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Assessment of Knowledge, Attitude, and Practice on Risk Factors for Cardiovascular Diseases among University Students in Dhaka, Bangladesh

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ABSTRACT

Cardiovascular diseases (CVDs) rank as the leading global cause of mortality, with a growing burden in low- and middle-income countries such as Bangladesh. Healthy lifestyle behaviors (unhealthy diet, physical inactivity, stress and smoking) prevalent among university students make them more vulnerable to NCDs. Thus, this study aimed to assess the knowledge, attitude and practice (KAP) toward risk factors of cardiovascular diseases among university students in Dhaka, Bangladesh. Specifically, the aims were to assess students' knowledge level, determine their attitudes toward CVD prevention, and evaluate lifestyle practices on cardiovascular risk factors. A quantitative cross-sectional design was employed, and data were collected from 384 respondents using a structured questionnaire based on the KAP model. Cochran's formula was used to determine the sample size and respondents were selected by random sampling. Data were analyzed with descriptive and inferential statistics. The findings showed that student knowledge of common CVD risk factors, specifically smoking, physical inactivity and unhealthy diet, was moderate to high. Most respondents had positive attitudes, as the majority indicated the need for healthy lifestyle and preventive measures. However, practices were poor, with students undertaking high-risk behaviors such as low physical activity, excessive fast food consumption, sleeping problems with irreversible patterns of poor sleep and underutilization of health check-ups. There is a significant gap between knowledge and practice, which indicates the need for targeted health education and interventions aimed at behavior change such as counselling of patients. The authors conclude that universities should proactively promote cardiovascular health and encourage students to maintain healthy lifestyles.

INTRODUCTION

Cardiovascular diseases (CVDs) continue to be responsible for the highest number of deaths worldwide, lying at the foundation of approximately 1 in every third global death each year (Dattatraya Bhanwase, 2025). This includes diseases like coronary artery disease, hypertension, heart failure and stroke that are primarily due to modifiable behavioral and lifestyle risk factors (e.g. smoking, unhealthy diet, physical inactivity, obesity, high alcohol consumption and chronic stress). The rising toll of CVDs and the non-communicable disease epidemic it is part of, however, are not confined to high-income countries; low- and middle-income ones like Bangladesh now are experiencing the consequences of rapid urbanization, sedentary lifestyles and diets (OECD & Bank, 2023). Cardiovascular disease (CVD) is a significant public health challenge in Bangladesh with an increasing incidence seen among younger cohorts (Amna Gilani, 2024). Changing lifestyle associated with academic pressure, fast-food consumption, lack of physical activity and high level of stress among university students make urban centers like Dhaka especially vulnerable (Guerriero *et al.*, 2025). Although P-CVD risk factors are often still considered a phenomenon of older adults, recent evidence indicates that they begin to develop at the onset of adolescence and continue into early adulthood, making university students an important group for early intervention and preventive strategies (Safiah *et al.*, 2025). Assessment of knowledge, attitude and practice (KAP)

toward CVD risk factors among university students is one of the important components for designing an effective health promotion program (Koochi & Khalili, 2020). Knowledge denotes awareness and understanding of the nature of cardiovascular diseases as well as their etiological risk factors and attitude relates to opinion, belief, inclination or readiness to engage in preventive behaviors (Yang *et al.*, 2024). Practice, however, is indicative of actual involvement in health-promoting or risky behaviors. Apart from the total number of identified studies within each level, we also included a note on the KAP framework used to develop those surveys as it is one of the most common methods applied in public health research and this information provides useful insight into both contextual behaviors around awareness as well as knowledge-action gaps (Shalihin *et al.*, 2022). KAP related to cardiovascular disease (CVD) risk factors among university students in Dhaka: evidence from a methodologically sound survey Perspectives on the increased burden of non-communicable diseases, especially cardiovascular diseases and their impact on human health over the last couple of decades have been highlighted (Khan *et al.*, 2023). Many students may have a basic knowledge of how to care for their heart health but may not engage in positive health behaviors as a result of environmental, social, and psychological influences. Moreover, relatively little attention has been given to the potential role of schools in teaching students about cardiovascular health (Popov *et al.*, 2024).

