Occupational Medicine & Health Affairs

Research Article **Open Access**

Hypertension among Police Personnel with Reference to Perceived Stress - A Cross Sectional Study

Mahesh Puri A[1]* and Mohan Joshi P[2]

[1]Puri MA, Department of Community Medicine, NKP-SIMS and RC, India
[2]Joshi MP, Department of Community Medicine, NKP-SIMS and RC, India

Abstract

Aim: A cross-sectional study was conducted amongst 340 police personnel for finding the prevalence of hypertension and associated risk factors with a reference to perceived stress from Dec 15 to Dec 17 in metro city in central India.

Methods: In this study, after obtaining written informed consent, hypertension among police personnel was measured and classified as per strategy of WHO STEPS wise approach and criteria used was JNCVIII. The height and weight was assessed by standard methods and the perceived stress was measured by validated and structured scale PSS-10. The data were collected and entered into excel spreadsheet and analysis of data was done by Epi Info 7.2.2.2 and Open Epi 3.01.

Results: The prevalence of hypertension in study group was 37.6% (128 out of 340 participants) and perceived stress scale – 10 reported 43% of participants had surprisingly reported low stress, followed by average stress (38%) among study population.

The factors with significant association with hypertension were reported as age, sex, education, designation, length of service, tobacco and alcohol consumption, additional salt intake, body mass index and waist to hip ratio, positive family history of hypertension and perceived stress. The length of service and family history of hypertension were reported significant on multivariate analysis.

Conclusion: The association of stress was found to be significant with designation, tobacco and alcohol consumption and length of service among study participants and only alcohol consumption and family history of hypertension on multivariate analysis.

Keywords: Police; Hypertension; Perceived stress; Prevalence

Introduction

Hypertension has been a silent killer since ages and global public health problem as well [1]. Non-communicable diseases (NCDs), including cardiovascular diseases, cancers, chronic respiratory diseases and diabetes including other NCDs, are now the leading cause of death in all regions of the world except African continent [2]. Even a recent editorial from Lancet noted that NCDs are not getting the necessary attention and also suggested that diseases like this must be considered as a top priority [3]. The prevalence of hypertension across world ranges from 22.1% to 28% [4]. The WHO Global Coordination Mechanism on the Prevention and Control of Non-communicable Diseases was established in 2014 with a mandate to implement WHO Global NCD Action Plan for the year 2013 to 2020 [2]. The stress is said to be interaction between various environmental forces and events causing precipitation of stress. These appears to be threatening to the person's reaction to the threat. Certain job-related factors among Indian police personnel act as vary specific stressors, for example unhealthy working conditions, too much work overload, lack of recognition even after worth dedication for cause, fear of severe injury or being killed on duty, inadequate equipment and facilities, anti-terrorist operations, confrontation with the public, sheer lack of job satisfaction, issues related to police hierarchy and so on. In multiple studies, the police personnel have been reporting with high prevalence of hypertension, unscheduled timing of meals, substance abuse, obesity and overweight, cigarette smoking and alcohol consumption and the most important, sedentary lifestyle and stress due to various reasons [5-7]. There are multiple studies done on health profile and stress among police personals, but very few studies on association of perceived stress and hypertension among them are found, especially in Central India. This study would identify hypertensive participants, level of perceived stress amongst them and probably generate the new evidence regarding the association of the perceived stress with hypertension amongst police personnel in current scenario. Hence, the needs of present study.

Material & Method

The study was a community-based cross-sectional study conducted from December 2015 to December 2017 (2 Years). The study area consisted of selected police stations of urban area in the metro city in central India. Out of 4 zones present in the metro city, one zone was selected as study zone by simple random sampling (Lottery method), which had 5 police stations and total numbers of police personnel working in the selected zone been 704. During calculating sample size, the prevalence of hypertension in reference study as 15% [8]. With confidence level 95% and the design effect of 1.5 (systematic random sampling), the sample size estimated was 304. After adjusting for non-response rate of 10%, final sample size was decided as 340 participants.

