ORIGINAL RESEARCH ARTICLE

NATIONAL JOURNAL NJMR MEDICAL RESEARCH

Prevalence of Hypertension and Associated Risk Factors among Police Personnel of Ballari City, Karnataka - A Cross-Sectional Study

Shivasharan HN[1*], Sameena ARB[2], Manjula K[3], Basavaraj S[4]

[1-4]Department of Community Medicine, Ballari medical college and research centre, Ballari, Karnataka, India

DOI:
10.55489/njmr.160320261327

***Corresponding author**:
Shivasharan HN
Email: shivasharan.hn@gmail.com

Date of Submission: 04/03/2026
Date of Acceptance: 20/06/2026
Date of Publication: 01/07/2026

Funding Support:
None Declare

Conflict of Interest:
The authors have declared that no conflict of interest exists.

How to cite this article:
Shivasharan HN, Sameena ARB, Manjula K, Basavaraj S. Prevalence of Hypertension and Associated Risk Factors among Police Personnel of Ballari City, Karnataka - A Cross-Sectional Study. Natl J Med Res 2026;16(03):167-173. DOI: 10.55489/njmr.160320261327

ABSTRACT

Background: Hypertension is an emerging health problem of genuine concern. It predisposes to myocardial infarction, chronic kidney disease, stroke and premature death. Police personnel belong to a distinct occupational group with experience of violence and stress at work, overnight duties and unhealthy life style which contributes to hypertension. The objectives were to assess the prevalence of hypertension and its associated risk factors in police of Ballari city.

Methods: This cross-sectional study was conducted among 368 police of Ballari city from January 2024 to December 2024. After informed consent sociodemographic and occupational details were collected. Height, weight, waist and hip circumference and blood pressure measurement was done. Police not willing to participate were excluded.

Results: The prevalence of Hypertension was 27%. Increasing age, male gender, family history of hypertension, smoking, alcohol consumption, excess salt intake, physical inactivity and obesity were significant risk factors (P<0.05). On multivariate analysis increasing age (aOR=2.83), male gender(aOR=2.97), family history of hypertension (aOR=2.68), physical inactivity(aOR=0.44), excess salt intake(aOR=1.85) and high Body Mass Index(aOR=2.45) exerted an independent impact on hypertension.

Conclusion: The police personnel are key in maintaining the law and order. Formulating appropriate strategy to keep them healthy and vigilant including regular blood pressure monitoring and educating on life style modifications can have positive impact on their health.

Keywords: Prevalence, Hypertension, Occupation stress, Police personnel, Law enforcement, non-communicable diseases

Copy Right: The Authors retain the copyrights of this article, with first publication rights granted to Medsci Publications.
License Term: Creative Commons Attribution-Share Alike (CC BY-SA) 4.0
Publisher: Medsci Publications [www.medscipublications.com] ISSN: 2249 4995 Official website: www.njmr.in

INTRODUCTION

Hypertension is a cardiovascular disease defined by an elevated systemic blood pressure. This silent killing aliment affects 30-40% of the adult population all across the globe The burden of hypertension is huge and it greatly enhances the peril of cardiovascular morbidity and mortality.[1]

There are multiple mechanisms labelled for the occurrence of hypertension. It includes enhanced salt absorption resulting in volume expansion, diminished response of the renin-angiotensin-aldosterone system and increased activation of the sympathetic nervous system. These changes result in increase of total peripheral resistance and afterload which predisposes to the development of hypertension.[2]

Elevated blood pressure contributes to coronary heart disease, stroke and other vascular complications. It is the common cardiovascular disorder which is a major public health challenge to population in socio economic and epidemiological transition.[3] An estimated 600 million adults with hypertension (44%) are not aware that they are victims of it. 630 million adults with hypertension (44%) are diagnosed and treated and 320 million adults with hypertension (23%) have it under control.[4]

The metabolic non-communicable disease health report of India from the ICMR-INDIAB national cross-sectional study conveyed the occurrence of hypertension in India as high as 35.5 percent. This means one in every three adults in India has hypertension.[5]

Police personnel are the prime law-enforcing authorities who tackle multiple stressors with unpredicted work patters, criminal encounters and dangerous situations. Prolonged duty hours, overnight duties, experience of violence and harassment impairs their physical and mental wellbeing.[6]

The extent of these activities gets enhanced during festivals, elections, communal and social disturbances, natural calamities and other disasters.[7] All of these contribute as risk factors for development of hypertension in police personnel. The duties can be executed efficiently if policemen are physically and psychologically active.

