

Original Research Article

Prevalence of hypertension and associated risk factors among petrol pump workers in Panvel city, Maharashtra: a cross-sectional study

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ABSTRACT

Background: Hypertension is a major public health challenge and an important risk factor for cardiovascular diseases worldwide. Petrol pump workers are exposed to occupational and lifestyle factors that may predispose them to hypertension. This study aimed to determine the prevalence of hypertension and associated risk factors among petrol pump workers in Panvel city, Maharashtra.

Methods: A cross-sectional study was conducted among 156 petrol pump workers aged 30 years and above in Panvel city, Raigad district, Maharashtra. Data were collected using a structured pre-tested questionnaire covering socio-demographic characteristics, occupational profile, dietary habits, tobacco and alcohol consumption, sleep pattern, and physical activity. Blood pressure was measured using standard procedures. Hypertension was defined as systolic blood pressure ≥ 140 mmHg and/or diastolic blood pressure ≥ 90 mmHg. Statistical analysis was performed using Chi-square test and odds ratios with 95% confidence intervals.

Results: The overall prevalence of hypertension was 30.8% (48/156). Additional salt intake was significantly associated with hypertension. Long-term tobacco use (≥ 10 years) was associated with increased odds of hypertension. Occupational factors such as duration of employment, standing duration, and working hours were not significantly associated with hypertension.

Conclusions: Nearly one-third of petrol pump workers were hypertensive. Additional salt intake was a significant risk factor for hypertension. Regular screening, dietary counselling, tobacco cessation services, and workplace-based lifestyle interventions are recommended for early detection and prevention of hypertension among petrol pump workers.

Keywords: Hypertension, NCD, Occupational health, Petrol pump workers, Tobacco use

INTRODUCTION

Hypertension is one of the most important modifiable risk factors for cardiovascular diseases, stroke, chronic kidney disease, and premature mortality worldwide. It is characterized by persistently elevated arterial blood pressure and is commonly defined as systolic blood pressure ≥ 140 mmHg and/or diastolic blood pressure ≥ 90 mmHg. Hypertension is often referred to as a “silent killer” because most affected individuals remain

asymptomatic until complications develop. According to the World Health Organization (WHO), more than one billion people worldwide are living with hypertension, and nearly two-thirds of cases occur in low- and middle-income countries.^{1,2} The burden of hypertension has increased substantially over the past few decades because of population ageing, urbanization, unhealthy dietary practices, physical inactivity, tobacco consumption, alcohol use, obesity, and psychosocial stress. Hypertension remains a leading contributor to

cardiovascular morbidity and mortality globally and is responsible for a significant proportion of deaths due to coronary artery disease, stroke, heart failure, and renal disease.^{8,9,13}

India is experiencing a rapid epidemiological transition with a growing burden of non-communicable diseases. Recent studies suggest that approximately one-third of Indian adults are hypertensive, making hypertension one of the most important public health challenges in the country.¹² The prevalence of hypertension among younger adults has also increased, leading to an increased risk of premature cardiovascular morbidity and mortality.^{11,12}

A community-based cross-sectional study conducted in Raigad district, Maharashtra, by Vishwambhar et al. reported a hypertension prevalence of 29.8% among adults aged ≥ 30 years and identified advancing age, smoking, and central obesity as significant predictors of hypertension, highlighting the continuing burden of hypertension in the region.²³

Occupational factors may contribute significantly to the development of hypertension. Petrol pump workers often work for prolonged hours while standing, experience occupational stress, and have irregular meal timings with limited opportunities for rest. These factors may increase the risk of hypertension. Although petrol pump workers are also exposed to vehicular emissions and petroleum vapours, these exposures are primarily associated with respiratory diseases; however, some studies suggest that long-term exposure to air pollution may also contribute to elevated blood pressure. Therefore, assessing hypertension among petrol pump workers is important for planning targeted workplace health interventions. Such exposures may adversely affect cardiovascular health and increase the risk of hypertension and related complications. Previous studies among petrol pump workers have reported various occupational health problems including respiratory, haematological, cytogenetic, and cardiovascular abnormalities.

Despite the large number of petrol pump workers employed in rapidly urbanizing areas, there is limited literature on their cardiovascular health and hypertension risk in India. Understanding the prevalence and associated risk factors of hypertension in this occupational group is important for planning targeted workplace interventions and preventive strategies. Therefore, the present study was undertaken to determine the prevalence of hypertension and identify associated risk factors among petrol pump workers in Panvel city, Raigad district, Maharashtra.

Objectives

The objectives of the present study were to estimate the prevalence of hypertension among petrol pump workers aged 30 years and above and to identify the selected

sociodemographic, occupational, anthropometric, and lifestyle-related risk factors associated with hypertension.