Sampling method was decided by following method. After flipping coin, 2nd police person was chosen from master list of all police personnel as the first participant of present study. Thereafter, every 2nd person was chosen as a participant for study by systematic random sampling until the sample size (340) was reached (i.e. 2nd, 4th, 6th…). All consenting police personnel were included in study, while police personnel who were chronically absent and were not available for assessment after three follow up visits were excluded.

For data collection, the participants were contacted, consents were taken. Then, initial part of case record form was filled by the interviewer for socio-demographic details. After that, during later part consisting of examination, anthropometric measurements as height and weight were recorded according to standard protocol. As far as measurement of blood pressure is concerned, the method used for measuring BP was by auscultatory method using mercury sphygmomanometer by following all standard guidelines. All measurements of blood pressure were classified according to JNC-VIII criteria [9].

After that, perceived stress scale – 10, which was translated in the vernacular language (Marathi or Hindi as per convenience of participant), was handed over to participants and guidance provided for filling it properly.

The structured and validated Questionnaire PSS - 10 (Perceived Stress Scale) evaluated perceived stress and it was divided into score levels and categories of perceived stress were calculated.

The study was approved by the institutional ethics committee and the Office of Commissioner of Police.

For the inferential analysis of data, bi-variate analysis was done by Pearson's Chi-square test of significance and chi-square for linear trend wherever necessary. The software used for analysis was MS Excel, Epi info 7.2.2.2 and open epi software 3.01. The regression analysis was done with the statistically significant factors and multiple logistic regressions calculated the final outcome with the help of Stata version 14.0.

Results and Discussion

Table 1 gives overview of the various similar studies with revealing varied prevalence of hypertension. This difference in the prevalence of hypertension in different studies can be attributed to the differences in methodology and socio-demographic and anthropometric measurements amongst the study participants. The police personnel are exposed to different workloads and the related exposure to stressful situations varies from region to region.

As mentioned in Table 2, descriptive statistics reveals socio-demographic characteristics of the study group. The mean age of study participants was 40.42 ± 8.87 years.

Author	Place	Year	Prevalence of Hypertension
Aggarwal et al. [8]	Akola	2014	15.82%
Sen et al. [20]	Kolkata	2015	32.50%
More et al. [23]	Navi Mumbai	2015	15%
Bo Hu et al. [10]	China	2015	15.29%
Almale et al. [24]	Mumbai	2015	42.40%
Meena et al. [12]	NCR Delhi	2016	30.66%
Bhatia et al. [25]	Gujarat	2017	5%
Ravikumar et al. [26]	Puducherry	2017	45.20%
Present Study	Nagpur, Central India	2017	37.60%
Meena et al. [15]	Jodhpur, Rajasthan	2018	29.28%
Jai Parkash et al [11]	Rohtak, Haryana	2019	36.40%

Table 1: Table showing prevalence of hypertension among police personnel.

Characteristics	Category	Number
Age	41-50 Years	122 (35.9%)
Sex	Male	266 (78.2%)
Marital Status	Married	305 (89.7%)
Length of Service	Up to 10 Years	140 (41.2%)
Designation	Police Constable	131 (38.5%)
Education	Graduate	169 (49.7%)
Type of Family	Nuclear	274 (80.6%)
Socio-economic Classification*	Upper Middle	335 (98.5%)
Tobacco Consumption	Present	140 (41.2%)
Alcohol Consumption	Present	77 (22.6%)
Additional dietary salt intake	Present	153 (45.0%)
Physical exercise	Regular	108 (31.8%)
Family history of hypertension	Present	82 (24.1%)
Body Mass Index	Pre-obese (25-29.9)	152 (44.7%)
Waist to Hip Ratio	Normal	27 (7.9%)
Hypertension	Present	128 (37.6%)
Stress	Average	130 (38.2%)
* - Modified Kuppuswamy Classification		

Table 2: Table showing distribution of police personnel according to socio-demographic characteristics (n=340).

