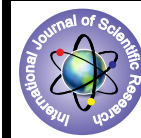


## Correlation of Hypertension with Bmi, Dietary Habit & Family History in Adolescents.



### Medical Science

**KEYWORDS :** Hypertension; Basal Metabolic Index (BMI); Dietary habit; Family history

<b>Dr. Jasmin J parmar</b>	III year Resident in Physiology, Smt NHL municipal medical college, Ahmedabad-6, Gujarat-India.
<b>Dr. Jitendra R Patel</b>	III year Resident in Physiology, Smt NHL municipal medical college, Ahmedabad-6, Gujarat-India.
<b>Dr. Jaydeep D Kagthara</b>	Tutor, Dept. of Physiology, GCS medical college, Ahmedabad-25, Gujarat-india

### ABSTRACT

*Prevalence of Hypertension is significantly increased in adolescents in India. So this study was undertaken to correlate the hypertension with BMI, dietary habit and family history of hypertension in adolescents. Age, diet, family history of hypertension, weight and height were recorded and Body Mass Index (BMI) was calculated from height and weight. BMI was distributed by criteria of WHO. Blood pressure was measured and classified as per the Seventh Report of the Joint National Committee, Geneva. The data was analyzed using chi-square test to find association between hypertension and variables. The results show that increase % of hypertension subjects having BMI>25, mixed dietary habit & positive family history. So, early modification in these variables can be very useful in decreasing the future prevalence of hypertension.*

### INTRODUCTION:

Prevalence of Hypertension in adolescents is around 3.5% worldwide with somewhat higher rates of pre-hypertension. Obesity affects approximately 20% of adolescents in the United States, and the prevalence of hypertension is much higher among obese adolescents compared with nonobese adolescents (Joseph T. Flynn & 1 Bonita E. Falkner, 2011). Similarly, non-vegetarian food increases Mortality and incidence rates of coronary disease events are indeed clearly lower in vegetarians (fraser, 2009). Impairment in baroreflex sensitivity in hypertension is in part genetically determined and may be an important hereditary component in the pathogenesis of essential hypertension (Robert J. Parmer, Justine H. Cervenká, & and Richard A. Stone, 1992), so the positive family history of hypertension also increase prevalence of hypertension in adolescents. So we attempt to study the prevalence of hypertension in hundred medical students in ahmedabad.

### AIMS & OBJECTIVES:

To correlate the hypertension with BMI, dietary habits and family history of hypertension in adolescents To compare the prevalence of hypertension in male and female

### MATERIALS & METHOD:

Present study was undertaken in 100 medical students at Ahmedabad. Out of 100 students 45 were female & 55 students were male with age group between 18 to 19 years. Students were informed about study.

### Inclusion criteria:

Age group: 18-19(years).

Subjects who definitely know their family history

### Exclusion criteria:

Age group above 19 years and below 18 years Uncooperative subjects Age, diet and family history of hypertension were recorded. We excluded subjects who didn't know their family history of hypertension and also uncooperative subjects. Weight and height was measured to calculate Body Mass Index (BMI) Using the BMI criteria of WHO (WHO. Physical status: the use and interpretation of anthropometry, 1995) The study subjects were categorized as underweight (BMI <18.5), normal (18.5-24.9), overweight (25.0-29.9) and obese (>30). Blood pressure measured by using sphygmomanometer in supine position. Out of three reading the average reading has been recorded for measurements. We classified blood pressure according to the Seventh Report of the Joint National Committee where Pre-hypertension is systolic BP (SBP) of 120-139 mmHg or diastolic BP (DBP) of 80-89 mmHg and Hypertension stage 1 is SBP of 140-159 or DBP of 90-99 mmHg(Aram V Chobanian, 2003). Subjects were informed about the study. Dietary habit included

either they were vegetarian or taking mixed (vegetarian & non-vegetarian) diet. Family history includes either they have positive or negative family history.

### STATISTICAL ANALYSIS:

Mean BP were computed for weight, height, BMI and blood pressure, data was analyzed using chi-square test to find association between hypertension and variables (BMI of <25 & BMI >25, diet -vegetarian and non-vegetarian and or absence of family history of hypertension). Those found to be significantly associated with hypertension (P<0.05) were then entered in multiple logistic regression.

### OBSERVATION AND RESULTS:

**TABLE 1: Values of different variables with respect to different stages of Hypertension.**

Number (100)	NORMAL	PRE-HT	HT STAGE-I
N	35	41	24
Blood pressure Mean±SD			
SBP (mmhg)	112.16±3.81	125.29±5.67	144.36±5.94
DBP (mmhg)	72.20±5.61	82.06±3.09	91.18±2.28
BMI (n) kg/m <sup>2</sup>			
<25	32	35	14
>25	3	6	10
DIET (n)			
Veg	28	29	12
Mixed	7	12	12
FAMILY HISTORY (n)			
Positive	11	20	13
Negative	24	21	11

(HT= Hypertension)

**TABLE 2: Respective P-values & Unadjusted Odds Ratio for different variables**

Variable	Code	n & % of HT	Unadjusted OR (95% CI)	P-value
BMI kg/m <sup>2</sup>	<25=0	(n=81) 49 (60.49%)	1	0.06
	>25=1	(n=19) 16 (84.25%)	3.48	
DIET	Veg=0	(n=69) 41 (59.42%)	1	0.1
	Mixed=1	(n=31) 24 (77.41%)	2.34	
FAMILY HISTORY	-ve=0	(n=56) 32 (57.14%)	1	0.07
	+ve=1	(n=44) 33 (75.00%)	0.44	

