Original Research Article

Assessment of Weight Status among Police Head Constables in Delhi

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ABSTRACT

Background: Police work is mentally demanding and stressful, which takes a heavy toll on the health of police personnel. The consequences are obesity, high blood pressure and diabetes which should be curbed to maintain sound health.

Methods: This was a cross sectional study that assessed the weight status of 85 male police head constables in Delhi. A predesigned & pretested questionnaire was used to elicit information on socio demographic and job profile of the participants. Height, weight, waist circumference (WC), body fat (BF) percentage and blood pressure of the participants were measured. Data was analyzed using SPSS 16.0 software.

Results: As per the World Health Organization (WHO), body mass index (BMI) classification, 60% (n=51) of the subjects were overweight and 12 % (n=10) were class I obese. According to adult treatment panel (ATP III) classification of waist circumference 41.2 % (n=35) of the subjects had above the desired level of WC. It was seen that 47.1% (n=40) had BF percentage of the overweight category and 45.8 % (n=39) were lying in the obese category. A strong positive correlation was found between BMI and body fat % (r= 0.93, p < 0.05). About 23.5% (n=20) of the subjects were found to be prehypertensive and 63.6% (n=54) had stage I hypertension.

Conclusion: Noticeable prevalence of overweight and obesity was found among the police constables along with associated comorbidities, emphasizing the need for suitable prevention strategies.

Key words: Police, Obesity, BMI

INTRODUCTION

The Police department is one of the most significant departments for societal welfare that sustains law and order in the population. Police have to work day and night, in order to keep the public safe and secure. [1] They deal with an array of unique situations and stresses on habitual basis. In law enforcement, the police personnel are trained and disciplined in policing for the longest time, however, no guidance are given to them on how to sustain and safeguard their psychological and physical wellbeing. [2] They go through a lot of stress due to their shift work, transferable jobs and inadequate sleep. This often leads to inappropriate food choices, irregular and unbalanced meals. High blood pressure, diabetes and obesity are the result of their stressful work which requires timely attention to maintain good health lifelong. [3]

Overweight and obesity are defined as abnormal or excessive fat accumulation in the body that may impair health. [4] Android obesity in particular has been linked with diseases and metabolic disorders such as hyperinsulinemia, insulin resistance, type 2 diabetes, hypertension, dyslipidemia, coronary heart disease, gallbladder disease, and certain cancers contributing to high morbidity and mortality. [6] Obesity can also limit activity restricting policemen to desk

duty and may create a dangerous situation while on patrol as it affects swiftness of action. Over a period of time those who are not obese becomes negligent towards maintaining a fitness regime as they age. [7]

Overweight and obesity are leading risks for mortality worldwide. Obesity causes around 3.4 million adults deaths each year. [4] The Global nutrition report 2017 shows the prevalence of overweight and obesity among adult men greater than the age of 18 years (using WHO BMI cutoffs) to be 38 % and 11 % respectively. [5]

A study conducted among Kolkata policeman evaluating the influence of risk factors on the prevalence of diabetes showed that age, parental history, waist circumference, waist to hip ratio (WHR) and waist to height ratio (WHtR) were important risk factors found to be significantly higher in impaired fasting glucose (IFG) and diabetes groups compared to the group having a normal blood glucose level. [8]

Excessive body fat may lead to increased metabolic risk, therefore its' measurement is imperative in implementing remedial and preventive health measures and interventions. [9] The present study was conducted to assess the prevalence of overweight and obesity among police head constables.

MATERIALS AND METHODS

This was a cross sectional study conducted on 85 adult male police head constables in Delhi, 20-60 years of age. Subjects were enrolled during the period of October 2013 to February 2014. Police personnel who were working in the field area and willing to participate in the study were selected. Informed consent was obtained from the subjects and participant information sheet consisting information about the purpose and methodology of the study was also given. Ethical clearance was obtained from Lady Irwin College institutional ethical committee.

