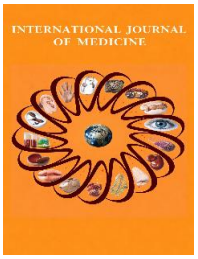

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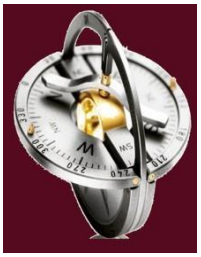

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Original Research

Prevalence and associated risk factors of hypertension among security guards employed at ESIC Medical College and Hospital, Kalburagi

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Abstract

Background: Hypertension is a major non-communicable disease and a leading risk factor for cardiovascular morbidity and mortality. Occupational groups exposed to chronic stress and irregular work schedules, such as security guards, are at increased risk, yet remain underrepresented in health surveillance programs. ***Objectives:*** To estimate the prevalence of hypertension and identify associated risk factors among security guards employed at ESIC Medical College and Hospital, Kalaburagi. ***Materials and Methods:*** A descriptive cross-sectional study was conducted among 120 security guards aged ≥30 years using universal sampling from May to July 2025. Data were collec ted using a pretested semi-structured questionnaire covering sociodemographic details, occupational profile, lifestyle factors, and family history. Anthropometric measurements and blood pressure were recorded using standard procedures. Hypertension was defined as systolic blood pressure ≥140 mmHg and/or diastolic blood pressure ≥90 mmHg or self-reported use of antihypertensive medication (JNC 8). Data were analyzed using SPSS version 22.0, and associations were tested using the chi-square test. ***Results:*** The overall prevalence of hypertension was 35.8%. Hypertension was significantly associated with overweight status (BMI >25 kg/m²), alcohol consumption, smoking, non-vegetarian diet, and work shift pattern ($p < 0.05$). Day-shift workers had a higher prevalence of hypertension compared to night-shift workers. Age and family history of hypertension were not significantly associated with hypertension. ***Conclusion:*** A high burden of hypertension was observed among security guards, predominantly associated with modifiable lifestyle and occupational factors. Regular screening, lifestyle modification, and workplace-based health promotion interventions are urgently needed to reduce cardiovascular risk in this occupational group.

Keywords: *Hypertension; Security guards; Occupational health; Body mass index; Lifestyle factors; Non-communicable diseases*

Introduction

Hypertension is one of the most prevalent non-communicable diseases worldwide and a leading modifiable risk factor for cardiovascular diseases, stroke, renal failure, and premature mortality. The World Health Organization (WHO) estimates that more than 1.28 billion adults aged 30-79 years are affected globally, with nearly two-thirds residing in low- and middle-income countries [1]. Despite availability of effective preventive and therapeutic interventions, hypertension remains underdiagnosed and poorly controlled, particularly among socio-economically vulnerable and occupationally exposed populations [2].

India is experiencing a rapid epidemiological transition with a rising burden of non-communicable diseases. Population-based studies indicate that nearly 28-30% of Indian adults are hypertensive, with a higher prevalence in urban areas compared to rural regions [3,4]. Urbanization, physical inactivity, unhealthy dietary practices, obesity, tobacco use, alcohol consumption, psychosocial stress, and sleep disturbances have significantly contributed to this growing burden [5]. Moreover, awareness, treatment, and control of hypertension remain inadequate in India, increasing the risk of cardiovascular complications [6].

Occupational factors have been increasingly recognized as important determinants of hypertension. Job strain, prolonged working hours, shift duties, circadian rhythm disruption, and chronic stress are independently associated with elevated blood pressure levels [7,8]. Security personnel represent a unique occupational group exposed to a combination of physical exertion, mental stress, irregular duty schedules, prolonged standing, and frequent interaction with the public, predisposing them to hypertension and other lifestyle -related disorders [9].
Security guards working in hospital environments encounter additional stressors such as emergency response duties, crowd mana gement, night shifts, and emotionally charged interactions with patients and attendants. Despite their critical role in institutional safety and healthcare delivery, security personnel are often excluded from structured occupational health surveillance programs, resulting in delayed diagnosis and treatment of chronic conditions such as hypertension [10].

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Studies conducted among occupational groups with similar job profiles, including police personnel and industrial workers in India, have reported hypertension prevalence ranging from 30% to over 40%, largely attributed to occupational stress, obesity, and adverse lifestyle behaviors [11,12]. However, literature focusing specifically on hospital-based security guards is limited. Available evidence suggests a substantial proportion of undiagnosed hypertension among this group, highlighting an important gap in occupational health research [13].

