Research Article

# Prevalence of hypertension and its associated risk factors among Kolkata-based policemen: a sociophysiological study

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**Abstract**

**Background:** In India, very sparse data are available on the prevalence of noncommunicable diseases such as hypertension among the police force, as a specific occupational group.

**Objectives:** To determine the prevalence of hypertension and its associated risk factors among the policemen of a metropolitan city, Kolkata, West Bengal, India.

**Materials and Methods:** A total of 916 men (policemen = 507, civilian = 409) were randomly selected from different regions of central Kolkata, and the age ranged from 20 to 60 years. Blood pressure, anthropometric parameters, lifestyle pattern, and family history of hypertension were recorded. All statistical computations were performed with SPSS, version 20.0.

**Results:** The prevalence of hypertension [systolic blood pressure (SBP) $\geqslant$ 140 mm Hg, diastolic blood pressure $\geqslant$ 90 mm Hg, or use of antihypertensive drugs] was observed among 32.5% of policemen, which was significantly higher when compared with the civilians ($P < 0.01$). Behavioral habits and obesity indices were also higher among the policemen ($P < 0.05$). Regression analysis identified age, body mass index (BMI), SBP, history of parental hypertension, and consumption of smokeless tobacco as the risk factors of hypertension. As obtained from receiver-operating characteristics analysis, the suggested cutoff values for BMI were 23.64 (kg/m$^2$), for age 47.53 year**,** and for SBP 135 mm Hg.

**Conclusion:** The findings revealed that notable numbers of Kolkata-based policemen are hypertensive than civilians and lifestyle modification along with healthcare strategies must be planned for this special population.

**KEY WORDS:** Addiction, body mass index, hypertension, policemen, receiver operating characteristics

## Introduction

Cardiovascular diseases including coronary heart disease, stroke, and hypertension are the leading causes of morbidity and mortality in both developed and developing countries.[1] Elevated blood pressure (BP) has been linked to ischemic heart disease, peripheral vascular diseases, stroke, myocardial infarction, and renal failure.[2] Individuals with hypertension possess twofold higher risk of developing coronary artery disease (CAD) and four times higher risk of congestive heart failure compared with normotensive subjects.[3] The "Global Burden of Disease Study" has projected CAD and cerebrovascular disease as the leading causes of death worldwide by the year 2020.[4] Hypertension is one of the major global risks factors, and its prevalence is rapidly increasing worldwide. Hypertension has been reported to be responsible for 57% of all stroke deaths and 24% of all cardiovascular deaths in East Asia.[5] In addition, there is an increasing prevalence of hypertension in the Indian population, especially in the urban areas.[6]

This global risk factor affects all populations of the world including the special occupational group, the policemen. Police work has been regarded as one of the stressful occupation in the world.[7] The physical threats in police operational duties have been regarded as inherent causes of stress in police work, but organizational factors such as work overload, time pressure, inadequate resources, manpower shortage, and lack of support and consultation and communication with the higher authorities in the organization have also been identified as the potential factors responsible for the stress in the policemen.[8] To relieve from this occupational stress, the policemen tend to stick to unhealthy habits such as smoking, consumption of alcohol and smokeless tobacco, and

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irregular dietary pattern, and they are not habituated in leisure time physical activity.[9,10] As a result, they face many adverse effects pertaining to these habits.

Various studies[11,12] have reported significantly high prevalence of stress-related disorders such as hypertension, 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.[13] A number of important contributory factors for hypertension have been identified, which include overweight/obesity, excessive dietary sodium intake, low physical activity, smoking tobacco and smokeless tobacco consumption, high alcohol intake, and family history of hypertension.[14–16] Furthermore, there exist several studies that not only identified the anthropometric and other risk factors of hypertension but also determined the cutoff values of those anthropometric parameters.[17–20] Unfortunately, the cutoff values of the latter parameters from the police population are lacking till date.

As not many studies has been carried out with the police professionals of Kolkata, West Bengal, India, this cross-sectional survey-based study was aimed to provide the baseline information on prevalence of hypertension among policemen, if any, and to identify the associated risk factors for hypertension in this population. Determination of the relationship between different anthropometric indicators and BP levels among the policemen is also an additional objective of this investigation. Moreover, the cutoff values of those indicators have also been determined for the first time in this study.

