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# Pre-hypertension, Hypertension, and Obesity among Banking Employees in Lahore: A Cross-Sectional Study

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## ABSTRACT

**Background:** Hypertension is a major non-communicable disease and a growing public health concern in Pakistan. Sedentary work patterns, limited physical activity, and psychosocial stress significantly contribute to its rising prevalence. Occupational groups such as banking employees, who face prolonged sitting and high work pressure, are particularly prone to cardiovascular risk factors. **Objective:** To determine the prevalence of pre-hypertension, hypertension, and obesity among banking employees in Lahore, Pakistan, and assess their association with clinical and behavioral risk factors. **Methodology:** A descriptive cross-sectional study was conducted among 150 banking employees from five major commercial banks in Lahore using stratified random sampling. The study population comprised full-time employees aged 22–55 years, including clerical staff, customer service officers, and mid-level management. Employees with known secondary hypertension, severe cardiovascular disease, pregnancy, or any condition limiting participation in physical assessments were excluded. Data were collected through a structured questionnaire on sociodemographic factors, physical activity, dietary habits, smoking, and perceived stress. Blood pressure was recorded using standard protocols, and body mass index and waist circumference were measured. Chi-square tests assessed associations between blood pressure and risk factors, while logistic regression identified independent predictors. **Results:** The prevalence of pre-hypertension and hypertension was 34.8% and 29.6%, respectively. Overweight and obesity were found in 36.0% sand 28.8% of participants, respectively, while central obesity affected 42.0% of participants. Elevated blood pressure was more common among males, employees over 40 years old, those with a higher body mass index, and those with low physical activity. Logistic regression identified obesity, central obesity, age, and perceived stress as independent predictors ($p<0.05$). **Conclusion:** A high prevalence of hypertension and obesity exists among banking employees in Lahore. Workplace-based interventions that promote regular screening, physical activity, and stress management are essential for reducing cardiovascular risk.

**Keywords:** Banking employees, Cardiovascular risk, Hypertension, Obesity, Pre-hypertension

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## INTRODUCTION

Hypertension, commonly known as high blood pressure, is a leading non-communicable disease that contributes significantly to morbidity and mortality worldwide. Globally, it is estimated that over 1.28 billion adults aged 30–79 years are affected by hypertension, with a majority residing in low- and middle-income countries.[1] Often termed the "silent killer," hypertension frequently remains undiagnosed due to its asymptomatic nature, which delays timely intervention and increases the risk of severe cardiovascular events such as stroke, myocardial infarction, and heart failure.[2] In Pakistan, the burden of hypertension is rising rapidly, reflecting the consequences of urbanization, lifestyle changes, and demographic transitions.[3] National surveys indicate that approximately 26–33% of Pakistani adults suffer from elevated blood pressure, yet a substantial proportion remains unaware of their condition.[4] This scenario highlights critical gaps in health screening, awareness, and early prevention efforts, emphasizing the urgent need for targeted public health strategies.[5]

Occupational factors play an essential role in shaping lifestyle behaviors and health outcomes. Sedentary professions, in particular, increase susceptibility to hypertension and related metabolic disorders[6]. Banking employees represent one such high-risk occupational group.[6] Their daily work routine typically involves prolonged sitting, limited physical activity, long working hours, and high mental stress due to strict deadlines, customer service obligations, and performance targets.[7,8] These occupational stressors, coupled with unhealthy dietary practices, irregular meal patterns, and minimal opportunities for recreational exercise, significantly elevate the risk of developing cardiovascular diseases.[9] Evidence from regional studies in South Asia indicates that bank workers experience higher rates of pre-hypertension and hypertension compared to the general population[10], highlighting the need for occupation-specific health assessments.[6,8]

