

Health Condition of Traffic Police Personnel in Nagpur Division of Maharashtra, India

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ABSTRACT Overweight and obesity is a medical condition in which abnormal or excess body fat has accumulated to an extreme that may harm health and reduce life expectancy. It may increase the risk of hypertension, diabetes mellitus, cardiovascular disease and musculoskeletal disorder. The investigation has been conducted to assess overweight and obesity and understand its relation with the morbidity pattern in traffic police personnel. The present investigation has been conducted in the Nagpur division among 277 traffic police personnel, including both male and female police personnel. Information has been collected through an interview schedule. The study shows that more than 50 percent of traffic police personnel are overweight, and 17 percent are obese. Between male and female traffic police personnel, there is a significant difference in BMI ($\chi^2=14.069$, $df=3$, $p=0.003$). Forty percent of traffic police personnel suffer from musculoskeletal disorders, cardiovascular disease, and diabetes in 11 percent of traffic police personnel.

INTRODUCTION

With the increase in urbanization, many cities are experiencing very rapid growth in the number of vehicles, leading to severe traffic congestion problems. Traffic police personnel play an essential role in controlling traffic congestion. Without their efficient service, keeping the city transport running smoothly is very tough. They hold traffic congestion and clear roads and squares for transportation, but they are not concerned about maintaining their physical and mental health. City people's life becomes charming and beautiful if the city's traffic condition is smooth. For that, the traffic police personnel spend the whole day in noisy, polluted, and unhealthy environments, so health to a large extent is affected. Long working hours in a static position, emergency official duty, sleeplessness and sudden encounters with events needing more physical and psychological ability are the life of traffic police personnel. Most police personnel work long hours in day and night shifts, and this exposure leads to ill health. The workplace of any population determines their health. Traffic police personnel work in unhealthy polluted working environments for a long time. They are exposed to pollution due to vehicular exhaust fumes considered a severe health hazard. Vehicular exhaust fumes include pollutants like carbon monoxide, nitrogen dioxide, sulphur dioxide, and harmful hydrocarbons such as benzene, toluene, and xylene.

It can cause significant health problems like lung dysfunction, respiratory problems, cardiovascular disease, hypertension, musculoskeletal disorders, etc. Traffic police personnel work in unfavourable and adverse working environments like long hours within a polluted environment, standing for long hours in a static position, and lack of sanitation facilities, etc., which can affect their health directly or indirectly. An unhealthy and polluted dangerous working environment hurts the health of the personnel and increases the high risk of their health condition. Long working hours, irregular eating habits, sleeplessness, and working night shifts are considered the causes of morbidity of traffic police personnel. Adverse effects of this occupation include circadian rhythm disorders, inadequate sleep, psychological disorders, metabolic diseases, type 2 diabetes mellitus and heart disease (Arrendondo 2018). Health problems like joint pain, sleeplessness, stress, hypertension, acidity, gastric and respiratory problems appear in their personal life. Preventive measures adopted in controlling the occupational health of traffic police personnel are not remarkable. A study has thereby been conducted to assess the health status of the traffic police personnel in the Nagpur division. It has also been tried to determine the related risk factor so that appropriate preventive measures can be recommended to safeguard their health.

Overweight and obesity is a complex multifactorial ill health condition. It is treated as a disease

in which excess body fat has accumulated to an extreme that may impair health. Obesity can be considered a significant health problem due to its potential to cause several health issues, including high blood pressure and diabetes (Ejheisheh et al. 2022). Obesity is a heterogeneous chronic disease that involves the accumulation of body fat. Several studies have pointed out that it may cause hypertension, diabetes, cardiovascular disease, osteoarthritis, and respiratory problems (Phadke et al. 2014; Aggarwal et al. 2015; Alghamdi et al. 2017). An obese person is prone to illness and inability to perform the assigned duties. Obesity is considered a crucial risk factor for the cause of cardiovascular disorders. It can be an indicator of early mortality. Nearly one-third of the world's population is now classified as overweight or obese (Zhang et al. 2022).

Overweight and obesity may be more common among police officers than the general population. Prolonged working may contribute to obesity of traffic police personnel if they have less physical activity, poor dietary and inadequate meals at home, and consume more fast food or pre-prepared processed food. Obese traffic police personnel may also face health problems due to prolonged standing at work and shift work. Police officers have high rates of cardiovascular disease (Baughman et al. 2013). Long working hours are also related to heart disease (Gu et al. 2012). Obesity is the most common health problem among traffic police personnel.