Table 3 mentions the association of various socio-demographic factors with hypertension and stress respectively. The literature review reports that as the age increases, likelihood of developing the hypertension also increases. The linear trend between age and hypertension was revealed (p < 0.001) in current study. Similar findings were also revealed [10-14].

When age and stress amongst police personnel were analysed with chi-square for linear trend, the association was found to be significant (P=0.014). The increasing age could also be associated with confounders like increasing length of service, more responsibility, higher SES and higher designation.

There was a highly significant association observed between sex among police personnel and hypertension (P<0.001) and odds of having hypertension in police personnel of male sex were 8 times more as compared to their female counterparts. These findings were supported by the study in China and in Delhi [10-12].

When education was analysed, inverse association between education and blood pressure was reported by present study, in accordance with studies by. Also, in study they reported lower education had odds of 3.9 (P=0.041) [11,12,15]

With analysis with respect to designation, it was observed that the personnel with more responsibility, have more odds of developing hypertension (P<0.0001). But, the findings also can be attributed to number of confounding factors like increasing age, length of service and more perceived stress due to work overload, more responsibilities and sedentary lifestyle among the study participants. Studies (P=0.03) also reported similar findings. Also, significant association was also observed among stress and designation (P<0.001) [8,11,12].

When analysed for association using chi sq. test, there was significant association between stress and designation, with a p-value of 0.02. The officers had 2.35 times more odds of having high stress when compared to constable group. The reason for higher stress could be more responsibilities among officers.

The present study reveals that as the length of service increases, likelihood of development the hypertension also increases. This increase may be partially due to their increasing age, which can work as confounding factor. The mean length of service of study population was 14.8 ± 9.3 years in the present study. [11,13,14,16] with adjusted odds ratio of 3.7 (95% CI; 1.1 to 14.0).

The tobacco consumers had 8.66 times more odds and alcohol consumers had 4.3, of having hypertension as compared to respective non substance consumer (P<0.0001) in this study. Similar findings were reported in Delhi, Nagpur [12,14,17]. Considering Alcohol Consumption, significant association of alcohol and hypertension was revealed. Similar findings were observed by studies reported odds of 4.3, reported adjusted odds of 1.79 (P=0.05) and reported odds of 5.2 (P=0.023) [12,14,15,18] .

The tobacco consumers had 3.35 times higher odds of having high stress compared to non-tobacco consumers and alcohol consumers had 2.6 times higher odds of having high stress compared to non-alcohol consumers. Study reported odds of 3.7 (P=0.045), similar to findings of present study. As far as alcohol is concerned, it was found to be significantly related factor after regression analysis [15].

Additional salt intake is proven factor for hypertension according to literature and the odds of having hypertension among participants with higher salt intake were 17 in this study and similar outcomes had been reported [19].

The overweight and obese group had 3.6 times higher odds of having hypertension (P<0.0001) and the participants with abnormally high waist to hip ratio had 18 times higher odds of having hypertension in present study. As Body Mass Index was related to studies (odds of 1.64), present study reported odds of 3.6 in similar comparison. Similar results were also reported odds of 5.2 (P=0.022) and adjusted odds ratio of 1.11 (P=0.0001) [12-15,20].

Another measure of obesity is Central Obesity, when taken into account, similar findings were reported, where adjusted odds of being hypertensive were 4.94 times for group with the waist circumference of 90 cm (P<0.0001). Similar findings, consistent with present study, were also reported [12,18].

