

Monitoring of Blood Pressure of Children of Hypertensive Parents in their Early Ages Reduces the Risk of Having Cardiovascular Diseases in Future: A Study Conducted on Adolescents

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ABSTRACT Hypertension is a silent but known risk factor for cardiovascular diseases and is estimated to contribute 4.5 percent of current global disease burden in developed countries and many developing countries. A family history of cardiovascular disease has been shown to be a risk factor for the subsequent development of the disease in children. Hence, the present study was conducted keeping in mind the objective to measure the anthropometric parameters of young healthy adults and its association with presence or absence of parental history of hypertension. A cross-sectional study was conducted on 18-25 years college-going 200 adolescents of both sexes. Half of the students were selected having parental history of hypertension and half were selected without any history of parental hypertension. A pretested questionnaire was used along with anthropometric measurements to know obesity or overweight. Among the 200 participants, 63 percent were male with average age 20.12 years (SD ± 2.01). 32 percent had Body Mass Index more than 25, their prevalence being 35.5 percent in male and 26.3 percent in female compared to that in offspring of normotensive parents which was 10 percent for both genders, 12.5 percent for male and 5.6 percent for female. Out of the 100 participants of the study group, 56 have their Waist Hip Ratio above the standard defined cut-off for their respective sex. There is a definite need of monitoring the children's of parental history of hypertension with other non communicable diseases like diabetes & obesity to prevent the occurrence of disease in future.

INTRODUCTION

Increasing trend of hypertension is a world-wide phenomenon. The data on sustained hypertension in school- going children and adolescents is scanty in India (Mohan et al. 2004). High blood pressure is a silent but known risk factor for non-communicable diseases including cardiovascular diseases (CVD) like coronary heart disease, stroke and blindness. Indeed, hypertension accounts for more than 5.8 percent of total deaths, 1.9 percent of years of life lost and 1.4 percent disability adjusted life years globally. These figures are more dramatic in the formerly socialist economies countries (Whitworth et al. 2003).

Blood pressure (BP) in children is a reliable predictor of adult blood pressure level (Gillman et al. 1999). Therefore, it is important to identify children and adolescents who are at increased risk of developing essential hypertension as adults (Buonomo et al. 1996).

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The adverse association of cardiovascular risk factors in both children and adults with parental history of disease is well-recognized (Burke et al. 1991). A family history of cardiovascular disease (CVD) has been shown to be a risk factor for the subsequent development of disease. Familial aggregation has been shown to occur for hypertension, myocardial infarction, diabetes and obesity (Munger et al. 1998). In fact hypertension in adults may be preceded by high blood pressure values in childhood. Children with positive family history of cardiovascular diseases have significantly higher body mass index (Glowińska et al. 2002).

Obesity is rapidly developing in the young adults of today. Obese persons are approximately 6 times as likely to develop hypertension and heart disease compared to persons with normal body weight. The World Health Report, 2002 "Reducing Risks, Promoting Healthy Life" has identified obesity as one of the ten leading risk factors, globally (Deshmukh et al. 2005). Also it has been recognized that a reduction in Body Mass Index (BMI) is associated with decreased cardiovascular risk (WHO Report 2000).

The waist-hip ratio (WHR) is used as an indicator of body-fat distribution. The waist-hip ratio is the preferred measure of obesity for predicting cardiovascular disease, with more uni-

versal application in individuals and population groups of different body builds. Benchmark studies of waist-hip ratio as dominant cardiovascular risk factors were reported in Swedish men and women in 1984 (Welborn et al. 2003).

The present study aimed to measure the anthropometric parameters of young healthy adults having parental history of hypertension and to correlate the anthropometric parameters of these individuals with those of the young healthy individuals who do not have parental history of hypertension. The study was conducted to compare observed differences in the mean blood pressure (BP), BMI, hip- waist ratio in young adult of hypertensive and normo-tensive parents.

METHODS

A cross-sectional study was conducted on college- going, all apparently healthy adolescents of Junior and Degree College near the institute of Mamata Medical College, Khammam. A total of 200 students between 18-25 years age group and of both sexes were selected for this study. Half of the students selected had parental history of hypertension and half of those selected did not have any history of parental hypertension. A pretested questionnaire was used along with anthropometric measurements to know obesity or overweight.

