

Knowledge on Risk Factors and Warning Signs of Cardiovascular Diseases among Hospitalized Patients with Acute Coronary Syndrome

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ABSTRACT

Cardiovascular diseases (CVDs) remain a leading global cause of death, accounting for approximately 17.5 million deaths annually, with over 75% occurring in low- and middle-income countries (LMICs). A cross-sectional, observational study was conducted between January and July of 2017, to determine knowledge on risk factors and warning signs of cardiovascular diseases among hospitalized patients with acute coronary syndrome (ACS). A total of 192 patients with acute coronary syndrome admitted in the Department of Cardiology, Bangladesh Medical University (BMU), Dhaka, Bangladesh, were enrolled in the study, as per inclusion and exclusion criteria. Data was collected using a semi-structured questionnaire. Face-to-face interview was done for data collection. The majority of patients were in the 40–59 years age-group (65.6%). Male-female ratio was 1.8:1. A statistically significant correlation was found between their level of knowledge and educational status ($p < 0.001$). Patients hailing from urban areas showed a comparatively higher level of expertise. Patients with hypertension have greater knowledge than those without hypertension ($p < 0.001$). Patients with diabetes mellitus and dyslipidemia also showed similar results ($p < 0.001$). However, there was notable gap in knowledge regarding CVD, their risk factors, and warning symptoms. Our study showed that ACS patients have a comparatively poor level of awareness of ACS risk factors and warning indicators.

Keywords: Cardiovascular diseases, risk factors, warning signs, acute coronary syndrome

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INTRODUCTION

Cardiovascular diseases (CVDs) remain a leading global cause of death, accounting for approximately 17.5 million deaths annually, with over 75% occurring in low income and middle income countries.¹ CVDs are disorders of the heart and blood vessels and include coronary heart disease, cerebrovascular disease, rheumatic heart disease and other conditions. Four out of five CVD deaths are due to heart attacks and strokes. Individuals at risk of

CVD may demonstrate raised blood pressure, glucose, and lipids as well as overweight and obesity.² Acute coronary syndromes (ACS) denote a constellation of symptoms of acute myocardial ischaemia due to impaired coronary blood flow. Its classification includes four frequently overlapping conditions: unstable angina (UA), ST-elevated MI (STEMI), non ST-elevated MI (NSTEMI) and sudden cardiac death (SCD).³ Rapid urbanization and adoption of sedentary life style resulted in a rising burden of CVD in developing countries.⁴ In particular, the incidence of acute coronary syndrome (ACS) in developing countries like Bangladesh is especially alarming because it contributes to one third of all deaths stemming from heart disease.⁵ World health organization (WHO) has identified tobacco use, unhealthy diet, physical inactivity and over use of

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alcohol as major risk of CVD which contribute to 80% of cardiovascular diseases.⁶ Other risk factors include age, male gender, family history, stress, obesity, hypertension, diabetes mellitus, hypercholesterolemia etc.⁷ The prevalence of CVD risk factors in the Asian population is high.⁸ According to non-communicable disease risk factor survey in Bangladesh, the prevalence of smoking is 26.2% which is 54.8% in men and the consumption of smokeless tobacco is 31.7%, overall daily per capita consumption of fruits and vegetables is 4 servings (against their minimum daily total requirement of 5 servings), level of physical activity was not satisfactory. Moreover, about 18% people are overweight; prevalence of hypertension and diabetes mellitus were 14.8% and 3.9% respectively.⁷ Outcomes of patients presenting with ACS are highly dependent on early identification and prompt initiation of treatment.⁹ The time between start of symptoms and treatment should be as short as possible.¹⁰ Knowledge improvement to the recognition of heart attack symptoms will lead to earlier presentation to medical care that may result in better patients outcomes.^{11,12} Knowledge of the risk factors is an important prerequisite for an individual in the modification of lifestyle behaviors leading towards its prevention.^{13,14} Good knowledge about CVD risk factors among individuals will aid them to be proactive in decreasing their risk since the majority of the risk factors are modifiable.^{11,15} Knowing and understanding CVDs and its risk factors impact judgments and decisions in adopting healthy lifestyle to prevent CVDs.¹⁶ Therefore, this study was focused to understand the knowledge on risk factors and warning signs of CVDs among the hospitalized patients with ACS. This study also described the factors of knowledge on risk factors and warning signs among hospitalized patients in a tertiary level hospital in Dhaka, Bangladesh.

