

# Prevalence of Cardiovascular Risk Factors among Executive and Nonexecutive Workers in an Urban Public Sector Office Setting: A Cross-Sectional Epidemiological Study from Eastern India

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## Abstract

**Aim:** The aim of the study is to determine the prevalence of cardiovascular risk factors among executive and nonexecutive workers in an urban public sector office setting. **Methods:** A prospective, cross-sectional survey of employees in a public sector office in Eastern India was done using a structured questionnaire to collect data on demographic and lifestyle details and health conditions. Clinical examination, anthropometric measurements, blood sugar, and lipid levels were measured. The employees were divided as executives and nonexecutives based on whether they held gazetted or nongazetted posts. **Results:** A total of 502 participants were surveyed – 140 executives and 362 nonexecutives; majority were male (88.23%). The executive group had a significantly greater number of participants with older age, hypertension (57.9% vs. 39%), and overweight (40% vs. 30.6%) than the nonexecutive group. Significantly, more nonexecutives had a physically active lifestyle and relatively less presence of conventional cardiovascular risk factors such as tobacco use, hypertension, diabetes, hypercholesterolemia, and weight. The prevalence of  $\geq 3$  cardiovascular risk factors was significantly high in executives (27.9%) as compared to nonexecutives (14.1%). **Conclusion:** A higher prevalence of mostly lifestyle-related modifiable cardiovascular risk factors was seen among the executives in an urban public sector office setting in Eastern India.

**Keywords:** Cardiovascular disease, executives, India, occupation, risk factors

## INTRODUCTION

The cardiovascular disease (CVD) burden of India is increasing enormously with a mortality prediction of 4.77 million by the end of 2020.<sup>[1]</sup> The CVD burden is projected to rise more among urban Indian communities<sup>[2]</sup> with more young and middle-aged individuals (30–69 years) being affected.<sup>[3]</sup> While the exact etiology of this predisposition of Indian to CVD remains unclear, rapid transition in diet and lifestyles with urbanization contributes to the rise in these potentially reversible CVD risk factors.<sup>[4]</sup> Several cross-sectional studies have confirmed the high prevalence of risk factors such as smoking, Type 2 diabetes, high blood pressure (BP), dyslipidemia, and obesity in urban Indians.<sup>[5]</sup> Given this background, it would be useful to study the CVD risk factors and lifestyle patterns in urban office settings with young and middle-aged Indians.

We report the findings of a survey conducted among the employees of a large organized urban public sector located in Kolkata, India. The objectives were to ascertain the prevalence of cardiovascular risk factors among the employees in a public sector and to determine the differences in the prevalence of these risk factors among executive and nonexecutive rank office bearers.

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## METHODS

### Study design and patient population

A cross-sectional survey was conducted among employees in a public sector office setting in Kolkata that dealt with research and development activities on different aspects of radiation and societal applications of radiation. All employees were considered eligible and received a letter of invitation ( $n = 647$ ) for voluntary participation in the study. Written consent was obtained from all participants and an Independent Institutional Ethics Committee approved the study.

The employees were divided into executives and nonexecutives, based on whether they held gazetted or nongazetted posts. Gazetted posts included administrative officers, account officers, engineers, doctors, physicists, and chief security officers; whereas nongazetted posts included technicians, office assistants, security officers, canteen staff, and cleaners.

### Study questionnaire

A structured questionnaire was used to collect the data related to demographic characteristics, lifestyle related factors and health status.

### Clinical examination and anthropometry

A 30-sec pulse rate was measured for each participant followed by three BP measurements using a sphygmomanometer by standard techniques. The first reading was discarded, and the mean of the second and third measurements was taken as the clinic BP.<sup>[6]</sup> Height was measured using a calibrated stadiometer and weight using a bathroom scale, which was validated daily with known weights.

### Laboratory measurements

Blood samples were drawn by trained personnel, centrifuged, and stored for later analysis. Laboratory assessments included fasting blood sugar (FBS) and lipid profile in an National Accredited Board of Laboratory approved laboratory.

### Definition of demographic variables

Educational status was designated according to the highest educational level and included six groups: (i) primary, (ii) secondary, (iii) higher secondary, (iv) graduate, (v) post-graduate, and (vi) professional. Physical activity was assessed using close-ended questions probing the self-perceived, self-reported type (occupational, domestic, leisure time, and transport related). The intensity of physical activity was classified as:<sup>[7]</sup> (i) very light (walking or desk job), (ii) light (work that necessitated standing all day or housework such as cooking and cleaning in the house), (iii) moderate physical activity (gardening, agricultural work, walking long distances, or climbing >20 steps in a day), and (iv) heavy (lifting heavy weights, construction work, manual labor, or running).