The hypothesis underlying the present study is that overweight or obesity contributes to the occurrence of occupational disease among police personnel. Obesity is a complex condition with severe physical and psychological impacts on overall health. It has been seen as abnormal or as excessive fat accumulation that may impair health. Being overweight is described as having a body mass index (BMI) of greater than or equal to 25 kg/m². Chronic health conditions such as cardiovascular disease, hypertension and diabetes are associated with changes in BMI.

Objective

The study aims to assess the overweight and obesity of traffic police personnel and indicates its relation with the morbidity pattern of personnel.

MATERIAL AND METHODS

This cross sectional study was conducted among traffic police personnel of Nagpur division in Maharashtra. There are six districts under the Nagpur division, of which two districts, namely Nagpur and Wardha, were selected for the study. Official permission was taken from the Commissioner of Police for conducting the study. 687 traffic police personnel were posted in Nagpur and Wardha district of which 277 samples (about 40% of the total population) were taken for the present investigation. The study population consisted of 277 police personnel, a non-random sampling method was used to collect data from different squares and Chowk of Nagpur and Wardha city, for whom after obtaining consent, traffic personnel were interviewed. The health condition of traffic police personnel was measured with anthropometric data collected through fieldwork. The quasi-participant observation was used to understand the life of traffic police personnel at their workplace. Data collection was done by using an interview schedule after the rapport establishment.

Demographic features, personal habits, illness patterns and physical activity have been collected through interviews using a structured schedule. Self-reported morbidities such as diabetes, musculoskeletal disorders, skin infections, eye and ear problems were collected using an unstructured schedule. Of 277 traffic police personnel, 268 agreed to give anthropometric measurements for measuring Body Mass Index (BMI). BMI is considered a risk indicator of the disease. Some diseases like cardiovascular diseases, musculoskeletal disorders, osteoarthritis, diabetes, etc., increase with the increase of BMI. Out of 268 personnel, 227 were male and 41 female. Anthropometric measurements, for example, height and weight, were taken from 268 personnel. Each personnel's height and weight have been measured to calculate BMI. It is a measure of weight relative to height, and it is used to identify overweight and obese people. Regardless of age, the cut-off points for men and women are the same. Weight was measured by asking the police personnel to look and stand straight on the pre-standardised weighing machine. They were asked to remove the belt, shoes, mobile phone and other heavy objects before taking anthropometric measurements. Data was entered on Microsoft

Excel and analysed using SPSS version 23. The chi-square test was used to see the association between the dependent and independent variables. A p-value less than 0.05 was considered significant.

RESULTS

A total of 277 selected traffic police personnel from the Nagpur and Wardha district of the Nagpur division in Maharashtra have been taken as a sample of the total population (687) for the present investigation. Nearly 80 percent of the sample belongs to the constable group. Only 4 percent of the total sample have completed more than five years of service in the traffic police department. Of 277 selected traffic police personnel, 234 (84.5%) were male, and 43 (15.5%) were female. The mean age of the traffic police personnel is about 43.4 years (44.7 years for males and 35.6 years for females). Nearly 52 percent of male traffic police personnel consume tobacco and 46.5 percent of them consume alcohol. 28.8 percent of police personnel have reported suffering from various health problems such as cardiovascular disease, respiratory problems, musculoskeletal disorders, etc. A total of 268 traffic police personnel have consented to measure their BMI, of which 227 were male and 41 female. The mean Body Mass Index was calculated at 27. It has been found that nearly 55 percent of traffic police personnel are overweight, and 17.2 percent are obese. Of these, about 20 percent obese are aged 41-50 and above 50 years. Overweight and obese are comparatively lower in females than males. The BMI difference was statistically significant ($\chi^2=14.069$, $df=3$, $p=0.003$) between male and female traffic police personnel. It has been observed that the overweight and obese are found more in officers than the constable group.

About 40 percent of traffic police personnel are in the age groups of 31-40 years, followed by the age above 50 (29.9%) and 41-50 (24.9%). A large number of male traffic police personnel are in the age group 31-40 and above 50 (each 34.6%), whereas more than 70 percent of female personnel belong to the age group 31-40 years (Table 1).