METHODS

This cross-sectional, observational study was conducted among patients of acute coronary syndrome admitted in the Department of Cardiology, Bangladesh Medical University (BMU), Dhaka, Bangladesh, between January and July of 2017. Patients were selected based on the following inclusion and exclusion criteria:

Inclusion criteria included: i) patients of acute coronary syndrome diagnosed on the basis of cardiac ischemic symptoms and signs and verified by investigation tools like ECG, Echocardiography, cardiac biomarkers; ii) aged ≥ 18 years; and iii) willingly participating in the study, while exclusion criteria were: i) hemodynamically unstable patients and ii) refusal to participate. Finally, a total of 192 patients were included in this study. Data was collected using a structured questionnaire containing all the variables of interest. Face-to-face interview was done with the patients for data collection.

To measure individual's stress level, Perceived Stress Scale (PSS-10) was used; 10 questions in this scale were asked about one's feelings and thoughts during the last month. At first, scores were counted as reverse for questions 4, 5, 7, and 8. On these four questions, scores were changed like: 0=4, 1=3, 2=2, 3=1, 4=0. Then all the scores were added up for each item to get a total. Individual scores on the PSS can range from 0 to 40 as higher scores indicating higher perceived stress, e.g., scores ranging from 0 to 13 was considered as low level of stress, while scores ranging between 14 and 26 was considered as moderate stress, and scores between 27 and 40 was considered as high level of stress.¹⁷

A scoring system was applied to measure the respondents' knowledge of each of the following: nine CVD risk factors, and five CVD warning signs/symptoms. Knowledge about CVD risk factors: low knowledge (≤ 2), moderate knowledge (3-5) and high knowledge (6-9). Knowledge in relation to warning symptoms of heart attack: low knowledge (≤ 1), moderate knowledge (2-3) and high knowledge (≥ 4).

After collection, data were checked for consistency and completeness and cleaned and edited. Statistical Package for Social Sciences (SPSS) version 21.0 for Windows was used for data analysis. Data was presented as frequency and percentage in tabulated form. Chi-square tests were applied to see the association between variables. A p-value < 0.05 was considered as statistically significant.

The study was approved by the Institutional Review Board (IRB) of Bangladesh Medical University (BMU), Dhaka, Bangladesh.

RESULTS

The majority of patients were in the 40-59 years age-group (65.6%). Male-female ratio was 1.8:1. The

number of non-smokers and ex-smokers nearly equal (34.9% and 35.4% respectively in respect of current smoking rate of 29.7%). As per perceived level of stress in daily life, only 4.7% led a stress-free life and 40.1% had family history of CVD (Table-I).

Table-I: Sociodemographic characteristics of the patients (n=192)

Variables	Frequency	Percentage
Age-group		
<40 years	19	9.9
40–59 years	126	65.6
≥60 years	47	24.5
Sex		
Male	124	64.6
Female	68	35.4
Educational status		
Illiterate	38	19.8
Primary	39	20.3
Secondary	10	5.2
Higher secondary	57	29.7
Bachelors/Masters	48	25.0
Family history of CVD		
Yes	77	40.1
No	39	20.3
Did not know	76	39.6
Smoking		
Yes, currently smoker	57	29.7
No, never smoked	67	34.9
Ex-smoker	68	35.4
Level of stress		
Very Stressful	49	25.5
Stressful	57	29.7
Relatively stressful	77	40.1
Free from stress	9	4.7

Patients' knowledge on cardiovascular warning signs discomfort in the jaw, neck or back on CVD where none (0.0%) and another case for feeling weak, light headache or faint, is known by only one-fourth (24.5%) of patients. The major portions of the respondents are concerned of chest pain (85.4%). Majority of patients were suffering from hypertension (66.1%). Most of the patients did not know about their comorbidities of diabetes mellitus (40.1%) and dyslipidemia (59.9%) (Table-II).

Table-II: Knowledge on CVD risk factors and warning signs among patients (n=192)

Variables	Frequency	Percentage
Hypertension as risk factor		
Yes	127	66.1
No	47	24.5
Did not know	18	9.4
Diabetes mellitus as risk factor		
Yes	47	24.5
No	68	35.4
Did not know	77	40.1
Dyslipidemia as risk factor		
Yes	59	30.7
No	18	9.4
Did not know	115	59.9
Discomfort in the jaw, neck or back		
Yes	0	0.0
No	87	45.3
Did not know	105	54.7
Feeling weak, light headache or faint		
Yes	47	24.5
No	47	24.5
Did not know	98	51.0
Chest pain or discomfort		
Yes		
No	0	0.0
Did not know	28	14.6
Discomfort in arms or shoulders		
Yes		
No	58	30.2
Did not know	134	69.8
Discomfort in breathing		
Yes		
No	19	9.9
Did not know	133	69.3

