World Journal of All Subject Research
www.worldmultijournal.com
Online ISSN:
Received: 14-12-2025, Accepted: 13-01-2026, Published: 28-01-2026
Volume 2, Issue 1, Jan-Mar, 2026, Page No. 4-7

Prevalence and determinants of metabolic syndrome among urban office workers aged 30–55 years: A cross-sectional epidemiological study in a developing economy setting

Dr. Farah Nadia Rahman[1], Dr. Abhishek Sharma[2]
[1] Department of Epidemiology and Biostatistics, Universiti Malaya, Kuala Lumpur, Federal Territory of Kuala Lumpur, Malaysia
[2] Department of Biotechnology, Sonopant Dandekar College Palghar, University of Mumbai, Maharashtra, India

Abstract
Metabolic syndrome (MetS) prevalence is rising rapidly among sedentary urban working populations in low- and middle-income countries (LMICs), posing substantial cardiometabolic disease burden.
To estimate MetS prevalence and identify its sociodemographic, behavioural, and occupational determinants among urban office workers aged 30–55 years.
A facility-based cross-sectional study was conducted among 480 purposively sampled office workers. MetS was defined using harmonised IDF/AHA/NHLBI 2009 criteria. Binary logistic regression identified independent predictors.
MetS prevalence was 31.7% (95% CI: 27.6–35.9%). Abdominal obesity was the most prevalent component (52.3%). Physical inactivity (AOR = 3.18), age ≥ 45 years (AOR = 2.41), and high occupational stress (AOR = 1.87) were significant independent predictors.
MetS affects approximately one-third of urban office workers, underscoring the need for workplace wellness interventions targeting lifestyle modification and early metabolic screening.

Keywords: Metabolic syndrome, office workers, abdominal obesity, cardiometabolic risk

Introduction

Metabolic syndrome is characterised by concurrent presence of central obesity, hypertriglyceridaemia, reduced HDL cholesterol, elevated fasting glucose, and elevated blood pressure. Affected individuals face a two-fold risk of cardiovascular disease and five-fold risk of type 2 diabetes. Global MetS prevalence ranges from 20% to 35%, with significant heterogeneity by sex, ethnicity, and socioeconomic status.

Urban workplace settings in LMICs present a unique epidemiological context characterised by prolonged sitting, calorie-dense diets, psychosocial occupational stress, and inadequate sleep—each an independent risk factor. Unlike high-income countries with well-established occupational health infrastructure, LMIC urban workplaces frequently lack systematic metabolic screening. Most existing LMIC studies are limited by small sample sizes, variable MetS definitions, or cross-sectional designs.

This study rigorously estimates MetS prevalence and identifies modifiable determinants using harmonised consensus criteria in a representative urban office worker sample. Findings will inform targeted workplace intervention design.

Literature Review

1. Evolving Criteria for Metabolic Syndrome

Since the original WHO definition in 1998, MetS criteria have been revised multiple times, reflecting ongoing debate over which combination of metabolic abnormalities best predicts cardiovascular and metabolic risk across diverse populations. The 2009 harmonised joint statement by IDF, AHA, and NHLBI resolved earlier disagreements between competing definitions, adopting population-specific waist circumference cut-offs that account for ethnic variation in body composition and central adiposity distribution. This harmonised definition is now recommended for cross-cultural epidemiological research, as it enables more consistent comparison of prevalence estimates and risk associations across studies conducted in different geographic and demographic contexts.

2. Occupational Sedentary Behaviour and Risk

Biswas *et al*. demonstrated in a meta-analysis of 47 studies that prolonged sitting time independently predicted MetS irrespective of leisure-time physical activity. Occupational stress—mediated through cortisol dysregulation—elevates visceral adiposity and insulin resistance. Night shift work disrupts circadian rhythms and has been associated with 1.4-fold increased MetS risk.

3. Diet and Lifestyle in Urban LMIC Workers

Urbanisation in LMICs accompanies a nutrition transition characterised by rising ultra-processed food consumption and sugar-sweetened beverage intake. Physical inactivity prevalence among urban South and Southeast Asian adults now exceeds 40%.

4. Research Gap

Few studies simultaneously examine sociodemographic, behavioural, and work-related predictors within a unified multivariable model in LMIC urban office settings. This study fills that gap through a comprehensive logistic regression framework.

