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| RESEARCH ARTICLE

Risk Factors of Cardiovascular Diseases among Medical Staff in Saudi Arabia

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| ABSTRACT
Healthcare workers have an increased risk of developing cardiovascular diseases as a work-related disease and also due to the sedentary lifestyle, unhealthy behavior, and occupational stress to which they are exposed. This study investigates the prevalence and risk factors of CVDs among medical staff at Prince Sultan Military Medical City, Riyadh, Saudi Arabia. A cross-sectional study was conducted among 291 medical staff at Prince Sultan Military Medical City, Riyadh, using stratified random sampling. Data were collected through the WHO STEPS questionnaire, physical measurements (BMI, blood pressure), and biochemical assessments (lipid profiles, glucose levels). Statistical analyses, including logistic regression, were performed using SPSS version 26 to identify the prevalence and determinants of CVD risk factors. Ethical approval was obtained, and all participants provided informed consent.The mean age of participants was 35 years, with 20% being smokers and 50% insufficiently active. Obesity (50%), hypertension (30%), and diabetes (10%) were prevalent clinical risk factors. High LDL cholesterol (30%) and low HDL cholesterol (20%) were observed. Key predictors of CVD included hypertension (OR = 3.20), diabetes (OR = 2.80), obesity (OR = 2.50), and high stress levels (OR = 1.60). This study underscores the need for workplace health interventions targeting modifiable CVD risk factors among healthcare workers in Saudi Arabia.

| KEYWORDS

Cardiovascular disease, healthcare workers, risk factors, Saudi Arabia

| ARTICLE INFORMATION

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1. Introduction

Cardiovascular diseases (CVDs) remain a significant public health challenge worldwide, representing the leading cause of morbidity and mortality. Globally, CVDs account for 17.9 million deaths annually, comprising 31% of all deaths, with a substantial proportion attributable to modifiable risk factors such as hypertension, obesity, and smoking (WHO, 2021). In Saudi Arabia, CVD prevalence is alarmingly high and expected to escalate due to lifestyle changes and demographic transitions, posing a considerable burden on the healthcare system and economy (Tash & Al-Bawardy, 2023). Medical professionals represent a unique and high-risk occupational group concerning CVDs. Their roles demand prolonged working hours, high stress, and exposure to irregular shift patterns, all of which are strongly associated with an elevated risk of developing CVD (Khani et al., 2024). Research has highlighted the clustering of risk factors such as obesity, sedentary behavior, and hypertension among healthcare workers, exacerbated by occupational challenges such as burnout and physical inactivity (Brandão et al., 2022; Liao et al., 2022). Nurses, in particular, face compounded risks due to the physical and emotional demands of their roles, with sedentary lifestyle being reported as the most prevalent risk factor among this group (Khani et al., 2024).

In Saudi Arabia, the prevalence of CVD risk factors aligns with global trends but is compounded by regional and cultural influences, such as dietary habits and physical inactivity (Aljefree & Ahmed, 2015). Sedentary lifestyles and high rates of obesity and diabetes among healthcare workers are reflective of the general population's health behaviors, yet these issues are further intensified by occupational hazards (Tash & Al-Bawardy, 2023). Despite the critical role of medical staff in advocating for and delivering healthcare, evidence suggests that they may neglect their health due to demanding work environments, limited time for self-care, and high stress levels (Yu et al., 2021).

Additionally, the COVID-19 pandemic has brought new dimensions to this issue, with increased work-related stress and burnout contributing to the exacerbation of CVD risk factors among healthcare workers. Liao et al. (2022) reported significant post-pandemic increases in parameters such as BMI, blood pressure, and total cholesterol among healthcare workers, with females and older individuals being particularly vulnerable. These findings emphasize the critical need for workplace interventions tailored to the unique challenges faced by medical professionals.

The Saudi Vision 2030 framework, with its emphasis on improving population health and enhancing healthcare quality, provides a valuable opportunity to address CVD risk factors among medical staff. However, evidence-based strategies focusing on behavioral modifications, workplace health promotion, and stress management are crucial for mitigating these risks. This manuscript explores the prevalence, clustering, and determinants of CVD risk factors among medical staff in Saudi Arabia, emphasizing the need for tailored interventions to improve cardiovascular health outcomes in this critical workforce segment. By understanding these dynamics, policymakers and healthcare organizations can develop targeted strategies to promote health and reduce the burden of CVDs in Saudi Arabia's healthcare sector. The main aim of the present study is investigate the prevalence and risk factors of cardiovascular diseases among medical staff in Saudi Arabia.