Information on socio-demographic and job profile of all the subjects was collected using a pretested semi structured questionnaire. Anthropometric measurements like height, weight, waist circumference and total body percentage of each subject were measured. Weight and body fat percentage were measured for the subjects using bioelectrical-impedance analyzer (BIA), TANITA (B-420 MA). The subjects were asked to stand bare feet and in light clothes on the instrument and were told to look straight ahead, with arms hanging loosely on sides while measuring weight. They were instructed to remove any extra clothing like sweaters, belts and accessories such as rings and mobile phones prior to measurement.

Height was measured using the anthropometric rod with the least count of 0.1 cm using standardized technique. [10] Blood pressure was measured using a standardized Digital Sphygmomanometer using standardized procedure. [11] The weight and height measurements were used to calculate BMI, an indicator of overweight and obesity. BMI is the ratio of weight in (kg)/height in (m²).

The waist circumference was measured using non stretchable, fiber glass tape, with sensitivity of 0.1cm. The data were scrutinized in a given day and all the errors encountered were resolved in the next visit.

Statistical analysis

Data collected was entered and consolidated in Microsoft excel 2010 version and were analyzed using Statistical Package for the Social Sciences (SPSS) 16.0 software. Pearson correlation coefficient was applied to check the correlation between BMI and body fat percentage of the subjects ($P < 0.01$) and BMI and systolic and diastolic blood pressure ($P < 0.05$).

RESULTS
Socio demographic and job profile

The study sample consisted of 85 police head constables. Table 1 shows the socio demographic characteristics of the subjects. Majority (57.6%) of the subjects were middle aged police personnel (41-50 years). The mean age of the subjects was

44.7 ± 8.08 years. Most of the subjects were married. According to National Council of Applied Economic Research (NCAER) [12] classification, all the participants belonged to middle income group category. Majority (95%) of them had nuclear families. All the subjects were literate and had varying levels of school and college education.

Table 1: Socio-demographic characteristics of the subjects (N=85)

S. No.	Domain	Number (%)
1.	Age	
	21-30	9 (10.7)
	31-40	6 (7)
	41-50	49 (57.6)
	51-60	21(24.7)
2.	Religion	
	Hindu	79 (92.8)
	Muslim	2 (2.4)
	Christian	2 (2.4)
	Others	2 (2.4)
3.	Marital Status	
	Unmarried	4 (5)
	Married	81 (95)
4.	Type of Family	
	Nuclear	81 (95)
	Joint	4 (5)
5.	Educational Status	
	High School (Class X)	34 (40)
	Intermediate School (Class XII)	31 (38)
	Graduate	16 (19)
	Post Graduate	4 (3)

The data showed that majority of the subjects 94% (n=80), reported that they did not have fixed job timing and often had to work round the clock. All of them reported that they did not get adequate time to sleep and had to commute long distances to work. Self reported morbidities included diabetes in 9 subjects (14.1 %) and joint pain and slip disc in two and three subjects respectively. Hypertension was reported by four subjects.

Anthropometric profile

The mean height and weight of the respondents were 174.6 cm and 81.6 kg respectively (Table 2). The data when compared with the definition for reference Indian man given by ICMR indicates the mean weight of the subjects was higher than the reference weight of 60 kg and also mean height was higher than the reference height of 1.73 m. [13]

Table 2: Height and weight measurements of subjects

Parameter	N=85	
	Range	Mean± SD
Height (cm)	165-191	174.6 ± 4.7
Weight (kg)	62.1-103.6	81.6 ± 8.9

Table 3, shows categorization of the police personnel based on BMI. The values of BMI for the subjects ranged between 18.64 kg/m² to 33.83 kg/m² with a mean of 26.80 ± 2.9 kg/m². As per WHO classification, 60% (n=51) of the subjects were in the category of overweight and 12% (n=10) were class I obese. [14] Based on International obesity task force/International association for the study of obesity (IOTF/IASO/ WHO) classification, 17.6% (n=15) were at risk of obesity, 60% (n=51) were in the category of obese class I and 11.8% (n=10) of the subjects were in obese class II category. [15]

Table 3: BMI of police personnel (N=85)