Of 277 police personnel, 79.5 percent were in the constable group, and 20.5 percent were in the officer group. Most traffic police personnel (96%) had less than five years of service completed.

Of 277 traffic police personnel, 157 (56.6%) were physically exercising. Personal habits like

Table 1: Age group and sex wise distribution of traffic police personnel

Age group	Male (%)	Female (%)	Total (%)
<30	8 (3.4)	5 (11.6)	13 (4.7)
31-40	81 (34.6)	31 (72.2)	112 (40.5)
41-50	64 (27.4)	5 (11.6)	69 (24.9)
>50	81 (34.6)	2 (4.6)	83 (29.9)
Total	234 (100)	43 (100)	277 (100.0)

Source: Based on primary data.

smoking, alcohol and tobacco consumption were collected from the 234 traffic police personnel (only male traffic police personnel were included). It showed that 46.5 percent were alcoholics, 11.5 percent were smokers, and 51.7 percent were tobacco consumers (43 female traffic police personnel were excluded) (Table 2).

Of 268 traffic personnel (who gave their consent to measure BMI), the mean height and weight are 169.6 (cm) and 77.6 (kg). It has been observed that more than half (54.8%) of traffic police personnel are overweight, and 17.2 percent of traffic police personnel are obese. About one-fourth (27.3%) of police personnel are in the normal range of BMI. As per BMI, nearly one percent (0.7%) of personnel is underweight. The overweight range of BMI has been reported more in males (58.7%) than females (34.2%). 17.6 percent of male traffic personnel are obese, whereas in females, it is 14.6 percent. On the other hand, the result of the study indicates that the normal range of BMI has been found more in females (48.8%). Out of 272 (who gave their consent) traffic personnel, the mean waist and hip circumference were 93.6 cm and 104.1 cm, respectively.

Table 2: Profile of traffic police personnel

Designation	
Constable group	220 (79.5%)
Officer group	57 (20.5%)
Years of Service	
Less than 5 years of service in the traffic department	266 (96.0)
More than 5 years of service in the traffic department	11 (4.0)
Personal Habits	
Alcohol consumption	109 (46.5)
Smoking	27 (11.5)
Tobacco consumption	121 (51.7)
Exercise	157 (56.6)

Source: Based on primary data.

Table 3: Anthropometric measurements of traffic police personnel

<i>Anthropometric variable</i>	<i>Mean + SD</i>
Height	169.6 ± 7.8
Weight	77.6 ± 11.7
BMI	27.0 ± 3.6
WC	93.6 ± 7.1
HC	104.1 ± 56.4

BMI=Body Mass Index, WC=Waist Circumference,
HC =Hip Circumference

Source: Based on primary data.

Of 268 traffic police personnel (9 (7 males and 2 female) personnel was not given their consent), 54.8 percent of traffic police personnel are overweight, followed by the normal (27.3%) and obese (17.2%) category. In contrast, in the officer's group, more than 50 percent of personnel 15.6 percent

Table 4: BMI of traffic police personnel

<i>BMI classification (WHO 2010)</i>	<i>Male</i>		<i>Female</i>		<i>Total</i>	
	<i>Fre- quen- cy</i>	<i>%</i>	<i>Fre- quen- cy</i>	<i>%</i>	<i>Fre- quen- cy</i>	<i>%</i>
Underweight (<18.5)	1	0.4	1	2.4	2	0.7
Normal (18.5-24.9)	53	23.3	20	48.8	73	27.3
Overweight (25.0- 29.9)	133	58.7	14	34.2	147	54.8
Obese (>30.0)	40	17.6	6	14.6	46	17.2
Total	227	100	41	100	268	100

$\chi^2=14.069$, $df=3$, $p=0.003$ significant

Source: Based on primary data.

(53.1%) are overweight, and about 15 percent (15.6%) are obese. In contrast, in the officer's group more than 20 percent (21.8%) are in the obese category (Tables 3, 4).

It has been observed that the overweight and obese are found more in officers than the constable group. In the constable group, about 53.1 percent of personnel are overweight, and

are obese category. In contrast in the officer's group, about 61.4 percent are in the overweight category, and 22.8 percent are in the obese category. Of 268 traffic police personnel (9 personnel was not given consent), 54.8 percent of traffic police personnel are overweight, followed by the normal (27.3%) and obese (17.2%) category (Table 5).

