

## Original Article

# ANTHROPOMETRIC AND HYPERTENSIVE PROFILE OF ADOLESCENTS OF SURAT CITY: A CROSS SECTIONAL STUDY

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## ABSTRACT

**Introduction:** Adolescence is a period of transition from childhood to adulthood. It is characterized by rapid physical, biological and hormonal changes resulting in to psychosocial, behavioural and sexual maturation between the ages of 10-19 years in an individual. Adolescence is often described as a phase of life that begins in biology and ends in society.

**Objective:** To assess the profile of the adolescents of Surat city in relation to anthropometric and blood pressure parameters.

**Methods:** A purposively selected sample of 450 college students & 150 out of college adolescents were studied. Those adolescents belonging in the age group of 17 to 19 years and willing to participate in the study were identified from one of the three prior identified colleges. Similarly adolescents not attending any college but who were literate and able to fill the self administered questionnaire were identified. These selected adolescents were studied between September 2010 and July 2011.

**Results:** In both the college & out of college groups, 44% had a normal BMI. More of the colleges going adolescents were found to be overweight (8% as compared to 2.7% in out of college adolescents). Majority of the respondents were found to be having normal WHR with the college going group being on the higher side. Thus, it was observed that the proportion of hypertension observed was more in college students, especially those in the professional college and also more among boys as compared to girls.

**Conclusion:** The proportion of hypertension was more in college students, especially those in the professional college and also more among boys as compared to girls.

**Key Words:** Adolescent, BMI, WHR, Hypertension

## INTRODUCTION

Adolescence is a period of transition from childhood to adulthood which is characterized by rapid physical, biological and hormonal changes resulting in to psychosocial, behavioural and sexual maturation between the age of 10-19 years in an individual.<sup>1</sup>

Adolescents are considered to be healthy since mortality in this age group is relatively low. However, mortality is a misleading measure of adolescent health. In fact, the adolescents do have a range of health problems that cause a lot of morbidity as well as definite mortality.<sup>2</sup>

One in every five people in the world is an adolescent, and 85% of them live in developing countries. Nearly two thirds of premature deaths and one third of the total disease burden in adults are associated with conditions or behaviours that began in youth, including

tobacco use, a lack of physical activity. Promoting healthy practices during adolescence and efforts that better protect this age group from risks will ensure longer, more productive lives for many.<sup>3</sup>

In light of the above mentioned scenario and the fact that today's adolescents will be tomorrow's adults comprising the productive group of the community influencing the overall growth of the country, this study is an endeavour to gather base line information about the anthropometric and hypertensive profile of adolescents.

## MATERIALS AND METHODS

It was a cross sectional study conducted from September 2010 to July 2011.

For the study 450 college going students and 150 out of college adolescents in Surat city were selected purposively. Three colleges were selected with 150 adolescents from each college - One professional college i.e. Government Medical College, Surat; and two General Stream colleges i.e. Akhanad Anand Arts & Commerce College and Sheth P. T. Sarvajanic Vanita Vishram College, Surat. Out of college adolescents were approached through an NGO named NIWCD (National Institute of Woman and Child Development).

The information was collected using a self administered, predesigned questionnaire which had both open and close ended questions. The responses allowed multiple choices in the questionnaire. After the completion of data collection, data entry was done into

Excel data file. Data analysis was done by Epi\_info version 6.04 software.

### RESULTS AND DISCUSSION

As shown in table 1, in the college & out of college groups, almost 44% fell in the category of normal BMI; more respondents in out of college group (53.3%) were underweight compared to college group (47.6%). A total of 8% in college & 2.7% in out of college adolescents were overweight. Majority of the respondents (87.6% college and 91.3% out of college) had normal WHR. WHR was seen higher in the college going group (12.4% in comparison to 8.7% in the out of college adolescents). These observations show a better nutritional status of college students as compared to out of college students.

**Table 1(A): Profile of Anthropometric Parameters of the Study Population (Comparison between College Going and Out of College Groups)**

	College			Out of college			P value
	Male (%) n = 226	Female (%) n = 224	Total (%) n = 450	Male (%) n = 73	Female (%) n = 77	Total (%) n = 150	
<b>BMI</b>							
Underweight	109(48.2)	105(46.9)	214 (47.6)	39(53.4)	41(53.2)	80 (53.3)	>0.05
Normal	98(43.4)	102(45.5)	200 (44.4)	34(46.6)	32(41.6)	66 (44.0)	
Overweight	19(8.4)	17(7.6)	36 (8.0)	0(0.0)	4(2.7)	4 (2.7)	
<b>Waist Hip Ratio (CDC)</b>							
Normal	204(90.3)	190(84.8)	394 (87.6)	70(95.9)	67(87.0)	137 (91.3)	>0.05
More	22(9.7)	34(15.2)	56 (12.4)	3(4.1)	10(13.0)	13 (8.7)	