Hence research is needed to investigate the physiological, psychological, and behavioural factors responsible for hypertension and design the targeted interventions in police for the diminution of these risk factors.[8]

Ballari is a district headquarters of North East Karnataka with rapid social and economic transition and lifestyle modification. As data about the non-communicable diseases among police personnel is sparse, the current research aims to determine the prevalence of hypertension and its associated risk factors among police personnel of Ballari.

MATERIALS AND METHODS

Study design and setting: A cross-sectional study was done in the seven police stations within the premises of Ballari city for a period of one year from January to December 2024. These are DSP city office, Gandhi Nagar police station, Bruce pet police station, APMC Yard Police station, Cowl bazar & Cantonment OP police station, Ballari traffic police station and Women police station.

Sample size: In the previous study conducted by Bannigida DM et.al in Koppal, Karnataka, prevalence of hypertension was 52.6%.[9] Considering this prevalence sample size was calculated using the formula $4pq/d^2$ and d is the allowable error, which is equal to 10% of prevalence. The sample size was 360. Considering a non-response rate of 2% the sample size estimated for the study was 368.

Data collection and study tools: All the police personnel working in seven police stations of Ballari city with a minimum service duration of one year were included. Consecutive sampling technique was used to enrol the participants up to the calculated sample size. Both the newly detected and previously known cases on treatment were considered to be hypertensive. The participants were included only after ensuring their eligibility to avoid selection bias. None of the women study participants were pregnant

Those Police not agreeing to participate in the study were to be excluded. The permission was obtained from the superintendent of police of Ballari District and the concerned heads of the police stations. All the police personnel were informed about the pattern and essentiality of the study and those who consented for it were included. This guaranteed that all partakers knew the significance of their responses.

The data was collected using a predesigned and semi structured questionnaire by face-to-face interview in the local language. The data consisted information about age, sex, religion, educational status, occupational cadre, marital status, socio economic status, tobacco and alcohol use, physical activity, nutrition and salt intake and family history of hypertension. The date collectors were given prior training about the mode of interview and the instruments were regularly calibrated. The interview was well structured, short and specific to the objectives. This minimised the information and recall bias. As it was person to person interview followed by anthropometric measurements, no data was missed. No subgroup analysis and sensitivity analysis were done. The data was analysed as a whole.

Measurements of anthropometry and clinical examinations were done to assess height, weight, waist and hip circumference, body mass index (BMI) and blood pressure. Mercury sphygmomanometer was used to measure the blood pressure of each participant. Both systolic and diastolic blood pressure were recorded twice in sitting position in right arm, 5 minutes apart with a cuff size of 34 cm arm size and the mean value of two readings was considered as blood pressure of the participant. The classification of blood pressure was done based on JNC 7 criteria.[10]. Those police whose read-

ings were in the range of 120 to 139 systolic blood pressure and 80 to 89 diastolic blood pressure were considered as pre hypertensives. The classification of Body Mass Index was done as per the guidelines of world health organisation.[11]

Salt intake was assessed by 24-hour dietary recall method by asking certain questions with respect to food habits. Those who consumed more than 5g per day (approximately equal to one teaspoon) were considered to be excess consumers of salt.[12] Those police who performed 150 minutes of moderate intense (brisk walking, gardening) or 75 minutes of vigorous intense (like running, hiking) activity throughout the week or combined equivalent were considered to be physically active.[13]

Ethical consideration: Approval was taken from the institutional ethical committee of Ballari medical college and research centre with letter no 11/2022-23 dated on 16.04.2023.

