

# Prevalence and Risk Factors of Hypertension Among Male Police Personnel in Urban Puducherry, India

Ganesh KS,<sup>1</sup> Naresh AGV,<sup>1</sup> Bammigatti C<sup>2</sup>

<sup>1</sup>Department of Community Medicine

<sup>2</sup>Department of General Medicine

Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER)

Puducherry, India

## Corresponding Author

Ganesh Kumar S

Department of Community Medicine

Jawaharlal Institute of Postgraduate Medical Education and Research (JIPMER)

Puducherry, India

E-mail: sssgan@yahoo.com

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## ABSTRACT

### Background

Hypertension is an important health issue among high risk occupation groups like police personnel.

### Objective

To assess the prevalence and risk factors of hypertension among male police personnel.

### Method

This cross sectional study was conducted among male police personnel residing in urban Puducherry, India. Data on blood pressure (BP), anthropometric measurements, demographic factors, smoking, alcohol intake, physical activity, stress level, obesity and dietary factors were collected by interview technique using a standard questionnaire.

### Result

About 296 police personnel were participated. Most of them belonged to the age group of 25-39 years (68%). The prevalence of pre-hypertension and hypertension was 37.8% and 34.5% respectively. Among those with hypertension, 56.86% (58/102) were known hypertensives and 43.13% (44/102) were newly diagnosed. Age group of 50-59 years (AOR=8.472) and 40-49 years (AOR=8.15), currently using alcohol (AOR=1.797), less than 7 servings of fruits in a week (AOR=3.228), moderate stress level (AOR=2.374) and waist circumference more than 90 cm (AOR=4.937) were associated with higher prevalence of hypertension among police personnel.

### Conclusion

Hypertension among Police personnel is comparatively higher than general population in this area. Reduction in alcohol use, increase in fruit servings along with other lifestyle modification measures may help in prevention and control of hypertension.

## KEY WORDS

*Hypertension, police personnel, risk factors, urban India*

## INTRODUCTION

In India, the Coronary Heart Disease (CHD) rate is expected to rise in parallel with the increase in life expectancy secondary to increase in per capita income and declining infant mortality.<sup>1</sup> Elevated blood pressure is one of the major risk factor for cardiovascular morbidity and mortality. Increased risk begins in the pre-hypertensive stage and increases further with higher blood pressure levels.<sup>2</sup>

Police personnel constitute a special occupational group with exposure to violence and stress at work, which directly and indirectly affects their health.<sup>3</sup> A cohort study on Helsinki policemen found coronary heart disease as a major cause of mortality among policemen.<sup>4</sup> Obesity, dietary factors, smoking, alcohol use, exposure to stress at work and lack of physical activity were important factors associated with hypertension. Very few studies were conducted with regard to this among police personnel in India.<sup>3,5</sup> With this background, the present study was conducted to assess the prevalence and certain risk factors of hypertension among male police personnel in urban Puducherry, India.

## METHODS

### Setting

This cross sectional study was conducted from April 2013 to September 2013 among male police personnel residing in police quarters of Dhanvantri Nagar, urban Puducherry, India.

### Sample size estimation and Sampling technique

By considering prevalence of hypertension among police personnel as 22.5%<sup>5</sup> and precision at 25% level, the minimum sample size was found to be 231. By adding 10% non-response error, total sample size became 254. However, we followed convenient sampling method and decided to include all the 396 male police personnel residing in the police quarters in Dhanvantari Nagar, Puducherry.

### Ethical issues

Approval was obtained from the Institution Ethics Committee before commencement of the study. Due written permission was obtained from the Inspector General of Police before initiating the study. Written informed consent was taken from the subjects.

### Study tools and method of data collection

BP was measured by using a mercury sphygmomanometer of appropriate cuff size, after 5 minutes of rest with subjects in sitting position, feet relaxed on floor and arm supported at chest level.<sup>6</sup> Hypertension is defined as a systolic BP of 140 mmHg or above or diastolic BP of 90 mmHg or above, in a minimum of 2 readings at least 5 minutes apart. The subjects were classified as Normal, Pre-hypertensive or Hypertensive according to JNC VII criteria.<sup>7,8</sup> Known

hypertensives diagnosed previously by registered medical practitioner were considered as hypertensive which was confirmed either by history of taking treatment or based on prescription slips. Thus prevalent hypertension cases were also included as known hypertensives. Pre-hypertensives were those with systolic BP of 120-139 mmHg or diastolic BP of 80-89 mmHg.

