

Original Research Article

Prevalence of obesity and its associated risk factors among policemen of Chitradurga district, Karnataka, India

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ABSTRACT

Background: Obesity is an increasingly prevalent disease worldwide and can be regarded as a health problem among individuals of different occupations, including policemen, who are responsible for public security. Working throughout the day in stressful atmosphere produces adverse physical and psychological effects. We conducted this study to find the prevalence of obesity among policemen, if any, and to identify the associated risk factors for obesity in this population.

Methods: Cross sectional study was conducted among 410 police personnel of 4 talukas of Chitradurga District, Karnataka from July 2017 to January 2018. Semi-structured questionnaire was prepared to collect the data, which consist of socio-demographic data, clinical examination findings, anthropometric measurements and biochemical investigations. At the end whoever had high risk factors, were treated for the same along with advice on healthy life style. Data entered in Microsoft Excel 2007 and analysed using SPSS software, version 20. Frequency tables, ANOVA test and chi-square test were used for analysis and interpretation.

Results: There were total 392 males and 18 females. Age group was ranging from 21 years to 59 years. 201(49%) of the police officers were overweight and 45(11%) were obese. Ideal weight police men were younger than obese policemen and weighed less than obese police. There was statistical difference in BMI between the three groups of policemen. The mean TG and TC levels among overweight and obese were higher than ideal weight policemen and this difference was statistically significant. 32.9% of participants had a high TC level (≥ 200 mg/100 ml). Moreover, 93.4% and 84.1% had a low level of HDL-C and high level of LDL-C, respectively (< 40 mg/ 100 ml and > 150 mg/100 ml, respectively). 49.5% of our study participants had TG levels > 150 mg/100 ml. 60.5% and 42.7% had high SBP and DBP, respectively (> 130 mmHg and > 90 mmHg). The difference between TC and HDL between different BMI groups was statistically significant.

Conclusions: Obesity and hypertension are high risk factors for development of cardiovascular diseases. Early detection of the same and effective implementation of a physical fitness program, a regular balanced diet, inoculation training for managing stress can improve the life of police personnel.

Keywords: Obesity, Overweight, Policemen, Risk factors

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 Demographic changes, changes in the lifestyle along with increased rates of urbanization are the major reasons responsible for the tilt towards the non-communicable diseases.² The ‘‘Global Burden of Disease Study’’ has projected Coronary Artery Disease and

cerebrovascular disease as the leading causes of death worldwide by the year 2020.³ Obesity is caused by an imbalance between energy intake and energy expenditure. One of the most recent global estimates found that roughly 500 million adults are obese. It has been defined by the World Health Organization (WHO) as abnormal or excessive fat accumulation that may impair health. In contrast, overweight is defined as a body mass index (BMI) of $\geq 25 \text{ kg/m}^2$.⁴

Police work has been recognized as a dangerous occupation. They perform specialized work involving exposure to violence, which can affect their health directly or indirectly and the health of police officers must be considered.⁵

In all countries, police officers play important roles by ensuring security and stability.⁴ Given the fact that policemen lead a physically inactive life, have irregular diet and limited choice of food while on duty, take overtime and shift work, suffer from disrupted sleep patterns, stress and have high rates of tobacco and alcohol consumption than the general population.⁶ Epidemiological reports have been demonstrated a higher prevalence of obesity among police officers, compared to non-police workers. Therefore, it is important to investigate the associations between body weight and biochemical parameters. Accordingly, treatment and preventive strategies should be implemented to improve the abilities of these officers during work periods.⁷

Authors conducted this study to find the prevalence of obesity among policemen and to identify the associated risk factors for obesity in this population.

METHODS

Cross sectional study was conducted among 410 police personnel of Chitradurga District, Karnataka from July 2017 to January 2018.

All cadres of policemen were included for the study. Those who were on leave while collecting data. And those who did not give consent for the study. There are total 6 talukas in Chitradurga district. Among these, 4 talukas were randomly selected, and all policemen of these talukas were selected for the study. Written informed consent was obtained before collecting the data. Semi-structured questionnaire was prepared to collect the data, which consist of socio-demographic data, clinical examination findings, anthropometric measurements and biochemical investigations. At the end whoever had high risk factors, were treated for the same along with advice on healthy life style.

