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Prevalence of Cardiovascular Risk Factors Among Healthcare Workers in a Tertiary Hospital: A Retrospective Study

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1. **Program/Project Title:**

   Prevalence of Cardiovascular Risk Factors Among Healthcare Workers in a Tertiary Hospital: A Retrospective Study

2. **Research Question:**

   What is the prevalence and distribution of cardiovascular risk factors among healthcare workers in a tertiary hospital?

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CHAPTER I

THE RESEARCH PROBLEM

Introduction

Cardiovascular diseases (CVDs) refer to a variety of conditions such as heart attack, stroke, arrhythmia, and heart failure. It is the most prevalent serious disorder in industrialized nations and is a rapidly growing problem in developing nations (World Health Organization, 2023). It remains a significant public health concern globally and collectively remains the leading cause of death worldwide. New data from the Philippine Statistics Authority (PSA) revealed that heart diseases are the leading cause of mortality in the Philippines (Philippine Statistics Authority, 2023). It is considered a public health emergency due to the alarming impact on mortality rates. Data from 2023 revealed that the top three causes of mortality in the Philippines are ischemic heart disease, neoplasm, and cerebrovascular disease (Philippine Statistics Authority, 2023).

Healthcare workers have a shift work schedule, which is defined as any schedule that is irregular or outside normal daytime hours (7/8 am – 5/6 pm). Shift work harms the physical, mental, and social well-being of employees and is also associated with several chronic diseases such as diabetes, obesity, cardiovascular disease, and metabolic syndrome (Caruso, 2014; Gan et al., 2015). Occupational factors such as excessive sitting time, shift work, and sedentary occupations significantly increase the risk for chronic diseases (Kecklund & Axelsson, 2016). Healthcare workers face various occupational hazards, including work-related diseases such as physical, chemical, biological, radiation, reproductive health, and psychiatric disorders (Vyas et al., 2012).

The health sector needs to maintain continuity of service as many patients require constant medical attention and monitoring. Healthcare workers are then forced to work irregular hours, increasing their risk of developing cardiovascular disease (Gan et al., 2015). Identifying the risk factors for cardiovascular diseases is of utmost importance to implement primary prevention and lifestyle modification strategies (World Health Organization, 2023).

General Objective:

This study aims to identify the prevalence and distribution of cardiovascular risk factors among healthcare workers in a tertiary hospital.

Specific Objectives:

Specifically, this study intends to:

1. Describe the demographic and occupational profile of healthcare workers with respect to:
    a. Age
    b. Sex
    c. Marital status
    d. Job category
    e. Work schedule
2. Determine the prevalence of selected cardiovascular risk factors among healthcare workers, including:
    a. Overweight and obesity (based on BMI)
    b. Hypertension
    c. Smoking status

d. Alcohol consumption

e. Physical activity level

f. Work-related stress

3. Determine the association between selected demographic, lifestyle, and occupational factors and overweight/obesity among healthcare workers.

Significance of the Study

Due to the demanding nature of the healthcare work, healthcare workers have an increased risk for cardiovascular diseases. The leading causes of death worldwide are related to a group of cardiovascular diseases. Understanding and identifying the modifiable and non-modifiable cardiovascular risk in the healthcare workers can improve prevention of development of the disease.

By identifying cardiovascular risk factors among healthcare workers, this study provides valuable data on the extent to which lifestyle, work-related stress and other factors contribute to the development of cardiovascular disease in the population. This can also allow early targeted interventions to reduce or manage risk. Healthcare workers in poor health may experience burnout and reduced efficiency and compromised patient care.

Scope and Limitation

The study was limited to regular employees with available annual physical examination records. Physicians, probationary employees, and outsourced personnel were not included because annual physical examinations were not routinely required for these groups and corresponding records were unavailable. Consequently, the findings may not be fully generalizable to the entire

hospital workforce. Furthermore, lifestyle-related variables were based on self-reported information documented during routine employee health assessments and may be subject to recall or reporting bias.

DEFINITION OF TERMS

Alcohol Consumption

Refers to the participant's self-reported intake of alcoholic beverages as documented during the annual physical examination and categorized as:

Never – an individual who does not consume alcoholic beverages.

Occasional – an individual who consumes alcoholic beverages less than once per week or only during social gatherings and special occasions.

Regular – an individual who consumes alcoholic beverages at least once per week or more frequently on a routine basis.

Body Mass Index (BMI)

It refers to the person's weight in kilograms divided by the square of their height in meters, used to categorize their body weight status and assess health risks.

Cardiovascular Diseases (CVDs)

A group of disorders affecting the heart and blood vessels, including coronary artery disease (CAD), stroke, heart failure, arrhythmias, and hypertension.

Healthcare Workers (HCWs)

Professionals engaged in patient care and hospital services, including doctors, nurses, allied health professionals, administrative staff, and support staff.