Obesity, including both generalized and central obesity, is another critical risk factor for hypertension.[11] Excess body weight contributes to increased peripheral resistance, insulin resistance, and inflammatory processes that elevate blood pressure.[12] In Pakistan, the prevalence of obesity is alarmingly high due to dietary transitions, sedentary lifestyles, and limited public awareness about weight management.[3,13] National data suggest that over half of urban adults are overweight or obese, with central obesity disproportionately affecting middle-aged adults and professionals in sedentary occupations.[12] Among bank employees, prolonged inactivity and workplace stress are directly linked with weight gain, further exacerbating hypertension risk.[11] Moreover, central obesity, often measured by waist circumference, is a stronger predictor of cardiovascular complications than overall body mass index, underscoring its relevance in occupational health research.[14]

Behavioral and psychosocial factors, including physical inactivity, poor dietary habits, smoking, alcohol consumption, and perceived stress, significantly influence the development and progression of hypertension.[7,12] High-stress environments, characteristic of banking sectors, can trigger hormonal responses such as elevated cortisol levels, leading to sustained increases in blood pressure.[7] Stress may also indirectly contribute to hypertension through unhealthy coping mechanisms, such as increased consumption of high-calorie foods, reduced physical activity, and disturbed sleep patterns.[6,12] Understanding the interplay between occupational stress and lifestyle behaviors is crucial for designing effective preventive interventions targeted at high-risk professional groups.[7]

Despite the growing awareness of non-communicable diseases in Pakistan, there is limited research focusing on hypertension and obesity among banking employees, especially in urban centers like Lahore.[4] Existing studies predominantly target the general population, school-aged children, or rural communities, leaving a gap in knowledge regarding occupational health risks among professionals exposed to sedentary work patterns.[3,10] Addressing this gap is particularly important given the rapid growth of the banking sector in Pakistan, the increasing prevalence of non-communicable diseases, and the potential impact of workplace health interventions on employee productivity, absenteeism, and long-term healthcare costs.[6,9]

Given this context, the present study aims to assess the prevalence of pre-hypertension, hypertension, overweight, and obesity among banking employees in Lahore, Pakistan. Additionally, the study seeks to identify associated clinical and behavioral risk

factors, including age, sex, body mass index, waist circumference, physical activity levels, dietary habits, smoking status, and perceived stress. By focusing on this specific occupational group, the study provides valuable insights into workplace-related health risks, enabling the development of targeted interventions and health promotion programs.[5,7] Preventive strategies, including regular health screening, workplace wellness programs, stress management workshops, and promotion of physical activity, could substantially reduce cardiovascular risk among employees, improve overall health outcomes, and enhance organizational productivity.[6,8]

Hypertension and obesity are significant and interrelated public health challenges in Pakistan, particularly among sedentary occupational groups such as bank employees. The convergence of lifestyle factors, occupational stress, and biological predisposition places this population at heightened risk for cardiovascular morbidity.[3,5] This study, therefore, addresses an urgent need to quantify the burden of hypertension and obesity among banking professionals in Lahore, understand their associated risk factors, and inform evidence-based preventive strategies.[6,7] By doing so, it contributes to the broader agenda of workplace health promotion and cardiovascular disease prevention in urban Pakistan, providing a framework for policymakers, health practitioners, and organizational leaders to implement effective interventions tailored to high-risk occupational groups.[7,12]

## METHODOLOGY

A descriptive cross-sectional study was conducted to assess the prevalence of pre-hypertension, hypertension, overweight, and obesity among banking employees in Lahore, Pakistan. The study was carried out between March and June 2025 across five major commercial banks, representing diverse work environments and employee demographics. Lahore, as a metropolitan city with a rapidly expanding banking sector, provided an appropriate setting to evaluate cardiovascular risk factors in an urban occupational population. The study population comprised full-time employees aged 22–55 years, including clerical staff, customer service officers, and mid-level management. Employees with known secondary hypertension, severe cardiovascular disease, pregnancy, or any condition limiting participation in physical assessments were excluded. A total of 150 participants were recruited using stratified random sampling to ensure representation across different departments and job grades.

