



High Prevalence of Hypercholesterolemia and Central Obesity among Medical Faculty Staff: A Cross-Sectional Study at Universitas Sebelas Maret

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Abstract

Background: Hypercholesterolemia and central obesity are significant precursors of cardiovascular disease. Although medical schools are frequently regarded as centers for promoting health literacy, it remains uncertain whether their educators possess adequate awareness of their health statuses. This study aimed to determine the prevalence of these risk factors and the level of awareness among the staff at Medical Faculty Universitas Negeri Semarang (FK UNS).

Methods: A cross-sectional survey (August 2024–May 2025) included 293 academic staff members. In addition to anthropometric and capillary blood cholesterol data, we relied on questionnaires to assess the association between diet-related habits and participants' previous health-related knowledge. Descriptive statistics were calculated using Pearson's chi-square test.

Results: Hypercholesterolemia was found in 52.67% of the staff, with females forming the majority (66.44%) compared with males (34.51%). Central obesity was observed in 48.39% of the participants. Most importantly, only 25.30% of the participants could determine whether they had high cholesterol levels. Statistical analysis demonstrated a significant correlation between awareness of hypercholesterolemia and actual cholesterol levels ($p = 0.016$).

Conclusion: The findings demonstrate a substantial gap between the professional identity associated with health literacy expertise and the actual cardiovascular risk among the medical faculty staff. The extremely silent risk factors support the need for mandatory annual metabolic profiling to embed objective risk awareness into routine clinical practice.

Keywords: workplace, cholesterol, obesity, awareness, medical faculty staff

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Introduction

Non-communicable diseases (NCDs) are a main contributor to global morbidity and mortality, representing 74% of total deaths worldwide, including cardiovascular diseases (CVD).¹ Hypercholesterolemia (high total cholesterol and/or low-density lipoprotein cholesterol (LDL-C)) is a well-described, modifiable risk factor for developing atherosclerotic cardiovascular disease

(ASCVD).² Although hypercholesterolemia is preventable disease, it often goes undiagnosed or untreated, particularly among populations who perceive themselves to be healthy and at minimal risk for CVD, which potentiates the silent progression of atherosclerosis leading to an increased probability of adverse cardiovascular events such as myocardial infarction (MI) and stroke.³

NCDs have become a significant epidemic in Indonesia over the past few decades. This increase is not accidental but reflects a perfect storm of urbanization and lack of physical activity.⁴ One such health burden is the concurrence of hypercholesterolemia and central adiposity, which together pose a compounded risk to cardiovascular health (CVH). Central obesity is more than just excess weight, it is an indicator of visceral adiposity and systemic inflammation.^{5,6} This negative pattern is also observed in the national data, with existing rates of change in adult obesity from 21.8% in 2018 to 23.4% in 2023.⁴

A popularized image portrays medical faculties as oases of health literacy, where the sheer volume of medical information creates an environment that protects against lifestyle-related disease. In theory, in a community with this level of literacy, fair participation and positive health outcomes should be observed. However, reality suggests otherwise.⁷ The disconnect between 'knowing' and 'doing' is not unfamiliar, rather, it reflects a global trend also identified by Zhou et al., where dyslipidemia rates among university staff exceeded 50% in men, and participation in at least one U.S. program was minimal (15%).⁸

This study was conducted to determine the prevalence of hypercholesterolemia and central obesity among the staff members at FK UNS. This study highlights a gap between health literacy and preventive behavior within an academic medical center, a population presumed to possess higher levels of health knowledge than the general population. Medical faculty staff often serve dual roles as educators and, in some cases, as healthcare providers, which may influence their lifestyle behaviors. High workloads, prolonged sedentary activities, and time constraints may limit engagement in healthy behaviors despite adequate knowledge of disease prevention. Furthermore, this study integrated objective clinical measurements with self-reported awareness of cholesterol status, enabling a more comprehensive assessment of the gap between knowledge and the actual health status of the

participants. This approach offers insights into how highly literate environments paradoxically exhibit low participation in preventive health care. We aimed to address the gap in risk detection and effective behavioral responses by combining clinical markers with self-reported awareness, thereby providing valuable insights into institutional strategies that maximize the translation of interventions (risk detection) into action.