Statistical analysis: Data entry was done in Microsoft excel spread sheet and was analysed using Jamovi 2.3.28 version software. Data was analysed for descriptives (frequencies, percentages, proportions). Chi square test and logistic regression test were employed to determine the strength of association by calculating the odds ratio (OR) with 95% confidence interval. P value of < 0.05 was considered to be statistically significant.

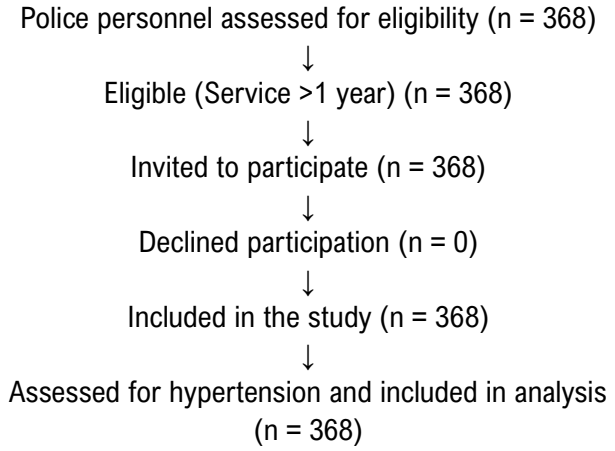

Figure 1: Flow chart indicating the enrolment of participants, eligibility and rejection from the participants, conduct of the study and analysis

RESULTS

A total of 368 police personnel took part in the study. All the participants consented for the study and none declined to take part. The mean age of the study participants was 40.9 years. Majority of the study participants were males (84.2%). 77.7% of them were Graduates. 70.4% belonged to class I socio economic status according to modified B G Prasad classification (Table 01).[14]

Table 1: Socio demographic profile of the study participants (N = 368)

Variable	Cases (%)
Age	
Up to 30	87 (23.6)
31 to 40	96 (26.1)
41 to 50	92 (25.0)
above 50	93 (25.3)
Gender	
Male	310 (84.2)
Female	58 (15.8)
Religion	
Hindu	330 (89.6)
Muslim	34 (9.2)
Christian	4 (1.1)
Education	
Post Graduate	38 (10.3)
Graduate	248 (67.4)
Pre university	55 (15)
Secondary	27 (7.3)
Marital Status	
Married	302 (82.06)
Unmarried	66 (17.94)
Socio Economic Status (According to Updated Modified BG Prasad Classification)	
Class I	259 (70.4)
Class II	109 (29.6)
Occupational Cadre	
Police sub inspector & above	33 (8.97)
Assistant sub inspector	41 (11.14)
Civil head constable	120 (32.61)
Civil police constable	174 (47.28)

Table 2: Prevalence of hypertension among study participants (N=368)

Hypertension status	Cases (%)
Normotensive	183 (50)
Pre hypertensive	84 (23)
Hypertension Stage I	71 (19)
Hypertension Stage II	30 (8)

Table 3: Prevalence of hypertension among police personnel of various occupational cadre

Occupational Cadre	Frequency (N= 368)	Prevalence of hypertension (percentage)
Police sub inspector & above	33	10(30.3%)
Assistant sub inspector	41	16(39%)
Civil head constable	120	50(41.7%)
Civil police constable	174	25(14.4%)

The mean systolic blood pressure among the study subjects was 128 ± 19.3 mm Hg and mean diastolic blood pressure was 81.4±11.2 mm of Hg. The prevalence of hypertension was 27% among the police. 23% of the police had prehypertension. (Table 02) With respect to the occupational cadre the prevalence was more in the civil head constables (41.7%). (Table 03).

The occurrence of hypertension was significantly associated with the age ($\chi 2$ value= 56.7, p = <0.001) .43% of the participants above the age 50 years had hyperten-

sion. 30.6% of the male participants had hypertension and the association was significant (χ2 value=30.6, P value = <0.001). The occurance of hypertension in those with positive famliy history for the disease was 48.3% and was significantly associted(χ2 value=21.1, p=0.001) (table 04).

