IJBPAS, August, 2014, 3(8): 1896-1903

ISSN: 2277–4998

International Journal of Biology, Pharmacy and Allied Sciences (IJBPAS)

'A Bridge Between Laboratory and Reader'

www.ijbpas.com

ANTHROPOMETRIC ASSESSMENT OF ADOLESCENT GIRLS LIVING IN URBAN AND RURAL AREAS OF PUNJAB

RANI S*, SINGAL P, MEHTA P AND KAUR G

***Corresponding Author: E Mail: seemajindal278@gmail.com**

ABSTRACT

The present cross-sectional study was conducted on 300 adolescent girls (150 urban and 150 rural) in the age range of 11 to 16 years from various schools of Barnala and Mansa districts of Punjab. The objectives were to study the growth pattern of the adolescent girls and compare the growth differences among them due to urban and rural areas. The physical growth including eight measurements viz., weight, height, sitting height, subischial length and various circumference (upper arm, calf, waist and hip circumference) were evaluated by the techniques given by Lohman *et al*., 1988. It was observed that all these measurements increased in both the groups but the values were more in urban adolescent girls as compared to rural girls. It can be concluded that in urban girls, the physical growth and adolescent spurt occurred earlier as compared to the ones living in rural areas.

Keywords: Anthropometry, Adolesence, Growth, Circumferences, Weight

INTRODUCTION

Adolescence is a process of development from childhood to adulthood, beginning with the appearance of secondary sex characteristics and terminating with the cessation of somatic growth. Many physiological changes occur during the adolescent period in a normal child as part of the process of growth and development which are under hormonal and to some extent environmental control leading to physical maturity that is assessed with the help of different anthropometric measurements.

Anthropometry is an important tool in the study and understanding of human biological variability, morphological variation as universally applicable **[1]**. Many studies

carried out on children residing in rural and tribes areas and ranging in age from 0 to 18 years have reported that all the anthropometric measurements increased with advancement of age **[2-21]**.

In Hungarian girls, Growth, Maturation, and Physical Fitness were studied that it was observed that weight, height and circumferences were more in urban girls as compared to rural girls (22). Growth and development of adolescent girls residing in Segou region of Mali (West Africa) was studied and it was reported that urban girls had better indicators of growth than rural girls (23).

A study on urban and rural Tonga girls' ages 6–18 from Zambia was conducted and reported that that the rural girls progress more rapidly than the urban girls through adolescent period despite their later start **[24]**. Some other populations showed that height and weight were increased with advancement of age **[25-26]**.

The present cross-sectional study was conducted to assess anthropometric status and the difference in growth pattern of adolescent girls living in urban and rural areas of Punjab.

MATERIAL AND METHODS

The present cross-sectional study was conducted on a sample of 300 children (150 urban and 150 rural girls) ranging in age from 11 to 16 years from Barnala and Mansa districts of Punjab from January to March 2010. The decimal age of each individual was calculated and the subjects were further divided into six age groups. Weight, height, sitting height, subischial length and various circumferences (upper arm, calf, waist and hip circumference) were taken with the help of techniques (27). Student's t-test was applied for assessing significant urban-rural differences.

RESULTS

The mean values of weight and height were more in urban girls as compared to rural girls and the total gain was 11.76 kg and 10.31 cm in urban girls and 14.44 kg and 13.44 cm in rural girls with the growth period of 11 to 16 years. The differences were statistically significant at 12 years in weight and 13 years in height **(Table 1)**.

Sitting height and subischial length were more in urban girls as compared to rural girls and the total gain was 6.91 cm and 4.38 cm in urban girls and 7.55 cm and 5.65 cm in rural girls during the growth period of adolescence and the differences were statistically non-significant in sitting height and significant at 13 years in subischial length (**Table 2**).

Urban girls had more upper arm circumference and calf circumference as compared to rural girls and the total gain was 1.79 cm and 5.17 cm in urban girls and 4.0 cm and 5.06 cm in rural girls over the growth period of 11 to 16 years. The differences were statistically significant at 12 years in both upper arm and calf circumference **(Table 3)**.

Waist and hip circumference were also more in urban girls as compared to rural girls and the total gain was 6.99 cm and 17.66 cm in urban girls and 5.10 cm and 12.99 cm in rural girls. The differences were statistically significant at 12 and 16 years in waist and at 14 and 16 years in hip circumference **(Table 4)**.