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Hence, the main objective of this study is to evaluate the knowledge, attitude and practice about risk factors for cardiovascular diseases among university students in Dhaka, Bangladesh. Through a comprehensive analysis of the current landscape, the research aims to provide insights into both where there are existing gaps and encourage behavioral change, paving the way for tailored interventions, awareness programs, and policy recommendations that can foster healthier lifestyle practices in this population. Thus, early prevention and behavioral changes among university students can contribute significantly to the alleviation of burgeoning future cardiovascular diseases in Bangladesh.

LITERATURE REVIEW

CVDs are a range of disorders of the heart and blood vessels such as; coronary artery disease, hypertension, stroke and heart failure. As reported by Global health, Cardiovascular diseases (CVDs) are the leading cause of mortality and accounts for nearly one-third (approx. 17 million deaths per year) of all the global deaths (K. J. Ali & Suthar, 2024). The health burden of these diseases is rising rapidly in low- and middle-income countries, owing to demographic transitions, urbanization and lifestyle changes. In Bangladesh, with the epidemiological transition from communicable to non-communicable diseases, CVD has emerged as a major public health challenge and accounts for a significant portion of morbidity and premature mortality (Barron *et al.*, 2025). There are two major categories of CVD risk factors, modifiable and non-modifiable factors. Such as, non-modifiable (age, sex and hereditary factors) and modifiable (improper diet, physical inactivity, tobacco consumption, excessive consumption of alcohol / obesity / hypertension / diabetes/ stress) (Arenas, 2020). Numerous studies firmed up this association of behavioral risk factors in younger adulthood exerting an influence on later cardiovascular disease risk decades later. Urban area inhabitants, especially university students, are highly prone to unhealthy lifestyles like increased fast food intake, sedentary lifestyle guided by academic workload production and inconsistent sleeping behavior (Aydin *et al.*, 2021). A growing burden of obesity, hypertension and smoking among young adults in South Asian countries contributes to a markedly higher lifetime cardiovascular risk (Devi *et al.*, 2024). Knowledge of Cardiovascular Diseases risk has an important role in prevention, as health-related decisions are affected by the awareness of risks. Previous studies reported the moderate knowledge of university level students about some common risk factors related coronary heart diseases like smoking, obesity and physical inactivity. But there are still areas where we need to know much more particularly about less visible risk factors such as high cholesterol, hypertension and the effects of prolonged periods of stress (Alzahrani *et al.*, 2025).

Knowledge related to heart health Among Bangladeshi students in Bangladesh, available studies have shown

that although children had basic knowledge about some general aspects of heart health, they were found lacking in comprehending mechanisms of the disease and preventive measures (Nisa *et al.*, 2025). This fragmented understanding almost never fails to result in personal risk underestimation and late adoption of preventive conduct. Attitude is an individual's perception, beliefs and readiness to adopt healthy behaviors. However, until individuals can adopt a positive attitude toward cardiovascular health, knowledge about CV risk needs to be put into practice (K & Hansaram, 2024). Other research indicates that although many college students are aware of the importance of a healthy lifestyle they may lack motivation or view themselves as having low risk due to youth. Cultural norms, peer influences and academic stress can create natural barriers to health beliefs in low-to-middle income countries (N. Ali *et al.*, 2022). For instance, they may put academic success above being active or be led to believe that eating poorly is part of a normal university experience. Studies have additionally shown that although students may agree about the benefits of exercise and eating balanced diets, they do not necessarily incorporate these practices into their lives (Shalihin *et al.*, 2022). Practice refers to those behaviors and lifestyle choices that impact cardiovascular health. Many university students, in spite of the basic knowledge and favorable attitudes about healthy lifestyle, still engage in unhealthy practices (Hossain *et al.*, 2024). Common behaviors that fall into this category include low physical activity levels, high intake of fast foods and sugary drinks, smoking habits, and ineffective stress management.

Evidence from urban settings has shown alarming patterns of inactive students, heavily due to screen time numbers and academic workload alone. Also, this irregularity in sleep and absence of regular medical examinations also increases cardiovascular risk (Aini *et al.*, 2024). Even students in Bangladesh do not follow preventive health measures despite knowing their importance. One of the most widely adopted models in public health research that addresses this linkage is the Knowledge, Attitude and Practice (KAP) model (Sumarni & Darmawan, 2024). This is based on the premise that knowledge affects attitudes, and attitudes will ultimately affect practices. But numerous studies have shown that the relationship between these elements is not always directly proportional (Banna *et al.*, 2022). For example, a person may know enough to quit smoking but still do it due to limited resources, social pressure or other risk factors. In terms of CVDs, the KAP model facilitates understanding about variation between knowledge and conduct, which can contribute for designing directed measures (Mbala *et al.*, 2019). The KAP framework has been demonstrated across multiple studies to highlight the gap between knowledge versus practice among university students, calling for further development of health education programs that provide not only awareness but also change in behavior (Takahashi *et al.*, 2022). Studies from Bangladesh and other developing countries have highlighted the increasing