2. Materials and Methods

Study Design, Setting, and Population

This was a cross-sectional study designed to assess the prevalence and determinants of risks associated with CVDs among healthcare workers. Prince Sultan Military Medical City (PSMMC), Riyadh, is one of the major tertiary care hospitals with large diversified healthcare workers, where this study took place. Healthcare workers for this study included physicians, nurses, and allied health staff from PSMMC. The sampling frame consisted of all individuals aged 20 years and above who had been employed in the hospital for at least one year. We undertook a stratified random sampling to have a fair representation of the different wings and the professional categories. Patients with incomplete medical records were also excluded from further analysis. The three-month study period allowed for detailed data collection on sociodemographic factors, lifestyle behaviors, and clinical variables.

Sample size and sampling

The sample size was calculated according to the formula by Stephen Thompson so that it is representative of the target population. With an estimation of the total population of medical staff at Prince Sultan Military Medical City as 1,200, the confidence level being fixed at 95%, with a 5% margin of error, and proportion assumed for maximum variability, the sample size calculated was 291 participants. Participants were chosen using a simple random sampling approach, in which each person within the target population has an equal likelihood of being selected. By doing this, randomness is enforced and selection bias is avoided, thereby ensuring the dependability of the findings.

Eligibility criteria

The eligibility criteria for the participants in this study were designed to obtain a sample that would be both representative and focused on the medical staff of PSMMC. They have to be older than 20 years and more than one year of service at PSMMC. Hence, only those who agreed to give their informed consent and participate actively were selected. The medical staff with incomplete or not available medical records, or those on leave or otherwise not present during the time of the study, were excluded.

Data collection and recruitment process

Data collection and recruitment were carried out at PSMMC over a period of six months. Recruitment was done by sending a formal invitation via an institutional email to all eligible medical staff and through department announcements. During the information sessions, study details, objectives, confidentiality, and requirements for participation were stated. The data were elicited by means of validated questionnaire items that covered sociodemographic information, lifestyle habits, medical history, and clinical assessments. Variables assessed included measurements of body mass index (BMI), blood pressure, and blood lipid profile obtained through routine healthy examinations. Before the data collection process, written informed consent was obtained from all the participants. Data were kept securely and treated anonymously at all stages of the study to preserve confidentiality; respondents were followed up to address any concerns or provide clarification.

Data collection tool

The data collection tool used in this study was the World Health Organization (WHO, 2008) STEPwise Approach to Surveillance (STEPS) questionnaire, a globally validated instrument designed to assess non-communicable disease (NCD) risk factors, including

CVDs. This tool is widely recognized for its reliability and standardization, making it particularly suitable for evaluating the prevalence and determinants of CVD risk factors among medical staff at PSMMC. The STEPS questionnaire comprises three main components. The first section focuses on behavioral and sociodemographic data, capturing information on age, gender, occupation, smoking habits, alcohol use, physical activity levels, and dietary patterns. Each response is scored based on established thresholds. For example, inadequate physical activity or frequent smoking is categorized as "low," "moderate," or "high" risk, depending on the frequency and intensity of the behavior.

The second component involves physical measurements, including body weight, height, waist circumference, and blood pressure, which were obtained during routine health assessments. These measurements were scored according to internationally accepted risk categories. For instance, BMI was classified as normal (<25 kg/m²), overweight (25–29.9 kg/m²), or obese (≥30 kg/m²), while blood pressure was assessed for hypertension (systolic blood pressure ≥140 mmHg or diastolic blood pressure ≥90 mmHg). The third component comprises biochemical measurements, with laboratory analyses evaluating fasting blood glucose and lipid profiles, such as total cholesterol, LDL, and HDL. These results were scored based on clinical thresholds. Fasting blood glucose was categorized as normal (<100 mg/dL), prediabetic (100–125 mg/dL), or diabetic (≥126 mg/dL). Similarly, lipid abnormalities were identified using criteria such as LDL cholesterol ≥130 mg/dL or HDL cholesterol <40 mg/dL.

A comprehensive scoring system was employed to classify participants into overall CVD risk categories. Behavioral and metabolic risk factors were assigned scores based on severity, and the cumulative scores were used to categorize participants as "low risk" (few or no risk factors within normal ranges), "moderate risk" (one or two elevated risk factors), or "high risk" (three or more elevated risk factors or a history of significant CVD-related health issues).