ESIC Medical College and Hospital, Kalaburagi, is a tertiary care teaching institution catering to a large patient population and employing a considerable number of security guards working in rotating shifts. Many of these personnel belong to lower socio-economic strata and have limited access to preventive healthcare services. Assessing the prevalence of hypertension and identifying associated risk factors among this occupational group is essential for early detection, targeted intervention, and development of workplace-based health promotion strategies. Hence, the present study was undertaken to estimate the prevalence of hypertension and to identify associated risk factors am ong security guards employed at ESIC Medical College and Hospital, Kalaburagi.

Materials and Methods

A descriptive cross-sectional study was conducted to estimate the prevalence of hypertension and to analyze its associated risk factors among security guards employed at ESIC Medical College and Hospital, Kalaburagi, Karnataka. The institution is a tertiary care teac hing hospital employing a considerable number of full-time security personnel working in rotating shifts.
The study population comprised all security guards currently employed and working within the premises of ESIC Medical College and Hospital during the study period. The study was carried out over a duration of three months, from May to July 2025.

Inclusion and Exclusion Criteria

Security guards aged 30 years and above, employed at the institution during the study period, and willing to provide informed written consent were included in the study. Security guards below 30 years of age, those unwilling to participate, and those on long-term leave or unavailable during data collection were excluded.

Sample Size and Sampling Technique

A universal sampling method was adopted. All 120 security guards employed at the institution during the study period wer e approached for participation. As all eligible individuals consented to participate, the final sample size consisted of 120 security guards.

Data Collection Tools and Techniques

Data were collected using a pretested, semi-structured questionnaire administered through face-to-face interviews. The questionnaire captured information on sociodemographic variables (age, gender, marital status, and educational status), occupational profile (duration of service and work shift), lifestyle factors (smoking, alcohol consumption, dietary pattern, and sleep quality), and family history of hypertension. Anthropometric measurements were obtained using standard procedures. Height was measured using a stadiometer to the nearest 0 .1 cm, and weight was recorded using a calibrated weighing scale to the nearest 0.1 kg. Body mass index (BMI) was calculated as weight in kilograms divided by height in meters squared (kg/m²).

Blood pressure was measured using a standard mercury sphygmomanometer following World Health Organization guidelines. Participants were instructed to rest in a sitting position for 15-20 minutes prior to measurement. Two blood pressure readings were recorded at an interval of five minutes, and the average of the two readings was considered for analysis. Hyperte nsion was defined as systolic blood pressure ≥140 mmHg and/or diastolic blood pressure ≥90 mmHg, or self-reported use of antihypertensive medication, in accordance with the JNC 8 guidelines.

Ethical Considerations

The study protocol was reviewed and approved by the Institutional Ethics Committee prior to initiation of the study. Participation was voluntary, and informed written consent was obtained from all participants. Confidentiality and anonymity of the collected data were strictly maintained throughout the study.

Statistical Analysis

Collected data were entered into Microsoft Excel and analyzed using the Statistical Package for the Social Sciences (SPSS) version 22.0. Descriptive statistics such as frequencies, percentages, means, and standard deviatio ns were used to summarize the data. The chi-square test was applied to assess associations between hypertension and categorical variables. A p-value of less than 0.05 was considered statistically significant.

Results

Table 1: Demographic profile of Study population (n=120)

Parameter	Frequency	Percentage
Age		
30-40 Years	15	12.5
41-50 Years	89	74.2
51-60 Years	16	13.3
Gender		
Male	109	90.8
Female	11	9.2
Marital Status		
Single	34	28.3
Married	72	60
Widow	5	4.2
Divorced	9	7.5
Education		
Primary	1	1
SSC	62	52
HSC	45	38
Diploma	1	1
Degree	10	8

Table 1 describes the demographic characteristics of the 120 security guards included in the study. The majority of participa nts belonged to the 41-50 years age group (74.2%), followed by those aged 51-60 years (13.3%) and 30-40 years (12.5%), indicating a predominantly middle-aged workforce. Males constituted an overwhelming majority (90.8%), reflecting the male -dominant nature of security services, while females accounted for only 9.2%. Regarding marital status, most participants were married (60%), followed by single individuals (28.3%), with widowed (4.2%) and divorced (7.5%) participants forming a smaller proportion. Educational status showed that more than half of the participants had completed secondary schooling (SSC: 52%), while 38% had higher secondary education (HSC). Only 8% were degree holders, and very few had primary education or diplomas, indicating a generally moderate educational background among the study population.