Data was collected by the investigator in their house. A structured questionnaire was prepared which included questions on diet, smoking, alcohol intake, physical activity and other self-reported co-morbid conditions. Part of the questionnaire included core and /or expanded items of WHO STEPS instrument and it was pre-tested.<sup>9</sup> Consumption of any junk food which included deep fried snacks, pizzas, burgers, chips and cold drinks in the preceding week was considered to assess the junk food consumption. Stress was assessed by Cohen's Perceived Stress scale.<sup>10</sup> Height was measured using a non-stretchable measuring tape, with an accuracy of 0.1 cm, standing against a wall bare foot, and weight was measured using an electronic weighing scale with an error of  $\pm 0.1$  kg. The complete process took about an hour for a subject.

### Statistical analysis

The collected data was entered in Statistical Package for Social Sciences version 19 for windows (SPSS v.19). It was analyzed by using univariate and multivariate analysis. 'p' value of less than 0.05 was considered as statistically significant.

## RESULTS

The data was collected from 296 male police personnel with a response rate of 75%. Most of them belonged to the age group of 25-39 years (68%). The prevalence of pre-hypertension and hypertension was 37.8% and 34.5% respectively. Among those with hypertension, 56.86% (58/102) were known hypertensives and 43.13% (44/102) were newly diagnosed [Table 1]. The proportion of those with associated risk factors were overweight and obesity (54.4%), smoking (21.6%), alcohol use (50.3%), very high level of perceived stress (51%) and diabetes (10.1%).

**Table 1. Prevalence of Hypertension among Police personnel in the study population (N=296)**

Variables	Number of subjects	Percentage (95% Confidence Interval)
Normal (SBP<120 and DBP<80)	82	27.7% (22.6-32.8)
Pre hypertensive (SBP 120-139 or DBP 80-89)	112	37.8% (32.28-43.32)
Hypertensive Grade I (SBP 140-159 or DBP 90-99)	42	14.2% (10.22-18.18)
Hypertensive Grade II (SBP $\geq$ 160 or DBP $\geq$ 100)	2	0.7% (-0.25 -1.65)
Known Hypertensives	58	19.6%

**Table 2. Prevalence of hypertension according to risk factors (N=296):**

Variable	No. of Subjects	Subjects with Hypertension	χ <sup>2</sup> , p value
<b>Age</b>			
25-39	202	56(27.7)	23.504, 0.000*
40-49	56	20(35.7)	
50-59	38	26(68.4)	
<b>Designation</b>			
Home Guard	26	6(23.1)	6.90 ,0.075
Police Constable	166	52(31.3)	
Head Constable	82	32(39.0)	
Sub-Inspector	22	12(54.5)	
<b>Vigorous Physical Activity</b>			
Nil	226	74(32.7)	1.612 ,0.447
<60 minutes	33	12(36.4)	
≥60 minutes	37	16(43.2)	
<b>Moderate Physical Activity</b>			
Nil	208	66(31.7)	2.311 ,0.315
<120 minutes	78	32(41.0)	
≥120 minutes	10	4(40.0)	
<b>Current Smoker</b>			
Yes	64	28(43.8)	3.121 ,0.077
No	232	74(31.9)	
<b>Current Alcohol Use</b>			
Yes	149	60(40.27)	4.483 ,0.034*
No	147	42(28.57)	
<b>Added Extra Salt While Dining</b>			
Yes	70	28(40)	1.467 ,0.226
No	224	72(32.1)	
<b>Consumption of foods with high salt content</b>			
Yes	186	58(31.2)	2.379 ,0.123
No	110	44(40)	
<b>Consumption of junk food</b>			
Yes	163	48(29.5)	4.034 ,0.045
No	133	54(40.6)	
<b>No. of Fruits Servings/week</b>			
<7	225	86(38.2)	5.880 ,0.015*
≥7	71	16(22.5)	
<b>Diabetes</b>			
Yes	30	16(53.3)	5.265 ,0.022*
No	266	86(32.3)	
<b>Kidney Disease</b>			
Yes	8	2(29.0)	0.326 ,0.568
No	288	100(34.7)	
<b>Perceived Stress</b>			
Low	14	4(28.6)	10.161 ,0.017*
Moderate	34	9(26.5)	
High	97	24(24.7)	
Very high	151	65(43.0)	

<b>BMI(in kg/m<sup>2</sup>)</b>			
<25	135	34(25.2)	12.688 ,0.002*
25-29.9	137	54(39.4)	
≥30	24	14(58.3)	
<b>Waist Circumference(in cm)</b>			
<90	231	60(25.9)	33.537 ,0.000*
≥90	65	42(64.6)	

\*P value less than 0.05 is considered as significant.