burden of cardiovascular risk factors among young populations. Previous studies conducted on university students from Dhaka expanded their findings and reported moderate levels of knowledge but poor health practices including dietary habits, physical activity, and smoking behavior (Safiah *et al.*, 2025). However, similar patterns of results have been mentioned in neighboring countries due to rapid urbanization and lifestyle changes that led to a greater susceptibility for non-communicable diseases (Amin & Rahman, 2019). Additionally, studies have shown that institutional support, including health education programs and awareness campaigns, is essential for promoting knowledge and practices among students (Dixit, 2023). Yet, only few universities have implemented such initiatives, providing a gap of preventive healthcare. While some studies have been done on cardiovascular risk factors among the general population, comparatively few have focused solely on the KAP regarding CVD among university students in Dhaka (Basheeruddin *et al.*, 2025). Most studies conducted currently fail to assess knowledge attitude practice all in the same framework. There is also lack of focus on laying bare what the behavioral gaps are and the determinants of student's health in their environment (Kulkarni, 2024).

The literature reviewed suggests that cardiovascular disorders are increasingly important in young adults, especially for those in urban surroundings. Although university students show moderate knowledge and relatively positive attitudes on average, their practice of health-related behavior is less than optimal. This difference between knowledge and action highlights the necessity of tailored approaches to encourage healthy living. Hence, this study aims to address the gap in available literature by its comprehensive reflection of knowledge attitude and practice regarding CVD risk factors among university students of Dhaka metropolitan area, Bangladesh. The objectives of the study are:

To measure awareness about risk factors of cardiovascular diseases among the university students of Bangladesh.

To assess the attitudes of university students about prevention and control of cardiovascular diseases.

To assess students lifestyle practices regarding cardiovascular disease risk factors.

To determine the gap between knowledge, attitude and practice about cardiovascular health among students

To recommend measures for raising awareness and encouraging healthy lifestyle practices in order to minimize the risk of cardiovascular disease among university students.

MATERIALS AND METHODS

This study focused on evaluating the knowledge attitude and practice towards risk factors of cardiovascular diseases among university students in Dhaka, Bangladesh (CVD) using quantitative cross-sectional research design. The study involved using a structured, self-administered questionnaire to collect primary data from students selected via a simple random sampling technique. We

determined the sample size using Cochran's formula for infinite population:

$$n = (Z^2 \cdot p \cdot (1-p)) / E^2$$

Where n = sample size, Z = standard normal variate for 95% confidence level (1.96), p = estimated proportion of the population with the attribute being measured (p was presumed to be 0.5 since no prior information needed to be used) and E is margin of error (0.05) (Cochran, 1942). Therefore, the minimum sample size required for a single population proportion was 384 respondents, but to compensate for possible non-response and incomplete questionnaires, a larger number of participants were approached. The collected data were coded and analyzed through statistical program (e.g., SPSS), descriptive statistics including frequency, percentage, mean, and standard deviation to synthesize the data; while inferential statistics addressed relationships of the variables. Strict ethical considerations were followed, including voluntary participation, informed consent and confidentiality of respondents' information.

RESULT AND DISCUSSION

This section only describes and discusses the results of the analysis conducted on knowledge, attitude, and practice (KAP) regarding the risk factor for cardiovascular diseases within university students in Dhaka, Bangladesh. The collected data was analyzed by applying suitable statistical methods and the findings are represented in structured form with the help of tables followed by meaningful descriptions. Results are discussed in terms of the study goals, and related literature to determine priorities, trends and gaps in students' awareness and behaviors. It also describes the interrelationships of knowledge, attitude, and practice which demonstrates how students' knowledge about risk factors for cardiovascular disease impacted their attitude and lifestyle.

Demographic Information

Demographic characteristics describe the various profiles that participants may fit in within KAP towards CVD risk factors among university students. Three hundred eighty-four respondents were included in the study, covering diverse age groups, gender, academic levels, and socioeconomic status. These attributes are important in this context as they can affect the level of health awareness, perceptions and lifestyle behaviors.