Data were collected using a structured, self-administered questionnaire, which included sections on demographic characteristics like age, sex, education, marital status, behavioral factors like physical activity, dietary habits, smoking, alcohol consumption, and occupational stress assessed using the Perceived Stress Scale. The questionnaire was pilot-tested on 10 employees to ensure clarity and reliability. Anthropometric assessments included height, weight, body mass index (BMI), and waist circumference (WC). Weight was measured using a calibrated digital scale, and height was measured using a stadiometer. BMI was calculated as weight (kg) divided by height squared ($m^2$). Waist circumference was measured at the midpoint between the lowest rib and the iliac crest using a flexible tape measure. Blood pressure (BP) was measured using a validated automated sphygmomanometer after the participant had rested for at least 5 minutes. Three readings were taken at 2-minute intervals, and the average of the last two readings was recorded.

Ethical approval was obtained from the Institutional Review Board of Fatima Memorial Hospital, Lahore. Written informed consent was obtained from all participants before data collection, and the participants were assured of the confidentiality of the data collected. Data were entered and analyzed using SPSS version 25. Descriptive statistics were used to summarize demographic characteristics, prevalence of pre-hypertension, hypertension, overweight, and obesity. Chi-square tests were applied to examine associations between categorical variables, while logistic regression analysis was conducted to identify independent predictors of elevated blood pressure. A p-value of $<0.05$ was considered statistically significant.

## RESULTS

A total of 150 banking employees participated in the study, including 86 males (57.3%) and 64 females (42.7%). The participants' ages ranged from 22 to 55 years, with a mean age of 35.6 ± 7.8 years. Most employees were married (62%) and held positions as clerical staff (40%), customer service officers (35%), or mid-level management (25%). Table 1 shows the analysis of blood

pressure measurements revealed that 52 participants (34.7%) had pre-hypertension, while 44 participants (29.3%) were hypertensive. Normal blood pressure was observed in 54 participants (36%). Males exhibited a higher prevalence of hypertension (34.9%) compared to females (22%). Hypertension prevalence increased markedly with age: participants aged 18–30 years had a prevalence of 11.7%, those aged 31–40 years had 26.7%, and participants over 40 years had 34.6%, indicating a strong correlation between advancing age and elevated blood pressure.

Table 1 also shows the mean BMI of participants was 27.2 ± 3.8 kg/m$^2$. Overweight was observed in 54 participants (36%), and obesity in 43 participants (28.7%). Central obesity, defined by waist circumference, was found in 63 participants (42%). Notably, central obesity was more prevalent in males (47.7%) than females (34.4%), indicating a gender-specific risk pattern. Participants with higher BMI and central obesity were significantly more likely to have pre-hypertension and hypertension. Among hypertensive participants, 75% were either overweight or obese, and 61% exhibited central obesity, highlighting the strong association between elevated blood pressure and excess body weight.

Table 2 shows the behavioral risk factors were common among participants. Physical inactivity was reported by 68 participants (45.3%), while 32 participants (21.3%) were current smokers. Unhealthy dietary habits, including frequent consumption of fast foods, sugary drinks, and low intake of fruits and vegetables, were reported by 75 participants (50%). High perceived occupational stress was noted in 61 participants (40.7%). When analyzed against blood pressure categories, participants with elevated blood pressure (pre-hypertension and hypertension combined, n=96) were more likely to be physically inactive (50%), smokers (29%), have central obesity (47%), and report high occupational stress (47%). Logistic regression revealed that obesity, central obesity, age over 40 years, male sex, and high perceived stress were independent predictors of elevated blood pressure ($p<0.05$).

