

STUDY OF ASSOCIATION IN BETWEEN MODIFIABLE RISK FACTORS AND HYPERTENSION AMONG ADULT MALES IN AN URBAN SLUM IN PUNE

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ABSTRACT

Background: It is well-established fact now that high blood pressure is a major risk factor for coronary, renal, and peripheral vascular diseases. If we compare the male adults of rural areas, the urban males living in poor socio-economic conditions are more prone to develop hypertension due to the presence of various modifiable risk factors. This study was carried out to study certain factors/ determinants, which are modifiable and their association with elevated blood pressure. **Material and Methods:** This cross-sectional study was carried out in an urban slum in Pune. It covered six month period from Jan 2019 to Jun 2019. The data collection procedure consisted of a physical examination by measuring the blood pressure, measurement of height, weight, hip, and waist. Besides these, a personal interview was undertaken by using a predesigned Performa. **Results:** Hypertension was found to be significantly linked with extra salt intake, alcohol consumption, lack of physical exercise, high BMI, and high WHR. **Conclusion:** There was a significant association observed between elevated blood pressure and extra salt intake, alcohol consumption, lack of regular physical exercise, and obesity.

Keywords: Blood pressure, urban male adult, risk

INTRODUCTION

For over a century, it is evident that high arterial pressure lessens life expectancy. The association between mortality and hypertension is quantitative. The higher the blood pressure, the worse the prognosis. It is now clear that hypertension has become a ubiquitous cause of morbidity and a leading contributor to mortality in most countries. (1)

Data from developing countries including India is very scarce regarding the distribution of hypertension, More the readings of blood pressure, the more is the likely hood that various disorders will develop prematurely. Various studies have

shown the prevalence of hypertension to be between 10-20% in the adult population. (1)

As per a survey conducted by ICMR during 2007-08 in some states of our country, the prevalence of hypertension was seen to be varying from 17 to 21% in all the states with marginal urban-rural differences. Worldwide, hypertension is estimated to cause about 7.5 million mortalities and the prevalence of elevated blood pressure in adults aged ≥ 25 years was around 40% in 2008. However, because of population growth and aging, the number of people with hypertension rose from 600 million in 1980 to one billion in 2008. (2)

As hypertension is the major risk factor for various disorders, certain numbers of risk factors are responsible for the elevation of blood pressure. Some of them are modifiable while some are not.

MATERIAL AND METHOD

It was a cross-sectional study carried out to find out the association between certain modifiable risk factors and hypertension. It was done in a defined adult male population of age 18 years and above, residing in an urban slum in Pune. It covered six month period from Jan 2019 to Jun 2019. Before commencing the study, the sample size was taken into account by considering the criteria incorporated in the book 'sample size determination in Health'.³ It was calculated to be 800 by using the formula $n=4Pq/D^2$, where D(error allowed) was taken as 5%. The modified sample size was calculated to be 396 by using the formula $n'=n/1+n/N$; where n-calculated sample size i.e.800, N-actual population of male adults i.e.794

A complete list of all adult males was prepared to live in that slum area. The sample of 396 subjects was drawn from this list, using random number tables. The required sample was selected from different age categories using a stratified random sampling method.

The instruments used for data collection included the physical instruments to measure blood pressure, height, weight, hip and waist, and a detailed pre-designed Performa. The questionnaire in it was designed following the guidelines and directives incorporated in many books.⁴ The subject was interviewed using this Performa, which included all required questions connected to their lifestyle.

The pilot study was also carried out selecting 25 subjects randomly. during this pilot study, both questionnaire and measuring instruments were tested, standardized, and validated to ensure high content criteria and validity.

The procedure of recording the blood pressure followed the directives given by the expert committee of WHO on Hypertension.⁵ To verify the authenticity of readings, it was recorded two times at the interval of 10-15 minutes. By using a high stand,

height was measured without wearing footwear. Similarly, weight was recorded with the subject wearing only undergarments. using a standardized portable weighing machine. Circumference of the waist was taken by placing the tape around the waist with its upper border touching the lower margin of the umbilicus. Circumference of the hip was measured by placing the tape horizontally at greater trochanters.