Statistical analysis

Data entered in Microsoft Excel 2007 and analysed using SPSS software, version 20. Data tabulated as frequency tables with comparison between groups. Mean

Anthropometric measurements and laboratory values were compared between the groups by ANOVA test. Chi-square test was used to check the association between health indicators associated with obesity.

RESULTS

Among 410 study participants, 392 (95.6%) were males and only 18 (4.4%) were females. Age group was ranging from 21 years to 59 years, majority 160 (39%) belonged to the age group of 30-39 years and 106 (25.9%) were in the age group of 40-49 years.

Table 1: Distribution of study participants according to body mass index (BMI).

BMI category	Frequency (%)
Underweight (<18.5 kg/m ²)	4 (1)
Ideal weight (18.5-25.0 kg/m ²)	160 (39)
Overweight (25.1-29.9 kg/m ²)	201 (49)
Obese ($\geq 30.0 \text{ kg/m}^2$)	45 (11)
Total	410 (100)

When assessed for obesity and overweight with respect to their BMI, it was observed that 201(49%) of the police officers were overweight and 45(11%) were obese. Only 160 (39%) police had a normal BMI (Body Mass Index) ranging from 18.5 to 25.0 (Table 1).

Table 2 shows that ideal weight police men were younger than obese policemen with mean age of 38.15 years and 42.67 years respectively and weighed less than obese police.

Table 2: Anthropometric and laboratory values among ideal weight, overweight and obese policemen.

Variables	Ideal weight	Overweight	Obese	P value
Age (years)	38.15	39.89	42.67	0.56
Height (cm)	172.2	172.06	164.73	0.19
Weight (kg)	67.76	80.40	95.24	<0.001
BMI (kg/m ²)	22.82	27.14	39.12	0.001
TC (mg/dL)	181.71	191.73	187.49	0.001
LDL (mg/dL)	116.34	118.15	114.53	0.64
HDL (mg/dL)	33.42	34.31	33.98	0.95
TG (mg/dL)	162.39	189.25	172.67	<0.001
SBP (mm Hg)	128.9	131.09	134.22	0.44
DBP (mm Hg)	83.85	84.41	85.56	0.92

There was statistical difference in BMI between the three groups of policemen. ($p=0.001$) The mean TG (Triglycerides) and TC (Total Cholesterol) levels among

overweight and obese were higher than ideal weight policemen and this difference was statistically significant. ($p<0.001$).

Table 3: Health indicators of policemen according to body mass index category.

Variables		Ideal weight	Overweight	Obese	P value
Blood sugar (mg/100 ml)	>110	33 (37.5)	46 (52.3)	9 (10.2)	0.80
	<110	130 (40.5)	155 (48.3)	36 (11.2)	
Total cholesterol (mg/100 ml)	>200	46 (31.7)	84 (57.9)	15 (10.3)	0.02
	<200	117 (44.2)	118 (44.5)	30 (11.3)	
High-density lipoprotein Cholesterol (mg/100 ml)	<40	158 (41.3)	183 (47.8)	42 (11)	0.05
	>40	5 (18.5)	19 (70.4)	3 (11.1)	
Low-density lipoprotein cholesterol (mg/100 ml)	<150	140 (40.6)	167 (48.4)	38 (11)	0.704
	>150	23 (35.4)	35 (53.8)	7 (10.8)	
Triglycerides (mg/100 ml)	>150	69 (34)	109 (53.7)	25 (12.3)	0.06
	<150	94 (45.4)	93 (44.9)	20 (9.7)	
Systolic blood pressure (mmHg)	>130	93 (37.5)	124 (50)	31 (12.5)	0.33
	<130	70 (43.2)	78 (48.1)	14 (8.6)	
Diastolic blood pressure (mmHg)	>90	67 (38.3)	86 (49.1)	22 (12.6)	0.64
	<90	96 (40.9)	116 (49.4)	23 (9.8)	

The results in Table 3 demonstrate that 145 (35.36%) participants in this study had a high TC level (≥ 200 mg/100 ml). Moreover 383(93.4%) and 65 (15.85%) had a low level of HDL-C (High Density Lipoprotein - Cholesterol) and high level of LDL-C (Low Density Lipoprotein - Cholesterol) respectively (<40 mg/ 100 ml and >150 mg/100 ml, respectively). 203 (49.5%) study participants had TG levels >150 mg/100 ml. 248(60.5%) and 175(42.7%) had high SBP (Systolic Blood Pressure) and DBP (Diastolic Blood Pressure), respectively (>130 mmHg and >90 mmHg). The difference between TC and HDL between different BMI groups was statistically significant ($p=0.02$, $p=0.05$).