## Materials and Methods

This cross-sectional survey-based study was conducted in 2013 among randomly selected 916 healthy men (policemen = 507, civilian = 409) from central Kolkata, with age ranged 20–60 years. Of these, 4.36% subjects ($n$ = 40) were excluded because of presence of either physical disability or based on medical history such as any major surgery, pacemaker insertion, and cerebral or cardiac stroke. Finally, 876 subjects participated in this study.

Policemen of different designation were included after obtaining necessary permission from Ministry of Home Affairs, Government of West Bengal, India. The civilian group was composed of persons residing at and around central Kolkata and engaged in various occupations other than police department. A self-structured questionnaire was designed for the purpose of data collection, which included all the details about age, sex, caste, religion, occupation, education, recording of anthropometric parameters, medical history of hypertension, food habits, smoking and alcohol consumption status, and history of regular physical activity. Subjects were requested to make an appointment, and measurements were made at their respective working place during their free time.

This noninvasive study was approved by the "Institutional Ethics Committee for Biomedical Research involving Human Subjects, Rammohan College," constituted in accordance to the guidelines framed by Indian Council of Medical Research. Written consent was obtained from each participant to act as volunteers in the study without any support in terms of cash or kind.

The BP was measured using standard mercury manometer (Life Line, Kolkata, West Bengal, India) and stethoscope (Duo Sonic, Kolkata, West Bengal, India) by auscultatory method. At least two readings at 5-min interval were recorded, and if a high BP ($\geqslant$140/90 mm Hg) was noted, a third reading was taken after 30 min. The lowest of the three readings was taken as BP. Resting pulse rate was measured from the radial artery for 1 min with the help of stopwatch (Racer, Coimbatore, Tamil Nadu, India). A person was considered as suffering from hypertension if systolic blood pressure (SBP) was 140 mm Hg or above and/or diastolic blood pressure (DBP) 90 mm Hg and above or is already under treatment for hypertension.

Height and weight of the individuals were measured to the nearest 0.1 cm and 0.1 kg by an anthropometric rod and portable weighing machine (Advanced Technocracy, Ambala City, Haryana, India), respectively, with the subjects standing barefoot and in light clothing. The body mass index (BMI) was calculated as weight in kilograms divided by squared height in meters. BMI $>$ 23.0 and $>$25.0 kg/m$^2$ was taken as cutoff value for overweight and obesity, respectively. The waist circumference (WC) was measured at the midpoint between the inferior border of the subcostal margin and iliac crest in the midaxillary line after normal expiration in standing posture; the hip circumference (HC) was measured at the widest part of the hip across both greater trochanters, from which the waist-to-hip circumference ratio (WHR) was calculated according to the WHO guidelines. Truncal obesity was diagnosed when WHR was $>$0.90 and abdominal obesity, when WC was $>$90 cm in men.

For the study, subjects who have smoked regularly and smoked at least one cigarette on an average each day during previous 30 days were defined as the current smokers. Smokeless tobacco consumption is defined as any form of tobacco consumed orally and not smoked. Subjects currently consuming alcohol or left this habit for last 6 months were considered as alcoholics. Physical activity was measured by asking about both work-related and leisure-time activities. Leisure-time physical activity for $>$30 min a day and for at least 3 days in a week was considered as regular. Information regarding dietary habits, that is, whether meals taken at proper intervals or not was also noted.

### Statistics

The study subjects were divided into two groups based on their occupation (civilian and policemen). The mean and its corresponding standard deviation were computed for continuous variables and frequencies and percentages for categorical variables. $\chi^2$-Test was used to compare differences for categorical variables, and the independent sample $t$-test was also used to compare differences in the continuous variables of the two populations. A multivariate logistic regression analysis was conducted to identify the predictors of hypertension among the policemen using hypertension as dependent variable. The

risks were reported as odds ratios (ORs) with corresponding 95% confidence intervals (CIs). Receiver-operating characteristics (ROC) analysis was done to identify the optimal cutoff values of significant risk factor indicators, obtained from regression analysis. Sensitivity and specificity of the anthropometric measurements have been calculated at all possible cutoff points to find the optimal cutoff value. All statistical computations were performed with the Statistical Package for Social Sciences software (SPSS, version 20.0). For all analyses, $P < 0.05$ was considered statistically significant.