Methods

Study Design and Setting

We performed a cross-sectional study to investigate the clinical prevalence of metabolic risk factors (hypercholesterolemia and central obesity) and the level of awareness among the staff of FK UNS. Data were collected through routine screening activities conducted in August 2024, April 2025 and May 2025.

Sampling Method and Participants

The study population comprised the entire academic community of FK UNS, including lecturers, administrative staff, and support staff members. Enrollment was open to any staff member over the age of 18 years who was willing to be involved in the study and who explicitly consented to the use of their health data for research. We excluded offers of non-consent refusals from participants who refused to provide their consent.

A total of 293 participants voluntarily participated in this study during institutional health screening activities. As participation was based on individual willingness and not random selection, this study used a non-probability (convenience) sampling approach to select the participants. Therefore, the sample may not fully represent the FK UNS population, and the findings should be interpreted with caution regarding generalizability. However, the sample reflected a substantial proportion of the staff who engaged in routine health screening programs within the faculty.

Data Collection and Measurements

Data were collected by trained health personnel during the assigned screening period at the faculty's premises. Data were collected directly during the *Posbindu* activities. The following procedures were implemented:

1. Physical and anthropometric measurements: Waist circumference was measured using a non-stretchable measuring tape following the WHO Health Organization STEPS procedure at the midpoint between the lower margin of the last palpable rib and the upper border of the iliac crest.
2. Blood pressure measurement: Blood pressure was measured in the sitting position using a pre-calibrated digital sphygmomanometer after the participants had been seated quietly for at least 5 min. Two measurements were taken 1–2 min apart, and the average was calculated. Capillary blood testing was chosen for its practicality and feasibility in large-scale screening settings, although it may have lower accuracy than venous laboratory-based tests.
3. Biochemical assessment: Capillary blood samples were collected via finger prick, and total cholesterol levels were measured using a calibrated point-of-care device (Cholesterol Test Meter). Hypercholesterolemia was defined as total cholesterol ≥ 200 mg/dL following national clinical guidelines
4. Questionnaire survey: A structured questionnaire regarding demographic data, medical history, lifestyle habits, dietary habits, and self-reported knowledge of cholesterol was administered to participants.

Data Analysis

The research variables included the following objects of study: health status of hypercholesterolemia (dependent variable), central obesity, awareness of hypercholesterolemia, and daily excessive fat intake (independent variables). Participant demographics and risk factor prevalence were analyzed using descriptive statistics. The relationship

between the variables, namely, sex, history and awareness of hypercholesterolemia, excessive fat dietary habits, central obesity in males, and central obesity in females with hypercholesterolemia status, was analyzed using Pearson's chi-square test. The analysis was limited to bivariate comparisons and did not include multivariable modeling; therefore, potential confounding variables were not adjusted. No imputation was performed for missing values for some variables. The case data for the variables were analyzed. Data were entered and analyzed using Microsoft Excel and STATA (version 17).

Results

A total of 293 individuals participated in the screening activities during the three data collection periods. The majority of participants were female (58.36%), while males accounted for 41.64% of the participants. The respondents' characteristics are shown in Table 1.

Hypercholesterolemia was present in 52.67% of the staff, with a higher prevalence in women (66.44%) than in men (34.51%) (Table 2). Notably, 48.50% of participants without a history of hypercholesterolemia had elevated cholesterol levels at screening.

Waist circumference findings indicated that 48.39% of the participants, both men and women, had central obesity (Table 1). Female staff (51.85%) were at a higher risk than males (43.59%); the study emphasized that metabolic risks in this faculty were not sex neutral. This sex difference aligns with the existing literature, which indicates higher rates of abdominal adiposity among women in similar population groups⁸. We also identified a significant lack of self-awareness among the participants. Only 25.30% of participants knew their cholesterol status prior to this study.