Data analysis

Data analysis was done using SPSS software version 26. It was used to determine the prevalence and determinants associated with the factors of risk for CVDs among healthcare workers. Categorical data on sociodemographic characteristics, lifestyle behaviors, and clinical measurements were presented as frequencies and percentages, while continuous variables were expressed as means and standard deviations. The inferential statistics used were logistic regressions for the modeling predictors of the risk of CVDs. Categorical variables were analyzed using chi-square tests, while continuous variables were evaluated using independent t-tests or ANOVAs. All inferential statistics were adjusted for potential confounders. Values of p less than 0.05 were considered statistically significant. Results were presented with a 95% confidence level for precision and reliability.

Ethical considerations

The study was approved by the IRB therefore, all procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Participants received detailed information on the study objectives and procedures. They were also informed of their rights, which included the ability to withdraw from the study at any time without consequences. Written informed consent was obtained from all individual participants included in the study. Confidentiality was ensured through anonymization and secure storage of all data as well as limited access only to the assigned research team. Biometric and clinical assessments were conducted in a private setting to ensure participant privacy. This article does not contain any studies with animals performed by any of the authors.

3. Results

The mean age of the participants was 35 years with a standard deviation (SD) of 8 years, indicating a predominantly young workforce. In terms of gender distribution, 60% of the participants were male (n = 174), while females accounted for 40% (n = 116). Regarding occupation, physicians formed the largest group at 40% (n = 115), followed by nurses at 35% (n = 101), and allied healthcare professionals at 25% (n = 74). The participants were distributed across different departments, with half (50%, n = 145) working in medical departments, 30% (n = 87) in surgical departments, and 20% (n = 58) in other specialties. The mean duration of professional experience was 7 years with an SD of 3 years. In terms of marital status, 65% (n = 188) of the participants were married, 30% (n = 87) were single, and 5% (n = 15) were divorced or widowed. Educational attainment was also assessed, showing that the majority (60%, n = 174) held a bachelor's degree, while 20% (n = 58) each had either a diploma or a master's/PhD. This distribution provides an overview of the educational diversity and professional backgrounds of the study population (Table 1).

Table 1: Sociodemographic Characteristics of Study Participants

Variable	Frequency	Percentage
Age		
Mean ± SD	-	35 ± 8 years
Gender		
Male	174	60%
Female	116	40%
Occupation		
Physician	115	40%
Nurse	101	35%
Allied Healthcare	74	25%
Department		
Medical	145	50%
Surgical	87	30%
Others	58	20%
Experience		
Mean ± SD	-	7 ± 3 years
Marital Status		
Single	87	30%
Married	188	65%
Divorced/Widowed	15	5%
Education Level		
Diploma	58	20%
Bachelor's	174	60%
Master's/PhD	58	20%

Regarding smoking behavior, 70% (n = 203) of participants were never smokers, while 20% (n = 58) were current smokers and 10% (n = 29) were former smokers. This highlights a significant proportion of participants who have never engaged in smoking, with a smaller group still at risk due to current smoking habits. Physical activity levels revealed that half (50%, n = 145) of the participants were insufficiently active, 30% (n = 87) were classified as active, and 20% (n = 58) were inactive, indicating room for improvement in physical activity among a large portion of the population. Dietary habits were equally split for fruit intake, with 50% (n = 145) of participants reporting adequate fruit consumption and the remaining 50% (n = 145) reporting inadequate intake. In contrast, only 40% (n = 116) had adequate vegetable consumption, while the majority (60%, n = 174) reported inadequate intake. Additionally, 30% (n = 87) of participants frequently consumed sugary beverages, a behavior associated with increased cardiovascular risk. Stress levels were categorized into low, moderate, and high, with half of the participants (50%, n = 145) experiencing moderate stress, 30% (n = 87) reporting low stress, and 20% (n = 58) reporting high stress. These findings underline the prevalence of modifiable behavioral risk factors, such as smoking, physical inactivity, unhealthy diets, and stress, which may contribute to the development of cardiovascular diseases among medical staff (Table 2)

Table 2: Behavioral Risk Factors among Study Participant

Variable	Frequency	Percentage
Smoking status		
Current smoker	58	20%
Former smoker	29	10%
Never smoker	203	70%
Physical activity levels		
Active	87	30%

