

Age Trends in Morpho-physiological Traits Among 19-24 Years Old Punjabi Female Youth of Amritsar, Punjab

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ABSTRACT A cross-sectional study of 346 19-24 years old urban Punjabi female youth of Amritsar was conducted to study age related changes in anthropometric and physiometric characteristics. The variables included height, weight, BMI, waist circumference, hip circumference, WHR, SBP, DBP and MBP. Regression analysis revealed that there was a significant age effect on weight, waist circumference, hip circumference and SBP. However, the overall increase of mean values has been found with increasing of age for all measured variables. The data may be used for future long-term health effects associated with blood pressure and other anthropometric measurements of Punjabi female youth in this region.

INTRODUCTION

There is limited information regarding age trends in anthropometric and physiometric characteristics among Punjabi female youth in this region except few for pre-pubertal and others (Badaruddoza and Sidhu, 2000; Sidhu and Badaruddoza, 2002; Sidhu et al., 2004). However, overall growth pattern of girls of different ethnic groups in India have been studied by several authors (Agarwal et al., 1992; Arya, 2002; Badaruddoza, 2000, 2001, 2004; Badaruddoza, and Afzal, 1999; Bose et al., 2005; ICMR, 1984; Reddy and Rao, 2000). Many hypotheses have been presented to relate growth and linear body measurement to the levels of blood pressure in adults male and female (Gardner and Poehlman, 1995; Gerber and Stern, 1999; Merio et al. 2004). The primary objective of the present investigation is to expand available limited information on age related changes in different anthropometric and physiometric traits among 19-24 years old urban Punjabi female youth in Amritsar city.

MATERIALS AND METHODS

The present study was conducted on 19 to 24 years old female youth from urban sections of society in Amritsar city, Punjab (North India). Measurements were made on 346 college/university going girls. All the participants were

subjected to sign the consent form and specific questions for age and ethnicity. The metrical measurement included height, weight, waist and hip circumferences, systolic and diastolic blood pressures. The waist hip ratio (WHR) was calculated as waist circumference divided by hip circumference and the body mass index (BMI) was computed using the standard equation: $BMI = \text{Weight (kg)} / \text{Height}^2 (\text{m}^2)$. The techniques were used for anthropometric measurements as described by Weiner and Lourie (1981) for the International Biological Programme. The measurements were taken using standard anthropometric tools.

Blood pressures measured with mercury sphygmomanometer and a stethoscope by following the recommendations of American Heart Association (1981). Mean arterial blood pressure (MBP) defined as the average pressure level during the cardiac cycle. MBP is simply estimated as $DBP + (SBP - DBP) / 3$ (Perusse et al., 1989).

RESULTS

The means, standard deviations and variance ratio of anthropometric and physiometric traits of 19-24 years old urban Punjabi female youth are given in Table 1. The analysis shows that the mean values of all anthropometric and physiometric traits consistently increase with the increase of age. But the amount of increment showed not always significant for every age group. The variance ratio between ages is not statistically significant for height, weight, BMI and waist circumference. Whereas, hip circumference, waist

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Table 1: Means of metrical measurements of 19-24 years old urban Punjabi female youth of Amritsar, Punjab

Measurements	Age in years						F variance ratio
	19 (n=53)	20(n=53)	21(n=50)	22(n=70)	23(n=62)	24(n=58)	
Height (cm)	158.88 (5.79)	158.95 (5.46)	159.70 (6.22)	160.89 (5.88)	161.67 (6.39)	161.72 (5.74))	1.36
Weight (kg)	49.26 (8.24)	51.50 (6.79)	51.82 (7.35)	53.08 (9.17)	54.65 (7.33)	56.05 (9.47)	1.95
BMI (kg/m ²)	19.56 (2.55)	20.66 (2.85)	20.85 (2.27)	20.89 (3.32)	21.35 (2.63)	21.85 (3.16)	1.69
Waist Circumference (cm)	73.79 (9.60)	76.75 (6.88)	76.87 (7.17)	76.85 (8.68)	78.41 (7.55)	80.31 (9.19)	1.95
Hip circumference (cm)	90.49 (8.22)	91.76 (6.32)	92.58 (4.99)	94.77 (7.41)	95.15 (6.83)	95.62 (9.42)	3.56**
WHR	0.80 (0.05)	0.83 (0.04)	0.79 (0.06)	0.82 (0.09)	0.83 (0.06)	0.84 (0.06)	5.06**
SBP (mm Hg)	110.29 (7.44)	112.56 (8.06)	114.35 (8.11)	115.86 (10.56)	117.06 (11.05)	118.21 (12.05)	2.62*
DBP (mm Hg)	71.34 (7.26)	69.18 (8.19)	68.55 (10.35)	69.72 (11.35)	70.35 (10.33)	71.31 (9.94)	2.44*
MBP(mm Hg)	84.35 (7.00)	85.35 (7.72)	85.57 (9.86)	85.75 (10.36)	86.23 (10.86)	86.65 (10.36)	2.41*