Hypertension

A chronic medical condition characterized by persistently elevated blood pressure defined as systolic blood pressure ≥140 mmHg or diastolic blood pressure ≥ 90 mmHg, or the use of antihypertensive medications.

Work Schedule – refers to the usual timing of an employee's work hours, categorized as:

Day Shift – working hours occurring predominantly during the daytime, defined as ≥80% of working hours between 6:00 AM and 6:00 PM

Night Shift – working hours occurring predominantly during nighttime, defined as ≥80% of working hours between 6:00 PM and 6:00 AM

Rotating Shift – work schedule that alternates between day and night shifts within a defined period, with no fixed predominance

Physical Activity

Refers to any bodily movement produced by skeletal muscles that requires energy expenditure, categorized based on the frequency and duration of activity as:

Active – engages in at least 150 minutes of moderate-intensity physical activity per week, or its equivalent

Moderately active – engages in some physical activity but does not meet the recommended 150 minutes per week

Sedentary – engages in minimal or no physical activity

Smoking Status

Refers to the classification of participants based on their history and current use of tobacco/ vape products, categorized as:

Never smoker – an individual who has never smoked or has smoked fewer than 100 cigarettes in their lifetime

Former smoker – an individual who previously smoked but has stopped smoking for at least 6 months prior to the study

Current smoker – an individual who currently smokes cigarettes or has smoked within the past 30 days

Stress Level

Refers to the frequency of perceived psychological stress experienced by the participant over the past month, categorized as:

Low – infrequent perceived work-related stress.

Moderate – occasional perceived work-related stress.

High – frequent or persistent perceived work-related stress.

CONCEPTUAL FRAMEWORK

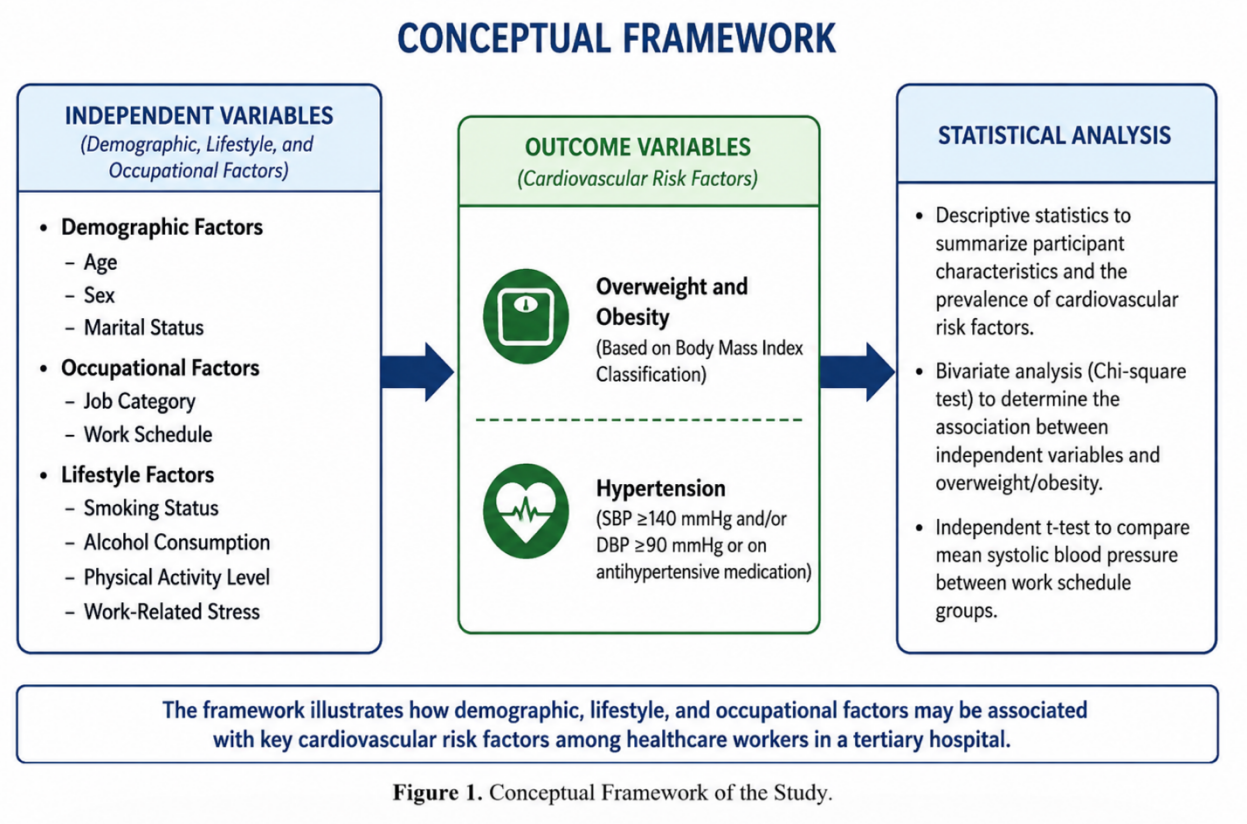

Figure 1. Conceptual Framework of the Study.