11.6% of the police personnel had the habit of smoking. The prevalence of hypertension among them was 39.6%. The association was statistically significant (χ2 value=9.69, p=0.021). 42.1% of the participants consumed alcohol. Among them 40.1% had hypertension with a significant statistical association (χ2 value=21.45, p<0.001).

The mean body mass index of the police personnel was 26.6 kg/m^2. 19.2% of the police had obesity. The occurrence of hypertension among the obese individuals was 49.3%. The association was statistically significant (χ2 value=47.2, p=<0.001).

43.47% of the police had excess intake of salt. The prevalence of hypertension in extra salt consuming police was 35.7% with a significant association (χ2 value=13.8, p=0.003). The occurrence of hypertension was 34.7% among the police with inadequate physical activity and it had a significant association. (χ2 value=10.6, p=0.014) (Table 05).

On applying binary logistic regression with outcome variable as Hypertension (stage I and II) vs Non-Hypertension (normal and prehypertension), Pseudo R square in Nagelkerke's model explained that 28.4 % of variance could be explained by independent variables. The overall model fit test was significant (P<0.05) indicating that the independent variables significantly improved the ability of the model to determine the outcome.

Age more than 40 years, male gender, family history of hypertension, excess salt intake, absence of adequate physical activity and high Body Mass Index were the potential risk factors which exerted a significant positive influence on occurrence of hypertension among police personnel. (Table 06)

Table 4: Association between non modifiable risk factors and hypertension

Variable	Normal (n=183) (%)	Pre hypertension (n=84) (%)	Hypertension stage I (n=71) (%)	Hypertension Stage II (n=30) (%)	Total (n=368)	P Value (χ2 test)
Age (in Years)						
Up to 30	61(70.1)	19(21.8)	6(6.9)	1(1.1)	87	χ2=56.7
31 to 40	59(61.5)	19(19.8)	16(16.7)	2(2.1)	96	P<0.001
41 to 50	36(39.1)	20(21.7)	20(21.7)	16(17.4)	92	
Above 50	27(29)	26(28)	29(31.2)	11(11.8)	93	
Sex						
Male	135(43.5)	80(25.8)	68(21.9)	27(8.7)	310	χ2=30.6
Female	48(82.8)	4(6.9)	3(5.2)	3(5.2)	58	p=<0.001
Family histroy of Hypertension						
Yes	26(43.3)	5(8.3)	24(40)	5(8.3)	60	χ2=21.1
No	157(51)	79(25.6)	47(15.3)	25(8.1)	308	P=0.001
Education						
Post graduate	22(57.9)	8(21.1)	7(18.4)	1(2.6)	38	χ2=34.8
Graduate	133(53.8)	56(22.7)	40(16.2)	19(7.6)	248	P=0.001
Pre university	24(43.6)	13(24.1)	14(25.9)	4(7.4)	55	
Secondary	4(14.8)	7(25.9)	10(37)	6(22.2)	27	

Table 5: Association between modifiable risk factors and hypertension

Variable	Normal (n=183) (%)	Pre hypertension (n=84) (%)	Hypertension stage I (n=71) (%)	Hypertension Stage II (n=30) (%)	Total (n=368)	P Value (χ2 test)
Smoking status						
Smoker	12(27.9)	14(32.5)	11(25.7)	6(13.9)	43	χ2=9.69
Non smoker	171(52.6)	70(21.5)	60(18.5)	24(7.4)	325	P=0.021
Alcohol intake						
Present	60(38.8)	36(23.3)	37(23.8)	22 (14.2)	155	χ2=21.45
Absent	123(57.7)	48(22.5)	34(16)	8(3.8)	213	P=<0.001
Salt intake						
Normal	120(52.7)	44(21.2)	32(15.4)	12(5.8)	208	χ2=13.8
Excess	63(39.4)	40(25)	39(24.4)	18(11.3)	160	P=0.003
Physical activity						
Present	103(52)	53(26.8)	32(16.2)	10(5.1)	198	χ2=10.6
Absent	80(47.1)	31(18.2)	39(22.9)	20(11.8)	170	P=0.014
Body Mass index						
Normal	88(69.2)	19(15)	14(11.1)	6(4.7)	127	χ2=47.2
Pre obese	73(42.9)	51(30)	36(21.2)	10(5.9)	170	P=<0.001
Obese	22(31)	14(19.7)	21(29.6)	14(19.7)	71	