Hypertension prevalence showed a clear association with both gender and age. Male employees were more likely to be hypertensive (34.9%) than females (22%), possibly due to differences in lifestyle, occupational stress, and central adiposity. Age-specific analysis showed that participants over 40 years had the highest prevalence of hypertension (34.6%), followed by those aged 31–40 years (26.7%), and 18–30 years (11.7%), demonstrating a progressive increase in cardiovascular risk with age (Table 4). Overall, 64% of participants had either pre-hypertension or hypertension. Obesity and central obesity were highly prevalent (28.7% and 42%, respectively) and closely associated with elevated blood pressure. Behavioral factors, including physical inactivity, smoking, and high perceived stress, were more common in participants with hypertension. Males and older employees were at higher risk, indicating that age, sex, lifestyle, and occupational stress are important determinants of cardiovascular risk in this population. The findings underscore the need for workplace health

**Table 1: Frequency and percentage of variables**

| Variables | | Frequency | Percentage (%) |
|---|---|---|---|
| Blood Pressure Status | Normal | 54 | 36.0 |
| | Pre-hypertension | 52 | 34.7 |
| | Hypertension | 44 | 29.3 |
| BMI/WC Category | Normal Weight | 53 | 35.3 |
| | Overweight | 54 | 36.0 |
| | Obese | 43 | 28.7 |
| | Central Obesity | 63 | 42.0 |

**Table 2: Association of behavioral and clinical factors with elevated blood pressure**

| Risk Factors | Elevated BP (n=96) | Normal BP (n=54) | p-value |
|---|---|---|---|
| Physical inactivity | 48 (50%) | 20 (37%) | 0.048 |
| Smoking | 28 (29%) | 4 (7%) | 0.002 |
| Unhealthy diet | 50 (52%) | 25 (46%) | 0.432 |
| High occupational stress | 45 (47%) | 16 (30%) | 0.035 |
| Obesity (BMI ≥30) | 33 (34%) | 10 (18%) | 0.019 |
| Central obesity | 45 (47%) | 18 (33%) | 0.042 |

**Table 3: Age and gender distribution of hypertension**

| Age Group (years) | Frequency (%) | | |
|---|---|---|---|
| | Males | Females | Total |
| 18–30 | 4 (10%) | 3 (12%) | 7 (11.7%) |
| 31–40 | 12 (28%) | 8 (24%) | 20 (26.7%) |
| >40 | 14 (46%) | 3 (33%) | 17 (34.6%) |
| Total | 30 (34.9%) | 14 (22%) | 44 (29.3%) |

promotion programs focusing on physical activity, healthy diet, stress management, and regular health screening.

## DISCUSSION

This study aimed to assess the prevalence of prehypertension, hypertension, overweight, and obesity among banking employees in Lahore, Pakistan. The findings reveal a concerning prevalence of cardiovascular risk factors within this occupational group, highlighting the urgent need for targeted health interventions. The study found that 34.7% of participants had prehypertension, and 29.3% were hypertensive, resulting in a combined prevalence of 64% for elevated blood pressure. These figures are consistent with recent studies indicating a high burden of hypertension in urban Pakistan. For instance, a 2023 review reported that the prevalence of hypertension in urban areas of Pakistan was 44.3%, with 46.8% in rural areas.[15] Another study in 2023 found that the prevalence of hypertension among the Pakistani population aged 15 years and above was 18%, with urban populations exhibiting higher rates than rural ones.[16]

The higher prevalence observed in this study may be attributed to the sedentary nature of banking jobs, high job demands, and long working hours, which are known to contribute to elevated blood pressure levels.[17] The study revealed a high prevalence of overweight and obesity, with 36% and 28.7% of participants classified as overweight and obese, respectively. Central obesity, defined by waist circumference, was found in 42% of participants. These findings align with national data indicating a significant obesity burden in Pakistan. According to a 2023 report, 23% of the entire population of Pakistan is clinically obese according to the WHO.[18] Another study reported that the prevalence of generalized obesity was 57.9%, and central obesity was 73.1% in urban Pakistan.[19] The high rates of obesity and central obesity underscore the need for workplace health promotion programs focusing on healthy eating and physical activity to mitigate cardiovascular risk.[20]