HT = Hypertension, OR = Odds Ratio, CI = Confidence Interval. P value <0.05 is significant

**TABLE 3: comparison of male and female with different variables**

VARIABLE	MALE (n=55)	FEMALE (n=45)
NORMAL OR HTN		
NORMAL	18	17
HYPERTENSION	37	28
BMI kg/m <sup>2</sup>		
<25	40	41
>25	15	4
DIET		
Veg	34	35
Mixed	21	10
FAMILY HISTORY		
Positive	26	18
Negative	29	22

**TABLE 4: comparison of BMI >25 with hypertensive male and female**

BMI >25 (n=19)	MALE (n=15) & %	FEMALE (n=4) & %	p value
HYPERTENSION	12 (80%)	3 (75%)	NS

**TABLE 5: comparison of mixed diet with hypertensive male and female**

MIXED DIET	MALE (n=21) & %	FEMALE (n=10) & %	p value
HYPERTENSION	17 (80.95%)	7 (70%)	NS

**TABLE 6: comparison of positive family history with hypertensive male and female**

POSITIVE HISTORY	MALE (n=26) & %	FEMALE (n=18) & %	p value
HYPERTENSION	20 (76.92%)	13 (72.22%)	NS

TABLE 1 shows that according to JNC-VII criteria, 41% students were pre-hypertensive while 24% were in hypertension stage-1. 19 students had >25 BMI, out of which 6 were in pre-hypertension and 10 had stage-1HT. 31 students were taking mixed diet out of which 12 were in pre-HT & 12 were in stage-1 HT. 44 students had positive family history out of which 20 were in pre-HT & 13 were in stage-1 HT.

Since the Stage 1hypertension had 24 subjects, we clubbed the subjects of pre-hypertension and stage 1 hypertension into a single group for appropriate statistical analysis.

TABLE 2 shows the respective P-values and Odds Ratio for BMI, diet and family history. here All three variables were not found to be significant after the application of Chi-square test, but % of hypertension was high with >25 BMI, mixed diet and positive family history of HT containing subjects.

TABLE 3 shows comparison of male and female with different variables in which out of 45 female & 55 male, 28 female and 37 male were hypertensive, 4 female &15 male had >25 BMI, 10 female & 21 male were on mixed diet, 18 female & 26 male had positive family history.

TABLE 4 shows % of hypertension in male and female with >25 BMI. There were 19 subjects with > 25 BMI in which 15 were male and 4 were female. From this 15 male & 4 female 12 male (80%) & 3 female (70%) were hypertensive.

TABLE 5 shows % of hypertension in male and female taking mixed diet. 21 male & 10 female were taking mixed diet out of which 17 male (80.95%) & 7 female (70%) were hypertensive.

TABLE 6: shows % of hypertension in male and female with positive family history. 26 male & 18 female had positive family history of HT. out of which 20 male (76.92%) & 13female (72.22%) were hypertensive.

**DISCUSSION:**

In my study majority of students were from upper-middle & middle class. They had altered eating habits and increase fat contents in diet (katrina r more, 2012). Moreover most of them left physical exercise and outdoor sports during school life to get admission in medical branch and lead sedentary life style with an addition of mental stress to get through the competitive medical exam(School stress in India: Effects on time and daily emotions, 2002). These are also contributory factors for increasing BMI & HT in adolescents. In my study out of 19 subjects with >25 BMI, 16 were hypertensive. Akhil kant et al study also shows increase prevalence of HT with obesity.(A k h i l Kant Singh, 2006)

According to this study 31 subjects were taking mixed diet, out of which 24 (77.41%) were hypertensive. Animal fats (largely saturated) raise LDL cholesterol and increase risk (Jacobs DR, 1979). A vegetarian diet usually provides a low intake of saturated fat and cholesterol and a high intake of dietary fiber and many health-promoting phytochemicals. As a result of these factors, vegetarians typically have lower body mass index, serum total and low-density lipoprotein cholesterol levels, and blood pressure; reduced rates of death from ischemic heart disease; and decreased incidence of hypertension (craig, 2010).

Family history of hypertension also plays a crucial role in the development of hypertension. In this study 44 students had positive family history out of which 33 (75%) were hypertensive. BP/SP-1 could reside on human chromosome 17q in a region that also contains the angiotensin l-converting enzyme gene (ACE) This encodes a key enzyme of the renin-angiotensin system9, and is therefore a candidate gene for hypertension.(P. HILBERT\*†, 1991). Furthermore impairment in baroreflex sensitivity in hypertension is in part genetically determined and may be an important hereditary component in the pathogenesis of essential hypertension(R J Parmer, 1992). Higher levels of angiotensinogen, cortisol and 18-OH corticosterone seen in the offsprings of high parental blood pressure may also lead to abnormalities of glucocorticoid metabolism and the renin-angiotensin system(Watt GC, 1992;).

**CONCLUSION:**

This study shows that increase prevalence of hypertension in adolescents is attributed to due to various factors like >BMI, dietary habit & positive family history. So early modification of this variable will help us to decrease prevalence of hypertension in adolescents.

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