Table 6: Multivariate analysis using binary logistic regression with outcome variable as hypertensive vs non hypertensive

Variables	Unadjusted odds (95% CI)	Adjusted odds (95% CI)	P value
Age (in years)			
Above40	4.47(2.63-7.36)	2.83(1.60-5.01)	<0.001
Up to 40			
Gender			
Male	3.82(1.59-9.22)	2.97(1.08-8.14)	0.03
Female			
Family History			
Present	3.06(1.73-5.42)	2.68(1.39-5.16)	0.003
Absent			
Smoking			
Present	1.87(0.97-3.62)	0.93(0.43-1.97)	0.85
Absent			
Alcohol			
Present	2.52(1.56-3.99)	1.66(0.94-2.93)	0.07
Absent			
Salt intake			
Excess	2.06(1.29-3.28)	1.85(1.09-3.14)	0.021
Normal			
Physical activity			
Absent	0.5(0.31-0.80)	0.44(0.25-0.75)	0.003
Present			
Body Mass Index			
Obese	3.40(1.98-5.83)	2.45(1.32-4.54)	0.004
Normal			

DISCUSSION

This study aimed to determine the occurrence of hypertension among the police personnel of Ballari city and the factors predisposing them to the same. The study found association for numerous risk factors.

In our study the prevalence of hypertension and prehypertension was 27% and 23% respectively. Chauhan VS et.al conducted similar study among 402 police personnel in Gwalior Madhya Pradesh. The prevalence of hypertension was 67.9%.[15] Chaturvedi DV et.al reported a prevalence of 55.2% in Mumbai police. [7] In the study conducted by Mukanga OL et.al[16] in Gomi Garrison, Democratic Republic of Congo the prevalence was 42.5 % and in that of Rattanatham R et.al[17] in Thailand, it was 51.1%. These prevalences were higher than the present study. More number of participants with high stress among the police might be the cause.

Padmanabhan A et.al reported the prevalence as 16.7% in the police personnel of Kozhikode Kerala.[18] In the study conducted by Parkash J et.al in Rohtak Haryana the prevalence was 36.4%.[19] These were close to our findings.

In our study, there is an increase in the prevalence of hypertension with increase in age. Our findings were similar to that of Chauhan VS et.al[15] and Mukanga OL et.al[16] where the occurrence of hypertension increased with advancing age. The natural stiffening and thickness of the arterial walls increase in persons with older age which reduces the vascular compliance and leads to increased blood pressure.

The prevalence of hypertension in males was more (30.6%) in comparison to females in our report. The results were in consistent with that of Kumar A et.al[20] (29.6%) and Hussain OJ et.al[21] (19.3%). Higher number of male police personnels and more proneness to risk factors like tobacco and alcohol addiction in them contributes to increased chances of hypertension.

In the current study the prevalence of hypertension was 59.20% among police who had completed their secondary education and 32.72% among those who had perceived their preuniversity education. The prevalence of hypertension decreased with the increase in the educational status. Parkash J et.al in Haryana also reported the equivalent results.[19]. Better educated police may have better knowledge about the disease and hence adopt healthy life style and good health seeking behaviour.

In the present study 48.3% of the police personnel with family history of hypertension were found to be hypertensive. The results were same with that of the observations made by Mukanga OL et.al[16] (61.2%) and Tariku Tesfaye[22] in Ethiopia (39.1%) where the prevalence was more in those with the family history than those without the genetic predisposition. These stresses the genetic susceptibility of the person to hypertension.