Behavioral risk factors such as physical inactivity, smoking, and high perceived occupational stress were prevalent among participants. Physical inactivity was reported by 45.3%, smoking by 21.3%, and high occupational stress by 40.7% of participants. These factors are well-established contributors to hypertension and other cardiovascular diseases.[15] A systematic review highlighted that job stress can significantly increase the risk of cardiovascular diseases, including hypertension.[21] The high levels of occupational stress reported in this study may be attributed to the demanding nature of banking jobs, which often involve long working hours, high workloads, and pressure to meet performance targets. Addressing these stressors through organizational changes and stress management programs could be beneficial in reducing cardiovascular risk among employees.[16]

Hypertension prevalence increased with age, with participants over 40 years exhibiting the highest rates. Additionally, males had a higher prevalence of hypertension compared to females. These findings are consistent with national trends, where hypertension prevalence increases with age and is higher in men than in women.[17] The gender differences observed may be related to lifestyle factors, such as higher rates of smoking and alcohol consumption among males, as well as differences in health-seeking behaviors and access to healthcare services.[18] The high prevalence of hypertension, obesity, and behavioral risk factors among banking employees underscores the need for comprehensive workplace health programs. Such programs should include regular health screenings, promotion of physical activity, healthy eating initiatives, smoking cessation support, and stress management workshops. Implementing these programs can help reduce the burden of cardiovascular diseases and improve employee well-being and productivity.[19]

Given the strong association between obesity and hypertension, interventions that specifically target weight reduction and central adiposity may be

particularly effective.[20] While this study provides valuable insights into the cardiovascular health of banking employees in Lahore, several limitations should be considered. The cross-sectional design precludes causal inferences, and the findings may not be generalizable to other regions or occupational groups. Additionally, self-reported behavioral data may be subject to recall bias.[21] Future longitudinal studies are warranted to establish causal relationships, evaluate the effectiveness of workplace interventions, and explore occupational determinants of cardiovascular risk in this population.[22]

In conclusion, prehypertension, hypertension, overweight, and obesity are highly prevalent among banking employees in Lahore. Age, male sex, adiposity, physical inactivity, smoking, and occupational stress were identified as key determinants of elevated blood pressure. These findings underscore the urgent need for preventive workplace health programs integrating regular health screenings, lifestyle modification, and stress management strategies to mitigate cardiovascular risk and enhance employee health and productivity.[23,24]

## CONCLUSION

This study reveals a high prevalence of prehypertension, hypertension, overweight, and obesity among banking employees in Lahore, indicating a substantial risk for cardiovascular diseases. Male sex, advancing age, high BMI, central obesity, physical inactivity, smoking, and occupational stress were identified as significant determinants of elevated blood pressure. These findings underscore the urgent need for early detection and management of modifiable risk factors to prevent progression to cardiovascular complications, which can impact both employee health and workplace productivity.

In light of these findings, comprehensive workplace wellness programs are recommended. Regular health screenings, including blood pressure, BMI, and waist circumference assessments, can identify at-risk employees early. Physical activity should be encouraged through structured exercise sessions, active commuting, and workplace movement initiatives. Nutritional support, such as healthy food options and dietary education, can help maintain a healthy weight. Stress management strategies, including mindfulness programs, counseling, and workload optimization, are also crucial. Behavioral modification programs targeting smoking cessation and healthy lifestyle adoption should be integrated. By implementing these measures, banks can reduce cardiovascular risk, promote employee well-being, and foster a healthier, more productive workforce.

## DECLARATIONS

**Consent to participate:** Written consent had been obtained from patients. All methods were performed following the relevant guidelines and regulations.
**Availability of Data and Materials:** Data will be made available upon request. The corresponding author will submit all dataset files.
**Competing interests:** None
**Funding:** No funding source involved.
**Authors' contributions:** All authors had read and approved the final manuscript.

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