**Table 3. Correlates of hypertension: Multiple logistic regression analysis**

Variables	Adjusted OR (95% C.I.)	P value
<b>Age</b>		
50-59	8.472(3.200-22.431)	0.000*
40-49	8.150(2.730-24.320)	0.000*
25-39	-	
<b>Current Alcohol Use</b>		
Yes	1.797(1.00-3.239)	0.05
No	-	
<b>Consumption of Junk Food</b>		
Yes	0.586(0.328-1.048)	0.071
No	-	
<b>Number of fruit servings/ week</b>		
<7	3.228(1.512-6.890)	0.002*
≥7	-	
<b>Diabetes</b>		
Yes	0.638(0.231-1.761)	0.386
No	-	
<b>Perceived Stress</b>		
Very High	1.484(0.354-6.213)	0.589
High	2.215(0.846-0.5.801)	0.105
Moderate	2.374(1.243-4.535)	0.009*
Mild	-	
<b>BMI(in kg/m<sup>2</sup>)</b>		
≥30	1.745(0.504-6.048)	0.380
25-29.9	1.228(0.392-3.847)	0.724
<25	-	
<b>Waist Circumference(in cm)</b>		
≥90	4.937(2.201-11.075)	0.000*
<90	-	

\*P value less than 0.05 is considered as significant.

It was shown that age was significantly associated with hypertension. Hypertension prevalence was found to increase with age. The prevalence was also found to be more among Sub inspector grade compared to other grades. Alcohol use, lesser fruit servings, diabetes and higher perceived stress were significantly associated with hypertension. Similarly higher Body Mass Index and waist circumference was associated with higher prevalence of hypertension [Table 2]. Multiple Logistic

Regression Analysis showed that age group of 50-59 years (AOR=8.472) and 40-49 years (AOR=8.15), currently using alcohol (AOR=1.797), less than 7 servings of fruits in a week (AOR=3.228), moderate stress level (AOR=2.374) and waist circumference more than 90 cm (AOR=4.937) were associated with higher prevalence rate of hypertension [Table 3].

Among subjects who were previously diagnosed with hypertension (58), 55% (32) were on regular antihypertensive medications, while others were not taking the prescribed drugs regularly with missing at least 2 doses in the preceding month. Life style modification was advised for 72% (42) of them along with the treatment.

## DISCUSSION

We hypothesized to assess the prevalence of hypertension and its associated risk factors among male police personnel in Puducherry region of India. The prevalence of hypertension was 34.5 % and associated risk factors were overweight and obesity (54.4%), smoking (21.6%), alcohol use (50.3%), very high level of perceived stress (51%) and diabetes (10.1%); and were comparatively higher than the results of other studies.<sup>5,6</sup> In a study in the year 2008 in the same place and same group of personnel in Pondicherry, India, the prevalence rate of hypertension was 30.5%.<sup>6</sup> This study highlights the marginal increase in prevalence over a period of 5 years. But, its interpretation should be done cautiously because it may be over reported or under reported because of the cross sectional study nature, and there may be overlapping of some of earlier study subjects and difference in data collection process between the two studies. Among Bank employees in Puducherry, prevalence of hypertension was found to be 44.3%,<sup>11</sup> while Group C employees of JIPMER it was found to be 38.8%.<sup>12</sup> A recent study in urban Tamil Nadu among the residents found the prevalence of hypertension as 31.5%.<sup>13</sup> Nagpur study found the prevalence rate of hypertension as 22.5%.<sup>5</sup> In contrast a recent study in Kerala found the prevalence rate of hypertension to be 37.7%.<sup>3</sup> In view of the above, the prevalence may be comparable or marginally higher than other risk groups or general population.

Our study in contrast to above studies showed some differences with respect to risk factors like proportion of

overweight and obesity (54.4% vs 43.08%), tobacco use (21.6% vs 54.42%) and alcohol consumption (50.3% vs 28.27%).<sup>5</sup> Study done in Kerala had higher body mass index (65.6%) while other risk factors like diabetes (7%), smoking (10%), and alcohol use (48%) were comparatively lower than in our study.<sup>3</sup>

A study showed that cardiovascular risk among police personnel is higher compared to general population in India. This is because police had higher prevalence of cardio metabolic abnormalities and diabetes in comparison to general population.<sup>14</sup>

Alcohol consumption may influence the higher prevalence of risk factors for IHD in police officers. Potential mechanisms for this relationship include a direct pressor effect of alcohol on the vessel wall, sensitization of resistance vessels to pressor substances, stimulation of the sympathetic nervous system and increased production of adrenocorticoid hormones.<sup>15</sup>

## Limitations

The study findings may not be generalizable to police officers of Puducherry since it lacks proper sampling technique and include only males. Single occasion BP measurement also may lead to misclassification bias. There may be subjective bias, and detailed dietary history, quantification of certain risk factors and biological parameters were not assessed due to feasibility constraints. Details on medications of those with previously diagnosed hypertensives were not assessed. The non-response rate was comparatively higher than expected.