A total of 86 participants (34.40%) reported excessive fat intake. Notably, 50.99% of those who perceived their diet as normal had hypercholesterolemia. This indicates an optimistic bias in their dietary habits. Moreover, ignorance is a significant risk factor for HCC development. A

significant relationship was observed between previous awareness and cholesterol levels ($P=0.016$). This indicates that individuals who were aware of their

cholesterol status were significantly more likely to have different cholesterol outcomes than those who were unaware of their cholesterol status.

Table 1. Description of the characteristics of respondents of Posbindu activities at the FK UNS

Characteristics	N	%	Notes
Gender			
Male	122	41.64	There is no missing data
Female	171	58.36	
Age			
≤18	2	0.87	This study had 62 missing data points. Therefore, the total data for age included 231 patients.
19-39	97	41.99	
40-44	40	17.32	
45-49	35	15.15	
50-54	29	12.55	
55-59	19	8.23	
60-64	8	3.46	
≥65	1	0.43	
Smoking			
Yes	27	10.51	There were 36 missing data points. Therefore, the total data on smoking included 257 participants.
No	230	89.49	
Diabetes			
Yes	11	3.94	There are 14 missing data. Therefore, the total number of patients with diabetes was 279.
No	268	96.06	
History and Awareness of Hypercholesterolemia			
Yes	64	25.30	This study had 40 missing data points. Therefore, the total data on the history and awareness of hypercholesterolemia were for 253 patients.
No	189	74.70	
Excessive Fat Dietary Habit			
Yes	86	34.40	There were 43 missing data points. Therefore, the total data for the excessive fat dietary habit variable included 250 subjects.
No	164	65.60	
Central Obesity in Male			
Waist Circumference ≥90 cm	51	43.59	There are 5 missing data. Therefore, the total data for central obesity in men were 117 patients. The total number of respondents (male and female) whose waist circumference was measured was 279.
Waist Circumference <90 cm	66	56.41	
Central Obesity in Female			
Waist Circumference ≥80 cm	84	51.85	Nine data points were missing from the dataset used in this study. Therefore, the total data for central obesity in women were 162 subjects. The total number of respondents (male and female) whose waist circumference was measured was 279 participants.
Waist Circumference <80 cm	78	48.15	
Systole Blood Pressure (mmHg)			
<120	97	33.56	There are 4 missing data. Therefore, the total data points for the systolic blood pressure variable were 289.
120-139	137	47.40	
140-159	34	11.76	
160-179	15	5.19	
≥180	6	2.08	
Cholesterol level (mg/dL)			
Yes	138	52.67	There were 31 missing data points were missing. Therefore, the total data for cholesterol levels were 262.
No	124	47.33	

Table 2. Relationship between sex, history and awareness of hypercholesterolemia, excessive fat dietary habits, central obesity in males, and central obesity in females and hypercholesterolemia status.

Variable	Cholesterol				Total	p-value
	Hyper-cholesterolemia		Normal			
	n	%	n	%		
Gender (n = 262)						
Male	39	34.51	74	65.49	113 (100%)	0.0000
Female	99	66.44	50	33.56	149 (100%)	
History and awareness of hypercholesterolemia (n = 227)						
Yes	40	66.67	20	33.33	60 (100%)	0.016
No	81	48.50	86	51.60	167 (100%)	
Excessive fat dietary habit (n = 225)						
Yes	44	59.46	30	40.54	74 (100%)	0.231
No	77	50.99	74	49.1	81 (100%)	
Central obesity in male (n = 111)						
Yes (Waist Circumference ≥90 cm)	16	34.04	31	65.96	47 (100%)	0.836
No (Waist Circumference <90 cm)	23	35.94	41	64.06	64 (100%)	
Central obesity in female (n = 146)						
Yes (Waist Circumference ≥80 cm)	51	68.00	24	32.00	75 (100%)	0.557
No (Waist Circumference <80 cm)	45	63.38	26	36.62	71(100%)	

Discussion

The results of this study indicate that higher-education institutions in the fields of medicine and health must pay attention to the health of their internal staff members. While almost half of the staff are struggling with hypercholesterolemia (52.67%) and central obesity (48.39%), what is more alarming is not the number of people who suffer from these conditions but rather the silence about it. More concerning than the prevalence is the lack of awareness, as only 25.30% of respondents were aware of their lipid status. This low level of individual health literacy among medical professionals is troubling.^{9,10} The observation that one in three hypercholesterolemic participants was unaware of their condition suggests that employment in a health-focused environment may foster complacency rather than vigilance. These results highlight a significant mismatch between biomedical risk and perceived health status.¹¹ In such settings, cognitive literacy has not translated into preventive behavior within the institutional environment.