## Results

The study population comprised 876 subjects (384 civilians and 492 policemen). The age range was almost same in both the study population: the mean ages of the civilian and policemen were 43.54 ± 10.21 and 44.30 ± 10.38 years, respectively. Table 1 shows the anthropometric characteristics of the study subjects. All the physiological and anthropometric parameters were significantly higher among the policemen ($P < 0.05$).

Figure 1 shows the prevalence of different behavioral habits among civilian and policemen. A significantly higher percentage of the policemen (80.9%) had irregular eating habit than the civilians (39.6%; $P < 0.0001$). Similar result was found for the physical activity also as a significantly higher percentage of policemen were physically inactive than the civilians (71.5% and 60.4% for policemen and normal individual, respectively; $P < 0.001$). Results for addictive habits showed that alcohol (33.3% vs. 23.4% ) and smokeless tobacco consumption (30.5% vs. 17.7%) were significantly higher in the policemen ($P < 0.01$ for alcohol and $P < 0.0001$ for smokeless tobacco) when compared with the civilians. Although statistically non-significant, the number of tobacco smoker was higher among civilians than that of policemen (42.2% and 38.2%, respectively).

Figure 2 represents the prevalence of hypertension and different obesity indices among the different populations under study. The occurrence of the hypertension was significantly lower among the civilians than the policemen (22.4% vs.