Figure 1. shows the Conceptual Framework of the Study. This depicts the selection of subjects included in the study, health care workers with the data needed to be collected and the cardiovascular risk factors.

CHAPTER II

REVIEW OF RELATED LITERATURE

Cardiovascular diseases (CVDs) remain the leading cause of morbidity and mortality worldwide, accounting for an estimated 17.9 million deaths annually (World Health Organization, 2023). These diseases encompass a range of conditions affecting the heart and blood vessels, including coronary artery disease, hypertension, heart failure, and stroke. The increasing burden of CVDs has prompted extensive research into their risk factors, prevention strategies, and management approaches.

Several well-established risk factors contribute to the development of CVDs, including hypertension, hyperlipidemia, diabetes mellitus, smoking, obesity, physical inactivity, and poor dietary habits. A study conducted by Yusuf et al. (2022) identified that hypertension was the most significant contributor to CVD risk, followed by chronic kidney disease (CKD) and diabetes mellitus. The study also highlighted that social determinants, such as low educational attainment and poor access to healthcare, further exacerbate CVD prevalence, particularly in low- and middle-income countries (Yusuf et al., 2022).

In addition to traditional risk factors, psychosocial factors such as chronic stress, depression, and social isolation have been increasingly recognized for their role in CVD development. A systematic review by Steptoe and Kivimäki (2012) found that individuals experiencing high levels of workplace stress and poor social support had a 40% higher likelihood of developing coronary artery disease compared to those with lower stress levels.

Occupational factors, particularly shift work and extended working hours, have also been implicated in the development of CVDs. Shift work, a common occupational hazard among HCWs, has been linked to an increased risk of cardiovascular diseases due to its impact on circadian rhythms, metabolism, and stress levels. A meta-analysis by Vyas et al. (2012) found that individuals engaged in night shift work had a 23% higher risk of myocardial infarction and a 24% increased risk of stroke compared to those working daytime hours. Disruptions in sleep patterns lead to increased blood pressure, glucose intolerance, and lipid profile abnormalities, all of which are major CVD risk factors.

Physical inactivity remains a major contributor to CVD risk. The American Heart Association's 2023 update reported that cardiovascular disease remains the leading cause of death in the United States, accounting for 928,741 deaths in 2020. A systematic review by Wilmot et al. found that prolonged sitting (more than 6 hours per day) was associated with a 34% increased risk of cardiovascular disease. Sedentary lifestyles, exacerbated by long working hours and administrative tasks, have been identified as a significant risk factor for cardiovascular diseases. Studies among HCWs have shown that nurses and administrative staff tend to exhibit lower physical activity levels, leading to weight gain, hypertension, and insulin resistance.

Smoking and excessive alcohol consumption further elevate cardiovascular risk. Despite widespread awareness campaigns, 9–15% of healthcare workers worldwide continue to smoke, contributing to increased rates of hypertension, atherosclerosis, and myocardial infarction. In addition, chronic alcohol use has been associated with hypertension, atrial fibrillation, and cardiomyopathy (Rehm et al., 2017).

Obesity is a significant modifiable risk factor for CVDs, with higher BMI levels correlating with increased cardiovascular morbidity and mortality. A study by Grundy et al. (2019) found that individuals classified as overweight or obese according to the Asia-Pacific criteria had significantly higher risks of metabolic syndrome, hypertension, and diabetes mellitus, which are major precursors to CVDs.

Workplace stress is another crucial factor contributing to cardiovascular risk among HCWs. Chronic exposure to high workloads, emotional exhaustion, and time pressures have been linked to hypertension, increased cortisol levels, and higher incidences of coronary heart disease. A study by Magnavita et al. (2018) found that healthcare workers experiencing high stress levels had significantly higher rates of metabolic syndrome, which increases their likelihood of developing CVD.

Unhealthy dietary choices among healthcare workers are influenced by long working hours, irregular meal patterns, and the availability of processed foods in hospital environments. Mozaffarian et al. (2011) highlighted that diets high in trans fats, sodium, and added sugars significantly increase cardiovascular risk. Conversely, adherence to a Mediterranean diet, rich in fruits, vegetables, whole grains, and healthy fats, has been associated with a 30% reduction in major cardiovascular events (Estruch et al., 2013).

Hypertension is a leading contributor to cardiovascular disease and remains one of the most commonly observed risk factors among healthcare professionals. The Global Burden of Disease Study (2019) reported that uncontrolled hypertension accounts for nearly 50% of ischemic heart disease cases worldwide.