The prevalence of central obesity in FK UNS cannot be observed independently; it reflects a broader national urgency for Indonesia, as indicated by the Indonesian Health Survey (SKI),

where adult obesity data rose to 23.4% in 2023.⁴ It seems that the cities are subject to this common fate as well, and that their inhabitants were influenced by acculturation, making them sensitive to communication.¹² This burden is not equitably shared. The high proportion of women with obesity (46.1%) suggests biologically specific vulnerability. Visceral fat gain accelerates in women during their middle age. Previous studies also indicate that women may also deposit fat centrally to a greater degree early-later in mid-life, making them more susceptible to lipid abnormalities and their cardiometabolic risks.¹³ Our evidence supports the observation of Amiosinor that female university staff are a specific high-risk group who are overlooked by generic interventions among staff.¹⁴

Another finding was the lack of understanding and awareness of cholesterol status among the participants. Only 25.30% knew their lipid status before even entering the screening. The small percentage of people who are aware of their cholesterol status could indicate this finding. A strong and important relationship, regardless of causality or direction, was identified between awareness and improved health status, emphasizing that knowledge is a form of prevention.

Providing basic information regarding cholesterol status (its causes and effects) is essential for improving the public health. However, this step cannot stop there, as awareness without being translated into preventive and promotive actions will not improve the health outcomes. Aside from that, as in general health studies, self-awareness is a precondition of self-care.¹⁵ Studies have shown that awareness campaigns alone are no longer sufficient. To make a real and sustainable difference, strategies that go beyond health education and focus on modifying the work environment to support healthy behaviors are needed. Furthermore, regular monitoring is crucial as a standardized system or method to ensure healthy behaviors are realized and maintained.¹⁶

However, our evidence shows that awareness is not a treatment but rather the starting point. The most obvious illustration of this is that 50.99% of hypercholesterolemic employees believed that they were eating healthy. This vast disconnect speaks to a profound cognitive dissonance: staff understand what a healthy diet should look like in theory but do not see the risk staring back at them from their own plates. The Health Belief Model describes that people change their behavior when they feel threatened; it seems like there is an environment in FK UNS that protects employees from such urgency.¹⁷ Information here is abundant but impersonal; it floats in the academic ether without ever landing as a concrete, personal warning to change one's daily habits.

The results of this study can be used as a finding or insight that working in a higher education institution in the health sector does not always guarantee an adequate understanding of health. The findings highlight a "knowledge–practice gap," wherein adequate knowledge of health risks does not necessarily translate into healthy behaviors. Similar patterns have been reported in previous studies, in which higher health literacy did not consistently result in better lifestyle practices.¹⁸ Several factors may explain these findings. First, medical faculty staff often experience high workloads and time constraints owing to their dual roles as

educators and, in some cases, healthcare providers.¹⁹ These demands may reduce opportunities for regular physical activity and healthy dietary practices.

