Hypertension in Young Adults

[1*]Anjali Arora, [2]Gurprit Singh Nanda, [3]Bhuwan Sharma, [4]Harinder Singh, [5]Prabhjot Kaur,
[1,3]Assistant Professor, [2] Professor, [4]Professor & Head, [5]Biostatistician, Department of Community Medicine, PIMS Medical College & Hospital, Jalandhar, Punjab

Abstract

Introduction: Cardiovascular diseases have been proved to be the leading cause of morbidity and mortality in developed countries, and are gradually emerging as an important health problem in developing countries as well accounting for approximately 31 percent of all global deaths. Increased blood pressure is one of the important risk factors of cardiovascular disease. In Asian urban adult populations, the prevalence of hypertension has shown an upward trend, at present varying between 15-35 percent, with hypertension and stroke occurring at a relatively younger age.

Materials & Methods: The present cross sectional study was conducted on 551 young adults (20-40 years) in rural field practice area PIMS, Jalandhar. Data was collected through house visits using a structured, pre-tested questionnaire. Universal sampling technique was used and all the families were enrolled in the study. The statistical evaluation of the data was performed by using SPSS software, version 21.0.

Results: A total of 101 subjects were found to be hypertensive with prevalence of hypertension as 18.5% in young adults. A total of 20% of the subjects were found to be pre-hypertensive. Maximum cases of hypertension were in the age group of 30-40 years with mean age of 33.4± 6.7 years.

Conclusions: Prevalence of prehypertension and hypertension were relatively high among young adults in rural areas of Punjab, India. Most of the cases were previously undiagnosed. Intervention to prevent further complications needs to be done early coupled with lifestyle modifications.

Keywords - *Cardiovascular Diseases, Hypertension, Prevalence, Young Adults*

I. INTRODUCTION

Cardiovascular diseases have been proved to be the leading cause of morbidity and mortality in developed countries, and are gradually emerging as an important health problem in developing countries as well accounting for approximately 31 percent of all global deaths. Of these 17.5 million, 7.4 million were due to coronary heart disease and 6.7 million were due to stroke.[1] According to the WHO's World Health Statistics Report 2012, a third of the world's adult population has raised blood pressure.[2] Increased blood pressure is one of the important risk factors of cardiovascular disease.[1] Hypertension contributes to 4.5 percent of the current global disease burden.[2] In Asian urban adult populations, the prevalence of hypertension has shown an upward trend, at present varying between 15-35 percent, with hypertension and stroke occurring at a relatively younger age.[3] Hypertension is responsible for 57% of stroke deaths and 24% of coronary heart disease deaths in India[4]. The prevalence of hypertension among younger individuals, however, is on a steady rise. This may be attributed to several factors such as dramatic changes in lifestyle and stress patterns, improved detection rates due to better screening[5] and a high prevalence of metabolic and dietetic coronary risk factors among adolescents of the middle- and upper-middle class. [6]

Hypertension is a preventable and controllable disease and a 2 mm Hg Population-wide decrease in BP can prevent 1,51,000 CHD deaths.[7] The capacity for management of hypertension has varied widely among countries. Over 80 percent of cardiovascular deaths in developing countries have been a result of a lack of widespread diagnosis and treatment as compared to developed countries.[8] Prehypertension and hypertension are related with many complications of nearly every organ, but often neglected by young adults in rural area.[9]

Most of the hypertensive cases are asymptomatic and are diagnosed accidentally. So, it is very important to detect such cases as early as possible. The primary aim of this study was to determine the prevalence of hypertension and prehypertension stage among young adults in rural areas of Punjab as there is a paucity in data regarding hypertension in this age group, particularly in this area. The socio-demographic variables associated with hypertension had also been collected in order to identify potential interventions.

II. AIM & OBJECTIVES

1. To study the prevalence of hypertension among young adults aged 20-40 years of age in rural areas of Punjab.
2. To study the epidemiological correlates of hypertension among young adults.

