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Original Research Article

Prevalence of hypertension and its associated risk factors in young adults attending a tertiary care institute of Nagpur: a cross sectional study

Chaitanya R. Patil, Durgesh Prasad Sahoo*, Manjusha Dhoble, Abhijit Kherde, Asim Inamdar

Department of Community Medicine, Indira Gandhi Government Medical College, Nagpur, Maharashtra, India

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***Correspondence:**
Dr. Durgesh Prasad Sahoo,
E-mail: dpsstanley8@gmail.com

ABSTRACT

Background: Hypertension is a silent killer and global public health problem. With the advent of globalization affecting the lifestyle of the population, non-communicable diseases like hypertension, diabetes etc. is affecting the young adults (18 to 40 years). The aim of the study was to estimate the prevalence of hypertension and its associated risk factors among young adults (18 to 40 years) attending a tertiary care centre of Nagpur.
Methods: This was a cross sectional study on 370 participants of age 18 to 40 years attending the outpatient department of urban health training centre in Nagpur. Data was collected using pretested and pre designed questionnaire and anthropometric measurements were done by standard guidelines. Blood pressure was measured using sphygmomanometer in sitting position. Data was analyzed using Epi info version 7.2. Chi square test/ fisher's exact test has been used to find the difference between two proportions. Unadjusted odds ratio was calculated for various risk factors studied. Stepwise logistic regression analysis was done to calculate the adjusted odds ratio.
Results: The prevalence of hypertension was found to be 23.24%. The prevalence was higher among males (25%) when compared to females (22.3%). Body mass index and waist hip ratio were significantly higher among the hypertensive when compared to normotensive study population ($p<0.01$). For every one year increase in age, the odds ratio increases by 1.06 (1.02 to 1.09) and the subjects who were overweight were having 2.15 odds of being hypertensive.
Conclusions: We found a high prevalence of hypertension among the adults of age group of 18 to 40 years. The population with high body mass index, high waist to hip ratio and age group of 30 to 40 years were found to be associated with hypertension. Early surveillance and prompt treatment forms will help in decreasing the cardiovascular risk of young adults in near future.

Keywords: Hypertension, Young adults, Body mass index, Central obesity

INTRODUCTION

Hypertension is a silent killer and global public health problem.[1] According to WHO estimates, 57 million disability adjusted life years are attributed to hypertension. It is a major risk factor for coronary heart disease, ischemic heart disease and stroke across the world.[2] The global health observatory data reported that the age standardised prevalence of hypertension is 24.1% and 20.1% for males and females respectively.[3] This epidemic of hypertension is affecting the population of low and middle income countries. Once known to be a common chronic disease in older age groups, with the advent of globalisation affecting the lifestyle of the

population, non-communicable diseases like hypertension, diabetes etc. are affecting the young adults (18 to 40 years).[4,5] Since, 18 to 40 years is the most productive group, there is a recent shift of focus on inculcation of healthy lifestyle among these age groups.[6]

A study by Kirkpantur A et al reports that the cause of hypertension in young adults is primary in more than two thirds of the total hypertensive.[7] Many studies have been conducted in adolescents, children and older adults for hypertension. Further studies have been conducted in young adults in developed countries; there is paucity of research in this age group in developing countries like India.[8-13] So, we conducted this study to estimate the prevalence of hypertension and its associated risk factors among young adults (18 to 40 years) attending a tertiary care centre of Nagpur.

METHODS

This was a cross sectional study on the patients attending the outpatient department of urban health training centre of Indira Gandhi Government Medical college, Nagpur. The study period was from September 2016 to January 2017. The study subjects who were permanent residents of the area, with no documented hypertension and who gave consent were included in the study. Pregnant women and subjects with pre-existing thyroid disease, renal and other cardiac diseases were excluded from the study. Ethical committee permission was sought before the start of the study.

A study conducted by Dores et al estimated the prevalence of hypertension among young adults to be 24.9%.[14] Using this prevalence, with 95% confidence interval and 5% allowable error the minimum sample size calculated was 287. Considering the non-response rate, we recruited a total of 370 study subjects in our study. Convenience sampling was done. According to Center for Disease Control and Prevention, Atlanta, young adults are defined as adults in the age group of 18 to 40 years.[15] Data collection instrument was pretested and pre designed having demographic variables like age, gender and religion and behavioural risk factors like tobacco chewing, alcohol use and smoking. The anthropometric variables like height, weight, waist circumference and hip circumference were measured according to standard guidelines. [16] Further, body mass index and waist hip ratio were calculated. Body mass index was classified into underweight, normal, overweight and obese based on the WHO guidelines.[17] The waist hip ratio was classified separately for males and females using the WHO guidelines.[18] Physical activity was measured using the WHO/FAO/1985 guidelines on human energy requirements.[19] Blood pressure was measured using sphygmomanometer in sitting position. Average of two blood pressure readings 15 minutes apart was considered. Further, blood pressure was classified into pre hypertension, hypertension and normotension based on the JNC 8 classification.[20] The patients who were diagnosed hypertensive for the first time were advised to dietary modifications, pharmacological treatment and regular follow up.