According to WHO (2000), BMI Classification (kg/m²)	
Classification	Number (%)
Normal (18.5-24.9)	24 (28 %)
Overweight (25-29.9)	51 (60%)
Class I Obesity (30-34.9)	10 (12%)
According to IOTF/IASO/WHO (2000), BMI Classification (kg/m²)	
Normal weight (18.5-22.9)	9 (10.6%)
At risk of obesity (23- 24.9)	15 (17.6%)
Obese class I (25-29.9)	51 (60%)
Obese II (≥30)	10 (11.8%)

The waist circumference of the subjects is shown in Table 4. WC of the subjects ranged between 74.5-124 cm with a mean of 99.6 cm and SD of 8.2 cm. According to ATP III, 41.2 % (n=35) of the subjects had above desirable level of waist circumference. [16] According to the classification given by IOTF/IASO/WHO, 90.6 % (n=77) subjects had waist circumference more than the desired levels. [17]

Table 4: Waist circumference of police personnel (N=85)

ATP III (2001) Classification of Waist Circumference	
Waist circumference	Number (%)
Desirable (< 102 cm)	50 (58.8)
Above desirable (≥ 102 cm)	35 (41.2)
IOTF/IASO/WHO(2000) classification of waist circumference	
Desirable (< 90 cm)	8 (9.4)
Above desirable (≥ 90 cm)	77 (90.6)

Table 5 categorizes police constables based on their body fat percentage. The mean body fat percentage of the subjects was 26.08 % with a range of 12.1-33 %. Based on the classification by Gallagher *et al,* [17] 60% (9) of the subjects in the age

group of 20-39 years had body fat percentage of the overweight category and 33.3% (n= 5) of the subjects were lying in the obese category. In the middle aged group of 40-59 years, 44.3 % (n= 31) had body fat % of the overweight category and

48.6% (n= 34) subjects were lying in the obese category according to their body fat percentage. Overall 47.1 % (n= 40) and 45.8 % (n= 39) of the subjects had fat percentage of the overweight and obese category respectively.

Table 5: Body fat percentage of police constables

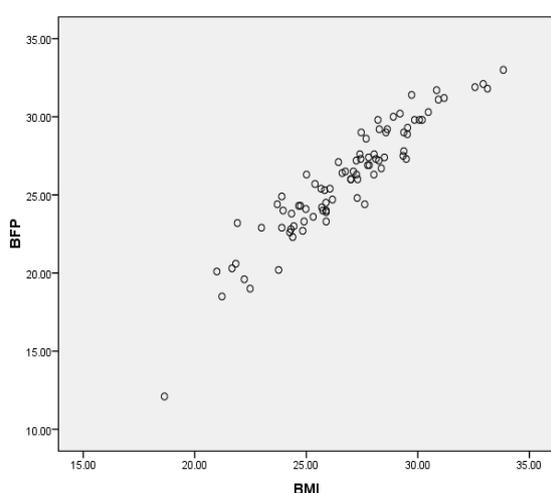| Age	Under Fat	Healthy Range	Overweight	Obese
20-39 years	Less than 8%	8%-less than 19%	19% -25%	More than 25%
Subjects (n=15)	0	1 (6.7 %)	9 (60 %)	5 (33.3 %)
40-59 years	Less than 11%	11%-less than 22%	22% -27%	More than 27%
Subjects (n=70)	0	5 (7.1 %)	31 (44.3 %)	34 (48.6 %)
Total (N=85)		Total sub= 6 (7.1 %)	Total sub = 40 (47.1 %)	Total sub = 39 (45.8 %)

Figure 1: Scatter plot of the relationship between BMI and BFP (Body fat percentage)

Pearson correlation coefficient was also calculated to see the relationship between

BMI and body fat percentage of the subjects (Figure 1). A strong positive correlation was found between BMI and body fat % (r= 0.93, p < 0.01).