Elevated fasting blood glucose levels and abnormal lipid profiles are strong indicators of cardiovascular risk. Healthcare workers with dyslipidemia and insulin resistance are at a significantly higher risk of developing atherosclerosis and type 2 diabetes mellitus, both of which contribute to increased cardiovascular mortality (Grundy et al., 2019). The American Diabetes Association (2022) recommends regular screening for prediabetes and lipid abnormalities as part of workplace health programs. Substantial burden of cardiovascular risk factors among healthcare workers, driven by shift work, sedentary lifestyles, high stress levels, and poor lifestyle choices.

Recent studies have further emphasized the growing burden of cardiovascular risk factors among healthcare workers globally. A cross-sectional study by Alshammari et al. (2023) demonstrated that more than 50% of healthcare workers were either overweight or obese. The authors attributed this to sedentary work patterns, irregular schedules, and limited access to healthy food options within healthcare settings.

Sleep disruption associated with shift work has also been identified as a major contributor to cardiovascular risk. According to Wang et al. (2021), prolonged exposure to rotating shifts increases the risk of cardiovascular disease through mechanisms involving circadian misalignment, impaired glucose metabolism, and sympathetic overactivity.

Furthermore, global evidence suggests that even in populations with adequate medical knowledge, such as healthcare workers, adherence to healthy lifestyle practices remains suboptimal. This paradox underscores the importance of structured workplace interventions rather than relying solely on individual awareness.

These findings reinforce the need for comprehensive and institution-based preventive strategies to mitigate cardiovascular risk among healthcare workers.

CHAPTER III

METHODOLOGY

Research Design

This study utilized a retrospective cross-sectional research design.

Research Setting

The study was conducted and completed at the Divine Word Hospital (DWH). Tacloban City, Philippines. A tertiary teaching hospital, which currently has a 179-bed capacity and is duly accredited by the Philippine College of Physicians to conduct a Residency Training Program in its Department of Internal Medicine.

Study Population

- **Inclusion Criteria:** Healthcare workers (doctors, nurses, allied health professionals, administrative staff) who have undergone routine health screenings within the hospital
- **Exclusion Criteria:** Workers with incomplete or no medical records, those who were on leave during the physical exam schedule or those without documented cardiovascular risk assessments.

Sampling Technique

The study employed total enumeration sampling. All eligible healthcare workers employed in the hospital who underwent annual physical examination during the study period (year 2026) were included in the study. Hospital records identified 633 regular employees as the target population. Of these, 453 employees met eligibility criteria and had complete annual physical

examination records available for analysis. Total enumeration was selected because the study population is finite, accessible, and manageable, allowing inclusion of all eligible participants and minimizing selection bias. This approach ensures a more accurate estimation of the prevalence and distribution of cardiovascular risk factors among healthcare workers.

Participants were included if they had available annual physical examination records containing at least the essential variables (e.g., age, sex, and at least one cardiovascular risk parameter such as blood pressure or body mass index). Participants were excluded due to missing data.

Data Collection

- Data were collected retrospectively through review of annual physical examination records maintained by the Human Resources Department and Employee Health Service. Demographic, occupational, anthropometric, and clinical data were extracted using a standardized data collection form developed for the study.
- Clinical and anthropometric variables extracted included age, sex, job category, work schedule, height, weight, body mass index (BMI), and systolic and diastolic blood pressure. BMI was computed as weight in kilograms divided by height in meters squared (kg/m^2). Body mass index (BMI) was classified according to the WHO Asia-Pacific criteria, where BMI was categorized as:
    - Normal: 18.5–22.9 kg/m^2
    - Overweight: 23.0–24.9 kg/m^2
    - Obese: ≥25.0 kg/m^2

- Blood pressure measurements were obtained using standard clinical procedures during the physical examination.
- Lifestyle and occupational variables were obtained from self-reported information documented during annual physical examinations. Information regarding smoking status, alcohol consumption, physical activity, and perceived work stress was routinely elicited and recorded by the health nurse or designated healthcare personnel.
- **Ethical Considerations**
    - Data was anonymized to protect worker confidentiality.
    - No direct patient/worker interaction is required, minimizing ethical concerns.