The association between educational status and knowledge is statistically significant ($p < 0.001$). The patients from urban areas had relatively advanced (88.2%) to having the moderate level of knowledge of CVD risk factors. Those patients with family history of CVD had higher knowledge (100%) than those with no family history (25.6%), which is statistically significant ($p < 0.001$). There, a vast portion of the patients with moderate knowledge level on risk factors was the highest amongst dyslipidemia (83.1%) than non- dyslipidemia patients (50.0%) and was statistically significant ($p < 0.001$) (Table-III).

Table-III: Factors associated with knowledge of risk factors among patients (n=192)

Characteristics	Knowledge on risk factors		p-value
	Low knowledge Frequency (Percentage)	Moderate knowledge Frequency (Percentage)	
Age-group			
<40 years	9 (47.4)	10 (52.6)	<0.05
40-59 years	39 (31.0)	87 (69.0)	
≥60 years	28 (59.6)	19 (40.4)	
Sex			
Male	57 (46.0)	67 (54.0)	<0.05
Female	19 (27.9)	49 (72.1)	
Educational status			
Illiterate	28 (73.7)	10 (26.3)	<0.001
Primary	29 (74.4)	10 (25.6)	
Secondary	-	10 (100)	
Higher secondary	19 (33.3)	38 (66.7)	
Bachelors/Masters	-	48 (100)	
Family history of CVD			
Yes	-	77 (100.0)	<0.001
No	29 (74.4)	10 (25.6)	
Did not know	47 (61.8)	29 (38.2)	
Hypertension			
Yes	39 (30.7)	88 (69.3)	<0.001
No	19 (40.47)	28 (59.6)	
Did not know	18 (100)	-	
Diabetes mellitus			
Yes	18 (38.3)	29 (61.7)	<0.001
No	10 (14.7)	58 (85.3)	
Did not know	48 (62.3)	29 (37.7)	
Dyslipidemia			
Yes	10 (16.9)	49 (83.1)	<0.001
No	9 (50.0)	9 (50.0)	
Did not know	57 (49.6)	58 (50.4)	

The association between educational status and knowledge is statistically significant ($p<0.001$). The patients from urban areas have relatively advanced to having the relatively higher level of knowledge. Hypertensive patients were more knowledgeable

than non-hypertensive patients and it is statistically significant ($p<0.008$). Same findings were observed for diabetic ($p<0.001$), dyslipidemia ($p<0.001$) patients as well (Table-IV).

Table-IV: Factors associated with knowledge of warning signs among patients (n=192)

Variables	Knowledge of warning signs		p-value
	Low knowledge Frequency (Percentage)	Moderate knowledge Frequency (Percentage)	
Age-group			
<40 years	10 (52.6)	9 (47.4)	>0.05
40-59 years	76 (60.3)	50 (39.7)	
≥60 years	28 (59.6)	19 (40.4)	
Sex			
Male	76 (61.3)	48 (38.7)	>0.05
Female	38 (55.9)	30 (44.1)	
Educational status			
Illiterate	19 (50.0)	19 (50.0)	<0.001
Primary	39 (100)	-	
Secondary	-	10 (100)	
Higher secondary	47 (82.5)	10 (17.5)	
Bachelors/Masters	9 (18.8)	39 (81.3)	
Family history of CVD			
Yes	28 (36.4)	49 (63.6)	<0.001
No	29 (74.4)	10 (25.6)	
Did not know	57 (75)	19 (25)	
Hypertension			
Yes	68 (53.5)	59 (46.5)	<0.05
No	37 (78.7)	10 (21.3)	
Did not know	9 (50.0)	9 (50.0)	
Diabetes mellitus			
Yes	18 (38.3)	29 (61.7)	<0.001
No	38 (55.9)	30 (44.1)	
Did not know	58 (75.3)	19 (24.7)	
Dyslipidemia			
Yes	20 (33.9)	39 (66.1)	<0.001
No	18 (100.0)	-	
Did not know	76 (66.1)	39 (33.9)	