III. MATERIAL & METHODS

A community based cross-sectional study was conducted to know the prevalence of hypertension among young adults aged 20-40 years of age in rural field practice area of Department of community medicine, PIMS, Jalandhar, Punjab. The prevalence of Hypertension in young adults as per literature review was taken as 8%. [5,10,]

By using the formula: $\mathbf{n = Z^2 p(1-p)/e^2}$, the sample size came out as 1002 (n = sample size; Z = level of confidence (1.96); p = prevalence of Hypertension and; e = allowable error (taken as 10%). As there are only 1000 families in our rural field practice area, applying universal sampling technique, all the families were enrolled in the study. The study was conducted from January 2015 to December 2015. All the adults of the desired age group

residents of the area willing to participate in the study were enrolled in the study. 60 people refused to participate and finally the study was conducted on 551 participants.

Methodology

Data was collected through house visits using a structured, pre-tested questionnaire which had two sections:

Section 1: Included identification data: age, sex, religion, social class [Kuppuswamy's scale(7) - classified as social class I to V], Physical activity: very good [physical exercise like manual work per se or sports activity or other physical exercise for >3 h/day], moderate [1-3 h/day], mild [<1 h/day], sedentary [nil physical activity], per capita salt intake, History of Parental hypertension, Smoking: light [< 5 cigarettes/day], moderate [6-10 cigarettes/day], heavy [>10 cigarettes/day], non-smoker [never smoked], Alcohol consumption: occasional [once or twice a month], frequent [once or twice a week], always [>twice a week], never consumed, Dietary history using food frequency method.

Section 2: Included Anthropometry: Height - recorded to nearest 0.1 cm with stadiometer, weight to nearest 100 g with solar weighing machine, BMI was calculated using the formula, Weight (kg) / Height (m^2).

Waist circumference was measured to the nearest 0.1 cm at the mid-point between coastal margin and iliac crest using a measuring tape at the end of normal expiration with the subject standing erect in a relaxed position, feet 25-30 cm apart. Hip circumference was measured at the level of the greater trochanters (widest portion of the hip) to the nearest 0.1 cm by a measuring tape, while the subject stood with their arms by their side and feet together. Waist-hip ratio was calculated as the ratio of waist circumference over hip circumference.

Operational Definitions

Hypertension: A subject was considered hypertensive if he/she had been previously diagnosed and/or on treatment OR if the systolic blood pressure was ≥ 140 mm of mercury or diastolic blood pressure was ≥ 90 mm of mercury at the time of measurement, Prehypertension is considered to be blood pressure readings with a systolic pressure from 120 to 139 mm Hg or a diastolic pressure from 80 to 89 mm Hg (JNC-VII criteria).[10] The subject was asked to rest for 5-10 min if he/she had engaged in physical activity. The WHO criteria[11] were followed in recording the BP and the average of two readings recorded 3 min apart.

Obesity: A BMI of ≥ 25 kg/m^2 was recorded as 'overweight' and BMI ≥ 30 kg/m^2 as 'obese'. Waist hip ratio of >1 for males and > 0.85 for females were designated as Truncal obesity while waist circumferences of ≥ 94 cm in males and ≥ 80 cm in females were designated as Central or Abdominal obesity [12].

Data was analyzed using SPSS 21.0 (SPSS Inc., Chicago, IL, USA), chi square was used to evaluate the results.

IV. RESULTS

A total of 551 subjects were studied between the age group of 20 to 40 years with the mean age of 29.4 ± 4.2 years. [Table 1]. Out of total 551 study subjects 361 (65.5%) were males and 190 (34.5%) were females. [Table 2] A total of 101 subjects were found to be hypertensive with its prevalence as 18.5% in young adults while prevalence of pre-hypertension was observed as 20% [Table 3]. It was observed that maximum cases of hypertension were in the age group of 30-40 years with mean age of 33.4± 6.7 years with preponderance of male subjects (22.2%) as compared to females(11.1%) and this relation was found to be statistically significant ($p<0.05$). Hypertension was seen to be more prevalent among illiterates and subjects with low education status but this relation was non-significant ($p>0.05$). Socio-economic status of the family showed statistically significant association with the disease with more hypertensives were found among subjects who belonged to higher socioeconomic class. A highly significant relation was also seen between family history (25.2%), history of OC pills intake (36.7%), BMI of more than 25 Kg/m^2 (30.1%) and those who had the habit of eating high salt diet and over the table salt (32.3%) [Table 4].