**Table 1(B): Profile of Anthropometric Parameters of the Study Population (Comparison between the Two Colleges)**

	General stream college			Professional college			P valve
	Male (%) n = 156	Female (%) n = 151	Total (%) n = 307	Male (%) n = 70	Female (%) n = 73	Total (%) n = 143	
<b>BMI</b>							
Underweight	90 (57.7)	74 (49.0)	164 (53.4)	19 (27.1)	31 (42.5)	50 (35.0)	0.001
Normal	57 (36.5)	64 (42.4)	121 (39.4)	41 (58.6)	38 (52.1)	79 (55.2)	
Overweight	9 (5.8)	13 (8.6)	22 (7.2)	10 (14.3)	4 (5.5)	14 (9.8)	
<b>Waist Hip Ratio (CDC)</b>							
Normal	152 (97.4)	130 (86.1)	282 (91.9)	52 (74.3)	60 (82.2)	112 (78.3)	0.0001
More	4 (2.6)	21 (13.9)	25 (8.1)	18 (25.7)	13 (17.8)	31 (21.7)	

Within the two colleges, majority (53.4%) adolescents in General Stream Colleges were under weight whereas, majority (55.2%) in Professional College were normal. More students were overweight in Professional College group (9.8%) as compared to General Stream Colleges (7.2%). More of the professional college adolescents (21.7% compared to 8.1% from general stream) were falling in the category of "more WHR". This also reflects better nutritional status of Professional College students which in turn may be due to better socioeconomic conditions, more awareness about the same on their or their parents' part. Over weight was also observed to be more among Professional College which again might be due to

more sedentary life style, partly because of higher socio-economic condition as well as more hours required to be given for academics as compared to their counter parts.

As reported in "Reproductive and Sexual Health of Young People in India; Secondary analysis of data from NFHS - 1, 2, 3", More than 2% adolescent women (15-19 years) are overweight. <sup>4</sup>

It was observed by Rao V G et al that high prevalence of under nutrition in terms of underweight, stunting and wasting was found among adolescent boys and girls. More than half of the adolescents were found underweight (61.7%).<sup>5</sup>

**Table 2 (A) : Profile Of Hyper Tension In The Study Population ( Comparison Between College Going And Out Of College Groups)**

	College			Out of college			P value
	Male (%) n = 226	Female (%) n = 224	Total (%) n = 450	Male (%) n = 73	Female (%) n = 77	Total (%) n = 150	
<b>SBP (JNC 7)</b>							
Normal	94(41.6)	177(79.0)	271 (60.2)	37(50.7)	64(83.1)	101 (67.3)	>0.05
Pre HT	109(48.2)	41(18.3)	150(33.3)	26(35.6)	13(16.9)	39 (26.0)	(df = 2)
Stage I	17(7.5)	6(2.7)	23 (5.1)	10(13.7)	0(0.0)	10 (6.7)	
Stage II	6(2.7)	0(0.0)	6 (1.3)	0(0.0)	0(0.0)	0(0.0)	
<b>DBP (JNC 7)</b>							
Normal	81(35.8)	152(67.9)	233 (51.8)	39(53.4)	45(58.4)	84 (56.0)	0.06
Pre HT	113(50.0)	57(25.4)	170 (37.8)	30(41.1)	29(37.7)	59 (39.3)	(df = 3)
Stage I	12(5.3)	8(3.6)	20 (4.4)	3(4.1)	3(3.9)	6 (4.0)	
Stage II	20(8.8)	7(3.1)	27 (6.0)	1(1.4)	0(0.0)	1(0.7)	

**Table 2 (b): Profile of Hyper Tension in the Study Population (Comparison between the two Colleges)**

	General stream college			Professional college			P Value
	Male (%) n = 156	Female (%) n = 151	Total (%) n = 307	Male (%) n = 70	Female (%) n = 73	Total (%) n = 143	
<b>SBP (JNC 7)</b>							
Normal	68 (43.6)	124 (82.1)	192 (62.5)	26 (37.1)	53 (72.9)	79 (55.2)	0.005
Pre HT	80 (51.3)	23 (15.2)	103 (33.6)	29 (41.1)	18 (24.7)	47 (32.9)	(df = 2)
Stage I	3 (1.9)	4 (2.6)	7 (2.3)	14 (20.0)	2 (2.7)	16 (11.2)	
Stage II	5 (3.2)	0	5 (1.6)	1 (1.4)	0	1 (0.7)	
<b>DBP (JNC 7)</b>							
Normal	62 (39.7)	123 (81.5)	185 (60.3)	19 (27.1)	29 (39.7)	48 (33.6)	0.0001
Pre HT	88 (56.4)	26 (17.2)	114 (37.1)	25 (35.7)	31 (42.5)	56 (39.2)	(df = 3)
Stage I	6 (3.8)	2 (1.3)	8 (2.6)	6 (8.6)	6 (8.2)	12 (8.4)	
Stage II	0	0	0	20 (28.6)	7 (9.6)	27 (18.9)	