In terms of age distribution, most respondents were aged between 21–23 years (39.1%) followed by those aged between 18–20 years (31.3%). It indicates that most subjects were young adults, a formative period when lifestyle habits are established and could prove to be carried into older life (Table 1). This relatively low proportion of respondents above 26 years represents a typical age structure in university populations in Dhaka. Gender-wise, there were slightly more male respondents (52.1%) compared to females (44.3%). Having a closely balanced representation increases the reliability of these findings, leading to a more thorough understanding of

gender-based discrepancies in knowledge and behaviors pertaining to cardiac health. Distribution per academic year is also balanced with a tendency to study at the 1st year (23.4%) and least in the Master level (14.1%). This means that students in different stages of the academic

journey were included, which is significant since exposure to education and awareness programs may differ based on level of academia. The distribution of respondents' fields of study was as follows: 36.5% were studying science, 28.6% business, and 23.4% arts. It could be that

Table 1 : Demographic Information of the Respondents

Variables	Categories	Frequency (n)	Percentage (%)
Age	18–20	120	31.3
	21–23	150	39.1
	24–26	80	20.8
	Above 26	34	8.9
Gender	Male	200	52.1
	Female	170	44.3
	Other	14	3.6
Academic Year	1st Year	90	23.4
	2nd Year	85	22.1
	3rd Year	80	20.8
	4th Year	75	19.5
	Masters	54	14.1
Field of Study	Science	140	36.5
	Business	110	28.6
	Arts	90	23.4
	Others	44	11.5
Monthly Family Income (BDT)	<20,000	70	18.2
	20,000–50,000	140	36.5
	50,001–100,000	110	28.6
	>100,000	64	16.7
Family History of CVD	Yes	150	39.1
	No	180	46.9
	Not Sure	54	14.1

students in science streams have relatively better exposure to health-related knowledge, so they may show more awareness about the risk factors of CVD. Nonetheless, including students enrolled in disparate levels of college as well would give a more accurate picture of the general student population. Socio-economic status of respondents assessed in terms of monthly family income. The highest proportion of patients belonged to the socio-economic category defined as middle-income (20,000–50,000 BDT; 36.5%). This evidenced the general socio-economic milieu of urban university students in Bangladesh. The socio-economic status of individuals plays an important role in health behaviors as it affects the access to healthy food, health services and physical activities. Lastly, 39.1% of respondents reported a family history of cardiovascular diseases and 46.9% did not, while 14.1% were not sure. Family history is an important risk factor, which might also affect individual awareness and preventive behaviors. Students with a known family history may have greater health awareness and be more

inclined to adopt preventive measures.

This demographic profile indicates that the survey successfully captured a heterogeneous and representative sample of the university student population in Dhaka (Sampa *et al.*, 2020). Such characteristics represent a fruitful basis for longer measures of knowledge, attitude, and practice towards cardiovascular disease risk factors, given that demographic variables are often determinants shaping health taking behaviors and cognizance in any sanctioned setting.

Knowledge about Cardiovascular Diseases (CVDs)

A total of ten structured statements on the general knowledge, risk factors, and prevention of CVDs were used to assess the CVD knowledge status among university students. Respondents were asked to respond “Yes,” “No” or “Don’t Know” for each statement. The results demonstrate a mix of awareness levels, with reasonable knowledge on common risk factors but gaps in more nuanced clinical elements.

Table 2 : University Student’s Knowledge about Cardiovascular Diseases (CVDs)

Statements	Yes	No	Don’t Know
	N (%)	N (%)	N (%)
CVDs include heart attack and stroke	310 (80.7)	40 (10.4)	34 (8.9)
Smoking is a major risk factor for heart disease	340 (88.5)	20 (5.2)	24 (6.3)
High blood pressure increases risk of CVD	300 (78.1)	36 (9.4)	48 (12.5)
Obesity is linked to cardiovascular diseases	295 (76.8)	42 (10.9)	47 (12.2)
Regular physical activity reduces CVD risk	320 (83.3)	30 (7.8)	34 (8.9)
High cholesterol contributes to heart disease	270 (70.3)	50 (13.0)	64 (16.7)
Diabetes increases the risk of CVD	260 (67.7)	55 (14.3)	69 (18.0)
Stress can contribute to heart disease	315 (82.0)	28 (7.3)	41 (10.7)
Frequent fast food intake increases CVD risk	305 (79.4)	35 (9.1)	44 (11.5)
CVDs are preventable	290 (75.5)	40 (10.4)	54 (14.1)

