+) to 33.72 (17+) in RTG and in case of NRTG mean scores ranged between 29.27 (12+) to 31.04 (17+). In both the groups best performance was observed at 17+ years. Comparative statistics showed RT Girls out performed NRTG only in the age group except 13+ and 17+.

Table no 05 : Descriptive & Comparative Statistics of 10 x4 shuttle Run (Agility) of Tribal Boys and Girls.

	Age	Residential				Non Residential				T Test	
		n	Mean SE	SD	CV	n	Mean SE	SD	CV	T Stat	P
Boys	12	40	11.4 ± 0.09	0.56	4.91	30	12.43 ± 0.14	0.77	6.16	6.52	P<0.001
	13	42	11.51 ± 0.09	0.53	4.53	30	12.26 ± 0.15	0.78	6.36	4.88	P<0.001
	14	32	11.2 ± 0.12	0.67	5.98	31	11.97 ± 0.2	1.10	9.18	3.39	P<0.005
	15	37	11.35 ± 0.08	0.48	4.15	30	12.24 ± 0.15	0.79	6.43	5.79	P<0.001
	16	34	11.44 ± 0.08	0.46	3.97	30	11.85 ± 0.1	0.53	4.47	3.38	P<0.005
	17	38	11.26 ± 0.11	0.67	5.94	31	11.44 ± 0.1	0.53	4.61	1.26	NS
Girls	12	30	12.17 ± 0.16	0.85	6.93	30	12.1 ± 0.12	0.63	5.16	0.36	NS
	13	30	11.98 ± 0.14	0.74	6.15	30	11.94 ± 0.12	0.64	5.30	0.27	NS
	14	33	11.72 ± 0.13	0.71	6.01	30	11.94 ± 0.14	0.72	6.01	1.25	NS
	15	38	11.6 ± 0.12	0.73	6.25	30	12.27 ± 0.16	0.83	6.73	3.58	P<0.001
	16	32	11.57 ± 0.11	0.58	4.94	30	11.74 ± 0.13	0.69	5.81	1.10	NS
	17	32	12.27 ± 0.63	3.56	29.02	32	12.08 ± 0.12	0.64	5.24	0.30	NS

n= number, SE = Standard Error, SD = Standard Deviation, CV = Coefficient of Variance, p = Probability and NS = Not Significant



In case of shuttle run mean scores ranged between 11.2 (14+) to 11.51 (13+) in RTB and in case of NRT boys mean scores ranged between 11.44 (17+) to 12.43 (12+). The best performance was observed at 14+ age in RTB and at 17+ in NRTB. There was significant difference observed between both the groups in shuttle run in all the age group except 17+, performance of RTB were recorded to be higher as compared to NRTB.

In case girls mean scores of shuttle run ranged between 11.6 (15+) to 12.27 (17+) in RTG and in case of NRTG mean scores ranged between 11.74 (16+) to 12.1 (12+). Comparative statistics showed insignificant difference between both the groups, except at the age 15+.

IV. CONCLUSION

It is evident from the table that the growth pattern of both residential and non-residential groups of boys and girls under study is similar. No significant difference noted between both the groups in anthropometric variables. In spite of insignificant difference between the groups in anthropometric variables insignificant differences have been observed in fitness variable. The result indicates that training and diet might be responsible for the better performance of the RT groups.

Similar result have been reported by Shukla et al (2009,2013)^{4,5,6} JNV boys instead of shows lower anthropometric values showed better performance in physical fitness variable, as JNV boys were residing in hostel and participated in regular physical activities, followed a regular diet patten also, which might have contributed to better fitness as compared to day boarders.

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