METHODS

A community-based cross-sectional study was conducted between October 2022 and September 2023 among petrol pump workers employed at various petrol pumps in Panvel city, Raigad district, Maharashtra. Petrol pump workers aged 30 years and above who were employed during the study period and willing to participate were included in the study. Workers aged below 30 years and those unwilling to provide written informed consent were excluded. Universal sampling was adopted, and all eligible workers available during the study period were enrolled, resulting in a total sample of 156 participants.

Data were collected through face-to-face interviews using a structured and pre-tested questionnaire. Information regarding socio-demographic characteristics, occupational profile, dietary habits, tobacco and alcohol consumption, sleep pattern, physical activity, and awareness regarding hypertension was obtained. Anthropometric measurements, including height and weight, were recorded using standard procedures, and body mass index (BMI) was calculated as weight in kilograms divided by height in metres squared (kg/m^2). Participants were classified according to the standard BMI classification.

Blood pressure was measured using a standardized sphygmomanometer after the participant had rested adequately. Three blood pressure readings were recorded at intervals of approximately 10 minutes. The first reading was discarded, and the average of the second and third readings was considered for analysis. Hypertension was defined as systolic blood pressure ≥ 140 mmHg and/or diastolic blood pressure ≥ 90 mmHg. Long-term tobacco use was defined as tobacco consumption for 10 years or more, while additional salt intake referred to the habit of consuming extra salt in addition to that used during food preparation.

The collected data were entered into Microsoft Excel and analysed using STATA version 15. Descriptive statistics were expressed as frequencies and percentages. Associations between hypertension and explanatory variables were assessed using the Chi-square test and Fisher's exact test where appropriate. Odds ratios (ORs) with 95% confidence intervals (CIs) were calculated for selected risk factors, and a p value of less than 0.05 was considered statistically significant.

Ethical approval for the study was obtained from the institutional ethics committee of the National Institute of Public Health Training and Research (NIPHTR), Mumbai. Written informed consent was obtained from all participants before enrolment, and confidentiality of the collected information was maintained throughout the study.

RESULTS

A total of 156 petrol pump workers participated in the study. Nearly half of the respondents (48.1%) belonged to the age group of 30-39 years, followed by 33.3% in the

age group of 40-49 years and 18.6% in the age group of 50-62 years. The majority of the participants were males (92.9%), and nearly half (49.4%) had primary education or were illiterate (Table 1).

Table 1: Sociodemographic characteristics of study participants (n=156).

Variables	Categories	Frequency	Percentage
Age (in years)	30-39	75	48.1
	40-49	52	33.3
	50-62	29	18.6
Sex	Male	145	92.9
	Female	11	7.1
Religion	Hindu	136	87.2
	Non-Hindu	20	12.8
Caste	General	59	37.8
	OBC	73	46.8
	SC/ST	24	15.4
Education	Primary/Illiterate	77	49.4
	Secondary	54	34.6
	Senior secondary/higher	25	16.0
Family income	<₹15,000	56	35.9
	₹15,000-30,000	69	44.2
	>₹30,000	31	19.9
Family structure	Nuclear	129	82.7
	Joint	27	17.3

Table 2: Occupational characteristics of study participants (n=156).

Risk factors	Categories	Frequency	Percentage
Working on the pump since	1-2 years	17	10.9
	3-5 years	45	28.9
	6-9 years	56	35.9
	≥10 years	38	24.4
Working hours	8-10 hours	101	64.7
	11-13 hours	55	35.3
Standing time at Petrol pump	<8 hours	14	9.0
	8-9 hours	87	55.8
	≥10 hours	55	35.2

Regarding occupational characteristics, more than one-third of the respondents (35.9%) had been working at petrol pumps for 6-9 years. Nearly two-thirds (64.7%) worked for 8-10 hours daily, while more than half (55.8%) reported standing for 8-9 hours per day at the workplace (Table 2).

Most participants (87.2%) reported sleeping for 6-8 hours daily. More than half (51.9%) had a normal body mass index (BMI), whereas 23.7% were underweight, 17.3% were overweight, and 7.1% were obese (Table 3). Tobacco consumption was reported by 46.1% of respondents, while smoking and alcohol consumption were reported by 7.7% and 9.0% of participants, respectively (Table 4).

Table 3: Distribution of sleeping hours and BMI characteristics of respondents (n=156).

Variables	Categories	Numbers	Percentages
Sleeping hours	6-8 hours	136	87.2
	>8 hours	20	12.8
Body mass index	Underweight	37	23.7
	Normal	81	51.9
	Overweight	27	17.3
	Obese	11	7.1

The overall prevalence of hypertension among petrol pump workers was 30.8% (48/156). The associations between hypertension and selected sociodemographic,

occupational, behavioural, and lifestyle-related factors are presented in the subsequent tables.