DISCISSION

The present study showed that the urban girls were heavier, taller and had greater circumferences as compared to rural girls.

In the present study, weight and height were increased with advancement of age as in the other population **[21, 25-26] (Table 5 & 6)**. In the present study, the total gain for both were 8.52 kg and 10.16 cm in urban girls and 9.84 kg and 12.94 cm in rural girls, 13.78 kg and 15.51 cm in urban girls and 14.98 kg and 15.03 cm in rural girls for dharwad district of Karnataka and Orissa **[25]** and 16.0 kg and 13.7 cm in Bahrain population **[21]** and it was 18.06 kg and 23.32 cm for tribal population of Visakhapatnam district, Andhra Pradesh **[26]**. It showed that the total gain of both parameters were less in present study as compared to other populations **[21, 25-26]**. The mean values of weight were more in the present study as compared to other population except at 15 years of age **[25-26]** but the values were less in the present study as compared to bahrain population **[21]**. As compared to present study, the mean values for height were less in other population **[25-26]**.

Upper arm and calf circumference also increased with age up to 15 years in the present study and when compared with other population **[21, 26]** it was observed that the total gain for both were 1.79 cm and 5.17 cm in urban and 4.0 cm and 5.06 cm in rural girls (In present study), 5.85 cm and 6.41 cm for tribal population of Andhra Pradesh **[26]**, 7.1 cm for upper arm circumference in Bahrain population **[21]**. It was observed that the total gain was less in the present study as compared to other populations **[21, 26]**. It was found that the mean values for upper arm and calf circumference were more in present study as compared to other population **[21, 16]** but the values were less for upper arm

circumference **[21]** and calf circumference **[26]** only at 15 years of age.

The rural girls progress more rapidly than the urban girls through adolescent period despite their later start (in the present study) because the total gain was more in rural girls as compared to urban girls.

It was concluded that the adolescent spurt occurred earlier in urban girls as compared to the rural girls. The better physical growth in urban girls may be attributed to better nutrition and less physical activity whereas the rural girls do more physical activity and poor socio-economic level may be responsible for delayed growth in rural girls. Therefore, further more research should be conducted on adolescent children among the different states to provide better suggestion to both urban and rural population about suitable programmers and strategies which may be helpful to improve their nutritional status and achieve better physical growth.

ACKNOWLEDGEMENT

The authors are thankful to the institutional authorities for the help provided, and also to the subjects for their cooperation and support in my research work.

REFERENCES

[1] WHO, Physical Status: The Use and Interpretation of Anthropometry, Report of a Expert Committee, WHO, Geneva, 1995.

[2] Singh, SP, Physical growth of Gaddi Rajputs of Dhauladhar range of the Himalaya, Z. Morph. Anthrop., 71, 1980, 65-81.

[3] ICMR, Growth and Physical Development of Indian Infants and Children, Technical Report, Series No.18. ICMR, New Delhi, 1984.

[4] Bharati S, Mukherjee D and Bharati P, Patterns of growth among the Bengali Brahmin and Mahishya Castes of Howrah district, West Bengal, India, Ind. J. Phy. Anthrop and Hum. Genet., 17, 1991, 163-174.

[5] Sharma JC, Physical growth, sexual and skeletal maturity of Punjabi adolescents in relations to their socio-economic status, Ind. J. Phy. Anthrop and Hum. Genet., 17 (2&3), 1991, 139-154.

[6] Nath S, Sachadeva V and Chauhan N, Progression of maturational sequence in stature and linear measures of the extremities and sex differences among Lodhas of West Bengal, Ind. J. Phy. Anthrop and Hum. Genet., 17, 1991, 205-218.

[7] Dharma Rao B and Busi BR, A study of physical growth among Jatapu tribal boys of A.P., J. Hum. Ecol., 5, 1994, 281-286.

[8] Dharma Rao B and Busi BR, Growth progression and maturational sequence among Savara tribal boys of A.P., India, J. Hum. Ecol., 6, 1995(a), 89-96.

[9] Dharma Rao B and Busi BR, Patterns of physical growth and maturational sequence among Chenchu tribal boys of A.P., Bionature, 15, 1995 (b), 11-18.