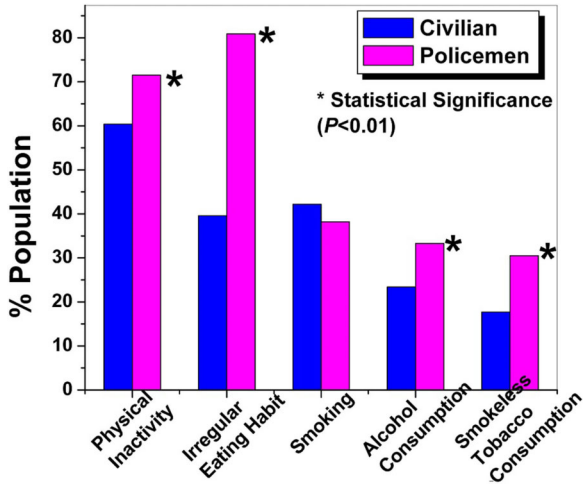


**Figure 1:** Prevalence of different behavioral habits among civilian and policemen.

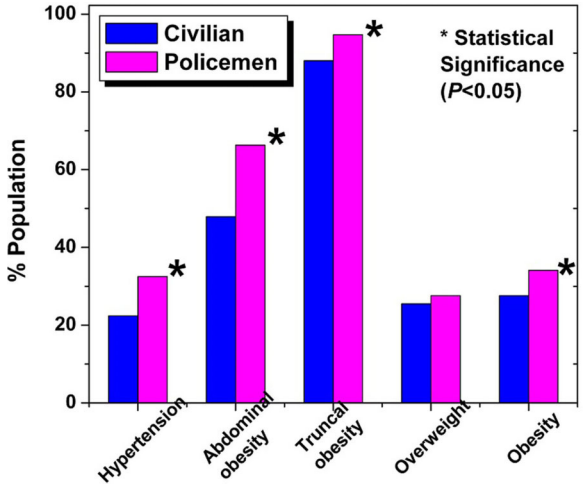


**Figure 2:** Prevalence of hypertension and obesity indices among the different populations under study.

**Table 1:** Baseline characteristics of the study subjects

| Variables | Total ($n$ = 876) | Civilian ($n$ = 384) | Policemen ($n$ = 492) | $P$-value |
|---|---|---|---|---|
| Age (yr) | 43.97 ± 10.31 | 43.54 ± 10.21 | 44.30 ± 10.38 | 0.45 |
| Height (cm) | 169.86 ± 6.72 | 166.13 ± 6.87 | 172.77 ± 4.93 | 0.0001* |
| Weight (kg) | 68.40 ± 10.10 | 63.87 ± 11.27 | 71.94 ± 9.37 | 0.0001* |
| Resting pulse rate (beats/min) | 77.05 ± 8.56 | 75.77 ± 9.13 | 78.04 ± 7.95 | 0.0001* |
| SBP (mm Hg) | 129.34 ± 14.26 | 127.45 ± 15.06 | 130.81 ± 13.43 | 0.001* |
| DBP (mm Hg) | 81.37 ± 8.31 | 80.46 ± 9.61 | 82.08 ± 7.06 | 0.01* |
| WC (cm) | 91.22 ± 9.96 | 88.14 ± 10.41 | 93.63 ± 8.89 | 0.0001* |
| WHR | 0.98 ± 0.06 | 0.97 ± 0.07 | 0.99 ± 0.06 | 0.0001* |
| BMI (kg/m$^2$) | 23.65 ± 3.25 | 23.10 ± 3.6 | 24.08 ± 2.87 | 0.0001* |

BMI, body mass index; DBP, diastolic blood pressure; SBP, systolic blood pressure; WC, waist circumference; WHR, waist-to-hip ratio.
Values are mean ± SD.
*Statistically significant ($P < 0.01$) when compared between policemen and civilians.

32.5%, $P < 0.001$). Overall obesity, assessed by BMI, was significantly prevalent among the policemen ($P < 0.05$). A higher percentage of policemen were found to be overweight (BMI > 23 kg/m$^2$) and obese (BMI > 25 kg/m$^2$) than the normal individuals (27.6% overweight and 34.1% obese in policemen, whereas 25.5% overweight and 27.6% obese in civilians). The percentage of population with abdominal obesity (WC > 90 cm) and truncal obesity (WHR > 0.90) were significantly higher among the policemen when compared with the civilians (66.3% vs. 47.9%, $P < 0.0001$ for WC and 94.7% vs. 88.0%, $P < 0.01$ for WHR).

Table 2 represents the comparison of different physiological and anthropometric parameters among normotensive and hypertensive individuals in the two studied groups. Mean values of all the parameters except height were significantly higher among hypertensive than normotensive civilian and policemen ($P < 0.05$).

Figure 3 shows the percentage distribution of hypertensive individuals in each age group among the study population. It had been observed that in the youngest group, there were no subjects with hypertension in civilians, but 16.1% of the policemen of this age had hypertension. Similar result was found for the next age group, where the prevalence rates were 8.2% in civilians and 19.2% in policemen. For the age group older than 50 yr, 51.6% of the policemen had hypertension, whereas only 29.7% of the civilians had hypertension. Interestingly, the reverse nature of the result was observed in the age group of 40–49 years.

Table 3 shows the results of the multiple logistic regression analysis using hypertension as dependent variable. The variables such as age, SBP, BMI, smokeless tobacco consumption, and family history of hypertension were found to be potential risk factors, exerting significant positive independent impact on prevalence of hypertension among the policemen. The ORs of age, SBP, BMI, tobacco chewing, and family history of hypertension were 1.07 (95% CI: 1.03–1.12, $P < 0.0001$),