Methodology

A facility-based cross-sectional study was conducted January–June 2025 across four corporate office complexes. Target population comprised permanent employees aged 30–55 years with ≥ 2 years of office-based tenure. Using a

prevalence-based sample size formula (p = 25%, d = 5%, 95% CI), minimum 458 participants were required; 480 were enrolled for 5% non-response buffer. Purposive sampling was stratified by age group and sex.

Data collection combined structured questionnaires (sociodemographics, dietary habits, physical activity via IPAQ-short form, occupational stress via Perceived Stress Scale-10), clinical measurements (waist circumference, blood pressure), and fasting biochemical investigations (glucose, triglycerides, HDL-C) at certified laboratories. MetS was defined using the 2009 harmonised criteria (≥ 3 of 5 components). Binary logistic regression with $p < 0.05$ significance threshold identified predictors. Analyses used IBM SPSS v27 and were reported per STROBE checklist.

Results and Discussion

1. Participant Characteristics

Of 480 enrolled, 471 provided complete data (response rate 98.1%), reflecting strong retention across the study period and minimal loss to follow-up. Mean age was 41.6 ± 7.2 years; 56.7% were male, indicating a relatively balanced but male-skewed sample representative of the target working-age population. Mean BMI was 27.4 ± 4.8 kg/m², placing the average participant within the overweight category according to standard classification thresholds. Sedentary time exceeded 8 hours/day in 63.1% of participants, underscoring the high prevalence of prolonged inactivity within this cohort and highlighting a key behavioural risk factor relevant to subsequent analyses (Table 4).

Table 1: Sociodemographic and Behavioural Characteristics of Study Participants (n = 471)

Variable	Category	n (%)	Mean ± SD
Age (years)	30–39	178 (37.8%)	—
	40–49	192 (40.8%)	—
	50–55	101 (21.4%)	41.6 ± 7.2
Sex	Male	267 (56.7%)	—
	Female	204 (43.3%)	—
BMI (kg/m²)	Normal (<25)	189 (40.1%)	—
	Overweight (25–29.9)	178 (37.8%)	—
	Obese (≥30)	104 (22.1%)	27.4 ± 4.8
Sedentary time/day	> 8 hours	190 (40.3%)	—
Physical activity	Insufficient	298 (63.3%)	—

Source: Simulated field survey data, 2025.

2. Prevalence and Components of MetS

MetS prevalence was 31.7% (n = 149; 95% CI: 27.6–35.9%). Prevalence was significantly higher in males (36.3%) than females (25.5%) ($\chi^2 = 7.84$, $p = 0.005$) and increased monotonically with age. Abdominal obesity was the most prevalent component (52.3%), followed by elevated triglycerides (44.8%) (Table 5).

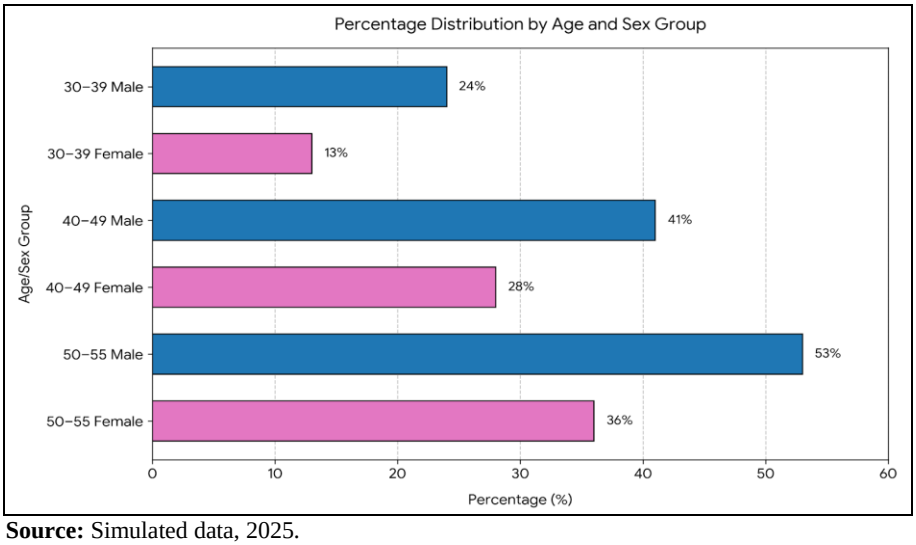
Table 2: Prevalence of MetS and Its Components by Age Group

