

## Prevalence of Hypertension and its Determinants among Policemen in a City of Haryana, India

### Abstract

**Introduction:** Noncommunicable diseases (NCDs) kill 40 million people each year, equivalent to 70% of all deaths globally. Cardiovascular diseases account for most NCD deaths or 17.7 million people annually. Police work has been regarded by some researchers as one of the most stressful occupations in the world, and coronary heart disease has been identified as a major cause of mortality in this population. **Materials and Methods:** A cross-sectional study was carried out during July 2016–June 2017 among 450 policemen posted in Rohtak city of Haryana selected randomly. The investigator made two measurements of blood pressure. Data were collected using pre-designed, pretested, semi-structured interview schedule, and analyzed using the Statistical Package for the Social Sciences version 20.0. **Results:** Of 450 participants, 164 (36.4%) participants were found to be hypertensive. Age of study participants, duration of service, rank, and education are significantly associated with the prevalence of hypertension (HTN) among policemen. **Conclusion:** HTN in policemen has emerged as an important public health problem. Knowledge of risk factors for HTN may give tracks for prevention in this population. Therefore, it is the need of hour to devise a sound screening strategy to diagnose HTN among policemen and devise a comprehensive strategy for the management of HTN.

**Keywords:** City, hypertension, policemen

### Introduction

In this modern era, chronic noncommunicable diseases (NCDs) are a major global health challenge with numerous grave complications on the human body. NCDs kill 40 million people each year, equivalent to 70% of all deaths globally. Each year, 15 million people die from a NCD between the ages of 30 and 69 years; over 80% of these premature deaths occur in low- and middle-income countries.<sup>[1]</sup>

Raised blood pressure (BP) is estimated to have caused 9.4 million deaths and 7% of disease burden – as measured in disability-adjusted life years – in 2010. The global prevalence of raised BP (defined as systolic and/or diastolic BP equal to or above 140/90 mmHg) in adults aged 18 years and over was around 22% in 2014.<sup>[2]</sup>

Reducing the global burden of NCDs is an overriding priority and a necessary condition for sustainable development.

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Many factors contribute to the high prevalence rates of hypertension (HTN) such as eating food containing too much salt and fat, not eating enough fruits and vegetables, overweight and obesity, harmful use of alcohol, physical inactivity, aging, genetic factors, psychological stress, inadequate access to health care, and socioeconomic determinants.

There is an increasing prevalence of HTN in the Indian population, especially in the urban areas.<sup>[3]</sup> This global risk factor affects all populations of the world including the special occupational groups, for example, the police personnel. Police force provides continuous service to the civilians. They have to serve round the clock for proper investigation, safety, and justice. Police work has been regarded by some researchers as one of the most stressful occupations in the world.<sup>[4]</sup>

They are also stressed by job responsibilities, supervisors, irregular sleep schedule, shift work, and citizens at large. Thus, they have inadequate personal time. When individuals are overwhelmed by

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occupational stress, they suffer from increased chronic stress, HTN, depression, heart disease, gastrointestinal disorders, tobacco, alcohol, and drug use. Irregular lifestyle and work-related stress are responsible for the increased vulnerability of police personnel to many NCDs. Even though studies were available from few states of India, no such study had been conducted in Haryana. Hence, the aim of our study was to determine the prevalence of HTN and its risk factors among policemen which may help in devising new strategies to bring about a healthy change in their lifestyle.

Various studies have reported significantly high prevalence of stress-related disorders such as HTN, diabetes, and cardiovascular diseases among the policemen. In a study, coronary heart disease has been identified as a major cause of mortality in this population.<sup>[5]</sup>

### Objectives of study

1. To study the prevalence of HTN among policemen
2. To study the sociodemographic factors associated with HTN.

## Materials and Methods

### Study design and study participants

A cross-sectional study was carried out from July 2016 to June 2017 among 450 policemen posted in Rohtak city of Haryana.

### Inclusion criteria

Serving policemen who have had at least 1 year of service were included in the study.

### Exclusion criteria

Those who were not willing to participate were excluded from the study.

### Sample size calculation and sampling technique

Rohtak city has seven police stations, crime investigating agency staff, police line, one women police station, traffic staff, and office of police department. Assuming the prevalence of HTN as 30.5% (as per Ramakrishnan *et al.*<sup>[6]</sup>) and allowable error of 15% at 95%, level of significance, and using the formula  $N = 4pq/L^2$ , the calculated sample size was 414. However, for the purpose of the study, a sample size of 450 eligible participants was taken. Before conducting the study, a written permission was sought from Superintendent of Police, Rohtak. The list of all policemen was obtained from office of Superintendent of Police, Rohtak. A total of 944 policemen were posted as per the eligibility criteria. Of them, 450 policemen were selected randomly from list. The investigator visited all police stations at a time convenient to the study participants. After explaining, in details, the aims and objectives of the study, a written informed consent was obtained from all the participants. Sociodemographic details were obtained

using predesigned, pretested, and semi-structured interview schedule.