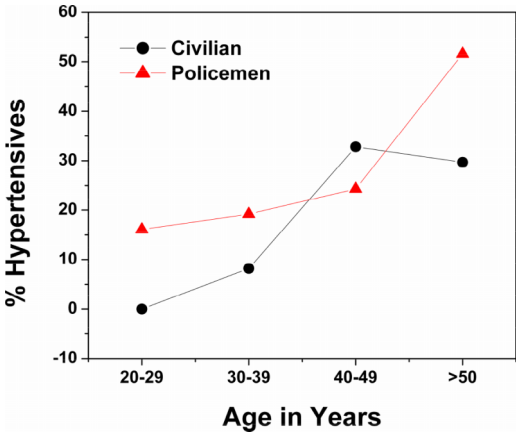


**Figure 3:** Percentage distribution of hypertensive individuals in each age group of the two different populations.

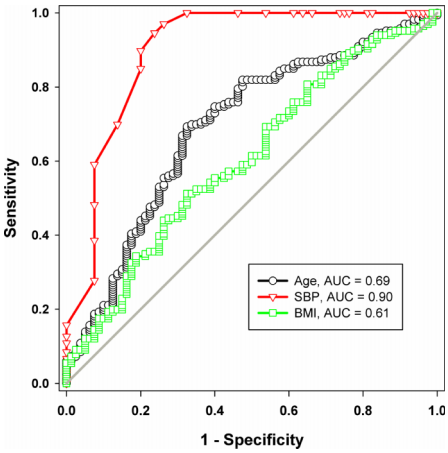


**Figure 4:** The ROC curve showing AUC of predictive risk factor variables of hypertension in policemen.

**Table 2:** Comparison of different physiological and anthropometric parameters among normotensive and hypertensive individuals in the two studied groups

| Variables | Civilians | | Policemen | |
|---|---|---|---|---|
| | Normotensive ($n$ = 298) | Hypertensive ($n$ = 86) | Normotensive ($n$ = 332) | Hypertensive ($n$ = 160) |
| Age (years) | 42.31 ± 10.56 | 47.82 ± 7.49* | 42.14 ± 10.13 | 48.78 ± 9.44* |
| Height (cm) | 166.22 ± 6.84 | 165.84 ± 7.01 | 172.62 ± 4.80 | 173.08 ± 5.19 |
| Weight (kg) | 62.45 ± 11.08 | 68.80 ± 10.59* | 70.84 ± 9.13 | 74.21 ± 9.50* |
| Resting pulse rate (beats/min) | 74.93 ± 8.54 | 78.76 ± 10.52* | 77.33 ± 7.68 | 79.53 ± 8.32* |
| SBP (mm Hg) | 121.60 ± 10.16 | 147.72 ± 11.23* | 124.49 ± 7.47 | 143.93 ± 13.58* |
| DBP (mm Hg) | 77.57 ± 7.88 | 90.47 ± 8.31* | 80.07 ± 4.91 | 86.25 ± 8.82* |
| WC (cm) | 86.63 ± 10.58 | 93.36 ± 7.81* | 91.94 ± 8.51 | 97.15 ± 8.66* |
| WHR | 0.96 ± 0.07 | 1.0 ± 0.05* | 0.98 ± 0.05 | 1.02 ± 0.06* |
| BMI (kg/m$^2$) | 22.56 ± 3.56 | 24.97 ± 3.13* | 23.77 ± 2.89 | 24.74 ± 2.73* |

BMI, body mass index; DBP, diastolic blood pressure; SBP, systolic blood pressure; WC, waist circumference; WHR, waist-to-hip ratio.
Values are mean ± SD.
*Statistically significant when hypertensive individuals were compared with normotensive individuals in their respective groups ($P < 0.05$).

**Table 3:** Results of multiple logistic regression analysis

| Significant variables | Coefficient ($\beta$) | SE | OR | 95% CI | *P*-value |
|---|---|---|---|---|---|
| Age (years) | 0.071 | 0.020 | 1.07 | 1.03–1.12 | 0.0001* |
| SBP (mm Hg) | 0.292 | 0.048 | 1.34 | 1.22–1.47 | 0.0001* |
| BMI (kg/m$^2$) | 0.104 | 0.051 | 1.11 | 1.0–1.23 | 0.04* |
| Smokeless tobacco consumption | 0.733 | 0.316 | 0.48 | 0.26–0.89 | 0.02* |
| Family history of hypertension | 1.37 | 0.549 | 0.26 | 0.09–0.75 | 0.01* |

BMI, body mass index; CI, confidence interval; OR, odds ratio; SBP, systolic blood pressure; SE, standard error.
*$P < 0.05$, statistically significant.

**Table 4:** Cutoff points for different indicators along with their sensitivity and specificity

| Risk factor variables | Cutoff | Sensitivity (95% CI) | Specificity (95% CI) |
|---|---|---|---|
| Age (years) | 47.53 | 0.692 (0.640–0.742) | 0.675 (0.597–0.747) |
| SBP (mm Hg) | 135 | 0.946 (0.916–0.968) | 0.762 (0.689–0.826) |
| BMI (kg/m$^2$) | 23.64 | 0.512 (0.460–0.567) | 0.675 (0.597–0.747) |

BMI, body mass index; SBP, systolic blood pressure; CI, confidence interval.