[10] Dharma Rao B and Busi BR, Physical growth and maturational sequence of certain measurements in Chenchu tribal girls of Andhra Pradesh, South Asian Anthropologist, 17 (1), 1996 (a), 39-45.

[11] Dharma Rao B and Busi BR, A Study of physical growth and nutritional status among Jatapu tribal girls of Andhra Pradesh, J. Hum. Ecol., 7 (3), 1996 (b), 1-3.

[12] Dharma Rao B, Rao VLN and Busi BR, Growth in physical and physiological variables of Konda Reddi tribal boys of A.P., South Asian Anthropologist, 18, 1997(a), 23-32.

[13] Dharma Rao B, Rao VLN and Busi BR, A Study of growth in physical and physiological variables among Koya Dora tribal boys of A.P., J. Hum. Ecol., 7, 1997(b), 1-3.

[14] Dharma Rao B, Girija Vani DSS and Busi BR, A study of growth in physical and physiological variables among Mala boys of Visakhapatnam district, Andhra Pradesh, J. Hum. Ecol., 8 (5), 1997(c), 1-7.

[15] Dharma Rao B and Busi B, A study of physical growth and nutritional status among Savara tribal boys of Andhra Pradesh, South Asian Anthropologist, 19 (2), 1998, 65- 70.

[16] Dharma Rao B and Busi BR, Growth progression in physical and physiological variables among Porja tribal boys of Visakhapatnam district, A.P., South Asian Anthropologist, 20, 1999 (a), 35-42.

[17] Dharma Rao B, Rao VLN and Busi BR, Growth progression in physical, physiological and sickle cell traits among Porja tribal girls of Visakhapatnam district, Andhra

Pradesh, Anthropologist, 1 (3), 1999 (b), 155-161.

[18] Dharma Rao B, Rao VLN and Busi BR, Growth progression, blood pressure and sickle cell trait among Gadaba tribal girls of Visakhapatnam district, Andhra Pradesh, Anthropologist, 1(3), 1999(c), 163-169.

[19] Dharma Rao B, Rao VLN and Busi BR, Growth progression in physical and physiological variables among Bondo tribal boys in Orissa, Man in India, 80 (1-2), 2000, 157-167.

[20] Busi BR and Dharma Rao B, Growth progression in physical and physiological variables among Rellis: A Scheduled Caste of Andhra Pradesh, Man in India, 83(1-2), 2003, 89-107.

[21] Gharib NM and Rasheed P, Anthropometry and body composition of school children in Bahrain, Annals of Saudi Med., 29 (4), 2009, 258-269.

[22] Eiben OG, Barabás A and Németh A, Comparison of Growth, Maturation, and Physical Fitness of Hungarian Urban and Rural Boys and Girls, J. Hum. Ecol., 17(2), 2005, 93-100.

[23] Pawloski LR, Growth and development of adolescent girls from the Segou region of Mali (West Africa), American J. Physical Anthropol., 117, 2002, 364-372.

[24] Gillett-Netting R, Meloy M and Campbell BC, Catch-up reproductive maturation in rural Tonga girls, Zambia, American J. Human Biol., 16(6), 2004, 658-669.

[25] Sahoo K, Hunshal S and Itagi S, Physical growth of school girls from Dharwad and Khurda districts Karnataka, J. Agric. Sci., 24 (2), 2011, (221-226).

[26] Rao VLN, Dharma Rao B, Rao CS and Busi BR, Patterns of growth and physiological Variables among Khond tribal population of Visakhapatnam district, Andhra Pradesh, Anthropologist, 7(4), 2005, 237-245.

[27] Lohman, TG, Roche, AF and Martorell, R, Anthropometric Standardization References Manual, Human Kinetic, Champaign, 1988.