Statistical analysis

The data was collected and compiled using Epi Info Version 7.2. The quantitative variables were expressed in terms of mean and standard deviation and the qualitative variables were expressed in proportions. Chi square test/ fisher's exact test has been used to find the difference between two proportions. Unadjusted odds ratio was calculated for various risk factors studied. Stepwise logistic regression analysis was done to calculate the adjusted odds ratio.

RESULTS

We included total of 370 study subjects.

Table 1: Demographic characteristics of the study subjects.

Demographic characters	No	%
Age group*		
18-29	203	54.86
30-40	167	45.14
Gender		
Male	132	35.68
Female	238	64.32
Religion		
Hindu	319	86.22
Muslim	13	3.51
Buddha	38	10.27

*in years, No-Number, %-percentage.

The mean age of the study subjects was 27.42±8.83 years. Majority of them were females and belonging to Hindu religion.

Table 2: Prevalence of pre hypertension and hypertension based on gender.

Prevalence	Overall (n=370)		Male (n=132)		Female (n=238)	
	No	%	No	%	No	%
Hypertension	86	23.24	33	25.00	53	22.30
Stage 1	60	16.22	21	15.91	39	16.39
Stage 2	26	7.03	12	9.09	14	5.88

No-Number, %-percentage.

The prevalence of hypertension in our study was found to be 23.24%. The prevalence was higher among males (25%) when compared to females (22.3%).

Behavioural risk factors like use of alcohol, smoking and tobacco chewing were higher in case of hypertensive when compared to normotensive, but they did not attain the level of significance (p>0.05). There was no

significant difference between the physical activity of hypertensive and normotensive study subjects (p>0.05). Body mass index and waist hip ratio were significantly higher among the hypertensive when compared to normotensive study population (p<0.01).

Table 3: Risk factors for pre hypertension and hypertension among the study population.

Risk factors	Overall (n=370)		Hypertensive n=82		Normotensive n=288		P value^
	No	%	No	%	No	%	
Alcohol use	41	11.08	12	14.63	29	10.07	0.2453
Smoking	60	16.22	18	21.95	42	14.58	0.1102
Tobacco use	124	33.51	34	41.46	90	31.25	0.0838
Physical activity level*							
<1.69 (Sedentary)	59	15.95	13	15.85	46	15.97	0.9793
≥1.69 (Moderate to vigorous)	311	84.05	69	84.15	242	84.03	
Body mass index@							
Underweight (<18.5 kg/m^2)	71	19.19	8	9.76	63	21.88	0.0001
Normal (18.5 to 24.99 kg/m^2)	187	50.54	33	40.24	154	53.47	
Overweight (25.0 to 29.9 kg/m^2)	83	22.43	31	37.80	52	18.06	
Obesity (>30.0 kg/m^2)	29	7.84	10	12.20	19	6.60	
Central obesity							
Present$	133	35.95	40	48.78	93	32.29	0.0060
Absent	237	64.05	42	51.22	195	67.71	

*- According to Joint report of WHO/FAO/1985 for human energy requirements; @-WHO classification of body mass index; $- ≥0.85 for female, ≥0.90 for male; No-Number, %-percentage; ^-Chi square/ fisher's exact test applied.

Table 4: Unadjusted Odds ratio for risk factors of hypertension of the study population.

Risk factors	Unadjusted Odds ratio for hypertension
Age group	
18-29	1 (Reference)
30-40	3.43 (2.03 to 5.78)*
Gender	
Male	1.20 (0.72 to 1.99)
Female	1 (Reference)
Alcohol use	
Yes	1.53 (0.74 to 3.15)
No	1 (Reference)
Smoking	
Yes	1.64 (0.88 to 3.05)
No	1 (Reference)
Tobacco use	
Yes	1.55 (0.94 to 2.58)
No	1 (Reference)
Physical activity level	
Sedentary	0.99 (0.50 to 1.93)
Moderate to vigorous	1 (Reference)
Body mass index	
Underweight (<18.5 kg/m^2)	0.59 (0.25 to 1.35)
Normal (18.5 to 24.99 kg/m^2)	1 (Reference)
Overweight (25.0 to 29.9 kg/m^2)	2.78 (1.55 to 4.98)*
Obesity (>30.0 kg/m^2)	2.45 (1.04 to 5.76)*
Central obesity	
Present	1.99 (1.21 to 3.28)*
Absent	1 (Reference)

*significant values.

Table 5: Logistic regression for risk factors of hypertension in the study population (final model).