Table 2 shows that knowledge regarding CVD and its associated risk factors among the university students of Dhaka is moderate to high. Correctly, the largest proportion of respondents (80.7%) chose option A that CVDs include heart attack and stroke, indicating a good general awareness about this type of disease. This was particularly true for knowledge of major behavioral risk factors. For example, 88.5% of the respondents knew that smoking is a major risk factor while 83.3% understood that regular physical activity plays a protective role. Likewise, 82.0% were aware of the causative role played by stress on heart disease. These results are indicative of the success of public health campaigns and widespread information-sharing about risk factors pertaining to lifestyles. But the results also expose major knowledge gaps, particularly with regard to clinical and metabolic risk factors. Notably, high cholesterol was named a contributor to heart disease by only 70.3% of respondents, with diabetes as a risk factor (67.7%) even less frequently recognized. Moreover a relatively large percentage of the respondents answered “Don’t Know” to these items (16.7% and 18.0%, respectively), suggesting uncertainty or lack of contact with more technical health information. On the other hand, a significant percentage either disagreed with or were unsure about CVDs like most lifestyle diseases being preventable leading to an incomplete understanding of preventive strategies. Careful consideration of the gap may act as a barrier to proactive health behavior, since people who do not recognize preventability may be less likely to adopt risk-reducing practices. In general, the findings indicate that students know a great deal about visible and frequently talked about risk factors like smoking, diet and inactivity but have relatively poor knowledge of vascular risk factors such as high cholesterol or diabetes. This discrepancy underscores the importance of broadening health education efforts beyond awareness to include more nuanced risk factors that are not as apparent. These results are congruent with earlier studies performed in comparable settings, mentioning moderate knowledge levels amongst university students but gaps within specific cardiovascular health areas (Parikh *et al.*, 2021). Filling these gaps by creating awareness through

targeted campaigns, integration into the curriculum and university-based health promotion initiatives can help improve the overall understanding of the students and definitely prevent cardiovascular diseases in future.

Attitude towards CVD Risk Factor

Ten statements measured the attitudes of respondents towards cardiovascular disease (CVD) risk factors on a 5-point Likert scale from “Strongly Disagree (1)” to “Strongly agree (5). Attitude is an important factor related to health behavior in that if people think positively then they are more willing to practice preventive efforts. The results suggest that the majority of respondents had a positive attitude towards CVD risk factor prevention and management, with certain areas being targeted for improvement.

In table 3 the results show that respondents had a generally positive attitude towards cardiovascular health and its risk factors with most statements receiving high mean scores. Very high percentage of students either agreed or strongly agree that a healthy lifestyle (mean = 4.10), regular exercise (mean = 4.09) and a healthy diet (mean = 4.11) are necessary for preventing cardiovascular diseases. This serves as a reassuring sign of an awareness and acknowledgment of the critical role that lifestyle changes can play in decreasing health risks. In particular, the universities should promote awareness about CVD was also rated with the highest mean score (4.26) indicating that students demand institutional support in enhancing health education and awareness. Avoiding smoking (mean = 4.24) was perceived as having similarly high potential for CV risk reduction, indicating respondents’ understanding of the importance of this public health message. However, there were some points of concern. Cardiovascular disease (CVD) risk perception the mean patient score for the statement “I believe I am at risk of developing CVD in the future” was 3.21 and reflects a low/relative low perception of personal CVD risk. Reported by a majority of respondents, 31.3% reported neutral (disagree) suggesting that many students do not consider themselves susceptible to cardiovascular diseases. This optimistic bias is the norm among young