1.34 (95% CI: 1.22–1.47, $P < 0.0001$), 1.11 (95% CI: 1–1.23, $P < 0.04$), 0.48 (95% CI: 0.26–0.89, $P < 0.02$), and 0.25 (95% CI: 0.09–0.72, $P < 0.01$), respectively.

Figure 4 and Table 4 represent the AUC, cutoff values, sensitivity, and specificity of predictive risk factor variables of hypertension in policemen. The cutoff values for the significant parameters of logistic regression were calculated by ROC analysis to identify the risk of hypertension. The BMI cutoff value was 23.64 (sensitivity = 0.51 and specificity = 0.68) and AUC was 0.60 (95% CI: 0.53–0.68) for the policemen. The cutoff value for age was 47.53 (sensitivity = 0.69 and specificity = 0.68), having an AUC value of 0.69 (95% CI: 0.62–0.76). The AUC value for SBP was 0.90 (95% CI: 0.85–0.95), and the cutoff value for being hypertensive was 135 (sensitivity = 0.95 and specificity = 0.76).

## Discussion

In India, very sparse data are available on the prevalence of noncommunicable diseases such as hypertension among the police force, as a specific occupational group. Occupational factors are likely to contribute to increased risk of cardiovascular diseases among emergency responders such as policemen. Prevalence of hypertension is less among the younger policemen aged 20–29 yr as majority of them are newly appointed [Figure 3]. The reverse result is observed in policemen aged more than 50 year, with the prevalence rate of hypertension being much higher, as majority of them are either newly diagnosed with hypertension or they have the known history of hypertension. It is obvious that, as the seniority of policemen increases, more and more responsibilities are posed on them. Burden of these job responsibilities,[8] in addition to increased family responsibilities, increases the level of stress, resulting in higher risk of hypertension among the policemen when compared with their other counterparts. It can be said that policemen retire with some stress-related disorders, although they joined the police department in good health.

It is widely accepted that the lack of regular physical exercise leads to increased risk for both excess weight gain and cardiovascular disease. In addition, sedentary persons are at increased risk for acute cardiovascular events during activities requiring considerable physical exertion.[21,22] The police officers lead a physically inactive life and have irregular and spicy, hotel-made diet because of limited choice of food while on duty. Owing to their job condition and practice, frequent shift work is a very normal phenomenon; thereby, they suffer from sleeplessness.[23] Significantly increased irregular eating habit and decreased physical activity is observed among the policemen [Figure 1]. These sedentary activities may lead to hypertension and all types of obesity in this special population, although these two factors did not contribute significant association in the regression analysis.

Lifestyle studies of policemen showed very high rate of addiction to alcohol and tobacco. They work under tremendous pressure and stress, which may make them alcohol and smoking dependant.[9] This combination can have a synergistic and detrimental effect on the deterioration of their health status. In developing countries such as India, tobacco is consumed mainly in two forms: smoked tobacco products and smokeless tobacco. Studies have shown that smokeless tobacco acutely increases BP and heart rate similar to tobacco smoking.[24] Acute nicotine exposure from smoking cigarettes is a well-known factor for causing adverse cardiovascular outcomes.[25,26] The sympathicoadrenal-activating properties of nicotine and high sodium content of oral tobacco

preparations could be the main contributing factors for high BP in tobacco chewers.[25] Our study also showed that the alcohol and smokeless tobacco chewing habits are significantly higher among the policemen [Figure 1], and smokeless tobacco consumption is found to be one of the risk factors for developing hypertension in policemen (OR: 0.48, $P < 0.02$). For civilians, addiction toward smoking tobacco is found to be more prevalent. An inverse relationship between cigarette smoking and BMI has already been reported.[27] This study also corroborates with this fact as the civilians showed significantly lower BMI status [Table 1].

Observational studies and clinical trials have documented a direct, dose-dependent relationship between alcohol intake and BP, particularly when the intake of alcohol increases above two drinks per day. Increased energy intake in the form of high alcohol consumption was associated with increased abdominal obesity.[28] These observations are also supported by our findings where alcohol consumption is significantly higher among the policemen, and this particular addictive habit might be a cause of hypertension and all form of obesity in them.