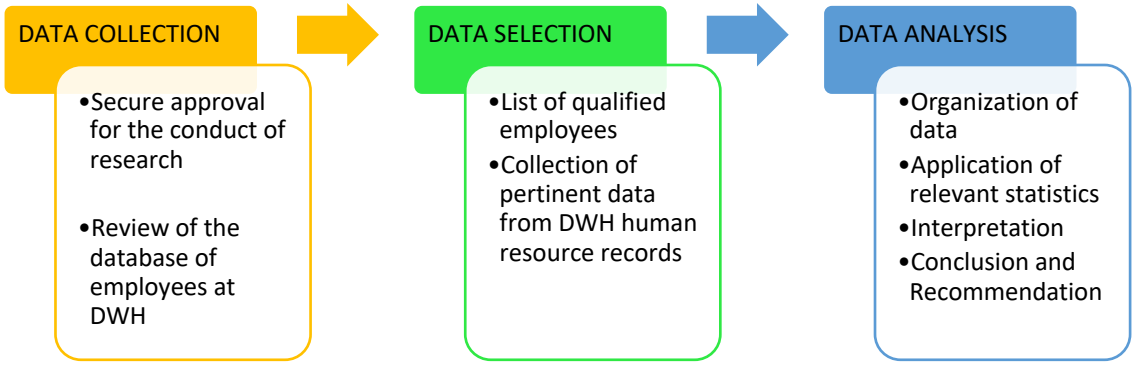

Figure 2: Data Collection Process

Data Analysis

Data were encoded and organized using Microsoft Excel and subsequently analyzed using statistical software.

Descriptive statistics were used for continuous variables in the study, including age, body mass index (BMI), and blood pressure (BP), were summarized using mean and standard deviation

(mean ± SD). Categorical variables, such as sex, job category, work schedule, smoking status, alcohol use, physical activity, work stress, overweight/obesity, and hypertension, were presented as frequency and percentage**.**

Bivariate analysis was performed to assess associations between categorical variables using the Chi-square test of independence. This included evaluation of relationships between selected variables such as sex and hypertension, sex and overweight/obesity, physical activity and overweight/obesity and work stress and overweight/obesity. Results were expressed as frequency distributions and corresponding percentages, with comparisons made across categories.

For continuous variables, independent sample t-tests were used to compare mean values between two groups, specifically mean BMI between males and females and mean systolic blood pressure between day shift and rotating shift workers. Where applicable, assumptions of normality and independence were considered prior to analysis.

A p-value of <0.05 was considered statistically significant for all analyses. Results were presented in tabular form with corresponding summary statistics, test values, and significance levels to address each research objective.

CHAPTER IV

RESULTS AND DISCUSSION

Out of a total of 633 regular employees**,** 453 (71.6%) were included in the present study based on the availability of annual physical examination records. Employees without documented records, those on leave during the study period, and non-regular personnel were excluded from the analysis. The included participants represented 71.6% of all regular employees and provided a substantial sample for estimating the prevalence of cardiovascular risk factors within the institution.

The study population had a mean age of 32.11 ± 7.7 years and was predominantly Female (69.3%)**,** with nurses comprising the largest proportion (57.2%). The majority of employees were assigned to rotating shifts (71.7%)**,** reflecting the demands of continuous healthcare service delivery. These characteristics are important, as younger age and occupational exposures such as shift work may influence the early development of cardiometabolic risk.

Table 1 summarizes the demographic and occupational characteristics of the study population. The cohort is largely composed of young to middle-aged adults, with a high proportion of healthcare workers engaged in rotating schedules. This distribution is clinically relevant, as shift work and occupational demands have been associated with disruptions in circadian rhythm, metabolic changes, and increased cardiovascular risk over time.

TABLE 1. Demographic and Occupational Characteristics (n = 453)

Variable	n (%) or Mean ± SD
Age (years)	32.11 ± 7.7
Sex	
Male	139 (30.7%)
Female	314 (69.3%)
Marital Status	
Single	313 (69.1%)
Married	140 (30.9%)
Job Category	
Nurse	259 (57.2%)
Admin Staff	74 (16.3%)
Allied Health	91 (20.1%)
Support Staff	29 (6.4%)
Work Schedule	
Day Shift	128 (28.3%)
Rotating Shift	325 (71.7%)
Smoking Status	
Never	415 (91.6%)
Former	32 (7.1%)
Current	6 (1.32%)
Alcohol Use	
Never	76 (16.8%)
Occasional	376 (83.0%)
Regular	1 (0.2%)
Physical Activity	
Sedentary	178 (39.3%)
Moderate	238 (52.5%)
Active	37 (8.2%)
Work Stress	
Low	53 (11.7%)
Moderate	290 (64.0%)
High	110 (24.3%)

A notably high prevalence of overweight and obesity (71.7%) was observed in this study, while the prevalence of hypertension remained low (3.31%). This pattern suggests that a significant proportion of employees may be in the early phase of cardiovascular risk, where excess adiposity is already present but has not yet progressed to overt hypertension. This observation aligns with current understanding that obesity precedes the development of hypertension through mechanisms such as insulin resistance, chronic inflammation, and endothelial dysfunction (Grundy, 2021).

The prevalence observed in this study is higher than that reported in several recent studies among healthcare workers, where overweight and obesity rates generally range from 50% to 60% (Alshammari et al., 2023). The higher burden identified in this population may reflect occupational factors, including irregular work schedules, limited time for physical activity, and workplace stress.