### Definition of risk factors

Hypertension was diagnosed as systolic BP >139 mmHg, diastolic BP >89 mmHg,<sup>[8]</sup> or history of treatment for hypertension and diabetes as FBS >126 mg/100 ml, or

history of treatment for diabetes. Tobacco use included any form of tobacco consumption in the past 6 months, i.e., smoked (cigarettes, beedis, and cigars), oral (tobacco chewed, pan masala, etc.), and inhaled forms (snuff). Alcohol consumption was categorized as never, occasional/social, once weekly, more than once weekly, or daily. Hypercholesterolemia was diagnosed as total blood cholesterol levels >200 mg/100 ml, hypertriglyceridemia as fasting serum triglyceride levels >150 mg/100 ml, decreased high-density lipoprotein (HDL) cholesterol as fasting blood HDL-cholesterol <40 mg/100 ml, and body mass index (BMI)  $\geq 25\text{kg/m}^2$  as overweight. History of stroke and CAD was confirmed by documented evidence.

### Statistical analysis

Categorical variables were compared using Chi-square test, Fisher's exact test or Gamma statistics while an independent t-test was used for continuous variable. Logistic regression was used to assess the impact of age on the prevalence of the number of risk factors among the occupational class.

## RESULTS

Of the 647 employees invited, 502 participants responded – 140 were executives and 362 were nonexecutives. About 88% were males and the overall mean age of the group was  $45.25 \pm 11.60$  years.

### Characteristics of the overall population

Table 1 presents the demographic characteristics of the participants. Male preponderance was seen in both groups. Executives were significantly older ( $P < 0.001$ ) and had higher educational status ( $P < 0.001$ ) than the nonexecutives. More professionals, postgraduates, and graduates were seen as executives as compared to nonexecutives. The annual income was significantly higher for executives; however, the number of dependents on a participant showed similar trends in both the groups. The food habits (vegetarian or nonvegetarian) and tobacco or alcohol use were comparable across groups. The nonexecutive group was physically more active ( $P < 0.001$ ), whereas more executives had hypertension ( $P < 0.001$ ); there was no difference in the mean lipid levels, FBS, and BP between groups.

A gender-specific subgroup analysis was attempted to determine differences between the prevalence of risk factors among males versus females across both the occupational classes. However, the differences were not conclusive owing to a very low number of female participants.

### Prevalence of risk factors among occupational class

Table 2 depicts the prevalence of modifiable CVD risk factors (tobacco use, hypertension, diabetes, hypercholesterolemia, and overweight) for executive and nonexecutive groups. The prevalence of these modifiable risk factors among both the groups was significantly correlated ( $P < 0.001$ ) only when more than three risk factors were present. Executives showed more prevalence of CVD risk

**Table 1: Baseline characteristics of the overall study population (n=502)**

Characteristics	Executive (n=140), n (%)	Nonexecutive (n=362), n (%)
Age (years)	49.45±8.47 <sup>#</sup>	43.63±12.24
Number of dependents	1.96±1.074	2.01±1.041
Annual income (INR in Lacs)	24.65±5.32 <sup>#</sup>	7.991±5.447
Gender (male:female)	118 (84.3): 22 (15.7)	325 (89.8): 37 (10.2)
Marital status* (married)	133 (97.8)	312 (87.9)
Education <sup>§</sup>		
Up to higher secondary	0	235 (64.9)
Graduate	88 (62.9)	106 (29.9)
Postgraduate	43 (30.7)	14 (3.9)
Professional	9 (6.4)	0
Diet (nonvegetarians)	126 (90.6)	337 (94.7)
Physical activity <sup>§</sup>		
Very light	57 (41.0)	102 (28.3)
Light	81 (58.3)	230 (63.9)
Moderate	1 (0.7)	28 (7.8)
Risk Factors		
Tobacco use	76 (54.7)	167 (46.1)
Alcohol consumption		
More than once weekly	2 (1.4)	2 (0.6)
Daily	0 (0.0)	5 (1.4)
Medical history		
CAD	1 (0.7)	3 (0.8)
Stroke	1 (0.7)	2 (0.6)
Hypertension*	81 (57.9)	141 (39)
Diabetes mellitus	22 (15.7)	50 (13.8)
Total cholesterol levels (>200 mg/100 ml)	6 (4.3)	10 (2.8)
Fasting serum triglyceride levels (>150 mg/100 ml)	66 (47.1)	193 (53.3)
Fasting HDL levels (<40 mg/100 ml)	30 (21.4)	63 (17.4)
Fasting blood sugar levels (>126 mg/100 ml)	20 (14.3)	33 (9.1)
BMI <sup>^</sup> (≥25 kg/m <sup>2</sup> )	56 (40.0)	110 (30.6)
Systolic blood pressure (>139 mmHg)	4 (2.9)	3 (0.8)
Diastolic blood pressure (>89 mmHg)	6 (4.3)	6 (1.7)