## CONCLUSION

Hypertension among police personnel is more in this area compared to general population. Reduction in alcohol use, increase in fruit servings along with other lifestyle modification measures may help in prevention and control of hypertension. The study gives valuable information regarding the present magnitude of hypertension and certain risk factors among this vulnerable group. This information can be utilized for introduction and implementation of appropriate interventional measures by the concerned authorities.

## REFERENCES

1. Yusuf S, Reddy S, Ounpuu S, Anand S. Global burden of cardiovascular diseases: Part II: Variations in cardiovascular disease by specific ethnic groups and geographic regions and prevention strategies. *Circulation* 2001;104:2855-64.
2. Stefanos NK, Antonios JT, Chunbai Z, Elpidoforos SS. Blood Pressure in Fire-fighters, Police Personnel, and Other Emergency Responders. *American Journal of Hypertension* 2009; 22:11-20.
3. Thayyil J, Jayakrishnan TT, Raja M, Cherumanalil JM. Metabolic syndrome and other cardiovascular risk factors among police personnel. *North Am J Med Sci* 2012;4:630-5.
4. Pyorala M, Miettinen N, Laakso M, Pyorala K. Plasma insulin and all cause, cardiovascular and non-cardiovascular mortality in Helsinki policemen. *Diabetes Care* 2000; 23:1097-102.
5. Priyanka Rastogi. Diet and High Blood Pressure; 2005. (Accessed August 4, 2013, at [http://sajprevcardiology.com/vol9/vol9\\_2/highprevalenceofcoronaryheartdisease.htm](http://sajprevcardiology.com/vol9/vol9_2/highprevalenceofcoronaryheartdisease.htm))
6. Ramakrishnan J, Majgi SM, Premrajan KC, Lakshminarayanan S, Thangaraj S, Chinnakali P. High prevalence of cardiovascular risk factors among policemen in Puducherry, South India. *J Cardiovasc Dis Res* 2013;4:112-5.

7. Thomas GP, John EH, Lawrence JA, Bonita EF, John G, Martha NH et al. Recommendations for Blood Pressure Measurement in Humans: A Statement for Professionals from the Subcommittee of Professional and Public Education of the American Heart Association Council on High Blood Pressure Research. *Hypertension* 2005;45;142-161.
8. Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo JL Jr, et al. The Seventh report of the joint national committee on prevention, detection, evaluation, and treatment of high blood pressure: the JNC 7 report. *JAMA* 2003;289:2560-72.
9. WHO STEP wise approach to chronic disease risk factor surveillance - Instrument v2.1. Accessed August 6, 2013, Available from: <http://www.who.int/chp/steps/riskfactor/en/>.
10. Cohen S, Kamark T, Mermelstein R. A global measure of perceived stress. *J Health Soc Behav* 1983 ;24:385-96.
11. Ganesh Kumar S, Deivanai Sundaram N. Prevalence and risk factors of hypertension among bank employees in urban Puducherry, India. *Int J Occup Environ Med* 2014;5:94-100.
12. Ashwin K, Ghorpade AG, Kar SS, Kumar G. Cardiovascular Disease Risk Factor Profiling of Group C Employees in JIPMER, Puducherry. *J Fam Med Prim Care* 2014; 3:255-9.
13. Bhansali A, Dhandania VK, Deepa M, Anjana RM, Joshi SR, Joshi PP et al. Prevalence of and risk factors for hypertension in urban and rural India: the ICMR-INDIAB study. *J Hum Hypertens* 2014; doi: 10.1038/jhh.2014.57. [Epub ahead of print]
14. Tharkar S, Kumpatla S, Muthukumaran P, Viswanathan V. High prevalence of metabolic syndrome and cardiovascular risk among police personnel compared to general population in India. *J Assoc Physicians India* 2008;56:845-9.
15. Shiozaki M, Miyai N, Morioka I, Utsumi M, Koike H, Arita M, et al. Assessment of the Risk of Ischemic Heart Disease and its Relevant Factors among Japanese Police Officers. *Sangyo Eiseigaku Zasshi* 2013; 55:115-24.