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Prevalence of Risk Factors for Coronary Heart Disease Among College Students: A Cross-Sectional Study

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Abstract

Introduction: Coronary Heart Disease (CHD), traditionally considered a condition of older adults, its risk factors increasingly being identified among younger populations. The emergence of unhealthy lifestyles among youth, particularly college students, is concerning, as early exposure to risk factors significantly elevates future disease burden.

Materials & Methods: A cross-sectional study was conducted among 100 undergraduate students aged 18–22 years at a private medical college in Chennai from June to December 2024. Participants were selected using simple random sampling. Students with chronic illnesses or those on medication for known CHD risk factors were excluded. Data were collected through a pre-tested, semi-structured questionnaire.

Results: The study revealed a notable presence of CHD risk factors among college students. A proportion of students reported tobacco or alcohol use, while physical inactivity was commonly observed. Obesity, based on BMI and waist circumference, was also present in a significant subset. Blood pressure readings identified a few participants with elevated values, though clinical hypertension was not diagnosed.

Conclusion: This study underscores the early presence of CHD risk factors among college students. Although they are generally considered a low-risk group, the adoption of unhealthy behaviours during young adulthood can accelerate the development of chronic conditions later in life. Preventive measures such as health education, lifestyle counselling, and routine screening should be integrated into college health programs to curb the early onset of cardiovascular diseases.

Keywords: Coronary heart disease, risk factors, college students, lifestyle, cross-sectional study, preventive cardiology, young adults.

Introduction

Chronic non-communicable diseases (NCDs) are gaining increasing importance among adult populations globally, including in both developed and developing nations. Improvements in healthcare have led to longer life expectancy, and as people live into older age, they face a higher risk of developing chronic diseases. Rapid lifestyle and behavioural changes are also contributing significantly to the growing burden of these conditions. Cardiovascular diseases (CVDs) include heart and vascular disorders such as coronary heart disease (CHD), hypertension, stroke, and congenital heart disease. In India, it was estimated that about 29.8 million people were living with CVDs in 2003, and approximately 1.5 million died each year due to these conditions. CHD accounted for around 2.4 million cases, and stroke for 0.93 million cases

annually. India suffers the greatest loss of potentially productive life years due to CVD among people aged 35–64 years, with this loss expected to increase to 17.9 million by 2030, over nine times higher than that in the USA [1].

CHD, also known as ischemic heart disease, is now the leading cause of death worldwide. Initially prevalent in high-income countries, it has now become widespread globally. CHD results from reduced blood flow to the heart due to blocked coronary arteries, impairing heart function [2]. It can manifest as angina, myocardial infarction, or sudden death, with myocardial infarction being the most specific. Globally, CHD causes 7.2 million deaths annually, representing 12.2% of all deaths. The highest mortality rates are observed in Europe, followed by Southeast Asia [3].

Although once considered a male-dominant disease, CHD is now the leading cause of death in both sexes [4,5]. Indian studies from the 1990s to early 2000s show higher CHD prevalence in urban (6.4%) than rural (2.5%) populations, with urban females (6.7%) having a slightly higher rate than urban males (6.1%) [6,7]. CHD has a multifactorial origin. Non-modifiable risk factors include age, sex, family history, and genetics, while modifiable factors include smoking, hypertension, cholesterol levels, diabetes, obesity, physical inactivity, and stress [8,9].

Alarmingly, the age of CHD onset is declining, with individuals in their 30s undergoing cardiac interventions [10,11]. Indians face a significantly higher CHD risk, 3 to 4 times more than white Americans and up to 20 times more than the Japanese. They also experience an earlier onset and have a higher prevalence of diabetes, abdominal obesity, and dyslipidemia [12]. Most studies on CHD risk factors have not focused on young adults, especially in South India. This study aims to assess CHD risk factors in this younger age group.

Materials & Methods

A cross-sectional study was conducted to determine the prevalence of coronary heart disease (CHD) risk factors among undergraduate students aged 18–22 years at a government medical college in Chennai, Tamil Nadu, over six months from June to December 2024. The study population included both male and female students within the specified age group. Students who were aged between 18 and 22 years and willing to participate were included, while those younger than 18 or older than 22 years, currently pregnant, on medications for known CHD risk factors, or unwilling to participate were excluded to reduce potential confounding variables.

A total of 100 participants were selected using simple random sampling from the complete list of eligible students provided by the college administration, ensuring proportional representation across different academic years to avoid selection bias. Before participation, each student received a detailed explanation of the study objectives, procedures, and potential benefits and risks in both Tamil and English to ensure comprehension. Written informed consent was obtained from all participants.