Table 1. Distribution of subjects based on Age group

Age group (years)	N	%
20-25	143	26.0%
26-30	179	32.5%
31-35	131	23.8%
36-40	98	17.8%
Total	551	100.0%

Table 2. Distribution of subjects based on Gender

Gender	N	%
Male	361	65.5%
Female	190	34.5%
Total	551	100.0%

Table 3. Distribution of subjects based on Status of Hypertension

Status	N	%
Hypertension	101	18.3%
Pre-hypertension	110	20.0%
Normal	340	61.7%
Total	551	100.0%

Table 4. Association of Hypertension with

Variable	Mean (±SD)/ n (%)		p- value
	Hypertensives (n-101)	Normotensives (n-450)	
Age (n-551)	33.45 ± 6.7	28.15 ± 5.4	<0.05
Male (n- 361)	80 (22.2%)	281 (77.8%)	<0.05
Female (n- 190)	21 (11.1%)	169 (88.9%)	
Married (n-512)	89 (17.4%)	423 (82.6%)	0.257
Illiterate/ Primary education (n-222)	35 (15.7%)	187 (84.3%)	0.22
SES (III-V) (n-488)	88 (18%)	400 (82%)	0.605
SES (I-II) (n-63)	13 (20.6%)	50 (79.4%)	
Nuclear Family (n-186)	34 (18.3%)	152 (81.7%)	1.0
Joint Family (n-365)	67 (18.4%)	298 (81.6%)	
Family history of HT (n-131)	33 (25.2%)	98 (74.8%)	<0.05
History of OC Pill intake (n-131)	29 (36.7%)	50 (63.3%)	<0.05
Extra Salt added to Food (n-201)	65 (32.3%)	136 (67.7%)	<0.05
BMI (> 25 Kg/m2) (n-103)	31 (30.1%)	72 (69.9%)	<0.05

V. DISCUSSION

The persistence of elevated childhood and adolescent blood pressure and its progression into adult hypertension has been demonstrated in the past. Repeated high BP measurements in adolescence are a predictor of adult hypertension. Blood pressure monitoring in young adults is therefore useful for the early detection and management of hypertension. High prevalence of hypertension was found among the young adults in our study. Similarly, high rates have been demonstrated in earlier studies on young adults[13] as well as in teenagers.[14] About half of the remaining sample was found to be pre-hypertensive, illustrating the necessity of monitoring blood pressure in this age group. The high prevalence of prehypertension (20.15%) and hypertension (18.3%) in this study, confirms this increasing trend. High prevalence of prehypertension observed in this study was similar to that reported by other studies in Himachal Pradesh [15], Central India [16] and Kerala [17]. In present study maximum cases of hypertension are in the age group of 30 to 40 years which suggests that, as the age increases the chances of hypertension also increases. Similar trends have been observed in a study from US where the prevalence rate varies from 4% in the age group 18-24 years to 60% in the age group 65-74 years.[18] Another study from Chennai by Deepa R et al. [19] showed a prevalence of 8% in the age group < 40 years, 28% among 40-60 yrs and 54% in the age group > 60 yrs. The Jaipur Urban study [20] reported a prevalence of 15.4% amongst < 40 yrs age group, 34.7% between 40-49 yrs, and 58% in the age group > 50 yrs.

More hypertensive cases were seen in higher socio economical class i.e. in class I and class II in our study. Most of the studies in India have indicated a higher prevalence of hypertension in higher socio-economic groups. A study done on hypertension with special reference to socio-economic status in rural south-Indian community [21] showed that the prevalence of hypertension in highest socio-economic group (22.5%) was more than twice that in the lowest socio-economic group (8.8%). This can be related to a pattern of lifestyle difference between the different socioeconomic classes.