60 percent of traffic police personnel are overweight in the age group 41-50, followed by those above 50 (57.8%) and aged 31-40 (52.4%) percent of traffic police personnel are overweight, and 14.9 are in the obese category in the 31-40 age group, whereas 60 percent of traffic police personnel are overweight, 20 percent are obese in the age group 41-50, and 57.8 percent of police personnel in the age group above 50 are overweight, and 20.5 are obese (Table 6).

Out of 277 traffic police personnel, 80 (28.8%) of police personnel have reported suffering from various health problems like diabetes, cardiovascular or musculoskeletal disorders, etc. Out of which, about 40.1 percent police personnel suffer from musculoskeletal disorders and cardiovascular disease each. 11.3 percent of traffic personnel have suffered from diabetes, 3.7 percent are reported as having respiratory disease, and about 1 percent each from skin disease, allergic problems, and eye and ear problems.

Out of 220 traffic constables selected for the study, 26.8 percent suffered from different health problems, of which 45.7 percent of constables reported suffering from musculoskeletal disorder, followed by cardiovascular disease (33.9%). In contrast, out of 57 traffic officers, 36.8 percent of officers reported suffering from health issues. Of these, 57.2 percent of traffic officers suffered from cardiovascular disease, and 23.9 percent officers had musculoskeletal disorders. 5 percent of constables suffered from respiratory disease. Diabetes was found more in officers (14.2%) than the constable group (10.2%). Allergy, eye and

Table 5: BMI of constable and officer group

Post	BMI classification								Total	
	Underweight		Normal		Overweight		Obese			
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Constable group	2	0.9	64	30.3	112	53.1	33	15.6	211	100
Officer group	0	0	9	15.8	35	61.4	13	22.8	57	100
Total	2	0.7	73	27.3	147	54.8	46	17.2	268	100

Source: Based on primary data.

Table 6: Age wise cross-tabulation of BMI

Age group	BMI classification								Total	
	Underweight		Normal		Overweight		Obese			
	Frequency	%	Frequency	%	Frequency	%	Frequency	%	Frequency	%
Up to 30	-	-	9	69.2	4	30.8	-	-	13	100
31-40	2	1.8	33	30.8	56	52.4	16	14.9	107	100
41-50	-	-	13	20	39	60	13	20	65	100
>50	-	-	18	21.7	48	57.8	17	20.5	83	100
Total	2	0.7	73	27.3	147	54.8	46	17.2	268	100

Source: Based on primary data.

ear-related problems were found in the constable group but skin diseases were in the officer group (Table 7).

The relationship of BMI with age ($r^2=0.024$), weight ($r^2=0.081$), waist circumference ($r^2=0.47$), SBP ($r^2=0.32$), and DBP ($r^2=0.25$) are found to be in positive correlation. The Pearson's correlation coefficient was found to be negative and significant ($p < 0.05^*$, $p < 0.01^{**}$) between hip circumference and weight with the value of ($r^2 = -0.12$) (Table 8).

DISCUSSION

The present study has assessed the obesity and co-morbidity of traffic police personnel in the Nagpur division. 277 police personnel have been selected for the study, of which 84.5 percent are male and 15.5 percent female. About 95 percent of police personnel belong to the age group above 30. 40.5 percent of police personnel

are in the 31-40 age group, followed by the age group above 50 (29.9%). Out of the total police personnel selected for the study, about 80 percent of police personnel were working as constables, and about 20 percent were in the officer group. Most of the traffic police personnel (96%) have spent less than five years in the traffic department.

Table 8: Correlation matrix for anthropometric measurement and BMI

Correlations									
Anthro- pometric variable	Age	Hei- ght	Wei- ght	WC	HC	SBP	DBP	BMI	
Age	1	.14*	.25**	.21**	0.10	.31**	.29**	.24**	
Height		1	.40**	.14*	-0.01	.18**	.19**	-0.01	
Weight			1	.70**	-.12*	.33**	.29**	.81**	
WC				1	.17**	.24**	.16**	.74**	
HC					1	0.02	-0.06	0.09	
SBP						1	.75**	.32**	
DBP							1	.25**	
BMI								1	

*Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

WC=Waist Circumference, HC=Hip Circumference, SBP=Systolic Blood Pressure, DBP=Diastolic Blood Pressure, BMI = Body Mass Index

Source: Based on primary data.