The participants having family history of hypertension were had 13 times higher odds of having hypertension. Family history of

Parameter	Test	OR	P Value
Hypertension			
Age	Chi. Sq. for trend - 90.3	-	<0.001
Sex	Chi. Sq. - 32.02	7.99 (95% CI = 3.67 to 19.42)	<0.001
Education	Chi. Sq. - 9.16	2.05 (95% CI = 1.3 to 3.2)	0.002
Designation (Officers)	Chi. Sq. for trend -15.38	-	0.0001
Designation (Constables)	Chi. Sq. for trend - 35.94	-	<0.0001
Length Of Service	Chi. Sq. for trend -107.03	-	<0.001
Alcohol Consumption	Chi. Sq. - 31.58	4.3 (95%CI 2.56 to 7.56)	<0.0001
Tobacco Consumption	Chi. Sq. - 79.87	8.66 (95%CI 5.27 to 14.45)	<0.0001
Additional salt intake	Chi. Sq. - 118.5	16.9 (95%CI 9.6 to 29.6)	<0.0001
Body Mass Index	Chi. Sq. - 18.09	3.6 (95% CI 1.99 to 7.08)	<0.0001
Waist to Hip Ratio	Chi. Sq. - 14.4	17.67 (95%CI 3.26 to 370.6),	<0.0001
Family History	Chi. Sq. - 84.49	12.92 (95%CI 7.07 to 24.54),	<0.0001
Stress	Chi. Sq. - 9.2	3.6 (95%CI 1.5 to 9.2),	0.003
Stress			
Tobacco Consumption	Chi. Sq. - 17.04	3.35 (95%CI 1.89 to 5.94)	<0.0001
Alcohol Consumption	Chi. Sq. - 10.53	2.6 (95%CI 1.44 to 4.69)	0.002
Designation	Chi. Sq. - 5.91	2.35 (95%CI 1.16 to 4.75)	0.02
Length of Service	Chi. Sq. for trend - 9.2	-	0.002

Table 3: Table showing association of socio-demographic characteristics with hypertension and stress.

Factor	B	P Value
Hypertension		
Service Length	-1.576	0.001
Family History	-2.197	0
Stress		
Alcohol	1.576	0.003
Family History	1.206	0.023

Table 4: Table showing association of Socio-demographic factors to hypertension and stress by using Multiple Logistics Regression.

Hypertension was the factor which is significantly related to both stress and hypertension independently after performing multiple logistic regression. Literature review relating to this relationship suggests the similar results.

The participants with higher stress had 3.6 times more odds of having hypertension when compared to participants with lower grades of perceived stress. The average score of PSS-10 scale was 13.4 (± 4.82) showing police personnel were having average stress in their life. A systemic review also suggests similar outcomes [21].

Stress as a significant risk factor for hypertension (p<0.05). Malaysia reported 40.3% participants had stress [12,22].

The stress had a significant relationship with work overload. The average stress level had adjusted odds of 2.374 (P=0.009) among police participants. Odds of being hypertensive were 1.25 when the association between hypertension and stress was seen [10,18].

Table 4 gives overview of the socio-demographic factors and hypertension and stress after applying multiple logistic regressions. It reveals that hypertension was significantly related to service length and family history while family history and alcohol were the significantly associated factor when stress is considered.

Conclusion and Recommendations

The population-based wellness strategies with routine physical fitness program that promote healthy habits should be made available to the entire police personnel. Also, regular check-up of vital parameters, especially among high risk personnel like tobacco and alcohol consumers as well as de-addiction programme, daily salt consumption up to maximum limit of 5 gm/day along with DASH diet, regular exercises should be recommended. The DASH diet, sodium restriction, physical activity, moderate consumption of alcohol, and maintenance of healthy weight or weight loss for those with BMI in the overweight and obese categories is strongly recommended. This can go a long way in the prevention of all non-communicable diseases among police personnel.

Limitations

The present study has all the inherent limitations of cross sectional study.

References

1. Roth GA, Johnson C, Abajobir A, Abd-Allah F, Abera SF, et al. (2017) Global,regional, and national burden of cardiovascular diseases for 10 causes, 1990 to 2015. J Am Coll Cardiol 70: 1-25.