DISCUSSION

CVDs are the leading cause of death and one of the major causes of morbidity. According to the literature, developing world is at risk of CVDs because many have at least one or more CVD risk factors¹⁸. In this study, majority of participants was 40-59 years old group and many were in the middle adulthood aged stage. Jousilahti et al. describe among middle-aged people, CVDs are 2 to 5 times more common in men

than in women, and this sex ratio varies between populations which is similar to this study results¹⁹. Individuals may be willing to change their lifestyle if education were emphasized on the impact of health on work and family relationships. In this study, the educational level of participants was relatively high. Similar sociodemographic characteristics were reported in two other previous studies conducted among the CVD patients in the developing

countries.²⁰⁻²² Personal habit and lifestyle of the patients are one of the important indicators for risk assessment for coronary artery diseases.²³ Smith reported that hypertension, dyslipidemia, diabetes mellitus, and smoking are more strongly linked to CVDs. Also the high burden of ACS in developing countries is due to increasing diabetes mellitus associated with rising prevalence of obesity and dyslipidemia.²⁴ In our study, comorbid conditions of the patients had close relationship with knowledge. Majority of hypertensive patients knew that hypertension is one of the major causes of CAD whereas patients of diabetes mellitus and dyslipidemia were not aware that these are the risk factors of CVDs. Knowledge about CVD and its risk factors is an important pre-requisite for an individual to implement behavioral changes leading towards CHD prevention. In the present study, majority of the patients had low knowledge on risk factor of CVDs and warning signs of ACS. The knowledge level of majority of the patients was low to moderate which was confined to 1-2 warning sign and 3-4 risk factors. Middle aged male, highly educated, hailing from urban area with positive family history and comorbid medical conditions were more sufferers. Knowledge on relationship between risk factors and CVDs was also limited. Majority considered smoking, stress, positive family history and hypertension as risk factors of CVDs whereas they did not have adequate knowledge regarding unhealthy diet, physical inactivity, obesity, high blood LDL cholesterol level & diabetes mellitus as the risk factors of CAD. Knowledge on CVD risk factors were explored in different developing countries previously where knowledge level among the participants of not satisfactory.²⁵⁻²⁸ However, the knowledge level was reported relatively better among the population of developed countries.^{20,29}

According to Jafary et al., most commonly identified risk factors were stress, dietary fat, smoking and lack of exercise. About 20% were not able to identify even a single risk factor for CHD¹¹. Dracup et al. concluded that even after following the diagnosis of ACS and numerous interactions with physicians and other health care professionals, knowledge about ACS symptoms and treatment on the part of cardiac patients remained poor.²⁹ This result was also similar to our study. Knowledge on warning sign among the majority participants in this study was also limited to chest pain, feeling weak. Light headed and faint

and also difficulty in breathing whereas discomfort in the jaw, neck or back and discomfort in arms or shoulders were not considered as the warning signs. It represents there are huge lack of knowledge on warning sign among our majority of patients. These findings were consistent with some previous studies of different countries.³⁰⁻³² According to Memis et al., loss of consciousness/fainting, chest pain, radiation of pain was reported as the warning signs.³⁰ As documented by Zhang et al., among Beijing (China) residents, the knowledge about heart attack symptoms was found deficient.³¹ Delay in identification of warning signs may increase the chance of fatality. People having limited knowledge participate in emergency lately so it may worsen the condition of the patients. Prolonged rehabilitation may necessary for the survived patients.

CONCLUSION

This study finding conveyed that the ACS patients have relatively lower level of knowledge about risk factors and warning signs of ACS. There are striking gaps in knowledge about CVDs, its risk factors and warning signs. These deficiencies in knowledge appear to translate into inadequate preventive behavior patterns. Factors significantly associated with knowledge included age, sex, education level, a family history of CHD and history of hypertension, diabetes mellitus and dyslipidemia. This study despite some limitations, should raise strong concerns about the lack of knowledge and awareness about CHD amongst common people in Bangladesh and should serve as a stimulus for establishing health education programs in the country. There is a need for necessary awareness, utilizing community based education program and mass media focusing CVD risk factors and warning signs that might help reduction of morbidity and mortality related to CVD.

REFERENCES

1. GBD 2017 Causes of Death Collaborators. Global, regional, and national age-sex-specific mortality for 282 causes of death in 195 countries and territories, 1980-2017: a systematic analysis for the Global Burden of Disease Study 2017. *Lancet*. 2018; 392(10159):1736-88.
2. Celermajer DS, Chow CK, Marijon E, Anstey NM, Woo KS. Cardiovascular disease in the developing world. *J Am Coll Cardiol*. 2012;60(14):1207-16.
3. Steg P, James SK, Atar D, Badano L, Blömsström-Lundqvist C, Borger M, et al. Task Force on the