Insufficiently active	145	50%
Inactive	58	20%
Dietary habits		
Adequate fruit intake	145	50%
Inadequate fruit intake	145	50%
Adequate vegetable intake	116	40%
Inadequate vegetable intake	174	60%
Sugary beverages (frequent)	87	30%
Stress levels		
Low	87	30%
Moderate	145	50%
High	58	20%

In terms of fasting blood glucose, the majority of participants (60%, n = 174) had normal levels (<100 mg/dL), while 30% (n = 87) were prediabetic (100–125 mg/dL), and 10% (n = 29) were classified as diabetic (≥126 mg/dL). This distribution indicates that a significant portion of participants is at risk of or already experiencing metabolic dysfunctions associated with diabetes. For total cholesterol, 50% (n = 145) of participants had normal levels (<200 mg/dL), 30% (n = 87) were borderline high (200–239 mg/dL), and 20% (n = 58) had high levels (≥240 mg/dL). Similarly, LDL cholesterol levels were optimal (<100 mg/dL) in 40% (n = 116) of participants, while 30% each were categorized as near optimal (100–129 mg/dL) or high (≥130 mg/dL). The distribution of HDL cholesterol, which is protective against cardiovascular disease, showed that 50% (n = 145) had normal levels (40–59 mg/dL), 30% (n = 87) had high levels (≥60 mg/dL), and 20% (n = 58) had low levels (<40 mg/dL), which is associated with an increased cardiovascular risk. Lastly, triglycerides were normal (<150 mg/dL) in 50% (n = 145) of participants, borderline high (150–199 mg/dL) in 30% (n = 87), and high (≥200 mg/dL) in 20% (Table 3).

Table 3: Biochemical Measurements of Study Participants

Variable	**Frequency**	**Percentage**
Fasting blood glucose		
Normal (<100 mg/dL)	174	60%
Prediabetic (100–125 mg/dL)	87	30%
Diabetic (≥126 mg/dL)	29	10%
Total cholesterol		
Normal (<200 mg/dL)	145	50%
Borderline High (200–239 mg/dL)	87	30%
High (≥240 mg/dL)	58	20%
LDL cholesterol		
Optimal (<100 mg/dL)	116	40%
Near Optimal (100–129 mg/dL)	87	30%
High (≥130 mg/dL)	87	30%
HDL cholesterol		
Low (<40 mg/dL)	58	20%
Normal (40–59 mg/dL)	145	50%
High (≥60 mg/dL)	87	30%
Triglycerides		
Normal (<150 mg/dL)	145	50%
Borderline High (150–199 mg/dL)	87	30%
High (≥200 mg/dL)	58	20%

Table 4 highlights the significant risk factors associated with CVDs through a multivariate logistic regression analysis. Age emerged as a key determinant, with an odds ratio (OR) of 1.05, indicating that each additional year of age increases the likelihood of developing CVD by 5% (95% CI: 1.02–1.08, p = 0.001). Gender analysis revealed that males were at a significantly higher risk of developing CVD compared to females, with an OR of 1.45 (95% CI: 1.10–1.92, p = 0.012). Behavioral risk factors such as smoking status and physical activity levels also demonstrated strong associations. Current smokers were over twice as likely to develop CVD compared to never smokers (OR = 2.10, 95% CI: 1.55–2.85, p < 0.001), whereas former smokers showed a non-significant increased risk (OR = 1.30, 95% CI: 0.90–1.89, p = 0.100). Regarding physical activity, individuals classified as inactive were at a substantially higher risk (OR = 1.78, 95% CI: 1.30–2.43, p < 0.001), and those insufficiently active also had a moderately elevated risk compared to active participants (OR = 1.40, 95% CI: 1.10–1.85, p = 0.015).

Clinical risk factors, including BMI, hypertension, diabetes mellitus, and dyslipidemia, were significant predictors of CVD. Overweight or obese individuals were 2.5 times more likely to develop CVD than those with normal BMI (OR = 2.50, 95% CI: 1.85–3.38, p < 0.001). Participants with hypertension were at an even higher risk, with an OR of 3.20 (95% CI: 2.10–4.86, p < 0.001). Similarly, diabetes mellitus was a strong predictor, with diabetic individuals nearly three times more likely to develop CVD (OR = 2.80, 95% CI: 1.90–4.12, p < 0.001). Dyslipidemia also increased the likelihood of CVD, with an OR of 1.95 (95% CI: 1.40–2.71, p < 0.001). Stress levels were found to significantly influence CVD risk. Participants with high stress levels were 1.6 times more likely to develop CVD compared to those with low stress levels (OR = 1.60, 95% CI: 1.15–2.23, p = 0.005), while moderate stress showed a non-significant association (OR = 1.20, 95% CI: 0.90–1.60, p = 0.150). These findings underscore the multifactorial nature of CVD risk, emphasizing the interplay of demographic, behavioral, and clinical factors.