Table 2: General Characteristics of Study population (n=120)

Parameter	Frequency	Percentage
Diet		
Veg	79	65.8
Non-Veg	41	34.2
Sleep quality		
Good	41	34
Average	40	33
Poor	39	33
Body Mass Index		
Normal weight (<25)	34	28.3
Over weight (>25)	86	71.7

Table 2 presents the general characteristics related to lifestyle and anthropometry. A majority of participants followed a vegetarian diet (65.8%), while 34.2% consumed a non-vegetarian diet. Sleep quality assessment revealed that only 34% of participants reported good sleep, whereas an equal proportion reported average (33%) and poor sleep quality (33%), indicating that nearly two-thirds of the security guards experienced suboptimal sleep. Body mass index (BMI) analysis showed a high prevalence of overweight individuals, with 71.7% having BMI greater than 25 kg/m², while only 28.3% were in the normal weight category. This highlights a significant burden of overweight status in this occupational group.

Table 3 illustrates the prevalence of hypertension among the study participants stratified by gender. Overall, 43 out of 120 participants were hypertensive, resulting in a prevalence of 35.8%, while 64.2% were non-hypertensive. Among hypertensive individuals, the majority were males (93.0%), with females constituting only 7.0%. Although the proportion of hypertensive males was higher in absolute numbers, the distribution largely reflects the male-dominant study population. These findings indicate a substantial burden of hypertension among security guards, underscoring the occupational vulnerability of this group.

Table 3 : Prevalence of Hypertension among Study population (n=120)

Hypertension	Hypertensive		Total
	Hypertensive	Non-Hypertensive	
Gender			
Female	3 (7.0%)	40 (93.0%)	43 (35.8%)
Male	8 (10.4%)	69 (89.6%)	77 (64.2%)
Total	11 (9.2%)	109 (90.8%)	120 (100%)

Table 4: Association of Hypertension with other risk factors

Parameter	Hypertensive	Non-Hypertensive	Chi Square	P value
Family history of HTN				
Yes	20	33	0.15	0.68
No	23	44		
Habits				
Alcohol	16	22	12.61	0.0055 (Significant)
Smoker	4	7		
Nil	16	45		
Both	7	3		
Work Shift				
Day	30	39	4.12	0.0424 (Significant)
Night	13	38		
BMI				
Normal weight (<25)	3	31	13.46	0.0002 (Significant)
Over weight (>25)	40	46		
Diet				
Non-Veg	35	44	7.19	0.0073 (Significant)
Veg	8	33		
Age				
30-40	5	10	0.5	0.78
41-50	31	58		
51-60	7	9		

Table 4 examines the association between hypertension and various demographic, lifestyle, and occupational risk factors. Family history of hypertension did not show a statistically significant association with hypertension status ($\chi^2 = 0.15$, $p = 0.68$), suggesting that non-genetic factors may play a more prominent role in this population. In contrast, lifestyle habits demonstrated a significant association with hypertension ($\chi^2 = 12.61$, $p = 0.0055$). Participants consuming alcohol, smoking, or both had a higher prevalence of hypertension, with the highest proportion observed among those with combined habits.

Work shift pattern showed a statistically significant association with hypertension ($\chi^2 = 4.12$, $p = 0.0424$), with day-shift workers exhibiting a higher prevalence of hypertension compared to night-shift workers. Body mass index was strongly associated with hypertension ($\chi^2 = 13.46$, $p = 0.0002$), as overweight individuals accounted for the majority of hypertensive cases. Dietary pattern was also sig nificantly associated with hypertension ($\chi^2 = 7.19$, $p = 0.0073$), with non-vegetarians showing a higher prevalence compared to vegetarians. However, age category did not demonstrate a statistically significant association with hypertension ($\chi^2 = 0.50$, $p = 0.78$), indicating that hypertension in this cohort may be more closely linked to modifiable lifestyle and occupational factors rather than age alone.

Discussion

The present descriptive cross-sectional study assessed the prevalence of hypertension and its associated risk factors among security guards employed at ESIC Medical College and Hospital, Kalaburagi. The study revealed a high prevalence of hypertension (35.8%) in th is occupational group, highlighting the growing burden of non-communicable diseases among institutional support staff who are often overlooked in routine health surveillance.

Prevalence of Hypertension

The overall prevalence of hypertension in the present study (35.8%) is higher than the national adult prevalence reported in India, which ranges between 28% and 30% [1,4,14]. This finding is comparable with studies conducted among other high-stress occupational groups in India. Patnaik et al. reported a hypertension prevalence of 32% among hospital security personnel in Odisha [13], while Prakash et al. observed a prevalence of 41.6% among police personnel in Haryana [11]. Similar prevalence rates have also been reported among police and industrial

workers in other Indian settings, suggesting that occupational stress and lifestyle factors play a significant role in elevating blood pressure beyond community levels [12,13].