Anthropometric characteristics of the subjects by age group are shown in Table 6. The mean weight, BMI, waist circumference and body fat percentage were relatively higher in middle aged police head constables as compared to young adults. About 23.5% (n=20) of the subjects were found to be prehypertensive and 63.6% (n=54) had stage I hypertension shown in Table 7 by joint committee on nutrition (JNC) 8 classification. [18] A weak correlation was seen between BMI and systolic and diastolic blood pressure respectively (r_1= 0.22, r_2=0.23, p < 0.05)

Table 6: Anthropometric characteristics of the subjects by age group

Blood pressure classification JNC (2014)(N=85)	Number (%)
Normal (Systolic < 120 mm of Hg and/ or Diastolic <80 mm of Hg)	11 (12.9)
Prehypertension (Systolic 120-139 mm of Hg and/ or Diastolic 80-89 mm of Hg)	20 (23.5)
Stage I hypertension (Systolic 140-159 mm of Hg and/ or Diastolic 90-99 mm of Hg)	54 (63.6)

Table 7: Categorization of subjects based on the blood pressure, JNC 8 [18]

Characteristics	Young (18-39 years) n=15 (Mean ± S.D)	Middle age (40-59 years) n=70(Mean ± S.D)
Weight (kg)	80.3 ± 10.1	81.9 ± 8.6
BMI (Kg/m^2)	24.9 ± 2.65	27.2 ± 2.8
Waist circumference (cm)	91.3 ± 6.8	101.5 ± 7.3
Body fat %	23.6 ± 3.8	26.6 ± 3.3

DISCUSSION

A total of 85 police head constables were enrolled in the study to assess their weight status. Our study indicated the prevalence of overweight as 60% and class I obesity as 12% according to WHO cut offs. A study carried out among 100 police staff

in Bangladesh reported that one fourth of the respondents were overweight (24%) according to WHO cutoffs for Asian populations. [19] Our study indicated a higher prevalence of overweight and obesity, which may be due to difference in dietary habits and work habits. Saya *et al* [20] also

reported prevalence of overweight as 46.1% and obesity as 8.1 % among police personnel in Puducherry. Another study conducted among traffic police in Mumbai revealed that out of 269 respondents 157 (58%) was obese. [21]

Police departments ensure maintenance and check of firearms, vehicles and various other required tools, recognizing its importance, but there is no scheduled regular health checkup program for the police personnel themselves to maintain their health. [2] A study conducted by Aggarwal *et al* [22] also reported prevalence of overweight among police personnel to be 26.15% (347) as per WHO BMI classification. [14] Furthermore, the present global scenario is such that, 23% of the ischemic heart disease burden, 44% of the diabetes burden and between 7 % and 41% of certain cancer burden are attributable to overweight and obesity according to WHO [4] estimates. The National family health survey (NFHS 4) 2015-2016 shows that about 18.6 % of adults in the age group of 15-49 were found to be overweight or obese (BMI $\geq$ 25.0 kg/m^2) in India, which has doubled since NFHS2005-06 (9.3 %). [23]

In the present study a strong positive correlation was found between BMI and body fat % (r= 0.93, p < 0.01) which is in line with the results of a study conducted among Sri Lankan adults that assessed the relationship between BMI and body fat percentage and revealed a significant positive correlation between BMI-BF%, in males (r =0.75, p < 0.01) suggesting that BMI is a strong predictor of body fat percentage. [24] The present study had several limitations. Due to paucity of time the sample size in the study had to be restricted to 85 subjects and women head constables could not be included because of unavailability of the sample. Biochemical profile for selected parameters such as blood glucose and lipids could not be carried out due to financial constraints.

CONCLUSION

Little has been done to determine the health status of the police constables and indicate preventive measures for the upliftment of their health. Without their competent services, it is next to impossible to keep the city functioning smoothly. Lifestyle modifications and a regular fitness programme targeted at specific groups such as police personnel who are vulnerable to non communicable diseases is essential to prevent escalation of such diseases and maintain good health.

The study should not be interpreted/utilized for any medico-legal proceedings. It is solely based on individual's observation.

Conflict of Interest

The authors declare no conflict of interest

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