The study period was of six months from July 2010 to December 2010. The college authorities were contacted and explained about the study. After obtaining the permission from the college authorities, the investigator visited the college as per pre-planned schedule for interviewing the adolescents. The adolescents were explained about the purpose of the study and assured of confidentiality. A verbal consent was obtained from all the students before administering the questionnaire.

All the students were contacted for face-to-face interview. A group of 100 students having parental history of hypertension constituted the study group whereas another 100 students having no parental history of hypertension constituted the control group. The participants were matched across age (18-25 years) and sex. A personal history of smoking or other addictions and diet habits was also noted in all cases. Parental history of hypertension was recorded from students. If required in some cases, we asked them to bring the records for verification of parental hypertension.

All the participants were interrogated and examined only once in a single meeting. The anthropometric parameters measured in the study were height in cm, weight in kg, waist and hip circumference used to calculate body mass index and waist hip ratio. Waist Hip Ratio was calculated as waist circumference divided by hip circumference. To reduce subjective error, all measurements were taken by the same person. The cut-off used for the waist-hip ratio (WHR) for males was 0.9 and for females it was 0.8 to define obesity (Maria et al. 2007).

The collected data was tabulated analyzed and interpreted statistically using the standard tests to ascertain the clinical relevance of the present study.

RESULTS

The average age of study participants was 20.12 years (SD ± 2.01) with a median of 21 years, varying from 18 to 25 years. Of the 200 students studied, 63 percent were male and 37 percent female. Out of 126 male students, majority (47.62%) were aged 20-21 years, 36.51% were 22-23 years, 11.11% bellow 20 years and remaining 4.76 percent were 24-25 years old. Out of 76 female a majority (54.05%) belonged to 22-23 years age group, 37.87 percent 20 to 21 years and least (8.11%) bellow 20 years (Fig. 1).

When distribution of participants in relation to parent's blood pressure status was studied of both male and female students, it was found to be around 50 percent, thus making the study group and control group comparable (Table 1).

Table 1: Distribution of participants in relation to parent's blood pressure status

Parents blood pressure status	Male students	Female students	Total
Hypertensive	62 (49.20)	38 (51.35)	100 (50.00)
Normotensive	64 (50.80)	36 (48.65)	100 (50.00)
Total	126 (63%)	74 (37%)	200 (100%)

The proportion of male and female with (Body Mass Index) BMI 25 or more was significantly higher in those with parental history of hypertension than those without it ($p < 0.01$). Males with BMI of 25 or more were 35.48 percent with history of hypertensive parents, while only 12.5 percent of males were having BMI of

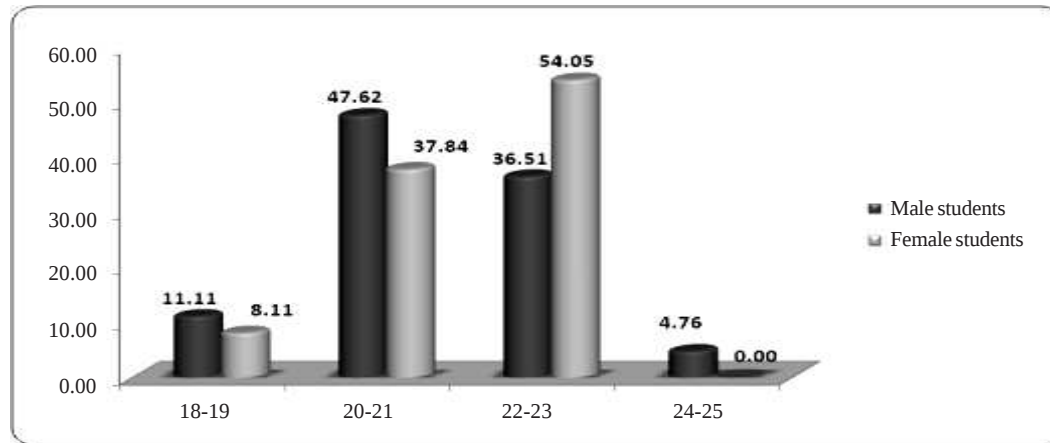


Fig. 1. Age and gender distribution of study population

25 or more with history of normotensive parents. Females with BMI of 25 or more were 26.31 percent with history of hypertensive parents, while only 5.55 percent of females were having BMI of 25 or more with history of normotensive parents (Table 2).