Another very important factor affecting the prevalence of hypertension in emergency responders is obesity.[29] As evident from this study, the obesity markers such as BMI, WC, and WHR are significantly correlated with hypertension. Recently, WHO reported that, globally, more than 1.4 billion adults are overweight and more than one-third of them are obese, with a BMI higher than 30.[30] The chance of incurring health risks such as diabetes, cardiovascular diseases, hypertension, hyperlipidemia, and risk of certain cancers increases many folds in association with obesity.[31,32] In this comparative study, the results show that the policemen have significantly higher overall obesity (assessed by BMI), abdominal obesity (WC), truncal obesity (WHR), and high BP when compared with civilians [Table 2]. The overweight and obese individuals have 1.11-fold increased risk for developing hypertension than the nonobese person among the policemen [Table 3]. The cutoff values of 23–24.9 and 25.0 kg/m$^2$ were taken for overweight and obesity, respectively, and for identifying the risk of associated morbidities.[33] In an effort to map the epidemic of obesity and associated risk of comorbidities, it has become common practice to use these cutoff values in different populations with the assumption that different ethnic groups have similar morbidity/mortality risk for the specific BMI level in absence of any such evidence.[34] Studies from urban India[33,35] suggested lower cutoff values of this anthropometric indicator. This study also suggests further lower cutoff values for the police population, and odds of having hypertension at these lower cutoff values are significantly high. In our population, visceral adiposity increased the risk of related morbidity such as hypertension at lower cutoff values of BMI levels [Table 4].

Apart from BMI, the other risk factors associated with hypertension include age, SBP, smokeless tobacco consumption, and family history of hypertension. Increased prevalence of hypertension with age was reported in an earlier study,[36] and our study also represents that increase in age increases the risk of hypertension around 1.07-fold and the cutoff value for age is 47.53 [Tables 3 and 4]. This finding indicates that the risk of hypertension in police population arises at middle age and, if not taken care, they might develop other cardiovascular diseases. Figure 3 also supports this finding, which shows increase in the age increases the prevalence of hypertension among both the groups.

In our study, hypertension shows significant positive correlation with age, SBP, and family history of hypertension. In previous studies, a positive parental history of high BP has been shown to be important in predisposing hypertension, and the individuals with a family history of hypertension also showed a stronger relationship between SBP and age, suggesting that they are likely to develop hypertension at a younger age than subjects without such a genetic susceptibility.[16,20] This study also supports the above-mentioned finding where the odds of being hypertensive is 0.26 in the policemen with parental history of hypertension. This suggests that the proneness in the development of hypertension often is genetically inherited. The police persons with increased SBP also have 1.34 times more risk to be hypertensive, and the cutoff value for SBP in them is 135, which is lower than the cutoff value proposed by the WHO[37] for being hypertensive [Tables 3 and 4]. This suggests that this population needs special screening programs to control the progress of hypertension among them.

Elevated BP is inadequately controlled among policemen. Keeping this in mind, it can be suggested that competent authorities should take proper and necessary actions such as organization of health camp to provide potential benefits of health promotion among these emergency responders to check and control hypertension.

## Conclusion

The findings of this study showed that a remarkable number of Kolkata-based policemen have hypertension and, accordingly, have a very high risk for the development of cardiovascular disease than the civilians. Age, overall obesity assessed by BMI, SBP, history of parental hypertension, and consumption of smokeless tobacco are the identified risk factors of hypertension among this group of emergency responders. It is also found that people with hypertension from both the groups have higher mean values for all the measured parameters. The suggested lower cutoff values of the indicators will include maximum number of people from the population with higher risk for hypertension and may help in reducing the mean BP levels of the population. Additional detailed research is recommended to identify the other associated lifestyle and environmental factors, which might be involved in inducing these conditions. Lifestyle modifications should be used as initial therapy to control BP in all patients with hypertension. Prevention of smokeless tobacco consumption would be an important intervention in preventing the ongoing upswing in prevalence of chronic heart disease.

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