Data collection was carried out using a pre-designed, pre-tested, semi-structured interview schedule, which included sections on demographic details, lifestyle habits, family history of CHD, and other relevant clinical information. Standardized procedures were followed to ensure consistency in data collection. Participants' confidentiality was strictly maintained, with unique codes assigned to each student, and all responses were anonymized and recorded in aggregate form for analysis.

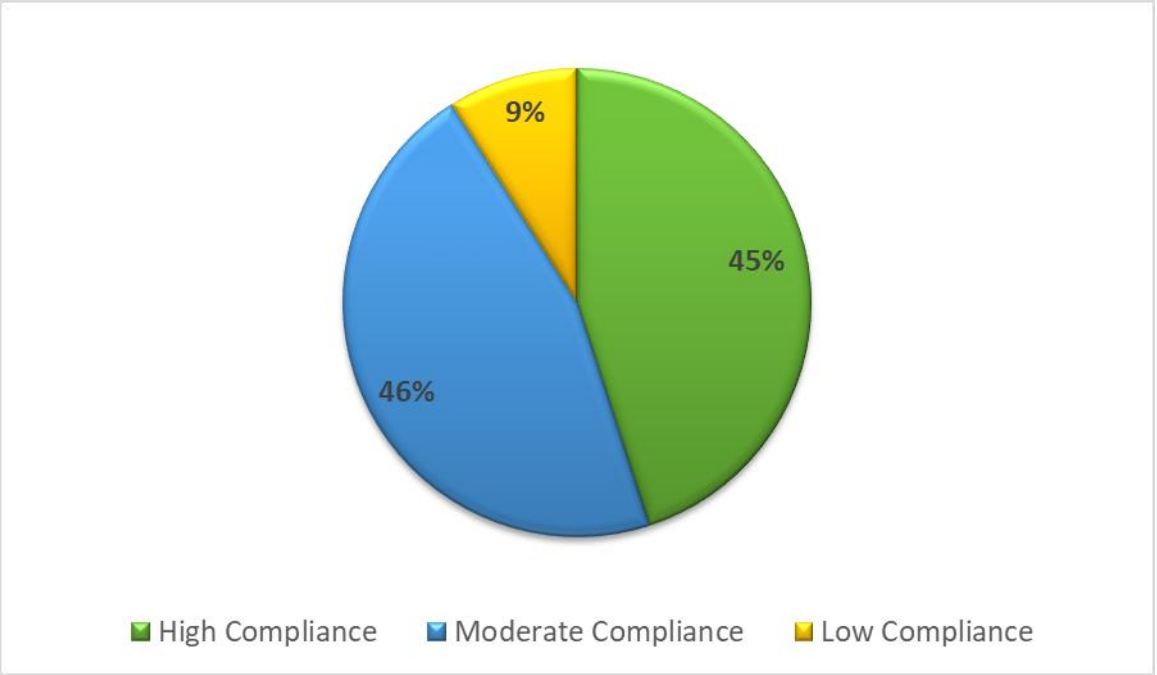
All collected data were systematically entered into Microsoft Excel and subsequently analyzed using SPSS version 26. Descriptive statistics, including mean, standard deviation, and percentages, were calculated to summarize the demographic characteristics and prevalence of various CHD risk factors. Where appropriate,

cross-tabulations and frequency distributions were used to identify patterns and associations within the data.The study protocol was reviewed and approved by the Institutional Ethics Committee of the college. The study adhered strictly to the principles of the Declaration of Helsinki, ensuring ethical conduct throughout the research process. Participants' autonomy, confidentiality, and right to withdraw from the study at any point were fully respected, and care was taken to minimize any potential risks associated with participation.

Ethical approval was obtained from the Institutional Ethics Committee of Government Medical College, Indore, Madhya Pradesh (Ref No: IEC/GMC-IND/2024/00638). All participants were provided with a detailed Participant Information Sheet, and written informed consent was obtained prior to their inclusion in the study.

Results

Figure 1: Distribution of Study Participants Based on Level of Medication Compliance (n = 100)



The majority of participants exhibited either high (45%) or moderate (46%) medication compliance, accounting for 91% of the study population. Only 9% of participants showed low compliance. This reflects an overall good adherence to anti-diabetic medications among the rural cohort studied.

Table 1: Association Between Age and Medication Compliance (n = 100)

Age Group (Years)	High	Moderate	Low	Total	p-value
<45	10	8	2	20	**0.311**
45–59	22	23	3	48	
≥60	13	15	4	32	
Total	45	46	9	100	

No statistically significant association was observed between age and medication compliance ($p > 0.05$). However, high and moderate compliance were slightly better among middle-aged participants (45–59 years).