TABLE 2. Distribution of Cardiovascular Risk Factors and Selected Occupational Characteristics (n = 453)

Risk Factor	n (%)
Clinical Factors	
Overweight/Obese	325 (71.7%)
Hypertension	15 (3.31%)
Lifestyle Factors	
Current Smoking	6 (1.32%)
Former Smoking	32 (7.06%)
Alcohol Use (Occasional/Regular)	377 (83.22%)
Sedentary lifestyle	178 (39.3%)
Occupational Factors	
Moderate/High Work Stress	400 (88.30%)
Rotating Shift Schedule	325 (71.7%)

Table 2 presents the prevalence of cardiovascular risk factors among participants. The findings demonstrate that overweight and obesity constitute the most prominent clinical risk factor, while hypertension remains relatively uncommon. Lifestyle factors show a low prevalence of current smoking but a high prevalence of alcohol consumption. Additionally, a large proportion of participants reported moderate to high levels of work-related stress.

The low prevalence of smoking observed in this study may reflect increased awareness among healthcare workers regarding its adverse health effects. The high prevalence of alcohol use observed in this study reflects frequent consumption among healthcare workers. However, the level of intake (occasional vs. regular) should be interpreted with caution, as not all alcohol consumption necessarily confers significant cardiovascular risk (Piano, 2020). Furthermore, the high level of reported occupational stress is consistent with findings that healthcare workers are

particularly vulnerable to work-related stress due to long hours, high patient load, and shift duties (Magnavita et al., 2021).

Bivariate analysis revealed no statistically significant association between sex and hypertension ($p = 0.30$) or between sex and overweight/obesity ($p = 0.33$). Similarly, no significant association was found between physical activity and overweight/obesity ($p = 0.77$), nor between work stress and overweight/obesity ($p = 0.19$).

TABLE 3. Association Between Demographic, Lifestyle, and Occupational Factors and Overweight/Obesity Among Hospital Employees (n = 453)

Variable	Category	Overweight/Obese n (%)	Not Overweight/Obese n (%)	p-value
Age Group	<35 years	212 (67.9)	100 (32.1)	**0.007**
	≥35 years	113 (80.1)	28 (19.9)	
Sex	Male	104 (74.8)	35 (25.2)	0.33
	Female	221 (70.4)	93 (29.6)	
Physical Activity	Sedentary	129 (72.5)	49 (27.5)	0.77
	Moderate/Active	196 (71.3)	79 (28.7)	
Work Stress	Moderate/High	283 (70.8)	117 (29.2)	0.19
	Low	42 (79.2)	11 (20.8)	
Work Schedule	Day Shift	95 (74.2)	33 (25.8)	0.48
	Rotating Shift	230 (70.8)	95 (29.2)	

Table 3 presents the association between selected demographic, lifestyle, and occupational factors and overweight/obesity among hospital employees. A statistically significant association was observed between age group and overweight/obesity ($p = 0.007$). Employees aged 35 years and older had a significantly higher prevalence of overweight/obesity (80.1%) compared with employees younger than 35 years (67.9%).

The observed association between increasing age and overweight/obesity is consistent with established evidence demonstrating that body weight and adiposity tend to increase with age due to progressive metabolic changes, reduced energy expenditure, declining physical activity levels, and alterations in body composition. Recent studies have similarly shown that middle-aged adults are at greater risk of overweight and obesity compared with younger individuals, contributing to a higher burden of cardiovascular and metabolic diseases (Chooi et al., 2019; WHO, 2022).

No statistically significant associations were observed between overweight/obesity and sex ($p = 0.33$), physical activity level ($p = 0.77$), work-related stress ($p = 0.19$), or work schedule ($p = 0.48$). Although overweight and obesity were slightly more prevalent among males, sedentary workers, and day-shift employees, these differences did not reach statistical significance.

The lack of significant associations between overweight/obesity and occupational variables may suggest that excess body weight is broadly distributed throughout the workforce regardless of job-related characteristics. Similar findings have been reported in occupational health studies, where shared workplace environments and lifestyle exposures contribute to relatively uniform obesity prevalence across employee groups (Magnavita et al., 2021).

While work stress and shift schedules have been associated with obesity and cardiometabolic risk in previous studies, these relationships are often influenced by multiple factors, including sleep quality, dietary habits, duration of occupational exposure, and socioeconomic characteristics (Kivimäki & Steptoe, 2018; Wang et al., 2021). The absence of significant associations in the present study may reflect the relatively young age of the workforce and the multifactorial nature of obesity.