2. World Health Organization (2016) WHO global coordination mechanism on the prevention and control of NCDs. 1-2.

3. Horton R (2017) Offline: NCDs—Why are we failing? The Lancet 390: 346.

4. Zhou B, Bentham J, Di Cesare M, Bixby H, Danaei G, et al. (2017) Worldwide trends in blood pressure from 1975 to 2015: A pooled analysis of 1479 population-based measurement studies with 19·1 million participants 389: 37-55.

5. Mumford EA, Taylor BG, Kubu B (2015) Law enforcement officer safety and wellness. Police Q 18:111-133.

6. Ragesh G, Tharayil HM, Raj MT, Philip M, Hamza A, et al. (2017) Occupational stress among police personnel in India. Open J Psychiatry Allied Sci 8: 148.

7. Alghamdi AS, Yahya MA, Alshammari GM, Osman MA (2017) Prevalence of overweight and obesity among police officers in Riyadh city and risk factors for cardiovascular disease. Lipids Health Dis 16: 79.

8. Sumit SA, Deepti DA, Kalpana MK, Nandkeshav RA, Prakash RB (2015) Cross sectional study of obesity in police personnel in Akola city. Int J Heal Sci Res 5: 6-11.

9. James PA, Oparil S, Carter BL, Cushman WC, Himmelfarb DC, et al. (2014) Evidence-based guideline for the management of high blood pressure in adults. JAMA 11: 507.

10. Hu B, Liu X, Yin S, Fan H, Feng F, et al. (2015) Effects of psychological stress on hypertension in middle-aged Chinese: A cross-sectional study. PLoS One 10: 1-13.

11. Parkash J, Kalhan M, Singhania K, Punia A, Kumar B, et al.(2019) Prevalence of hypertension and its determinants among policemen in a city of Haryana, India. Int J Appl Basic Med Res 9: 143.

12. Meena J, Kumar R, Meena G (2016) PS 15-10 Hypertension and its correlates among police personnel in national capital region (NCR), India. J Hypertens 34.

13. Boyanagari M, Boyanagari V, Shankar M, Ayyanar R (2018) Impact of occupational and psychological stress on police health in South India. Arch Ment Heal 19: 136.

14. Meshram FA, Narlawar U, Durge PM (2005) High prevalence of hypertension among police personnel at Nagpur. South Asian J Prev Cardiol 9.

15. Meena JK, Rustagi N (2018) A0473 Protect the protector 36: e266.

16. Tesfaye T (2017) Assessment of the prevalence of hypertension and associated factors among ethiopian federal police officers Addis Ababa, Ethiopia: A community based cross-sectional study. EC Cardiol 26: 278-286.

17. Shiozaki M, Miyai N, Morioka I, Utsumi M, Hattori S, et al. (2017) Job stress and behavioral characteristics in relation to coronary heart disease risk among Japanese police officers. Ind Health 55: 369-380.

18. Ganesh KKS, Naresh AGV, Bammigatti C (2014) Prevalence and risk factors of hypertension among male police personnel in urban Puducherry, India. Kathmandu Univ Med J 12: 242-246.

19. Soltani S, Mohammadi KR, Bidar SS, Vafa M, Abargouei SA (2019) Sodium status and the metabolic syndrome: A systematic review and meta-analysis of observational studies. Taylor and Francis Inc 59: 196-206.

20. Sen A, Das M, Basu S, Datta G (2015) Prevalence of hypertension and its associated risk factors among Kolkata-based policemen: A sociophysiological study. Int J Med Sci Public Heal 4: 225-232.

21. Magnavita N, Capitanelli I, Garbarino S, Pira E (2018) Work-related stress as a cardiovascular risk factor in police officers: A systematic review of evidence. Int Arch Occup Environ Health 91: 377-389.

22. Retneswari M, Bulgiba A, Chinna K, Darus A, Shathanapriya K, et al. (2018) Health and behavioural outcomes associated with stress in malaysian police officers. BMJ A581.2-A581.