Table 7: Morbidity pattern as reported by police personnel (in the last one year)

Morbidity	Post		
	Constable group	Officer group	Total
	Frequency (%)	Frequency (%)	Frequency (%)
Diabetes	6 (10.2)	3 (14.2)	9 (11.3)
Musculoskel- etal disorder	27 (45.7)	5 (23.9)	32 (40.1)
Cardiovascular disease	20 (33.9)	12 (57.2)	32 (40.1)
Respiratory disease	3 (5.1)	-	3 (3.7)
Skin disease	-	1 (4.7)	1 (1.2)
Allergy	1 (1.7)	-	1 (1.2)
Eye disease	1 (1.7)	-	1 (1.2)
Ear disease	1 (1.7)	-	1 (1.2)
	59 (100)	21 (100)	80 (100)

Source: Based on primary data.

The present study has indicated that 46.5 percent of traffic police personnel consumed alcohol, 11.5 percent were smokers, and 51.7 percent were tobacco consumers. A similar study conducted among police personnel in Brahmapur city by Satapathy et al. (2009) found that 48 percent of personnel were consuming tobacco. In contrast, the study conducted by Sridhar et al. (2017) in Chennai city revealed that 38.8 percent of personnel were alcoholics, 9.7 percent

were smokers, and 43.7 percent of personnel were consuming tobacco.

The present study revealed that more than 70 percent of subjects were either overweight or obese. 54.8 percent of traffic police personnel were overweight, and 17.2 percent were obese. This finding was quite similar to that of the study conducted by Saha et al. (2010), which found that 52 percent of personnel were overweight. Of 227 male traffic personnel selected for the present study, 54 subjects (23.7%) had a BMI of less than 25 kg per metre square, while 173 subjects (76.3%) had a BMI of more than 24.99 kg per square metre. They were either overweight or obese. On the other hand, of 41 female traffic personnel, 21 subjects (51%) were observed to have a BMI of less than 25, and 20 subjects (49%) were found to have a BMI of greater than 24.9, while more than half (56.7%) of the selected subjects (277) exercised more than 20 minutes daily. The present investigation has indicated that the overweight and obese groups are observed to have more officers than the constables. Aggarwal et al. (2015) also concluded that overweight was observed more in non-officers than officers. Alghamdi et al. (2017) concluded that a high prevalence of overweight and obese police officers in Riyadh City are susceptible to cardiovascular disease and diabetes.

The present study observed that more than one-third of traffic police personnel self-reported suffering from musculoskeletal disorders and cardiovascular diseases (40.1% each). It has also been observed that 11.3 percent of personnel were diabetic, and 3.7 percent reported having respiratory problems. Skin, eye, and ear problems were found at 1.2 percent each. Almale et al. (2015) reported that 62.7 percent of Mumbai police personnel complained of musculoskeletal problems. Satpathy et al. (2009) found that musculoskeletal disorders were observed in 27.08 percent of traffic police in Brahmapur city. Prajapati et al. (2015) observed that 62 percent of traffic police in Ahmedabad city had joint problems. The study also revealed that eye problem was observed in 45 percent, gastric issues in 41 percent, and respiratory problems in 32 percent.

CONCLUSION

The present study has indicated that traffic police personnel suffer from different morbidities, such as musculoskeletal disorders, cardiovascular

diseases, diabetes, respiratory problems, allergy, skin, eye problems, etc. Cardiovascular disease and musculoskeletal disorders are more common in the studied population. It has also been observed that a positive correlation exists between BMI with age, height, weight, waist circumference, hip circumference, systolic blood pressure, and diastolic blood pressure. Due to long working hours and an improper lifestyle, they cannot eat a balanced and nutritious diet and do not regularly exercise daily. It causes them to become overweight and obese. BMI is a disease risk indicator, as an increased BMI increases the risk of musculoskeletal disorders and cardiovascular disease. From the BMI of the traffic police personnel, it has been observed the high prevalence of overweight and obesity in the studied population is leading to musculoskeletal disorders and cardiovascular disease. Therefore, focusing on a proper lifestyle, a balanced diet and regular physical activity can reduce the risk of musculoskeletal disorders, cardiovascular disease, diabetes, etc.

RECOMMENDATIONS

Based on the present study's findings, it is recommended that more police personnel need to be recruited to reduce workload. Health camps must be organized to help traffic police personnel live healthy lives, solve their health problems, and work in noisy and polluted working environments. There is also a need for periodic health check-ups every month.

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