In our findings, the smokers had higher prevalence of hypertension (39.6%) in comparison to the nonsmokers. The concurring findings were reported by Kumar A et.al (57.1%).[20] Tobacco contains nicotine which induces atherosclerotic changes in the arterial walls and alters the blood pressure and hence act as a budding risk factor.

Alcohol consumers had the higher prevalence of hypertension (40.2%) than the non-alcoholics. The observation aligned with that of Chauhan VS et.al (79.5%).[15] Alcohol induces the oxidative stress and damages the endothelial lining of the blood vessels and is a potential risk factor for developing hypertension.

We reported that the prevalence of hypertension was 49.2% among the obese police. Findings of Tariku Tesfaye[22] in Ethiopia and Mukanga OL et.al[16] were comparable with our report. Increased visceral and retroperitoneal fat compresses the kidney and impairs the sodium excretion. Adipose tissue in obese individuals release pro inflammatory mediators which damage the endothelial lining. These factors lead to raise in blood pressure

In our research, the prevalence of hypertension among excess salt consumers was 35.7 %. Kumar A et. Al[20] found that 54.9% of the police who consumed excess salt had hypertension which is greater than our observation. Consumption of excess sodium leads to more water retention and rises the circulating volume of blood. This causes the elevation of blood pressure.

In the current study the occurrence of hypertension was more (34.7%) among those police who did not perform adequate physical activity. The results were concurrent with that of Kumar A et.al (47%). [20] Regular physical activity improves the blood vessel flexibility and protects against hypertension.

In our study the occurrence of hypertension was more in the higher occupational cadre. Similar results were seen in that of Parkash J et.al[19] and Chauhan VS et.al.[15] Police of higher occupational cadre are exposed to more stress and will have served for a longer duration of time. This might be the probable cause.

On performing multiple logistic regression analysis, age more than 40 years, male gender, family history of hypertension, excess salt intake, absence of physical activity and obesity were the risk factors which exerted independent significant influence in our study.

In the report of Kumar A et al high body mass index, mixed diet, smoking, use of extra salt and less physical activity exerted significant impact.[20] In a study conducted by Parkash J et al increased age had an independent influence on occurrence of hypertension.[19] In the observation of Sen A et.al in West Bengal age, family history and Body Mass Index were the significant predictors for hypertension.[23] In the findings of Mukanga OL et.al increasing age, alcohol intake, sedentary lifestyle and family history were the independent predictors.[16] These findings further confirm the multifactorial aetiology for the causation of hypertension.

In our study, smoking and alcohol which had significant association lost their impact in multivariate analysis. The confounding effect of age might the reason.

STRENGTHS AND LIMITATIONS

The following study used consecutive sampling technique and hence may not determine the exact situation since systematic random sampling always gives better picture of the situation. As the study is of cross sectional in nature it is not apt for determining the causal factors for hypertension. As the data was collected based on the information provided by the participant there are chances of information and recall bias. Our study used JNC 7 criteria for classification of blood pressure. As per the ACC/AHA guidelines the cutoff value for blood pressure was further reduced. The prevalence of hypertension would have been more if AHA criteria was used for the classification. As the female participants were in relatively lower number it may not reflect the exact status of hypertension in them. The study may not be generalised to the other geographical areas as the hypertension has multiple social, cultural, genetic and economic aetiologies which vary significantly from one place to another.

The study investigated the multiple risk factors for the occurrence of hypertension in the police personnel who encounter many challenges and difficulties in their profession. Hence this may help the concerned authorities to initiate appropriate measures to improve the health of the police.

CONCLUSION

On performing multivariate analysis to evaluate the independent impact of different variables age more than 40 years, male gender, family history of hypertension, excess salt intake, absence of physical activity and high body mass index were potential risk factors which exerted significant positive impact. The police personnel are key in maintaining the law and order of the nation. Hence formulating the appropriate strategy to keep them healthy and vigilant including regular blood pressure monitoring, educating on life style modifications with respect to diet and physical activity and formulating appropriate polices will have positive influence on their health status.