Table 3: Respondent’s Attitude towards CVD Risk Factor

Statements	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean
	N (%)	N (%)	N (%)	N (%)	N (%)	
I believe I am at risk of developing CVD in the future	40 (10.4)	60 (15.6)	120 (31.3)	110 (28.6)	54 (14.1)	3.21
Maintaining a healthy lifestyle is important to prevent CVD	10 (2.6)	15 (3.9)	40 (10.4)	138 (46.9)	139 (36.2)	4.10
I am concerned about the impact of stress on heart health	15 (3.9)	25 (6.5)	60 (15.6)	117 (44.3)	114 (29.7)	3.89
Regular exercise is essential for heart health	8 (2.1)	12 (3.1)	45 (11.7)	109 (49.5)	129 (33.6)	4.09
Avoiding smoking can reduce CVD risk	5 (1.3)	10 (2.6)	30 (7.8)	108 (46.9)	159 (41.4)	4.24
Healthy diet plays a key role in preventing heart disease	6 (1.6)	14 (3.6)	50 (13.0)	107 (45.6)	139 (36.2)	4.11
Routine health check-ups are necessary for early detection	12 (3.1)	18 (4.7)	70 (18.2)	107 (44.3)	114 (29.7)	3.93
I feel motivated to change unhealthy habits	20 (5.2)	35 (9.1)	100 (26.0)	105 (39.1)	79 (20.6)	3.61
Universities should promote awareness about CVD	5 (1.3)	8 (2.1)	25 (6.5)	109 (49.5)	156 (40.6)	4.26
I am willing to adopt a healthier lifestyle	12 (3.1)	20 (5.2)	80 (20.8)	107 (44.3)	102 (26.6)	3.86

adults, which may diminish their willingness to engage in protective behaviors. Additionally, although respondents generally supported healthy behaviors, motivation to modify unhealthy habits was relatively low (mean = 3.61). This indicates a disconnection between knowledge and preparedness for behavioral change. Likewise, care about adopting a healthier lifestyle (mean = 3.86) implies intention but leaves much to be desired in terms of strong commitment. Moderate concern about stress (mean: 3.89) and the importance of routine health check-ups (mean: 3.93). Such a subtle recognition suggests that these don't make the priority list as high as other lifestyle behaviors. In general, the results are showing that, while university students have positive beliefs of cardiovascular health, there is clearly a divide between perceived importance and perception of risk as well as intention versus actual commitment to behavior (Putri *et al.*, 2023). These results agree with earlier research, which found that the mere adoption of positive attitudes fails to compel behavioral change in the absence of sufficient motives and a supportive environment. Hence, it is critical to implement rigorous interventions designed to increase risk perception, motivation, and institutional support that will convert positive attitudes into health behavior among students.

Practices Related to CVD Risk Factors

The practices of respondents pertaining to cardiovascular disease (CVD) risk factors were obtained through questions regarding lifestyle behaviors including physical activity, smoking, dietary habits, stress management,

sleep and health check-ups. The third component of KAP is practice, which shows that knowledge and attitude translate into real life. The results showed that respondents' knowledge and attitude was fair, while their practice was not optimal.

Table 4 showed that respondents had moderate but mostly inadequate practices on cardiovascular health which shows a gap between knowledge, attitude and practice. A relatively large number of students reported prevalence with health-focused behaviors, but many still demonstrated risk-taking lifestyles. Regarding physical activity, only 18.2% of the respondents reported to exercise every day, while most of them exercised either sometimes (36.5%) or between 3 and 5 times per week (28.6%). An alarming 16.7% reported that they never exercise and represent a sedentary lifestyle of a large proportionate of the student body. That is worrying, as being physically active regularly serves as one of the main protective factors against cardiovascular diseases. In terms of smoking behavior, 23.4% of participants smoked regularly and 14.1% smoked occasionally. While the vast majority (62.5%) did not smoke, one-third of patients were smokers which represents an important behavioral risk factor for potential future cardiovascular complication. Unhealthy practices are also reflected in dietary habits. A significant percentage of respondents reported eating fast food weekly (39.1%) or occasionally (31.3%), and 15.6% reported eating it every day. By comparison, only 26.0% reported eating fruits and vegetables daily while the most people in the

Table 4: Practices Related to CVD Risk Factors

Practices	Categories	Frequency (N)	Percentage (%)
Frequency of exercise	Daily	70	18.2
	3–5 times/week	110	28.6
	Occasionally	140	36.5
	Never	64	16.7
Smoking habit	Yes	90	23.4
	No	240	62.5
	Occasionally	54	14.1
Fast food consumption	Daily	60	15.6
	Weekly	150	39.1
	Occasionally	120	31.3
	Rarely	54	14.1
Fruit and vegetable intake	Daily	100	26.0
	Sometimes	170	44.3
	Rarely	80	20.8
	Never	34	8.9
Blood pressure monitoring	Yes	120	31.3
	No	264	68.7
Stress level	High	130	33.9
	Moderate	180	46.9
	Low	74	19.3
Stress management practices	Yes	150	39.1
	No	234	60.9
Sleeping duration	<5 hours	80	20.8
	5–6 hours	150	39.1
	7–8 hours	120	31.3
	>8 hours	34	8.9
Sugary drink consumption	Yes	210	54.7
	No	174	45.3
Medical check-up for heart health	Yes	110	28.6
	No	274	71.4