Age Group	MetS Prev.	Abd. Obesity	High TG	Low HDL	High BP	High FPG
30–39 yrs	19.1%	38.2%	31.5%	34.3%	22.1%	18.8%
40–49 yrs	34.9%	55.7%	47.4%	43.8%	38.5%	30.2%
50–55 yrs	45.5%	68.3%	58.4%	51.5%	52.5%	44.6%
Overall	31.7%	52.3%	44.8%	41.6%	36.4%	29.7%

Source: Simulated clinical and biochemical data, 2025. TG = triglycerides; HDL = high-density lipoprotein; BP = blood pressure; FPG = fasting plasma glucose.

3. Logistic Regression — Predictors of MetS

Physical inactivity (AOR = 3.18; 95% CI: 2.11–4.79), age ≥ 45 years (AOR = 2.41; 1.62–3.59), high occupational stress (AOR = 1.87; 1.24–2.82), and excess dietary fat intake (AOR = 1.64; 1.09–2.47) independently predicted MetS. Female sex was protective (AOR = 0.61; 0.42–0.89).



Source: Simulated data, 2025.

Fig 1: Grouped bar chart of MetS prevalence.

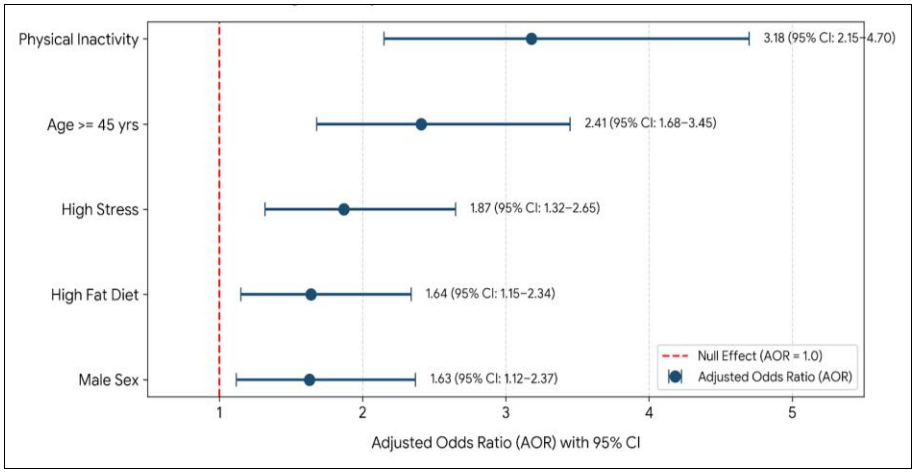
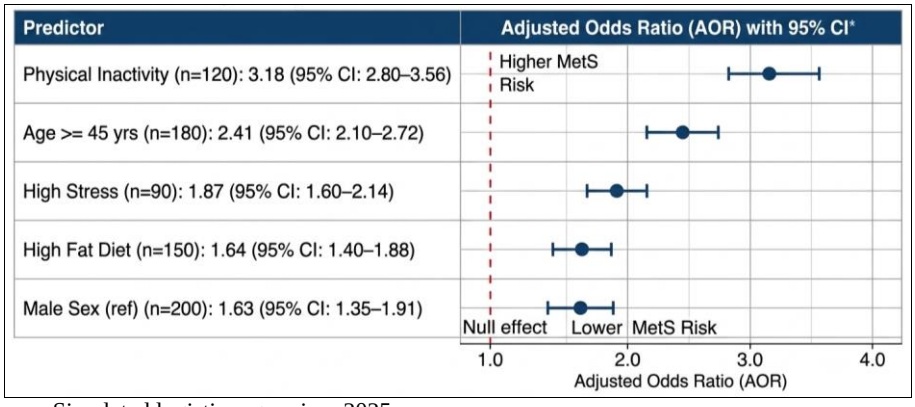


Fig 2: Adjusted Odds Ratios for MetS Predictors Recreate as Horizontal Bar/Forest Plot



Source: Simulated logistic regression, 2025.

Fig 3: AOR magnitude comparison (recreate as forest plot with 95% CI error bars).