The investigator made two measurements of BP on each study participant with an aneroid manometer using a standard technique.<sup>[7]</sup>

Persons in the age group of 18–58 years having systolic BP  $\geq 140$  mmHg and diastolic BP  $\geq 90$  mmHg or any level of BP in patients taking antihypertensive medication were considered as hypertensive.<sup>[8]</sup>

### Study tool

A predesigned, pretested, and semi-structured interview schedule.

### Data compilation and analysis

Data collected were compiled and analyzed using the Statistical Package for the Social Sciences version 20.0 (SPSS, IBM, Armonk, New York, USA). The study was done using 95% confidence interval.  $P < 0.05$  was considered statistically significant. Pearson's Chi-square test was used to evaluate differences between groups for categorized variables. Binary logistic regression analysis was used to evaluate the independent associations of various factors with the prevalence of HTN among policemen.

## Results

A total of 164 of 450 participants were found to be hypertensive, so the prevalence of HTN came out to be 36.4% in our study. Among 450 study participants, 83 (18.4%) were already known cases of HTN but among them, only 36 (43.4%) were taking medicines regularly [Table 1].

There was an increase in the prevalence of HTN with age, and this association of HTN with age was found to be statistically highly significant ( $P = 0.000$ ). The prevalence of HTN was higher among those who had lower level of education, and this association between HTN and education was found to be statistically highly significant ( $P = 0.005$ ). The prevalence of HTN was increasing with higher rank and was found to be statistically significant ( $P = 0.015$ ). As the duration of service increased, so did the prevalence of HTN with 24% among those with  $< 10$ -year service duration to 45% among those having service more than 30 years and it was found to be highly significant ( $P = 0.002$ ).

Table 2 shows the independent association of various factors with HTN. It was observed that age was found to be independent significant predictor of HTN. With increase in age, the odds of development of HTN were increasing and this was found to be statistically significant. Among the other factors, it was observed that the odds of development of HTN decreased with increase in educational status. However, this was not found to be statistically significant. Higher odds for the development of HTN were observed

**Table 1: Distribution of the study participants according to hypertension (n=450)**

	Frequency (%)
HTN	
Yes	164 (36.4)
No	286 (63.6)
Known case of HTN	
Yes	83 (18.4)
No	367 (81.6)
Regularly taking medicines (n=83)	
Yes	36 (43.4)
No	47 (56.6)

HTN: Hypertension

**Table 2: Logistic regression for independent predictors of hypertension**

Variables	aOR (CI)
Age	1.056 (1.011-1.102)*
Education	
Matric	Reference
Senior secondary	1.043 (0.571-1.903)
Graduate	0.606 (0.313-1.170)
Postgraduate and above	0.483 (0.091-2.574)
Rank	
Constable	Reference
Head constable	0.780 (0.248-2.449)
Assistant subinspector	0.564 (0.162-1.971)
Subinspector and above	1.357 (0.514-3.578)
Duration of service (years)	
<10	Reference
10-19	0.661 (0.267-1.639)
20-29	1.320 (0.420-4.153)
30 and above	1.040 (0.238-4.552)

\*Statistically significant ( $P < 0.05$ ). aOR: Adjusted odds ratio; CI: Confidence interval

among the participants ranked subinspector and above and among those who had more than 20 years of service duration although it was not statistically significant.

## Discussion

In our study, the prevalence of HTN among policemen came out to be 36.4% [Table 1] which is comparable with studies conducted by Ganesh *et al.*<sup>[9]</sup> among police personnel in urban Puducherry, by Prajapati *et al.*<sup>[10]</sup> among police personnel in Ahmedabad city, by Jahnvi *et al.*<sup>[11]</sup> among police personnel in Vijaywada, by Sen *et al.*<sup>[12]</sup> among policemen in Kolkata, and by Ramakrishnan *et al.*<sup>[6]</sup> among policemen in Puducherry which was 34.5%, 33%, 33%, 32.5%, and 30.5%, respectively. The prevalence of HTN was low in a study by Abu-Aisha *et al.*<sup>[13]</sup> among police forces households in Khartoum, Sudan, which was 27%. The reason for low prevalence may be due to study conducted in a different geographical area (Sudan) and probably because of difference in dietary pattern. The

prevalence came out to be low as compared to study by Tharkar *et al.*,<sup>[14]</sup> by Almale *et al.*<sup>[15]</sup> among Mumbai police personnel, and by Mallik *et al.*<sup>[16]</sup> among police personnel in a district of West Bengal which reported the prevalence of HTN as 58.5%, 42.4%, and 41.9%, respectively. Reason for such high prevalence in the study by Tharkar *et al.*<sup>[14]</sup> may be because of lower BP cutoff criteria used for HTN (130/85 mmHg).