They were categorized into normotensives and hypertensives by considering their blood pressure readings and then certain determinants were taken into account to establish their association with blood pressure.

RESULTS

Out of the total of 396 subjects, 21 (9.6%) were having elevated blood pressure and the remaining 358 (90.4%) were having blood pressure within normal limits. It was observed in this study that 92 (23.3%) were vegetarian and 304 (76.77%) were nonvegetarian. Out of them, 17 (44.8%) vegetarians and 21(55.2%) non-vegetarians were having hypertension. The difference was insignificant ($X^2=0.141,df=1, p>0.75$)

To find out the association of tobacco use with high blood pressure, it was seen that 197(49.7%) of study subjects were smoking regularly at present and 199 (50.3%) were not smoking at all. Hypertension was observed to be 22(11.6%) among subjects who indulged in smoking and 16 (8%) among those not smoking. This difference was insignificant (p value=0.29)

It was seen that 117(29.5%) were nondrinkers and 297(70.5%) were consuming alcohol. Prevalence of Hypertension was 32 (25.5%) among drinkers and 6 (5.1%) among those not consuming alcohol.

Hypertension was found in 15 (16.5%) among those consuming alcohol for the past five years and it rose to 17(9%) among individuals, drinking for more than five years.

The study showed that 209 (52.8%) were not adding salt in their daily diet regularly, while187 (47.2%) were consuming daily extra salt with all meals on regular basis. Hypertension was observed in 14

(6.7%) individuals among those not adding extra salt in their diet and 24(12.8%) among those using extra salt in their diet routinely. This difference was significant.(X²=4.28, df=1, p=0.04)

Out of the total study subjects, 154 (38.9%) were not using additional fat in their diet, while 242 (61.1%) were consuming daily extra fat with their all meals on regular basis. Hypertension was 13 (8.4%) among those not using additional fat in their daily diet and 25 (10.3%) among those adding fat in the extra amount in their daily diet. This difference was insignificant statistically. (X²=0.39, df=1, p=0.53) The present study has shown that 39 (9.8%) of

subjects were not involved in leisure-time physical activities, while 357 (90.2%) were looking after their health by doing physical activities regularly. Hypertension was 8 (20.5%) among those, who were not involved in any type of physical activity and 30(8.4%)among those exercising regularly. This difference was significant statistically.(X²=5.94, df=1, p=0.01)

The observation was made that High blood pressure was seen to be more (33.3%) in those having BMI_≥ 25, while lower (9%) in subjects having BMI<25, and the difference was significant (X² =11.2, df =1, p<0.001)

Table-1 Association of smoking

Tobacco smoking users	Hypertensives		Normotensives		Total	
	Number	%	Number	%	Number	%
Non smokers	16	8.0	183	92.0	199	50.3
Smokers	22	11.2	175	8.8	197	49.7
Total	38	9.6	358	90.4	396	100

Chi-square value=1.12 Df = 1 p value = 0.29 (not significant)

Table-2 Association of Alcohol consumption

Alcohol users	Hypertensives		Normotensives		Total	
	Number	%	Number	%	Number	%
Non drinkers	6	5.1	111	94.9	117	29.5
Drinking for past 5 years	15	16.5	76	83.5	91	23
Drinking for > 5 years	17	9.0	171	91	188	7.5
Total	38	9.6	358	90.4	396	100

Chi-square value=7.73 Df = 2 p value = 0.02 (significant)

Table-3 Association of Extra salt intake

Dietary extra salt intake	Hypertensives		Normotensives		Total	
	Number	%	Number	%	Number	%
Dietary salt intake	24	12.8	163	87.2	187	47.2
No dietary extra salt intake	14	6.7	195	93.3	209	52.8
Total	38	9.6	358	90.4	396	100

Chi-square value=4.28 Df = 1 p value = 0.04 (significant)