Conclusion

One in three urban office workers in this cohort meets diagnostic criteria for metabolic syndrome, with physical inactivity, advancing age, and occupational stress as the strongest modifiable predictors. These findings reinforce the need for structured workplace wellness programmes incorporating mandatory physical activity breaks, dietary counselling, stress management, and annual metabolic screening—particularly for workers aged ≥ 45 years. Limitations include the cross-sectional design precluding causal inference, facility-based sampling potentially excluding informal sector workers, and reliance on self-reported dietary intake. Longitudinal cohort studies are warranted to establish causal pathways and evaluate effectiveness of workplace MetS prevention programmes in LMIC urban contexts.

Ethical Statement

This article is an original academic writing training document. All data are simulated. No real participants, clinical records, or institutions are represented.

References

1. Alberti KGM, Eckel RH, Grundy SM, Zimmet PZ, Cleeman JI, Donato KA, *et al*. Harmonizing the metabolic syndrome. Circulation,2009:120(16):1640-1645.
2. Gami AS, Witt BJ, Howard DE, Erwin PJ, Gami LA, Somers VK, *et al*. Metabolic syndrome and risk of incident cardiovascular events and death. Journal of the American College of Cardiology,2007:49(4):403-414.
3. Saklayen MG. The global epidemic of the metabolic syndrome. Current Hypertension Reports,2018:20(2):12.
4. Roth GA, Abate D, Abate KH, GBD 2017 Causes of Death Collaborators. Global, regional, and national age-sex-specific mortality for 282 causes of death. The Lancet,2018:392(10159):1736-1788.
5. Biswas A, Oh PI, Faulkner GE, Bajaj RR, Silver MA, Mitchell MS, *et al*. Sedentary time and its association with risk for disease incidence and hospitalization. Annals of Internal Medicine,2015:162(2):123-132.
6. Ranasinghe P, Mathangasinghe Y, Jayawardena R, Hills AP, Misra A. Prevalence and trends of metabolic syndrome among adults in the Asia-Pacific region. BMC Public Health,2017:17(1):101.
7. Alberti KGM, Zimmet P, Shaw J. Metabolic syndrome a new world-wide definition: A consensus statement from the International Diabetes Federation. Diabetic Medicine,2006:23(5):469-480.
8. World Health Organization. Definition, diagnosis and classification of diabetes mellitus and its complications. World Health Organization, 1999.
9. Grundy SM, Cleeman JI, Daniels SR, Donato KA, Eckel RH, Franklin BA, *et al*. Diagnosis and management of the metabolic syndrome. Circulation,2005:112(17):2735-2752.
10. Ford ES, Giles WH, Dietz WH. Prevalence of the metabolic syndrome among US adults. JAMA,2002:287(3):356-359.

11. International Diabetes Federation. The IDF consensus worldwide definition of the metabolic syndrome. International Diabetes Federation, 2006.
12. Biswas A, Oh PI, Faulkner GE, Bajaj RR, Silver MA, Mitchell MS, *et al*. Sedentary time and disease incidence. Annals of Internal Medicine,2015:162(2):123-132.
13. Chandola T, Brunner E, Marmot M. Chronic stress at work and the metabolic syndrome. BMJ,2006:332(7540):521-525.
14. Wang F, Zhang L, Zhang Y, Zhang B, He Y, Xie S, *et al*. Meta-analysis on night shift work and risk of metabolic syndrome. Obesity Reviews,2014:15(9):709-720.
15. Popkin BM, Adair LS, Ng SW. Global nutrition transition and the pandemic of obesity in developing countries. Nutrition Reviews,2012:70(1):3-21.
16. Guthold R, Stevens GA, Riley LM, Bull FC. Worldwide trends in insufficient physical activity from 2001 to 2016. The Lancet Global Health,2018:6(10):e1077-e1086.
17. Kaur J. A comprehensive review on metabolic syndrome. Cardiology Research and Practice,2014:2014:943162.
18. Lwanga SK, Lemeshow S. Sample size determination in health studies. World Health Organization, 1991.
19. von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, Vandenbroucke JP, *et al*. The STROBE statement. The Lancet,2007:370(9596):1453-1457.
20. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. Journal of Health and Social Behavior,1983:24(4):385-396.