Demographic Profile and Gender Distribution
The majority of participants in this study were middle-aged males, with 74.2% belonging to the 41-50-year age group and 90.8% being male. The male predominance reflects the workforce composition of security services and is consistent with other occupational studies conducted in India [13,11]. Although a higher absolute number of hypertensive cases was observed among males, age and gender were not statistically associated with hypertension in the present study. Similar findings have been reported in occupational cohorts where exposure to work-related stressors and lifestyle risks tends to be uniform across age groups [7].

Lifestyle Habits and Hypertension
A significant association was observed between hypertension and lifestyle habits such as alcohol consumption and smoking. Participants with combined habits showed the highest prevalence of hypertension. This finding aligns with evide nce from Indian and international studies demonstrating that alcohol intake and tobacco use independently and synergistically increase blood pressure through sympathetic stimulation, endothelial dysfunction, and increased vascular resistance [15,16]. Roerecke et al. demonstrated that reduction in alcohol consumption leads to a significant decrease in blood pressure, reinforcing the causal relationship [17].

Body Mass Index and Hypertension
Body mass index emerged as one of the strongest predictors of hypertension in the present study. Overweight individuals (BMI >25 kg/m²) accounted for the majority of hypertensive cases, and the association was highly significant (p = 0.0002). This finding is consistent with multiple Indian studies that have demonstrated a strong link between overweight/obesity and hypertension [18,19]. The ICMR-INDIAB study also reported a rising prevalence of obesity-associated hypertension among urban and semi-urban populations [20]. Occupational sedentary behavior, irregular meal timings, and lack of structured physical activity may further exacerbate weight gain in security personnel.

Dietary Pattern and Hypertension
Dietary habits showed a statistically significant association with hypertension, with non-vegetarians exhibiting a higher prevalence compared to vegetarians. Similar associations have been reported in Indian studies, where diets rich in saturated fats, sodium, and processed foods are linked with higher blood pressure levels [21]. WHO dietary guidelines emphasize reduced salt intake and increased consumption of fruits and vegetables as key strategies for hypertension prevention [22]. Institutional canteen food choices and reliance on outside meals may contribute to unhealthy dietary patterns among security guards.

Work Shift Pattern and Hypertension
An interesting finding of the present study was the significantly higher prevalence of hypertension among day-shift workers compared to night-shift workers. Although most literature associates night-shift work with higher cardiovascular risk due to circadian rhythm disruption [23], similar findings have been reported in certain occupational studies where day-shift workers experience greater workload intensity, administrative pressure, and public interaction stress [24]. In hospital settings, day shifts often involve crowd management, emergency coordination, and greater supervisory demands, which may explain the observed association.

Sleep Quality and Hypertension
Although sleep quality was not statistically tested for association, nearly two-thirds of participants reported average or poor sleep quality. Poor sleep has been recognized as an emerging risk factor for hypertension, especially among shift workers [25]. Srivastava et al. demonstrated a significant association between poor sleep quality and uncontrolled hypertension among Indian workers [26]. This suggests that sleep hygiene should be addressed as part of workplace health promotion programs.

Family History and Age
Family history of hypertension and age did not show statistically significant associations in this study. Similar findings have been reported in occupational cohorts where lifestyle and environmental exposures overshadow genetic predisposition [7,27]. Under-reporting of family history due to lack of awareness may also explain this observation.

Public Health Implications
The findings of this study underscore the need for integrating occupational health screening and preventive strategies for security personnel in healthcare institutions. Regular blood pressure monitoring, lifestyle modification programs, dietary counselling, weight management initiatives, stress reduction interventions, and sleep hygiene education should be incorporated into institutional health policies.

Conclusion

This cross-sectional study demonstrates a high prevalence of hypertension (35.8%) among security guards employed at ESIC Medical College and Hospital, Kalaburagi, indicating a substantial burden of non-communicable disease in this occupational group. Hypertension was significantly associated with modifiable risk factors, including overweight status, unhealthy lifestyle habits such as alcohol consumption and smoking, non-vegetarian dietary pattern, and work shift characteristics. Body mass index emerged as a strong predictor of hypertension, highlighting the role of obesity in disease development. In contrast, age and family history did not show a significant association, suggesting that occupational and lifestyle factors play a more dominant role in this population. The findings emphasize the urgent need for routine blood pressure screening, lifestyle modification programs, and workplace-based health promotion interventions targeting security personnel to prevent cardiovascular morbidity and improve overall occupational health outcomes.

Conflict of Interest: None

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