Table-4 Association of Extra fat intake

Dietary Extra fat intake	Hypertensives		Normotensives		Total	
	Number	%	Number	%	Number	%
Dietary extra fat intake	25	10.3	217	89.7	242	61.1
No dietary extra fat intake	13	8.4	141	91.6	154	38.9
Total	38	9.6	358	90.4	396	100

Chi-square value=0.39 Df = 1 p value = 0.53 (not significant)

Table-5 Association of Physical exercise

Frequency of physical exercise	Hypertensives		Normotensives		Total	
	Number	%	Number	%	Number	%
Nil	8	20.5	31	79.5	39	9.8
Thrice or > in a week	30	8.4	327	91.6	357	90.2
Total	38	9.6	358	90.4	396	100

Chi-square value=5.94 Df = 1 p value = 0.01 (significant)

Mean BMI was comparatively more among hypertensive subjects (24.34±1.79) than the mean BMI of normotensives (22.44±1.14). (Z=8.97, p<0.001) significant statistically.

Table-6 Association of BMI

Status	Hypertensives		Normotensives		Total	
	Number	%	Number	%	Number	%
BMI ≥ 25	6	33.3	12	66.7	18	4.5
BMI < 25	32	8.5	346	91.5	378	95.5
Total	38	9.6	358	90.4	396	100

Chi-square value=12.25 Df = 1 p value = 0.001 (significant)

Hypertension was found to be more (28.6%) in those having WHR ≥ 0.9, while lower (9.3%) in subjects having WHR < 0.9. (X² =7.93,df =1,p=0.004) statistically significant

Table-7 Association of WHR

Waist hip ratio	Hypertensives		Normotensives		Total	
	Number	%	Number	%	Number	%
≥ 0.9	6	28.6	15	71.4	21	5.3
< 0.9	32	8.5	343	91.5	375	94.7
Total	38	9.6	358	90.4	396	100

Chi-square value=9.20 Df = 1 p value = 0.002 (significant)

DISCUSSION

In order to assess the association of various modifiable factors/ determinants with hypertension, it was observed that out of 396 study individuals, 38 were having elevated blood pressure, i.e 9.6%. WHO expert committee reported in a study that the distribution of hypertension is about 10%- 20% and observation of the present study is more or less close to it. (1)

WHO expert committee reported in its another study about the distribution of blood pressure in young people assumes Gaussian shape and it becomes more skewed gradually towards increasing

values for each increasing elder people after twenty years of age. (6)

10% dispersal of hypertension was reported by Gupta et al(7) in his study undertaken in few big cities. It commensurate with the dispersal of high blood pressure found to be between 7% to 35% as observed in nine developing countries by Li et al.(8)

Hypertension was slightly less among vegetarian individuals than those consuming a non-vegetarian diet. But this difference was not significant. (p>0.75). Many studies have supported it. (9,10)

49.7% of study subjects were found to be smokers in this study. Smokers were having slightly higher

blood pressure (11.2%). While the non-smokers were having slightly less no of hypertensives. (8%). the difference was insignificant. ($p=0.29$) . It has been mentioned by a report of the WHO expert committee that hypertension is not etiologically directly related to tobacco smoking. **(11)** It is a well-known fact that that tobacco smoking is a major risk factor for cardiac diseases, cerebrovascular disease, and this risk is multiplied by many folds when associated with hypertension. **(11,12,13,14)**

Hence, there is a need to educate and motivate adults to give up the habit of smoking.