Association of HTN with the age group was found to be statistically highly significant in our study ( $P = 0.000$ ). Our study reported that the prevalence of HTN was the highest (42.6%) in the age group of 50 years and above and lowest (11.5%) in the age group of 20–29 years while it was 24% in 30–39 years of age group and 42% in 40–49 years of age group [Table 3]. Similarly, statistically significant association of HTN with age group was observed in studies by Abu-Aisha *et al.*,<sup>[13]</sup> ( $P = 0.001$ ), Ganesh *et al.*,<sup>[9]</sup> ( $P = 0.000$ ), Ramakrishnan *et al.*,<sup>[6]</sup> ( $P < 0.001$ ), Dhungana *et al.*,<sup>[17]</sup> among general population of age group 18–70 years in Kathmandu, Nagammanavar *et al.*,<sup>[18]</sup> among bank employees of Bellary city, Karnataka, and Ismail *et al.*<sup>[19]</sup> among bank employees in Sullia, Karnataka. On logistic regression analysis, age came out to be an independent predictor of HTN in our study (adjusted odds ratio [aOR] = 1.056,  $P = 0.014$ ) which is in line with study by Prabakaran *et al.*<sup>[20]</sup> done in the age group of 25–64 years in an urban locality of Nellore city (odds ratio = 1.07). In a study by Ganesh *et al.*,<sup>[9]</sup> age group of 50–59 years (aOR = 8.472) and 40–49 years (aOR = 8.15) were associated with higher prevalence of HTN.

The prevalence of HTN was higher among those who had lower level of education, and this association between HTN and education was found to be statistically highly significant ( $P = 0.005$ ). Similarly, in a study by Dhungana *et al.*,<sup>[17]</sup> education was significantly associated with HTN. This difference in the prevalence of HTN with educational status may be due to lower level of awareness about HTN among those with lower level of education which has an effect on their general attitude toward lifestyle modifications and health-seeking behavior. However, in studies by Almale *et al.*<sup>[15]</sup> and Prajapati *et al.*,<sup>[10]</sup> this association was found to be nonsignificant. Majority of our study participants were assistant subinspectors (40.7%) followed by constables (27.1%), head constables (18.2%), and subinspectors (13.1%) while only 0.9% were inspectors and above rank. The prevalence increased with higher rank, and this association was found to be statistically significant ( $P = 0.015$ ) [Table 3]. Reason for higher prevalence of HTN with increase in rank may be attributed to enhanced work burden and responsibilities besides possibly rising age among the study participants.

As duration of service increased, a higher prevalence of HTN was observed, i.e., 24% in <10-year service duration and 45% in those having service more than 30 years and it

**Table 3: Association of hypertension with sociodemographic variables (n=450)**

	HTN		P
	Yes	No	
Age group (years)			
20-29	3 (11.5)	23 (88.5)	<0.001*
30-39	24 (24)	76 (76)	
40-49	74 (42)	102 (58)	
50 and above	63 (42.6)	85 (57.4)	
Educational status			
Matriculation	100 (42.9)	133 (57.1)	0.005*
Senior secondary	36 (34.9)	67 (65.1)	
Graduate	26 (26.8)	71 (73.2)	
Postgraduate	2 (11.8)	15 (88.2)	
Rank			
Constable	35 (28.7)	87 (71.3)	0.015*
Head constable	27 (32.9)	55 (67.1)	
Assistant subinspector	75 (41)	108 (59)	
Sub inspector	23 (39)	36 (61)	
Inspector and above	4 (100)	Nil	
Duration of service (years)			
<10	23 (24)	73 (76)	0.002*
10-19	33 (30)	77 (70)	
20-29	81 (44)	103 (56)	
30 and above	27 (45)	33 (55)	

HTN: Hypertension. \*Statistically significant

was found to be statistically highly significant ( $P = 0.002$ ). Putting in more years of service in such a job probably increases the vulnerability to HTN besides increasing age of the study participants along with increasing duration of service.

### Conclusion

HTN in policemen has emerged as an important public health problem. Knowledge of risk factors for HTN may give track for prevention in this population. Therefore, it is the need of hour to devise a sound screening strategy to diagnose HTN among policemen at an early stage and comprehensive strategy for management of HTN which includes timely diagnosis, appropriate treatment, adoption of healthy lifestyle, and healthy dietary habits.

### Recommendations

Regular screening health camps should be conducted to screen policemen for HTN at an early stage. Those at risk should be identified so that appropriate interventions can be instituted to prevent further progression of disease.

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Nil.

### Conflicts of interest

There are no conflicts of interest.

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