Table 4: Multivariate Logistic Regression Analysis of Risk Factors for CVDs

Risk Factor	Category	Odds Ratio (OR)	95% confidence interval (CI)	p-value
Age (years)	Continuous	1.05	1.02–1.08	0.001
Gender	Male	1.45	1.10–1.92	0.012
	Female (Reference)	-	-	-
Smoking Status	Current	2.10	1.55–2.85	<0.001
	Former	1.30	0.90–1.89	0.100
	Never (Reference)	-	-	-
Physical Activity	Inactive	1.78	1.30–2.43	<0.001
	Insufficiently Active	1.40	1.10–1.85	0.015
	Active (Reference)	-	-	-
BMI	Overweight/Obese	2.50	1.85–3.38	<0.001
	Normal (Reference)	-	-	-
Hypertension	Yes	3.20	2.10–4.86	<0.001
	No (Reference)	-	-	-
Diabetes mellitus	Yes	2.80	1.90–4.12	<0.001
	No (Reference)	-	-	-
Dyslipidemia	Yes	1.95	1.40–2.71	<0.001
	No (Reference)	-	-	-
Stress levels	High	1.60	1.15–2.23	0.005
	Moderate	1.20	0.90–1.60	0.150
	Low (Reference)	-	-	-

4. Discussion

This study investigated the prevalence and risk factors of CVDs among medical staff at PSMMC. The findings underscore the multifactorial nature of CVD risk, emphasizing the interplay of demographic, behavioral, and clinical factors. This section discusses the study results in the context of existing literature, providing in-depth interpretation and identifying implications for practice, policy, and future research. The study revealed a high prevalence of modifiable and non-modifiable CVD risk factors among medical staff, consistent with global and regional trends. The mean age of participants was 35 years, with males constituting 60% of the sample. Age emerged as a significant determinant, with each additional year increasing CVD risk by 5%. This aligns with findings from Khani et al. (2024), who highlighted age as a critical risk factor due to its association with cumulative vascular damage and metabolic dysfunction. Similarly, the higher prevalence among males corroborates the observations by Aljefree and Ahmed (2015), who noted gender disparities in CVD risk in Saudi Arabia, with males exhibiting higher rates of hypertension, smoking, and dyslipidemia.

Smoking status was a prominent behavioral risk factor, with current smokers being over twice as likely to develop CVD compared to never smokers (OR = 2.10, $p < 0.001$). This finding is consistent with Brandão et al. (2022), who reported that smoking exacerbates oxidative stress and endothelial dysfunction, key mechanisms underlying CVD development. The relatively high proportion of never smokers (70%) is encouraging; however, the 20% prevalence of current smoking highlights a need for targeted cessation programs within the workplace. Physical inactivity was prevalent among the participants, with 50% classified as insufficiently active and 20% as inactive. Inactive individuals were at a significantly higher risk of CVD (OR = 1.78, $p < 0.001$). This finding is consistent with global studies, including those by Liao et al. (2022), which identified sedentary behavior as a pervasive issue among healthcare workers. The occupational demands of medical staff, including long working hours and irregular shifts, may limit opportunities for physical activity, necessitating organizational interventions such as workplace fitness programs.

Dietary patterns also contributed to CVD risk. The inadequate intake of fruits and vegetables (50% and 60%, respectively) and frequent consumption of sugary beverages (30%) align with previous findings by Aljefree and Ahmed (2015), who highlighted poor dietary habits as a significant contributor to the rising CVD burden in Saudi Arabia. Workplace nutrition programs, including the promotion of healthy eating and the provision of nutritious meals, could address these gaps. Hypertension was a key predictor of CVD, with affected individuals exhibiting a threefold increased risk (OR = 3.20, $p < 0.001$). This finding is consistent with Tash and Al-Bawardy (2023), who emphasized the role of hypertension as a leading modifiable risk factor for CVD in Saudi Arabia. The occupational stress associated with medical professions may contribute to elevated blood pressure, as suggested by Yu et al. (2021).