Risk factor	Odds ratio	95% Confidence interval	P value
Age	1.06	1.02 to 1.09	0.000*
Body mass index			
Underweight (<18.5 kg/m^2)	0.70	0.30 to 1.65	0.425
Normal (18.5 to 24.99 kg/m^2)	1 (Reference)		
Overweight (25.0 to 29.9 kg/m^2)	2.15	1.17 to 3.94	0.013*
Obesity (>30.0 kg/m^2)	1.61	0.66 to 3.91	0.291

*significant values, Pseudo R^2=0.0877

The age group of 30 to 40 years, those study subjects who were overweight or obese and whose waist hip ratio is high had higher odds of being hypertensive (p<0.05).

After applying logistic regression analysis, the final model included age and being overweight as significant risk factor for hypertension in young adults. For every one year increase in age, the odds ratio increases by 1.06 (1.02 to 1.09) and the subjects who were overweight were having 2.15 odds of being hypertensive.

DISCUSSION

A study by Gupta et al reported that the prevalence of various cardio metabolic risk factors among adolescents is low, but there is a rapid escalation of these risk factors by the age of 30 to 39 years.[21] So, this hospital based cross sectional study focuses on young adults between the age group of 18 to 40 years on one of the major risk factor i.e. hypertension.

It was found that the prevalence of hypertension among this age group to be 22.16%, of which 16.22% were stage 1 and 7.03% in stage 2. The prevalence of hypertension in this age group found in our study was similar to study by Dores et al.[14] But, studies conducted by Venecia et al, Papathanasiou et al, Kayima et al, Bruno et al, Uchiyama et al, Reddy et al and Choukem et al inferred with lower prevalence when compared to our study.[22-28] Similar studies conducted by Al Majed et al and Kanade et al found higher prevalence in this age group.[29,30] The National Health and Nutrition Survey for the year 2012-2013 reports that the prevalence of hypertension in young adults of United States to be 7.3%, this prevalence is also lower than our study.[15] These statistics indicate that there is higher burden among developing countries like India.

We found significant association between age group, overweight, obesity and central obesity with hypertension among young adults. A study conducted by Kayima et al inferred that the prevalence of hypertension was significantly higher in the age group of 30 to 40 years when compared with 18 to 29 years (p<0.05).[24] A study conducted by Papathanasiou et al found that body mass index and male gender had higher odds of being hypertensive in this age group.[23] Similar findings were postulated by study conducted by Bruno et al.[25] In our study, we found a higher prevalence of hypertension in males when compared to females, but it did not attain the level of significance. Similar results were reported by a study conducted by Reddy et al.[27] But, a study conducted by Papathanasiou et al found higher prevalence of hypertension in males when compared to females.[23] This gender difference might be due to the fact that oestrogen is protective for cardiovascular diseases in females of this age group. In our study behavioural risk factors like tobacco chewing, smoking and alcohol use were not significantly higher in hypertensive study population. But, studies conducted by Kini et al, Yilmazel et al, Al Majed et al, Samara Simha et al and Grotto I et al inferred with similar results, but in these studies the outcome variable was pre hypertension.[29,31-34]

After logistic analysis, age and overweight category were found to be independent risk factors associated with hypertension. Similar inferences were found by Papathanasiou et al and Bruno et al.[23,25] Some studies conducted on pre hypertension as the outcome variable also found similar results. In our study, physical activity was found not associated with hypertension, but study conducted by Papathanasiou et al found physical activity to be protective for hypertension.[23] Another study by Pengpid et al conducted on university students did not find any significant association of physical activity with hypertension; this finding was similar with our study.[35] A study conducted by Choukem et al found body mass index and central obesity to be independent predictors for hypertension.[28] This was in concordance with our study. Another study conducted by Uchiyama et al among university students also found a significant relationship between overweight or obese category and hypertension among both males and females (p<0.05).[26] Further, among senior year males being underweight was found to be protective with an odds ratio of 0.55 (0.34 to 0.99). In our study, we did not attain the significance level for underweight category.

Since this study has been conducted on young adults attending the tertiary care hospital, the generalization of the findings is an issue. Nonetheless, in our study, by considering the non-response rate while calculating the sample size, we have tried to nullify the effect. Many other cardiovascular risk factors like dietary factors, lipid profile, stress, anxiety etc. have not been included in our study. In spite of all the limitations, our study is one of the pioneer studies focussing on the public health concern of most productive age group in the community.

Community based, larger studies will infer more precise results. Physical activity questionnaire used in this study has its own limitations. It is reliable, but newer methods of determining physical activity levels could not be included.

CONCLUSION

We found a high prevalence of hypertension among the adults of age group of 18 to 40 years. The population with high body mass index, high waist to hip ratio and age group of 30 to 40 years were found to be associated with hypertension. The person being overweight and age are independent predictors for hypertension in young adults.

Recommendations

We recommend that the policies in future have also to focus on screening for hypertension among age group of 18 to 40 years. Early surveillance and prompt treatment forms will help in decreasing the cardiovascular risk of young adults in near future. Lifestyle modifications with respect to maintenance of body weight have to be included in the health education of young individuals.

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