Standard deviation is presented in parentheses.

* P < 0.05 ; ** P < 0.01

hip ratio, SBP, DBP and MBP have found significant variance differences ($P < 0.05$) among different ages.

Regression analysis (Table 2) demonstrated that there were statistically significant age related changes in weight, waist and hip circumferences and SBP. There were, however, no age related changes in height, BMI, WHR, DBP and MBP. Although, height, BMI, WHR and DBP varied with age, but in the present study average one year increase of age among Punjabi female youth have no effect on these variables.

Finally, the apparent mean difference between two pooled age groups 19-20 and 22-24 years was investigated through t test (Table 3). The analysis shows statistical significant ($P < 0.05$) age related differences in all the traits except DBP and MBP.

DISCUSSION

The present study investigated the cross-sectional changes in body size, shape and blood pressure with adult growing age among Punjabi female youth living in the Amritsar city in Punjab. The changes in linear measurements of the body are the most important indicators of growth (Lohman et al., 1998; WHO, 1996).

The data from the current study demonstrate a minimum but consistent gain in mean values of all measurements. It has been suggested from the previous study (Dangour, 2003; Kelly and Kroemer, 1990; Shock, 1985) that there was a secular increase in younger adults. The regression analysis of the present data also showed a clear significant age related changes in weight,

Table 2: Regression analysis demonstrating effect of metrical variables on age among 19-24 years old urban Punjabi female youth of Amritsar, Punjab

Measurements	$b \pm S.E.$	t	p^*
Height (cm)	0.4014 ± 0.268	1.49	NS
Weight (kg)	1.323 ± 0.07	18.9	< 0.001
BMI (kg/m ²)	0.4234 ± 0.36	1.176	NS
Waist circumference (cm)	1.1302 ± 0.26	4.34	< 0.001
Hip circumference (cm)	1.086 ± 0.24	4.525	< 0.001
WHR	0.0090 ± 0.05	0.18	NS
SBP (mmHg)	1.573 ± 0.285	5.499	< 0.001
DBP (mm Hg)	0.1294 ± 0.29	0.444	NS
MBP (mm Hg)	0.4622 ± 0.328	1.405	NS

Asterisk indicates significance levels when testing the observed slope against zero.

Table 3: Statistical significance for mean differences through t values between 19-21 and 22-24 years of age group among urban Punjabi female youth of Amritsar, Punjab

Measurements	19-21 years Mean (SD)	22-24 years Mean (SD)	Mean difference	t	p
Height (cm)	159.08 (5.80)	161.43 (6.02)	2.35	3.89	< 0.001
Weight (kg)	50.59 (7.21)	54.59 (8.65)	4.00	5.40	< 0.001
BMI (kg/m ²)	20.73 (2.65)	21.87 (3.15)	1.14	3.94	< 0.001
Waist circumference (cm)	75.97 (6.89)	79.35 (7.56)	3.38	4.12	< 0.001
Hip circumference (cm)	92.71 (5.59)	96.28 (6.25)	3.57	5.14	< 0.001
WHR	0.81 (0.04)	0.83 (0.05)	0.02	3.03	< 0.01
SBP (mm Hg)	113.15 (7.89)	117.79 (9.89)	4.64	9.85	< 0.001
DBP (mm Hg)	68.39 (8.15)	69.16 (10.32)	0.77	0.78	NS
MBP (mm Hg)	84.79 (7.82)	86.24 (9.37)	1.45	1.46	NS

waist and hip circumferences and systolic blood pressure. However, in the pooled data within two age groups 19-21 and 22-24 years, the mean differences are found to be significant ($P < 0.001$) for all measurements except diastolic and mean arterial blood pressures. Therefore, the present data suggest that the age may be a significant contributory factor in the growing adult relative growth among Punjabi females.

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