Further analysis of continuous variables demonstrated no significant difference in mean BMI between males and females (26.03 ± 4.27 vs. 26.08 ± 8.26; p = 0.94). Similarly, no significant difference was observed in mean systolic blood pressure between day-shift and rotating-shift workers. These findings further support the observation that cardiovascular risk factors in this population are generally distributed across demographic and occupational groups, with age emerging as the most important determinant of overweight and obesity.

TABLE 4. Comparison of Mean BMI and Blood Pressure Across Selected Groups

Variable	Group	Mean ± SD	p-value
BMI	Male	26.03 ± 4.27	0.94
	Female	26.08 ± 8.26	
BP	Day Shift	109.14 ± 10.16	> 0.05
	Rotating Shift	108.49 ± 10.04	

Table 4 summarizes the comparison of mean BMI and blood pressure across groups. The absence of significant differences suggests that cardiometabolic risk is relatively consistent across demographic and occupational categories in this cohort. Although shift work has been associated with increased cardiovascular risk in previous studies, such effects are often cumulative and may not yet be evident in relatively younger populations (Wang et al., 2021).

Overall, the findings of this study demonstrate a high burden of modifiable cardiovascular risk factors, particularly overweight and obesity, among healthcare workers. Despite this, the absence of significant associations across subgroups suggests that these risks are broadly distributed and influenced by shared occupational and environmental factors.

This study has several limitations. First, the analysis was limited to employees with available annual physical examination records, which excluded certain groups such as resident

physicians, probationary employees, and outsourced support staff, as these personnel were not routinely required to undergo annual physical examinations. As a result, the findings may not fully represent the entire hospital workforce. Second, lifestyle-related variables were based on self-reported data recorded during routine assessments, which may be subject to reporting bias. Despite these limitations, the study provides valuable insights into the burden of cardiovascular risk factors among regular hospital employees and highlights the need for institution-wide preventive strategies.

These findings highlight the importance of implementing institution-wide preventive strategies, including workplace wellness programs, promotion of physical activity, stress management interventions, and regular health screening. Early identification and intervention at this stage may help prevent progression to overt cardiovascular disease.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

This retrospective cross-sectional study examined the prevalence and distribution of cardiovascular risk factors among healthcare workers in a tertiary hospital. A total of 453 healthcare workers were included in the analysis, representing 71.6% of the total workforce with available annual physical examination records.

The study population was predominantly female and relatively young, with a mean age of 32.11 ± 7.7 years. Nurses comprised the largest occupational group, and the majority of employees were assigned to rotating shift schedules, reflecting the operational demands of continuous healthcare delivery.

The findings demonstrated a high prevalence of modifiable cardiovascular risk factors, particularly overweight and obesity, which affected 71.7% of the study population. In contrast, the prevalence of hypertension remained relatively low at 3.31%. Other notable findings included a high prevalence of alcohol consumption, moderate to high levels of occupational stress, and sedentary lifestyle among a substantial proportion of employees.

Bivariate analysis revealed a statistically significant association between age and overweight/obesity ($p = 0.007$), with employees aged 35 years and older demonstrating a significantly higher prevalence of overweight/obesity compared with younger employees. No statistically significant associations were observed between overweight/obesity and sex, physical activity level, work-related stress, or work schedule. Similarly, no significant associations were

found between sex and hypertension. Comparisons of continuous variables showed no significant difference in mean BMI between males and females and no significant difference in mean systolic blood pressure between day-shift and rotating-shift workers.

These findings suggest that overweight and obesity represent the predominant cardiovascular risk factors among healthcare workers in this institution, with increasing age emerging as an important determinant of excess body weight. The results highlight the importance of early identification and preventive interventions aimed at reducing cardiometabolic risk and promoting employee health and wellness.

Conclusions

This study demonstrated a high prevalence of cardiovascular risk factors among regular healthcare workers, with overweight and obesity emerging as the most common risk factor, affecting more than two-thirds of the study population. In contrast, the prevalence of hypertension was relatively low.

Among the demographic, lifestyle, and occupational factors examined, age was the only variable significantly associated with overweight and obesity. Employees aged 35 years and older had a significantly higher prevalence of overweight and obesity compared with younger employees. No significant associations were observed between overweight/obesity and sex, physical activity, work-related stress, or work schedule.

The findings suggest that excess body weight is a major health concern among healthcare workers and may already be present before the development of overt cardiovascular disease. These results highlight the importance of early identification of cardiovascular risk factors and

implementation of preventive health strategies within the workplace, particularly among employees aged 35 years and older.

Despite the relatively low prevalence of hypertension, the high burden of overweight and obesity underscores the need for continued surveillance and institution-wide wellness initiatives aimed at reducing future cardiovascular risk among healthcare workers.

Recommendations

In light of the findings, it is recommended that healthcare institutions implement comprehensive and sustainable workplace wellness programs aimed at reducing cardiovascular risk among employees. Such programs should include regular health screenings, particularly for body mass index, blood pressure, and metabolic parameters, to facilitate early detection and intervention. Additionally, institutions should promote physical activity through structured initiatives, such as scheduled exercise breaks, access to fitness facilities, or partnerships with wellness programs.