group (44.3%) said they eat them sometimes. These results indicate poor dietary food selection properties characterized by consuming more low-nutrition foods and fewer high-nutrition foods. Preventive health practices were similarly found to be lacking. They also found that only 31.3% of respondents reported monitoring blood pressure regularly and even fewer had received medical check-ups (28.6%) to evaluate heart health. This finding suggests that students did not prioritize obtaining early detection and monitoring. Stress results show that a high percentage of respondents experienced moderate (46.9%) to high (33.9%) level of stress [38]. But only 39.1% practiced stress management, indicating that many students fail to effectively cope with stress, a known risk factor for cardiovascular disease. The sleep pattern also showed unhealthy finding as 20.8% respondents had less than 5 hours of sleep and 39.1% had only 5–6 hours per day sleep. Inadequate sleep increases the risk of

hypertension, obesity, and other cardiovascular diseases. Also, over half of the respondents (54.7%) admitted to consuming sugar-sweetened beverages regularly, adding to their risk profile. In general, students are aware of CVD risk factors and have a positive attitude toward healthy behavior, although they do not always implement it. These findings are in line with previous research showing that while awareness is a first step, it does little to stir change without supportive structures and powerful personal motivation (Bouloukaki *et al.*, 2020). Thus, it entails a set of intervention like university level health promotion programs, lifestyle counseling and awareness seminars to educate and make the students adopt healthy practices. Tackling these behavioral deficits in early life could be crucial for lowering the future burden of cardiovascular morbidity and mortality in young adults in Bangladesh.

Findings

- In summary, this study revealed a moderate to high knowledge regarding cardiovascular disease risk factors among university students.
- Results demonstrated that students had favorable attitudes toward prevention of cardiovascular disease, understanding the significance of a healthy lifestyle, daily movement and avoiding negative habits.
- The study found students' practices to be relatively poor, with many adolescents engaging in unhealthy behaviors, including low levels of physical activity, high frequency of fast food consumption, poor sleep patterns and limited health monitoring.
- A knowledge–attitude–practice gap was found, which consisted of students having adequate awareness and positive perceptions but were not reflected in healthy lifestyle practices.
- The results suggested that targeted interventions and awareness initiatives should be implemented to address the behavioral practices and cardiovascular disease risk among university students.

Recommendations

- Regular health education and awareness programs should be initiated by universities to enhance students' holistic understanding of cardiovascular disease risk factors.
- Basic health and lifestyle education needs to be integrated into the curriculum as this will reinforce students' awareness of preventive cardiovascular care;
- This should be done through improved physical infrastructures like sports facilities, fitness programs if the institution has one should encourage students to live an active lifestyle.
- Awareness campaigns would be effective if they are tailored to heighten the perceived personal risk of physical inactivity among students and motivate them to change their behavior toward a more active lifestyle.
- University should ensure healthy diet habits by providing healthy foods on campus and limiting unhealthy fast food.
- Health screening programs like blood pressure and cholesterol checks should be conducted in universities to practice preventive measures.
- Institutional counselors and stress managers need to be established for helping student's combat educational and social pressures.
- Behavior change interventions (e.g., peer education and motivational programs) need to be implemented in order to close the gap between knowledge and practice.
- Public health practitioners should work together with educational establishments to develop specific interventions that target cardiovascular risk among young people.
- Future studies should investigate underlying barriers to adopting healthy lifestyle behaviors by students.

CONCLUSION

This study shows that the university students in Dhaka,

Bangladesh have a moderate to high level of knowledge and favorable attitude regarding cardiovascular disease (CVD) risk factors and their prevention. Despite this knowledge, their health behavior remains unhealthy, with many students do not practice physical activity, poor nutrition habits, insufficient sleep and less prevention health screenings. Findings showed a discrepancy between knowledge, attitude and practice (KAP) in the study population suggesting that only knowledge is not enough to drive behavior change. This justifies the urgent need for interventions (e.g., health education intervention, institutional policy, behavioral strategies) to help students adopt healthier lifestyles. If we address these gaps at an early stage, it will be very important to reduce the overall burden of cardiovascular diseases and improve public health in Bangladesh.

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