In present study, we observed that positive family history, history of OC pills consumption, high consumption of over the table salt and obesity were the factors found to be associated with this rising trend of hypertension among young adults ($p<0.05$). Similarly different studies have also found these factors to be associated with hypertension [22,23]. Obesity indicators (BMI, WHR and waist circumference) have been repeatedly proven to possess a significant positive correlation with both elevated systolic and diastolic blood pressures in different studies [12,22,23]. In a National study of epidemiology of HTN under the Cardiology Society of India,[24] the incidence of family history of HTN, Stroke and CHD was at least 1.5 times as frequent in hypertensives as in controls. The Bombay executive study [25] also showed the family history of HTN in hypertensives as 1.5 times that observed in persons with normal and optimal BP.

WHO recommendation for adults is to reduce the salt intake to 5g/d or less. In a a study on 'How far should salt intake be reduced?', which re-analyses a meta-analyses of randomized long term salt reduction trials, says that the current public health recommendation to reduce salt intake from 9-12 g/d to 5-6 g/d will have a major effect on BP, but by no means is ideal and a further reduction to 3 g of salt per day will have a much greater effect on blood pressure.[26] Another study on sodium intake and blood pressure in healthy individuals indicate that 5-16% on healthy persons have a "salt dependent BP" and may benefit from a decrease in dietary salt intake [27].

Diet has been found to be a very important factor responsible for the disease in present study and maximum of the subjects with diet history of more consumption of fruits and vegetables were found to be normotensive (non-tabulated). Not many studies in India have addressed these issues. A study by O'Shaughnessy KM has shown positive role of DASH diet in control of hypertension.[28] Similar results were also observed in studies by Sacks et al.[29] and Appel LJ et al.[30]

VI. CONCLUSION

Hypertension was found to be a problem among young adults with most of the cases were previously undiagnosed. Their early identification facilitates early and active management of their hypertension thereby minimizing complications such as cardiovascular events and end organ damage later in life. Further studies are needed on hypertension and role of diet in young adult population of this area in order to formulate preventive strategies at all levels.

VII. REFERENCES

1. WHO Fact Sheet. Cardiovascular diseases. World Health Organization; January 2015. No. 317.
2. World Health Organization, International Society of Hypertension Writing Group. World Health Organization (WHO)/International Society of Hypertension (ISH) statement on management of hypertension. Journal of Hypertension. 21(11):1983-1992, November 2003.
3. Singh RB, Suh IL, Singh VP, Chaithiraphan S, Laothavorn P, Sy RG, et al. Hypertension and stroke in Asia: prevalence, control and strategies in developing countries for prevention. J Hum Hypertens. 2000 Oct-Nov;14(10- 11):749-63.
4. Gupta R. Trends in hypertension epidemiology in India. Journal of human hypertension. 2004 Feb 1;18(2):73-8.
5. Soudarssanane M, Mathanraj S, Sumanth M, Sahai A, Karthigeyan M. Tracking of blood pressure among adolescents and young adults in an urban slum of Puducherry.Indian J Community Med. 2008 Apr;33(2):107-12.
6. Gupta R, Goyle A, Kashyap S, Agarwal M, Consul R, Jain BK. Prevalence of atherosclerosis risk factors in adolescent school children. Indian Heart J. 1998 Sep-Oct;50(5):511-5.