DISCUSSION

Occupational factors are likely to contribute to increased risk of cardiovascular diseases among emergency responders such as policemen. It is widely accepted that the lack of regular physical exercise leads to increased risk for both excess weight gain.

In present study 60% of police personnel are having BMI ≥ 25 . Saha A et al, reported this as 56% in a study conducted among police officers from Hoogly district, West Bengal.⁸ Jahnvi G et al, reported that 58% police persons were having BMI ≥ 25 in their study in Vijayawada.⁹

Almost 60% of the study subjects were either overweight or obese. These results are similar to those from the study by Al-Qahtani et al, who observed prevalence rates of 43.9% and 81.4% for overweight and obesity among Saudi adult soldiers in northern Saudi Arabia.¹⁰

Present study demonstrates that 35.36% of participants in this study had a high TC level (≥ 200 mg/ 100 ml). Moreover, 93.41% and 15.85% had a low level of HDL-C and high level of LDL-C, respectively (<40 mg/ 100 ml and >150 mg/100 ml, respectively).

Increased body weight leads to elevated blood sugar levels; the study found that among participants with high blood sugar levels, approximately 10.2% were obese and 52.3% were overweight. These results agree with those obtained by Al- Qahtani et al, and Timar et al.^{11,12}

In present study authors observed that 60.5% of policemen had SBP >130 mmHg. The prevalence of hypertension among Nagpur and Chennai policemen was 22.5% and 59%, respectively.^{6,13} Although the high percentage could have been a manifestation of white collar hypertension, this issue should not be overlooked.

Present study results suggest a positive relationship between blood cholesterol levels and BMI among participants, as 10.3%, 57.9% and only 31.7% of those with high cholesterol were obese, overweight, and normal weight, respectively. Among subjects with low HDL-C, 11% were obese and 47.8% were overweight. It was also found that TG values increased with increasing BMI; normal-weight individuals had an average TG level of 162.4 mg/100 ml, whereas overweight and obese individuals had levels of 189.3 mg/100 ml and 172.7 mg/ 100 ml, respectively. Generally, the high levels of TG and cholesterol observed among police officers in present study may be due to the increased prevalence of overweight and obesity.

Poor health behaviors, which usually include a high intake of red meat, fried foods, and prepared food from restaurants, low intake of fibre-rich foods, and physical inactivity, may be the cause of the high blood lipid levels observed in police officers in the present study.

In present study authors found that 21.5% of policemen has blood sugar level >110 mg/dl. Increased body weight leads to elevated blood sugar levels; the study found that among participants with high blood sugar levels, approximately 10.2% were obese and 52.3% were overweight. These results agree with those obtained by Al- Qahtani et al, and Timar et al, who reported a high blood sugar prevalence of 2.9% among normal weight individuals compared to 4.8% and 5.8% among overweight and obese individuals, respectively.^{11,12} The increased blood sugar levels observed in obese police officers may be attributable to several causes, including an increased intake of sugars and sweets and low intake of fibre-rich foods. Other factors may also be attributable, such as a decreased insulin sensitivity, which is often associated with obesity and is a direct cause of high blood sugar levels. Christopher et al, noted that overweight and obesity led to poor insulin sensitivity and was associated with increased blood sugar levels, increased intake of carbohydrate-rich foods, and a lack of physical activity.^{14,15}

CONCLUSION

As there was more prevalence of obesity and overweight among policemen in studied district, effective implementation of a physical fitness program, a regular balanced diet, inoculation training for managing stress can improve the life of police personnel and make them less prone to be obese and related disorders. Health checkup should be made mandatory to avoid their negligent behavior and early detection of lifestyle-related disorder.

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