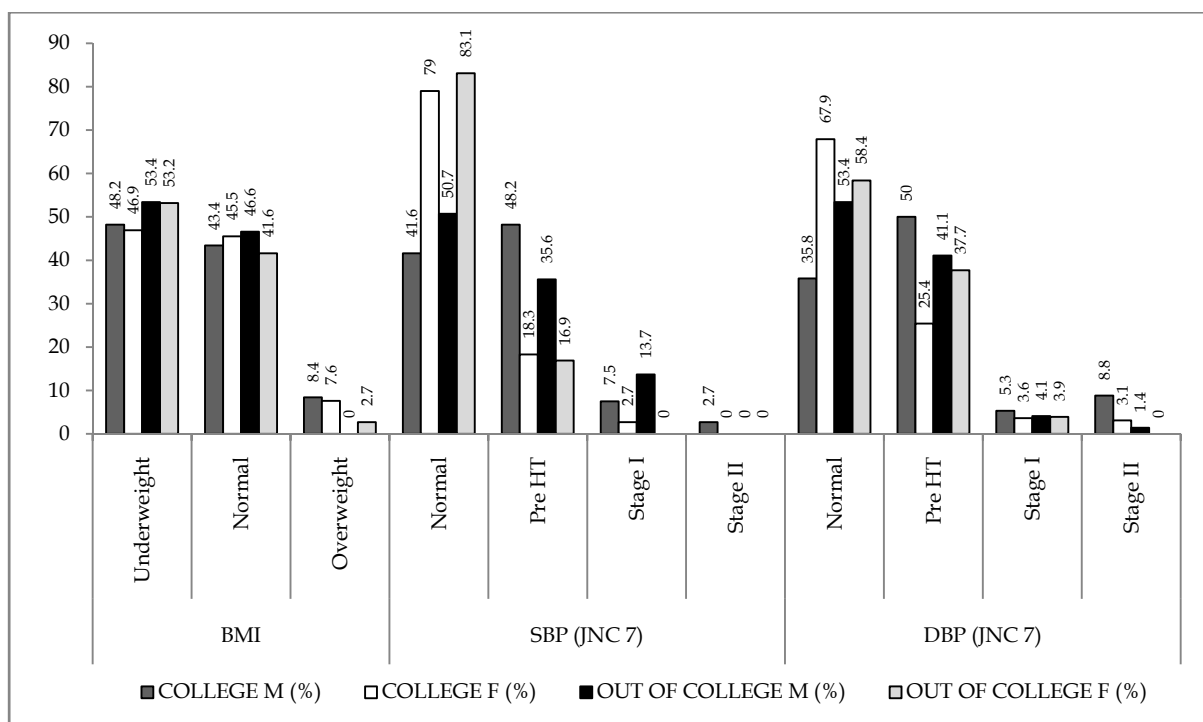


Fig 1: Comparison of BMI, Systolic BP and Diastolic BP among college student and out of college adolescent

Aparajita Dasgupta et al found that the proportion of under nourishment was 47.93% and 60.30% according to BMI.<sup>6</sup>

Khan M I et al observed that out of the total students examined, 10.44 % were found to be overweight and 5.77 % were obese according to the BMI criteria. The remaining 79.14 % had healthy weight and 4.48 % were underweight.<sup>7</sup>

As shown in table 2, according to JNC-7 classification, considering SBP, 33.3% (48.2% males & 18.3% females) of college & 26% (35.6% males & 16.9% females) of out of college adolescents were in the pre hypertensive category. Stage I hyper tension was found in 5.1% (7.5% males & 2.7% females) college and 6.7% (13.7% males) out of college group. A total of 6% (2.7% males) in the college group were falling in stage II hypertension. Considering DBP, 37.8% (50% males and 25.4% females) in college and 39.3% (41.1% males and 37.7% females) in out of college group were pre hypertensive. A total of 4.4% (5.3% males & 3.6% females) in college & 4% (4.1% males & 3.9% females) in out of college group were Stage I hypertensive. While, 6% (8.8% males & 3.1% females) students in college & 0.7% (1.4% males) in out of college group were having Stage II hypertension. Stage I SBP as well as stage I & II DBP was more in Professional College group.

Singh A K et al observed systolic hypertension (BP>140) to be present in 11.8% boys and 3.03 % girls, while diastolic hypertension (BP>90) in 3.58 % boys and 0.4 % girls.<sup>8</sup>

Khan M I et al observed in a study that the mean SBP among the participants was 109.6 mm Hg and the mean DBP was 69.3 mmHg. Out of all adolescent boys, 9.78 % were found to be hypertensive. <sup>7</sup>

Considering SBP, more of the adolescents from professional college, had stage I (11.2%) and while more from general stream had stage II hyper tension (1.6%). While according to DBP, more of the professional col-

lege adolescents had stage I and II hyper tension (8.4% and 18.9% respectively).

So, in this study, the overall more proportion of hypertension was observed in college students, especially those of professional college and also more among boys as compared to girls. This might be due to more stress of academics in the college students, those of Professional College being more prone.

## CONCLUSION

Consistent with the current change in life style, the Thus, it was observed that the proportion of hypertension observed was more in college students, especially those in the professional college and also more among boys as compared to girls.

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