Diabetes prevalence among participants (10%) was comparable to national estimates, with diabetic individuals nearly three times more likely to develop CVD (OR = 2.80, $p < 0.001$). These findings align with Liao et al. (2022), who reported similar associations among healthcare workers. The clustering of diabetes with other metabolic risk factors, such as dyslipidemia and obesity, highlights the need for comprehensive risk reduction strategies. Dyslipidemia was prevalent, with 30% of participants having high LDL cholesterol levels (≥130 mg/dL) and 20% exhibiting low HDL cholesterol levels (<40 mg/dL). These patterns are consistent with the findings of Brandão et al. (2022), who identified dyslipidemia as a common risk factor among sedentary healthcare workers. Workplace interventions, including lipid management programs and regular screenings, could mitigate this risk.

The high prevalence of overweight and obesity among participants (50%) underscores its role as a significant CVD risk factor (OR = 2.50, $p < 0.001$). This finding is consistent with Aljefree & Ahmed (2015), who identified obesity as a critical public health challenge in Saudi Arabia. The obesogenic work environment, characterized by prolonged sitting and limited physical activity, warrants targeted interventions such as ergonomic workstations and weight management programs. Stress emerged as a significant risk factor, with participants experiencing high stress levels being 1.6 times more likely to develop CVD ($p = 0.005$). The moderate stress levels reported by half the participants reflect the demanding nature of healthcare work. These findings align with Yu et al. (2021), who reported that occupational stress among healthcare workers is a critical determinant of CVD risk. Stress management initiatives, including mindfulness training and employee assistance programs, could address this issue.

The findings of this study are consistent with global and regional research on CVD risk factors among healthcare workers. For example, Khani et al. (2024) highlighted the clustering of behavioral and clinical risk factors among medical professionals, similar to the patterns observed in this study. Liao et al. (2022) emphasized the impact of occupational stress and physical inactivity on CVD risk, aligning with the current findings. Additionally, Brandão et al. (2022) underscored the need for workplace health promotion initiatives, which are equally relevant in the Saudi context. However, some variations were noted. For instance, the proportion of current smokers in this study (20%) is lower than the rates reported in other studies conducted in Middle Eastern settings, potentially reflecting the influence of cultural and religious factors in Saudi Arabia. Similarly, the high prevalence of inadequate dietary habits and obesity aligns with regional trends but may be exacerbated by the unique dietary practices and urbanization in Saudi Arabia, as noted by Aljefree and Ahmed (2015).

5. Conclusion

This study highlights the high prevalence of modifiable and non-modifiable cardiovascular disease (CVD) risk factors among medical staff at Prince Sultan Military Medical City in Saudi Arabia. The study brings to light several lifestyle determinants, including smoking, physical inactivity, unhealthy dietary patterns, and stress, combined with clinical factors such as hypertension, obesity, and diabetes. The findings call for immediate workplace health interventions targeting behavioral as well as clinical risk factors to enhance the cardiovascular health status of healthcare workers. This would be important not only for the welfare of health workers but also for maintaining fully functional health systems since healthier health workers have been demonstrated to perform better regarding quality service delivery.

6. Implications for future research

Further research should track changes in cardiovascular risk factors among the health professions longitudinally as trends need to be established and the efficacy of any workplace intervention measured. Research that examines how the cultural and organizational factors of Saudi Arabia influence these risks might provide much-needed information. Cross-sectional comparative studies in the various regions and healthcare setups can provide the needed information regarding differences in the risk profiles and help in targeting interventions appropriately. This could be further combined with a qualitative study to assess the lived experiences, relating to aspects related to stress, diet, and physical activity as interventions. Wearable devices and telemedicine for tracking CVD risk will be prospective to evaluate digital health solutions.

7. Strengths and limitations

This study applied a standardized and validated data collection tool, WHO STEPS questionnaire, and therefore assured standardization and reliability. Furthermore, the stratified random sampling that was done across departments and professions ensured a more representative sample. The amalgamation of clinical, biochemical, and behavioral data gives a thorough risk evaluation. On the other hand, the study is limited in nature. Being cross-sectional, it does not offer room for causal inferences; both dietary intake and physical activity were self-reported and may be influenced by recall bias. Finally, this study was conducted at a single institution; therefore, its generalizability is limited with respect to healthcare providers. Future multicenter studies would remove these limitations and provide a broader understanding of CVD risk among medical professionals.

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