Subjects who were consuming alcohol and having hypertension were 25.5% while it was 5.1% among non-drinkers. The difference was significant statistically ($p=0.002$). In the same way, hypertension and duration of drinking were also found to be associated significantly ($p<0.0001$). The individuals who were drinking for more than five years were having a higher incidence of hypertension than those drinking for five years It is well Many studies on this aspect have supported it.**(15,16)**

Hypertension and consumption of alcohol have a strong association. it has been demonstrated by Witteman et al.**(17)** Mac Mohan, supported it in his review of all thirty cross-sectional studies. **(15)**

The impact of extra salt intake on the incidence of hypertension was reported in the present study. The prevalence of hypertension was quite significant among individuals eating extra salt (12.8%). But it was comparatively less in individuals who were not adding extra salt in their diet on regular basis(6.7%). the difference was highly considerable ($p=0.04$). This finding is well supported by Various studies, have demonstrated a positive association ship in between blood pressure and intake of additional salt. **(11)** INTER SALT study**(9)**, and TOHP (trials of hypertension prevention) **(18)**, has demonstrated that blood pressure is related to the consumption of salt. Intake of salt i.e < 6 gm per day has been recommended by a report of the WHO expert committee. **(11)**

A significant positive relationship between hypertension and consumption of fat, in addition,

was not observed in this study ($p=0.53$). Individuals having extra fat in their meals were found to have high blood pressure (10.3%) while those not consuming extra fat in their daily meal were also having hypertension, though slightly lower than them (8.4%). the difference was not considerable ($p>0.05$). This finding commensurate with the observations of Singer et al,**(19)** who did not find any considerable association ship in between the intake of additional extra fat in a regular diet and hypertension. No causal relationship of extra fat consumption with hypertension has been established by a report of the WHO expert committee. **(11)**

Among subjects who were not undertaking any physical exercise, the prevalence of hypertension was higher (20.5%) and for those who were exercising three or more times in a week prevalence of hypertension was lower (8.4%). The difference was considerable. ($p=0.01$). Various studies on this association ship have demonstrated a significant association of physical activity with hypertension. **(20)** Shaper et al.**(21)** and Helmert et al **(22)**, also observed the same relationship between physical activities and blood pressure.

Overweight was found to be in 4% of subjects and it was observed that the distribution of hypertension was lower among subjects having BMI less than 25 (8.5%). While hypertensives were more among those having $BMI \geq 25$ (33.3%). It was seen in this study that there is a significant association between hypertension and body mass index (BMI) ($p=0.001$).

Chandrasekhar et al.**(23)** In a study and Dorn et al **(24)** in Buffalo health study(Newyork), it was demonstrated that BMI is a significant determinant for high blood pressure.

Waist hip ratio (WHR) also has an important relationship with hypertension like BMI. In the present study, Study subjects, who were possessing a WHR of 0.9 or more were found to have higher blood pressure (28.6%). The individuals possessing WHR less than 0.9(8.5%). The difference was considerable ($p=0.002$)

The observations made during the present study commensurate with the findings of Egger. **(25)**

CONCLUSION

In the present study, it was brought out that various modifiable risk factors found to be significantly associated with hypertension are alcohol intake, consumption of extra salt in the daily diet, lack of regular physical exercise, above normal values of body mass index(BMI) and waist-hip ratio(WHR).

RECOMMENDATIONS

Considering the observations and conclusions of this study, society is in great need of frequent screening of vulnerable age groups from time to time and their motivation regarding their lifestyle modification.

Medical and administrative authorities must educate the Population to need education and adequate knowledge about the injurious effects of high consumption of extra salt and additional extra fat in their daily diet. These educational programs can be initiated by the medical and administrative authorities. Various detrimental effects of tobacco use in any form(smoking and smokeless form) and addiction of alcohol intake should be communicated to all strata of society through various means of communication for motivating the population to quit this harmful habit or to at least minimize it.

Keeping because of the higher number of cases of hypertension among subjects not performing any type of physical exercise on regular basis, it is highly recommended to provide proper education and training of the population to strictly follow the physical activities in any form viz. brisk walking, jogging, cycling, swimming, yoga, etc.

Body mass index and waist-hip ratio have a considerable relationship with hypertension, which has been demonstrated in this as well as in various studies on this important aspect. Therefore there is a great need of educating the population about the health benefits of reducing and maintaining the bodyweight within permissible limits and follow up at regular intervals.

Recommended to enhance the health education training and programs to generate awareness regarding lifestyle medications to reduce the risks of hypertension.

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