<sup>#</sup>*P*<0.001 for the t-test considered significant, \**P*<0.001 for the Chi-square test considered for significant correlation, <sup>^</sup>*P*<0.05 for the Chi-square test considered for significant correlation, <sup>§</sup>*P*<0.001 for the gamma distribution test considered for significant correlation, Data presented as mean±SD or *n* (%). CAD: Coronary artery diseases, HDL: High-density lipoproteins, BMI: Body mass index

factors than nonexecutives. Further, nonexecutives without the presence of any of the risk factors were significantly more than executives with no risk factor presence (*P* < 0.01).

### Association between cardiovascular disease risk factors and age

The logistic regression analysis for the number of risk factors associated with occupational classes after adjustment for age is shown in Table 3. Increasing age was associated with increased number of risk factors. The presence of CVD risk factors in executives tends to rise with age as compared to nonexecutives.

## DISCUSSION

Occupational class is known to be associated with health-related behaviors. Studies have shown that those with white-collar jobs have less work-related stress than those with blue-collar jobs.<sup>[9]</sup> The assessment of the prevalence of cardiovascular risk factors among distinct occupational categories may, therefore, help to

understand the mechanisms involved in the CVD risk among the distinct occupational groups.<sup>[10]</sup>

The executives in our study were significantly older with lesser involvement in physical activities, higher BMI, and higher prevalence of hypertension than the nonexecutives. Although some of this association could be explained by lifestyle, this observation may be confounded by the older age of executives. A similar trend was seen in males when a gender-wise analysis was attempted; however, owing to a relatively lower number of female participants, the results in the female group appeared inconclusive.

Our findings are in contrast with the results from the Whitehall study published a few decades ago that showed a higher prevalence of CVD risk factors among those working in a lower grade.<sup>[9]</sup> The reason for the observed difference is not clear; however, our small sample size and data collection from a single office location might have impacted the outcome. While, it is also possible that, with time, the socioeconomically

**Table 2: Risk factor prevalence in the overall study population**

Prevalence of number of risk factors	Executive (n=140), n (%)	Nonexecutive (n=362), n (%)
Participants with no risk factor*	20 (14.3)	99 (27.3)
Participants with one risk factor	46 (32.9)	116 (32.0)
Participants with two risk factors	35 (25.0)	96 (26.5)
Participants with $\geq 3$ risk factors <sup>#</sup>	39 (27.9)	51 (14.1)

\*P-values for the Chi-square test <0.01, <sup>#</sup>P-value for the Chi-square test <0.001, Risk factors analyzed were tobacco use, hypertension, diabetes, hypercholesterolemia, and weight. Data presented as n (%)

**Table 3: Odds ratios (95% confidence intervals) of having 1, 2, and  $\geq 3$  versus no cardiovascular disease risk factors associated with age**

	Participants with the presence of one risk factor		Participants with the presence of two risk factors		Participants with the presence of $\geq 3$ risk factors	
	Executive	Nonexecutive	Executive	Nonexecutive	Executive	Nonexecutive
Age	1.108 (1.029-1.192)	1.114 (1.082-1.146)	1.134 (1.049-1.226)	1.144 (1.106-1.183)	1.410 (1.151-1.729)	1.171 (1.117-1.228)

advantaged class has rapidly adopted the behaviors that contribute toward increased risk of CVD.<sup>[10]</sup> Moreover, long working hours coupled with increasing job stress such as meeting customer expectations, target completions, and job insecurity also contribute toward the risk of developing CVD among the executives.<sup>[11]</sup> Previous epidemiological studies from India report lower cardiometabolic risk factors in people with poor socioeconomic status than those with high socioeconomic status.<sup>[12]</sup> A study in South-Eastern rural Australia which divided the workers as per occupational difference and genders showed that agricultural male workers had lower age-adjusted 5-year CVD risk scores compared to other nonagricultural rural workers.<sup>[13]</sup>

Although this study is limited by smaller sample size, the absence of psychosocial stress determination, some confounding variables such as older age in executives, and some bias that might not be ruled out; the findings do help to ascertain multiple risk factors in the present population to be lifestyle related.

## CONCLUSION

This single-center study indicates a higher prevalence of mostly lifestyle-related modifiable cardiovascular risk factors such as hypertension, higher BMI, and a sedentary lifestyle among the executives as compared to nonexecutives in an urban public sector office setting in Eastern India.

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## Conflicts of interest

There are no conflicts of interest.

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