Acknowledgement: We extend our appreciation to the superintendent of police Ballari district for his valuable cooperation and support during the conduct of the study and all the faculty members of the of community medicine department, Ballari medical college and research centre.

Individual Authors' Contributions: **SHN** contributed to the study conception, study design, data collection, data analysis and interpretation and manuscript preparation. **SA** contributed to the study conception, study design, data analysis and interpretation, and manuscript preparation. **MK** contributed to data collection and manuscript preparation. **BS** contributed to the study conception and manuscript preparation.

Availability of Data: The data supporting the findings of this research are available from the corresponding author upon request.

Declaration of non-use of generative AI Tools: This article was prepared without the use of generative AI tools for content creation, analysis, or data generation. All findings and interpretations are based solely on the authors' independent work and expertise.

REFERENCES

1. Goorani S, Zangene S, Imig JD. Hypertension: a continuing public healthcare issue. International journal of molecular sciences. 2024 Dec 26;26(1):123. DOI: https://doi.org/10.3390/ijms26010123 PMid:39795981 PMCid:PMC11720251
2. Iqbal AM, Jamal SF. Essential Hypertension. [Updated 2023 Jul 20]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2026 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK539859/
3. K. Park. Park s textbook of preventive and social medicine, 27th ed. Jabalpur. Bhanot publishers; 2023.p 425.
4. World Health Organization. Hypertension [Internet]. Geneva: World Health Organization; 2025 [cited 2026 Jun 03]. Available from: https://www.who.int/news-room/fact-sheets/detail/hypertension
5. Anjana RM, Unnikrishnan R, Deepa M, Pradeepa R, Tandon N, Das AK, Joshi S, Bajaj S, Jabbar PK, Das HK, Kumar A. Metabolic non-communicable disease health report of India: the ICMR-INDIAB national cross-sectional study (ICMR-INDIAB-17). The Lancet Diabetes & Endocrinology. 2023 Jul 1;11(7):474-489.
6. Jeganish A, Kiran PR, Lyngdoh DR, Abhay J, Anand R, Goalla PC, Gnanaselvam NA. Health status of police personnel in a selected subdivision of Bengaluru District, Karnataka, India. International Journal of Occupational Safety and Health. 2024 Jan 9;14(1):37-44. DOI: https://doi.org/10.3126/ijosh.v14i1.53102
7. Chaturvedi DV, Gupta D, Maheshgauri DM, Yadav GE, Debnath DJ, Chaturvedi AD. The prevalence and risk factors of diabetes and hypertension among police personnel: A population-based cross-sectional study. J Family Med Prim Care. 2025 Jan;14(1):441-446. DOI: https://doi.org/10.4103/jfmpc.jfmpc_1240_24 PMid:39989567 PMCid:PMC11844933
8. Yates JD, Aldous JWF, Bailey DP, Chater AM, Mitchell ACS, Richards JC. The Prevalence and Predictors of Hypertension and the Metabolic Syndrome in Police Personnel. Int J Environ Res Public Health. 2021 Jun 22;18(13):6728. DOI: https://doi.org/10.3390/ijerph18136728 PMid:34206524 PMCid:PMC8297085
9. Bannigida DM, Neeravari VS, Nayak SB. Metabolic Syndrome and Cardiovascular Risk Factors in Police Officers. Indian Journal of Medical Biochemistry. 2019 Sep;23(3):324-326. DOI: https://doi.org/10.5005/jp-journals-10054-0122
10. Chobanian AV, Bakris GL, Black HR, Cushman WC, Green LA, Izzo Jr JL, et al. Seventh report of the joint national committee on prevention, detection, evaluation, and treatment of high blood pressure. Hypertension. 2003 Dec 1;42(6):1206-1252. DOI: https://doi.org/10.1161/01.HYP.0000107251.49515.c2 PMid:14656957