Efforts to improve the workplace environment should also focus on enhancing access to healthy dietary options and reducing reliance on processed and high-calorie foods. Given the high levels of reported occupational stress, the integration of mental health support services, stress management programs, and workload optimization strategies is strongly recommended.

At the individual level, healthcare workers should be encouraged to adopt healthier lifestyle practices, including regular physical activity, balanced nutrition, and moderation of alcohol consumption. Self-monitoring of cardiovascular risk factors may further enhance awareness and promote early behavioral modifications.

Future research should consider multicenter and longitudinal study designs to improve generalizability and to evaluate the progression of cardiovascular risk over time. Additional variables, such as sleep quality, duration of shift work exposure, and detailed dietary patterns, should also be explored to provide a more comprehensive understanding of cardiovascular risk among healthcare workers.

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APPENDICES

GANTT CHART

	March 2025	Apr 2025	May 2025	Jun 2025	Jul 2025	Aug 2025	Sep 2025	Oct 2025	Nov 2025	Dec 2025	Jan 2026	Feb 2026	Mar 2026	Apr 2026
Preparation of research proposal	X													
Research proposal presentation	X													
Secure approval for the conduct of research				X	X	X								
Data Collection										X	X	X		
Data Selection										X	X	X		
Data Analysis												X	X	
Finalization of Research Output												X	X	
Final Research Presentation														X

CASE REPORT FORM (CRF)

Section 1: General Information

- **Study ID:** _____
- **Date of Data Collection:** ____ / ____ / _____
- **Data Collector Name:** _____

Section 2: Demographic Information

- **Age (years):** _____
- **Gender:** ☐ Male ☐ Female ☐ Other
- **Ethnicity:** _____
- **Marital Status:** ☐ Single ☐ Married ☐ Divorced ☐ Widowed
- **Job Role:**

  ☐ Doctor ☐ Nurse

  ☐ Allied Health Professional (Midwives, Medical Technologists, Nutritionist, Physical Therapist, Pharmacists, Radiologic Technologist)

  ☐ Non- Medical/Administrative Staff (Social Workers, Medical Records Officer, Accounting/Finance Office, Cashier, Clerk, Engineer, Driver)

  ☐ General Support Staff (Maintenance, Janitorial, Orderly)

- **Work Schedule:** ☐ Day Shift ☐ Night Shift ☐ Rotating Shift

Section 3: Lifestyle Factors

- **Smoking Status:** ☐ Never ☐ Former Smoker (stopped ≥1 month) ☐ Current Smoker
- **Alcohol Consumption:** ☐ Never ☐ Occasionally (drinks less than once a week ☐ Regularly (daily 1-2 glasses for men, daily 1 glass for women)
- **Physical Activity Level:**

  ☐ Sedentary (your daily activities include:
  - Activities of daily living only, such as shopping, cleaning, watering plants, taking out the trash, walking the dog, mowing the lawn, and gardening.
  - No moderate or vigorous activities.
  - Unless you do at least 30 minutes per day of intentional exercise, you are considered sedentary.

  ☐ Moderate
  - Daily exercise that is equal to walking for 30 minutes at 4 miles per hour.
  - More intense exercise can be performed for less time to achieve the same goal. For example, 15 or 20 minutes of vigorous activity, such as aerobics, skiing, or jogging on a daily basis would put you in this category.

☐ Active

 Daily exercise that is equal to walking for 1 hour 45 minutes at 4 miles per hour.

 More intense exercise can be performed for less time. For example, jogging for 50 minutes per day.

Section 4: Clinical & Laboratory Data

- **Height (cm): _____**
- **Weight (kg): _____**
- **Body Mass Index (BMI): _____**
- **Blood Pressure (mmHg): _____ / _____**
- **Fasting Blood Glucose (mg/dL): _____**
- **Total Cholesterol (mg/dL): _____**
- **LDL Cholesterol (mg/dL): _____**
- **HDL Cholesterol (mg/dL): _____**
- **Triglycerides (mg/dL): _____**

Section 5: Medical History

- **Hypertension:** ☐ Yes ☐ No ☐ Unknown
- **Diabetes Mellitus:** ☐ Yes ☐ No ☐ Unknown
- **Dyslipidemia:** ☐ Yes ☐ No ☐ Unknown
- **Family History of Cardiovascular Disease:** ☐ Yes ☐ No ☐ Unknown
- **Personal History of Cardiovascular Disease:** ☐ Yes ☐ No ☐ Unknown

Section 6: Additional Notes

Section 7: Data Verification

- **Verified by (Name & Signature): _____**
- **Date of Verification: ____ / ____ / _____**