Table 4: Distribution of tobacco, smoking and alcohol consumption among respondents (n=156).

Variables	Categories	Number	Percentage
Tobacco consumption	No	84	53.9
	Yes	72	46.1
Tobacco consumption since	Never	84	53.9
	<10 years	38	24.4
	≥10 years	34	21.7
Smoking	No	144	92.3
	Yes	12	7.7
Smoking since	Never	144	92.3
	<10 years	4	2.6
	≥10 years	8	5.1
Alcohol consumption	No	142	91.0
	Yes	14	9.0
Alcohol consumption since	Never	142	91.0
	<10 years	5	3.6
	≥10 years	9	5.4

DISCUSSION

The present study assessed the prevalence of hypertension and associated risk factors among petrol pump workers in Panvel city, Maharashtra. The overall prevalence of hypertension was found to be 30.8%. This finding is comparable with reports from studies conducted among the Indian adult population, which have shown that approximately one-third of adults are affected by hypertension. The increasing burden of hypertension in India has been attributed to rapid urbanization, changing dietary patterns, sedentary lifestyles, tobacco consumption, and other behavioural risk factors.¹²

In the present study, the majority of participants belonged to the economically productive age group of 30-49 years. Similar age distributions have been reported in studies conducted among Petrol pump workers and other occupational groups in India.¹⁸ The observed prevalence of hypertension among relatively younger workers is a matter of concern because hypertension at an earlier age is associated with increased cardiovascular morbidity and mortality.^{14,16} Previous studies have demonstrated that early-onset hypertension significantly increases the lifetime risk of cardiovascular diseases and premature death.¹⁶

Additional salt intake was significantly associated with hypertension in the present study. Participants consuming additional salt had higher odds of hypertension than those who did not consume extra salt. This finding is consistent with established evidence that excessive sodium intake contributes to elevated blood pressure and cardiovascular disease. The World Health Organization recommends reducing dietary salt intake as one of the most cost-

effective public health interventions for the prevention and control of hypertension and cardiovascular diseases

Tobacco consumption was common among the study participants, with nearly half reporting tobacco use. Long-term Tobacco use was associated with increased odds of hypertension, although the association was not statistically significant. Similar findings have been reported in other studies where tobacco use has been identified as an important modifiable cardiovascular risk factor.^{13,14} Tobacco consumption contributes to endothelial dysfunction, increased arterial stiffness, and enhanced sympathetic activity, thereby increasing cardiovascular risk.¹³

Among the study participants, 101 (64.7%) worked for 8-10 hours daily, while 55 (35.3%) worked for 11-13 hours. Additionally, 87 (55.8%) participants remained standing for 8-9 hours per shift, and 55 (35.2%) stood for 10 hours or more. However, no significant association was observed between working hours, standing duration, and hypertension.

However, no significant association was observed between hypertension and occupational factors such as duration of employment, working hours, and standing duration. Similar findings have been reported in studies among petrol pump workers, where behavioural and lifestyle factors appeared to have a greater influence on hypertension than occupational characteristics such as duration of employment, working hours, and prolonged standing. Nevertheless, petrol pump workers remain exposed to prolonged standing, workplace stressors, irregular meal timings, petroleum vapours, and vehicular emissions, which may adversely affect their long-term health.

The prevalence observed in the present study was similar to findings reported among adult populations in India. The burden of hypertension among petrol pump workers emphasizes the need for integrating occupational health services with non-communicable disease screening programs. Early identification and management of hypertension can reduce long-term cardiovascular complications and improve quality of life among workers.

The findings of the present study highlight the need for regular blood pressure screening, health education, dietary counselling, and tobacco cessation programmes among petrol pump workers. Workplace-based interventions focusing on lifestyle modification and early detection of hypertension may contribute substantially to reducing the burden of cardiovascular diseases in this occupational group.

The study was limited by its cross-sectional design, which precludes causal inference. The study was conducted in a single geographical area, limiting generalizability. Female participants constituted a small proportion of the study

population. Some behavioral variables were self-reported and may be subject to recall bias.

CONCLUSION

The present study found that the prevalence of hypertension among petrol pump workers in Panvel city was 30.8%, indicating a substantial burden of hypertension in this occupational group. Additional salt intake was significantly associated with hypertension, while long-term tobacco use showed increased odds of hypertension. Most occupational factors, including duration of employment, working hours, and standing duration, were not significantly associated with hypertension. The findings highlight the importance of regular blood pressure screening, early diagnosis, dietary modification, reduction of salt intake, and tobacco cessation interventions among petrol pump workers. Workplace-based health promotion activities and periodic health check-ups may contribute to improved cardiovascular health and help reduce the burden of hypertension and its complications in this population.

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