Table 2: Association Between Gender and Medication Compliance (n = 100)

Gender	High	Moderate	Low	Total	p-value

Male	25	23	4	52	**0.672**
Female	20	23	5	48	
Total	45	46	9	100	

Out of the 100 participants, 52 were male and 48 were female. Among males, 25 (48.1%) had high risk, 23 (44.2%) had moderate risk, and 4 (7.7%) had low risk. Among females, 20 (41.7%) had high risk, 23 (47.9%) had moderate risk, and 5 (10.4%) had low risk. Overall, 45 participants (45%) were classified as high risk, 46 (46%) as moderate risk, and 9 (9%) as low risk, indicating a fairly similar distribution of risk levels between male and female students.

Table 3: Association Between Duration of Diabetes and Medication Compliance (n = 100)

Duration of Diabetes	High	Moderate	Low	Total	p-value
<5 years	18	22	1	41	0.048*
5–10 years	15	14	2	31	
>10 years	12	10	6	28	

A statistically significant association was observed between duration of diabetes and compliance ($p = 0.048$). Patients with diabetes for more than 10 years had lower compliance, highlighting the need for continuous reinforcement of adherence.

Table 4: Association Between Co-morbidities and Medication Compliance (n = 100)

Co-morbid Condition	High	Moderate	Low	Total	p-value
Hypertension	16	22	4	42	0.329
No Hypertension	29	24	5	58	
Total	45	46	9	100	

No significant association was found between presence of hypertension and compliance ($p > 0.05$). However, slightly better compliance was noted in those without co-morbid conditions.

Table 5: Association Between Knowledge About Diabetes and Medication Compliance (n = 100)

Knowledge Level	High	Moderate	Low	Total	p-value
Good	30	20	2	52	0.006
Poor	15	26	7	48	
Total	45	46	9	100	

There was a statistically significant association ($p = 0.006$) between knowledge of diabetes and medication compliance. Patients with good awareness demonstrated higher compliance, underscoring the importance of diabetes education.

Discussion

This study assessed medication compliance and its associated factors among 100 Type 2 diabetes patients attending a Rural Health Training Centre in Tamil Nadu. The overall medication compliance was encouraging, with 45% demonstrating high compliance and 46% moderate compliance, leaving only 9% with low adherence (Table 1). This pattern suggests generally good adherence in this rural cohort, which is consistent with findings from similar rural Indian studies where compliance rates ranged between 70% to 90% (Kesmeera et al [1]; Angadi et al [2]).

When analysing demographic factors, no significant association was found between age groups and

medication compliance (Table 2), although middle-aged patients (45–59 years) showed slightly better adherence. This aligns with prior research by Salazar et al [3], where age did not strongly predict compliance, but younger and older extremes tended to have more challenges with adherence.

Gender distribution also revealed no significant difference in compliance (Table 3). Both males and females had comparable adherence levels, paralleling findings by Joha et al [4], who reported no gender disparity in medication adherence among rural diabetic populations.

Duration of diabetes, however, showed a significant association with compliance ($p = 0.048$) (Table 4). Patients with diabetes for over 10 years had notably lower compliance, a trend reported by Shamkuwar et al [5] and Kumar et al [6], suggesting long-term patients may experience treatment fatigue or complacency over time. This highlights the need for ongoing reinforcement and tailored interventions for patients with chronic disease durations.

Co-morbidities such as hypertension did not significantly affect medication compliance (Table 5), although patients without hypertension showed slightly better adherence. Similar observations were noted in a study by Maheshwari et al [7], where the presence of co-morbidities did not always translate to better compliance, possibly due to increased pill burden or health complications.

A crucial finding was the strong positive correlation between knowledge about diabetes and medication compliance ($p = 0.006$) (Table 6). Patients with good knowledge of their disease and treatment were more likely to adhere to medications, underscoring the critical role of patient education. This mirrors results from several studies emphasizing diabetes education as a key factor in improving compliance (Mishra et al [8]; Sivakumar et al [9]).

This study reveals that while demographic factors such as age and gender may not significantly influence medication compliance, disease duration and patient knowledge play substantial roles. These findings advocate for enhanced patient education programs and a special focus on long-term diabetic patients to sustain adherence, ultimately improving glycaemic control and reducing complications (Kumari et al [10]; Arshad et al [11]; Udupa et al [12]).

Conclusion

The study highlights that medication compliance among Type 2 diabetes patients in this rural setting is generally good, with most patients showing high to moderate adherence. However, patients with a longer duration of diabetes tend to have lower compliance, emphasizing the need for continuous support and follow-up. Importantly, better knowledge about diabetes strongly correlates with improved medication adherence, underlining the vital role of patient education. Targeted interventions focusing on enhancing awareness and addressing the challenges faced by long-term patients can help improve adherence and ultimately reduce the burden of diabetes-related complications in rural communities.

Conflict of Interest: Nil

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