7. Rogers A, Laws C, Mac Mohan S. Reducing the global burden of blood pressure related cardiovascular disease. J Hypertens. 2000; 18 (suppl 1): S3-S6.
8. Reddy KS, Y usuf S. Emerging epidemic of cardiovascular disease in developing countries. Circulation.1998;97: 596–601
9. Srinivas S, Satyavaraprasad K, Ramdas R, Krishna CP, Tajuddin T, Rao RP. Prevalence of prehypertension in adult population of rural Andhra Pradesh. Asian Journal of biomedical and pharmaceutical sciences. 2013 Aug 1;3(23):45.
10. Reddy VS, Jacob GP, Ballala K, Ravi C, Ravi B, Gandhi P, Tadkal P, Singh T. A Study on the Prevalence of Hypertension Among Young Adults in a Coastal District of Karnataka, South India. International Journal of Healthcare and Biomedical Research. 2015;3(3):32-9.
11. World Health Organization. Arterial hypertension. Technical Report Series. 1978 No 628.
12. Report of World Health Organization consultation. Obesity: preventing and managing the global epidemic. Geneva, Switzerland: World Health Organization; 2000. WHO Tech Rep Ser. No.894.
13. Rosenthal J. The epidemiology of blood pressure in young Mexican adults. J Hypertens. 1989 May;7(5):355-60.
14. Dimkpa U, Oji JO. Relationship of body mass index with haemodynamic variables and abnormalities in young adults.J Hum Hypertens. 2010 Apr;24(4):230-6.
15. Bhardwaj R, Kandoria A, Marwah R, Vaidya P, Singh B, Dhiman P, Sharma A. Prevalence, Awareness and Control of Hypertension in Rural Communities of Himachal Pradesh JAPI 2010;58:423-25.
16. Kokiwar PR, Gupta SS, Durge PM. Prevalence of Hypertension in a Rural Community of Central India. J A P I 2012;60:26-29.
17. Thankappan KR, Sivasankaran S, Khader. SA-Prevalence, awareness, treatment and control of in Hypertension, Kumarakom, Kerala. Indian Heart Journal 2006: 58:28-33.
18. National high blood pressure education program working group. Arch Intern Med. 1993; 153: 186-208.
19. Deepa R, Shantarani CS, Pradeepa R, Mohan V. Is the rule of halves in hypertension still valid? Evidence from the Chennai urban population study. J Assoc Phys Ind 2003; 51: 153-157.
20. Gupta R, Gupta S, Gupta P, Prakash H. Prevalence and determinants of hypertension in the urban population of Jaipur in Western India. J Hypertens 1995; 13: 1193-1200.
21. Ericus C, Gilberts AM, Marinus JC, Arnold WJ, Diederick E Grobbee. Hypertension and determinants of blood pressure with special reference to socio-economic status in a rural south Indian community. Journal of Epidemiology and community health. 1994; 48: 258-261.
22. Goel R, Misra A, Agarwal SK, Vikram N. Correlates of hypertension among urban Asian Indian adolescents. Arch Dis Child. 2010 Dec;95(12):992-7.
23. Deshmukh PR, Gupta SS, Dongre AR, Bharambe MS, Maliye C, Kaur S, Garg BS. Relationship of anthropometric indicators with blood pressure levels in rural Wardha. Indian J Med Res. 2006 May;123(5):657-64. 20. Reckelhoff JF. Gender differences in the regulation of blood pressure.Hypertension.2001; 37: 1199-1208.
24. Anand MP. Epidemiology of hypertension. Current concepts in hypertension Sainani GS (Ed) ICP Mumbai 1995; p. 4-13.
25. Anand MP. Prevalence and grades of hypertension amongst executives of Mumbai. Journal Assoc Phys Ind. 2000; 48 (12): 1200-01.
26. Feng J.He, Graham A.MacGregor. How far should salt intake be reduced? Hypertension (Indian Edition). 2004 jan- Feb; 5(1): 16-22.
27. Ducher M, Fauvel J-P, Maurine M, et al. Sodium intake and blood pressure in healthy individuals. J Hypertens. 2003; 21: 289-294.
28. O'Shaughnessy KM. Role of diet in hypertension management. Current hypertension reports. 2006 Jul 1;8(4):292-7.
29. Sacks FM, Svetkey LP, Vollmer WM, Appel LJ, Bray GA, Harsha D, Obarzanek E, Conlin PR, Miller ER, Simons-Morton DG, Karanja N. Effects on blood pressure of reduced dietary sodium and the Dietary Approaches to Stop Hypertension (DASH) diet. New England journal of medicine. 2001 Jan 4;344(1):3-10.
30. Appel LJ, Champagne CM, Harsha DW, Cooper LS, Obarzanek E, Elmer PJ, Stevens VJ, Vollmer WM, Lin PH, Svetkey LP, Young DR. Effects of comprehensive lifestyle modification on blood pressure control: main results of the PREMIER clinical trial. JAMA: Journal of the American Medical Association. 2003 Apr.