A significantly higher proportion (58.06%) of the males with history of hypertensive parents had Waist Hip Ratio (WHR) of 0.9 or more compared to only (12.51%) males with history of normotensive parents ($p < 0.01$).

Also, significantly higher proportion (52.63%) of females had a WHR of 0.8 or more compared to 16.66 percent in those without such a history ($p < 0.01$) (Table 3).

DISCUSSION

The study comprised of 200 college students. One group of 100 students having parental history of hypertension constituted the study group whereas another 100 students having no parental history of hypertension constituted the control group. The participants were matched across age (18-25) and sex. The anthropometric parameters considered in the study were height in cm, weight in kg, body mass index and waist hip ratio.

Out of the total 30 males who were reported to have the Body Mass Index greater than 25, 22 (72.6%) belonged to the study group, that is,

Table 2: Distribution of Body Mass Index in relation to history of hypertensive parents

Body Mass Index	Male students		Female students		Total
	Body Mass Index <25	Body Mass Index >25	Body Mass Index <25	Body Mass Index >25	
Hypertensive parents	40 (64.52)	22 (35.48)	28 (73.69)	10 (26.31)	100 (50)
Normotensive parents	56 (87.49)	08 (12.51)	34 (94.45)	02 (5.55)	100 (50)
Total	96 (48.0)	30 (15.0)	62 (31.0)	12 (6.0)	200(100.0)

$p < 0.01^*$ (significant)

Table 3: Distribution of waist-hip ratio in relation to history of hypertensive parents

	Male students		Female students		Total
	Hypertensive parents	Normotensive parents	Hypertensive parents	Normotensive parents	
Waist-hip ratio < cut-off 1	26 (41.94)	56 (87.49)	18 (47.37)	30 (83.34)	66 (33.00)
Waist-hip ratio > cut-off 1	36 (58.06)	08 (12.51)	20 (52.63)	06 (16.66)	134 (67.00)
Total	62 (100)	64 (100)	38 (100)	36(100)	200 (100)

$p < 0.01^*$ (significant)

those who have positive parental history of hypertension whereas out of the 12 females who were having their Body Mass Index greater than 25, 10 (80.8%) belonged to the study group. This shows a positive relation of the increasing Body Mass Index and its association in becoming a risk factor for developing hypertension in future. Similar co-relation was found in the study by Maria et al. (2007) where they investigated the risk factors associated with essential arterial hypertension in adolescents. They further mention that when both parents had hypertension, exhibited a positive association of more than ten times, both among the boys and the girls. Their study concluded that overweight, obesity and family history of hypertension (father and mother with hypertension) were the principal risk factors for arterial hypertension in adolescents.

Hence, when seen together in both the sexes, higher proportion of students who have their Body Mass Index greater than 25 were more common in those who had a parental history of hypertension (Study group) in comparison to those who did not show parental history of hypertension (Control group). Similar findings were also reported by Glowinińska et al. (2002) who also found higher body mass index (25.4 Vs 23.8 kg/m²) in children with positive family history of cardiovascular diseases have significantly than those without it.

The cut off for the Waist Hip ratio (WHR) for males to define obesity is 0.9 and for females is 0.8. In this study, out of the 62 males in the study group, 36 (58.1%) had their WHR above the standard defined cut off mark for obesity and 26 males had WHR below the cut-off mark. This shows that these 36 participants can be classified as obese which is a strong risk factor to develop hypertension in future.

Out of the 32 males in the control group, only 4 (12.5%) have their WHR above the standard cut-off for obesity. This also proves that lower value of WHR provides less chances of developing obesity and thus hypertension in future.

Similarly 20 (52.6%) of 38 females in the study group and only 6 (16.6%) out of 36 female in the control group had their WHR above the standard cut-off and were thus classified as obese which predisposes them to an increased risk of developing hypertension. The same findings were also referred by Deshmukh et al. (2005) in their study

CONCLUSION

The findings of the present study suggest the need of regular monitoring the BP of children of hypertensive parents and also other non-communicable diseases like diabetes and obesity to prevent the occurrence of the disease in the future.

RECOMMENDATIONS

Health care providers, therefore, have an important role to play in educating families and children about approaches that are useful in preventing hypertension.

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