11. World Health Organization. Obesity and overweight [Internet]. Geneva: World Health Organization; 2025 Dec 8 [cited 2026 Jun 17]. Available from: https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight
12. World Health Organization. Sodium reduction [Internet]. Geneva: World Health Organization; 2025 [cited 2026 Jun 4]. Available from: https://www.who.int/news-room/fact-sheets/detail/salt-reduction
13. World Health Organization, International Telecommunication Union. Be he@lthy, be mobile: a handbook on how to implement mobile health for physical activity [Internet]. Geneva: World Health Organization; 2021 [cited 2026 Jun 5]. Available from: https://iris.who.int/handle/10665/348214
14. Akshithanand K J, Mishra A, Borle AL. Updated B. G. Prasad Scale for Socioeconomic Status Classification for the Year 2024. Indian J Pediatr. 2024 Jun;91(6):643. DOI: https://doi.org/10.1007/s12098-024-05131-z PMid:38652429
15. Chauhan VS, Bansal M, Sharma V, Gupta R. Prevalence and Risk Factors of Hypertension among Police Personnel of District Gwalior- A Cross Sectional Study. Indian J Community Med. 2022 Jul-Sep;47(3):379-385. DOI: https://doi.org/10.4103/ijcm.ijcm_1154_21 PMid:36438512 PMCid:PMC9693942
16. Mukanga OL, Etebe JM, de Dieu Murhula Balezi J, Malabo AM. Prevalence and risk factors associated with arterial hypertension among police officers at the Goma garrison, Democratic Republic of Congo: A cross-sectional study. Discover Public Health. 2025 Jul 31;22(1):449. DOI: https://doi.org/10.1186/s12982-025-00848-4
17. Rattanatham R, Tangpong J, Chatatikun M, Sun D, Kawakami F, Imai M, et al. Assessment of eight insulin resistance surrogate indexes for predicting metabolic syndrome and hypertension in Thai law enforcement officers. PeerJ. 2023 May 29;11:e15463. DOI: https://doi.org/10.7717/peerj.15463 PMid:37273533 PMCid:PMC10234272
18. Padmanabhan A, Thayyil J, Alan G, Kumar S. Cardiovascular Risk Factors and Metabolic Syndrome among Police Officers in Kozhikode Corporation. Indian J Occup Environ Med. 2024 Jan-Mar;28(1):45-48. DOI: https://doi.org/10.4103/ijoem.ijoem_11_23 PMid:38783876 PMCid:PMC11111143
19. Parkash J, Kalhan M, Singhania K, Punia A, Kumar B, Kaushal P. Prevalence of Hypertension and its Determinants among Policemen in a City of Haryana, India. Int J Appl Basic Med Res. 2019 Jul-Sep;9(3):143-147. DOI: https://doi.org/10.4103/ijabmr.IJABMR_356_18 PMid:31392176 PMCid:PMC6652270
20. Kumar A, Gautam PB, Pore P. Prevalence of hypertension and its associated risk factors among police personnel of a metropolitan city. Asian Journal of Medical Sciences. 2023 Mar 1;14(3):122-129. DOI: https://doi.org/10.3126/ajms.v14i3.50019
21. Hussain OJ, Ajuwon AJ. Prevalence, Knowledge and preventive practices against Hypertension among police officers in Ibadan. Annals of Ibadan postgraduate medicine. Ann Ib Postgrad Med. 2020 Dec;18(2):114-121. PMID: 34421453; PMCID: PMC8369398.
22. Tariku Tesfaye. Assessment of the Prevalence of Hypertension and Associated Factors Among Ethiopian Federal Police Officers Addis Ababa, Ethiopia: A Community Based Cross-Sectional Study. EC Cardiology 2.6 (2017):278-286.
23. Sen A, Das M, Basu S, Datta G. Prevalence of hypertension and its associated risk factors among Kolkata-based policemen: A socio-physiological study. Int J Med Sci Public Health. 2015 Feb 1;4(2):225-232. DOI: https://doi.org/10.5455/ijmsph.2015.0610201444