Table 1: Weight (kg) and Height (cm) in Urban and Rural Adolescent Girls From 11 to 16 Years

Age	Weight	Height

	Urban	Rural	t-value	Urban	Rural	t-value
11	34.00	30.92	1.55	145.07	141.44	1.88
12	38.80	33.96	2.07*	147.24	145.32	1.00
13	40.88	38.16	1.05	151.99	146.51	2.76*
14	42.48	39.76	1.40	152.64	151.33	0.67
15	42.52	40.76	0.71	155.23	154.38	0.56
16	45.76	45.36	0.16	155.38	154.88	0.27

*Significant at 5% Level

Table: 2 Sitting Height (cm) and Subischial Length (cm) in Urban and Rural Adolescent Girls From 11 to 16 Years

Age	Sitting height			Subischial lenght		
	Urban	Rural	t-value	Urban	Rural	t-value
11	72.94	71.75	0.85	72.13	69.38	1.69
12	75.00	74.50	0.49	72.23	70.82	0.87
13	77.58	75.30	1.69	74.07	71.21	2.15*
14	78.57	77.44	0.96	74.40	73.88	0.10
15	79.80	78.72	1.01	76.08	74.58	1.14
16	79.85	79.30	0.54	76.51	75.03	1.22

*significant at 5% level

Table 3: Upper Arm Circumference (cm) and Calf Circumference (cm) in Urban and Rural Adolescent Girls From 11 to 16 Years

Age	Upper arm circumference			Calf circumference		
	Urban	Rural	t-value	Urban	Rural	t-value
11	21.52	18.94	3.07*	26.08	24.74	1.76
12	21.70	19.92	2.69*	28.56	26.07	3.67*
13	21.92	20.62	0.54	28.80	27.20	2.16*
14	21.96	20.75	1.70	29.13	27.70	1.90
15	22.40	21.06	1.87	29.77	28.78	0.98
16	23.31	22.94	0.46	31.25	29.80	1.01

*significant at 5% level

Table 4: Waist Circumference (cm) and Hip Circumference (cm) in Urban and Rural Adolescent Girls From 11 to 16 years

Age	Waist circumference			Hip circumference		
	Urban	Rural	t-value	Urban	Rural	t-value
11	60.69	58.16	1.72	70.22	69.89	0.10
12	63.12	59.50	2.54*	74.80	72.59	0.99
13	64.25	61.46	1.77	80.80	77.60	1.37
14	64.46	62.16	1.20	83.84	79.14	2.21*
15	64.86	62.45	1.39	84.78	82.74	1.12
16	67.68	63.26	2.26*	87.88	82.88	2.27*

*Significant at 5% Level

Table: 5 Comparison of Weight (kg) of the Present Study With Different Population

Age	Weight					
	Present study (2010)		Sahoo et al (2011)		Gharib and Rasheed (2009)	Rao et al (2005)
	Urban	Rural	Urban	Rural		
11	34.00	30.92	29.63	26.58	38.3	27.40
12	38.80	33.96	32.80	30.00	43.7	30.50
13	40.88	38.16	38.78	34.95	50.9	37.64
14	42.48	39.76	42.43	36.21	54.3	43.52
15	42.52	40.76	43.41	41.56	54.3	45.46

Table: 6 Comparison of Height (cm) of the Present Study With Different Population

Age	Height					
	Present study (2010)		Sahoo et al (2011)		Gharib and Rasheed (2009)	Rao et al (2005)
	Urban	Rural	Urban	Rural		
11	**145.07**	**141.44**	**137.81**	**137.00**	**141.8**	**134.34**
12	**147.24**	**145.32**	**143.40**	**143.61**	**147.6**	**139.38**
13	**151.99**	**146.51**	**148.92**	**146.64**	**152.8**	**148.60**
14	**152.64**	**151.33**	**150.01**	**148.25**	**156.1**	**154.77**
15	**155.23**	**154.38**	**153.32**	**152.03**	**155.5**	**156.92**

Table 7: Comparison of Upper Arm and Calf Circumference (cm) of the Present Study With Different Population

Age (years)	Upper arm circumference				Calf circumference		
	Present study (2010)		Gharib and Rasheed (2009)	Rao et al (2005)	Present study (2010)		Rao et al (2005)
	Urban	Rural			Urban	Rural	
11	**21.52**	**18.94**	**18**	**17.07**	**Urban**	**Rural**	**25.07**
12	**21.70**	**19.92**	**18.7**	**18.09**	**26.08**	**24.74**	**26.09**
13	**21.92**	**20.62**	**22.8**	**19.64**	**28.56**	**26.07**	**28.22**
14	**21.96**	**20.75**	**22.2**	**21.00**	**28.80**	**27.20**	**29.96**
15	**22.40**	**21.06**	**24.7**	**21.85**	**29.13**	**27.70**	**30.61**