Second, the work environment itself may contribute to sedentary behavior.²⁰ Academic activities such as teaching, administrative tasks, and research are typically associated with prolonged sitting, which has been linked to increased cardiometabolic risk.²¹ In addition, workplace food environments, including the availability of high-calorie or high-fat foods, may further influence dietary behavior despite adequate nutritional knowledge.²²

From a public health perspective, these findings indicate that education alone may not be sufficient to improve health outcomes in highly educated populations. Interventions should also address the environmental and structural factors within the workplace. Strategies such as routine health screening, personalized feedback, workplace health promotion programs, and improvements in the food and physical activity environment may help bridge the gap between knowledge and practice.²³

At the policy level, individual willpower is insufficient. Faculty should shift from viewing unhealthy behaviors as solely individual responsibilities to creating a healthier institutional environment. Screening activities should be the initial step rather than the final measure. A comprehensive re-engineering of the workplace, as advocated by proponents of behavioral nudges (e.g., removing unhealthy snacks from meeting rooms or incorporating exercise breaks into long administrative meetings), should be considered in this regard. As a progressive medical school, FK UNS has an ethical responsibility to guide this transition. Demonstrating that an academic campus can prioritize wellness may provide a replicable model for other campuses nationwide that face similar metabolic health challenges.

We recognize that this study has several limitations. The screening schedule was sporadic. Some might argue that logistical bottlenecks and two funding breaks disrupted the theoretical continuity of the program, providing a cross-sectional picture rather than a longitudinal one. In

addition, the analysis was limited to bivariate methods, without adjusting for potential confounders. To improve the accuracy of risk models, future institutional programs should ensure continuous quarterly screening funding to eliminate logistical delays and minimize the effects of a chronic history. We also note that the amount of missing data for behavioral variables (around 13.65%) is something we should be cautious about, because not all are due to lack of information or participants who refuse to respond; social desirability bias does play a role when individuals are unlikely to answer these questions related to smoking or diet. Prospective studies are warranted to complete the data for conducting multivariate analyses by controlling for latent confounders. Unavoidable selection bias: we may have reached the “worried well,” but not those most in need of intervention who steered clear of screening. Therefore, the prevalence of risk factors in our sample may potentially be an underestimation of the true prevalence among this population because these (missing) subjects could have an even higher undetected metabolic risk than the subjects we studied.

This study reveals a critical gap: medical literacy does not necessarily translate to personal health knowledge. Staff at FK UNS are experiencing a 'silent epidemic' of hypercholesterolemia and central obesity, primarily due to insufficient self-monitoring rather than a lack of theoretical knowledge. As the data indicate that awareness serves as a protective factor, bridging the gap between professional expertise and personal health is essential. Passive health promotion is inadequate; institutions should implement mandatory annual metabolic profiling, making self-awareness an integral component of professional practice. Future interventions should extend beyond education to actively disrupt sedentary lifestyle.

Conclusion

This study highlights a significant public health concern in academic medical settings. The high prevalence of hypercholesterolemia (52.67%) and central obesity (48.39%) underscores a critical

disconnect between presumed health literacy and actual health behaviors. Furthermore, low awareness of cholesterol status and modest recognition of high-fat dietary intake among hypercholesterolemic individuals highlight the knowledge–practice gap in this population. These findings suggest that providing health services alone is insufficient to drive behavioral change.

Importantly, the significant association between awareness and cholesterol status highlights the potential of targeted health education and communication in mitigating cardiovascular risks. Health institutions, such as FK UNS, must consider embedding behavioral science-based interventions alongside routine screening to foster awareness and encourage lifestyle modifications. Future efforts should focus on longitudinal assessments of integrated health programs that combine screening, counseling, and continuous engagement to improve outcomes.

Ethics approval

This study met all applicable standards for research integrity and ethics. The participants provided informed consent, and the data were stored securely. Minors were excluded from the study. It was conducted with ethical clearance from the Health Research Ethics Board of Universitas Sebelas Maret (Number: 151/UN27.06.11/KEP/EC/2025).

Availability of data and materials

The datasets generated and/or analyzed during the current study are not publicly available because of the inclusion of individual-level health data that may compromise participants' privacy. However, anonymized data are available from the corresponding author upon reasonable request and with permission from the Faculty of Medicine, Universitas Sebelas Maret, Indonesia.

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Author Contribution

VHPS conceived the study, designed the study, performed the analysis, and drafted, wrote, and revised the manuscript. DWS was responsible for data collection, storage, review, writing, and revision of the manuscript. AEP and LA reviewed the manuscript. All authors have read and approved the final manuscript.

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