- management of ST-segment elevation acute myocardial infarction of the European Society of Cardiology (ESC). ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation. *Eur Heart J*. 2012;33(20):2569-619.
4. Reddy KS, Yusuf S. Emerging epidemic of cardiovascular disease in developing countries. *Circulation*. 1998;97(6):596-601.
 5. Saeed O, Gupta V, Dhawan N, Streja L, Shin JS, Ku M, et al. Knowledge of modifiable risk factors of Coronary Atherosclerotic Heart Disease (CASHD) among a sample in India. *BMC Int Health Hum Rights*. 2009;9:2.
 6. Ezzati M, Lopez AD, Rodgers AA, Murray CJL. Comparative quantification of health risks: global and regional burden of disease attributable to selected major risk factors. Geneva: WHO; 2004.
 7. World Health Organization (WHO). *Non-communicable disease risk factor survey: Bangladesh 2010*. Dhaka: WHO; 2011.
 8. Pinto R. Risk factors for coronary heart disease in Asian Indians: clinical implications for prevention of coronary heart disease. *Indian J Med Sci*. 1998;52(2):49-54.
 9. Weaver WD, Simes RJ, Betriu A, Grines CL, Zijlstra F, Garcia E, et al. Comparison of primary coronary angioplasty and intravenous thrombolytic therapy for acute myocardial infarction: a quantitative review. *JAMA*. 1997;278(23):2093-8.
 10. Fanaroff AC, Rymer JA, Goldstein SA. Acute coronary syndrome. *JAMA* 2015;314(18):1990.
 11. Jafary FH, Aslam F, Mahmud H, Waheed A, Shakir M, Afzal A, et al. Cardiovascular health knowledge and behavior in patient attendants at four tertiary care hospitals in Pakistan—a cause for concern. *BMC Public Health*. 2005;5(1):124.
 12. McKinley S, Dracup K, Moser DK, Ball C, Yamasaki K, Kim CJ, et al. International comparison of factors associated with delay in presentation for AMI treatment. *Eur J Cardiovasc Nurs*. 2004;3(3):225-30.
 13. Vartiainen E, Puska P, Jousilahti P, Korhonen HJ, Tuomilehto J, Nissinen A. Twenty-year trends in coronary risk factors in north Karelia and in other areas of Finland. *Int J Epidemiol*. 1994;23(3):495-504.
 14. Dowse GK, Gareeboo H, Alberti KGM, Zimmet P, Tuomilehto J, Purran A, et al. Changes in population cholesterol concentrations and other cardiovascular risk factor levels after five years of the non-communicable disease intervention programme in Mauritius. *BMJ*. 1995;311(7015):1255-9.
 15. Al Hamarneh YN, Crealey GE, McElnay JC. Coronary heart disease: health knowledge and behaviour. *Int J Clin Pharm*. 2011;33(1):111-23.
 16. World Health Organization (WHO). The world health report 2002 – Reducing risks, promoting healthy life. Geneva: WHO; 2002.
 17. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. *J Health Soc Behav*. 1983;24(4):385-96.
 18. Ryan C, Shaw R, Pliam M, Zapolanski A, Murphy M, Valle H, et al. Coronary heart disease in Filipino and Filipino-American patients: prevalence of risk factors and outcomes of treatment. *J Invas Cardiol*. 2000;12(3):134-9.
 19. Jousilahti P, Vartiainen E, Tuomilehto J, Puska P. Sex, age, cardiovascular risk factors, and coronary heart disease. *Circulation*. 1999;99(9):1165-72.
 20. De Ponti A, Sorbara L, Amodeo R, Imperatore PF, Berizzi M, Di Rocco E, et al. Le conoscenze e gli stili di vita dei pazienti: indagine sui pazienti ricoverati per sindrome coronarica acuta nell'Unità Coronarica dell'Ospedale di Desio [Knowledge and lifestyles of patients: a survey on patients admitted with acute coronary syndrome in the CCU of an Italian hospital] [Article in Italian] [Abstract]. *Assist Inferm Ric*. 2006;25(3):163-9.
 21. Perkins-Porras L, Whitehead DL, Steptoe A. Patients' beliefs about the causes of heart disease: relationships with risk factors, sex and socio-economic status. *Eur J Cardiovasc Prev Rehabil*. 2006;13(5):724-30.
 22. Fatema K, Zwar NA, Milton AH, Ali L, Rahman B. Prevalence of risk factors for cardiovascular diseases in bangladesh: a systematic review and meta-analysis. *PloS One*. 2016;11(8):e0160180.
 23. Haskell WL. Cardiovascular disease prevention and lifestyle interventions: effectiveness and efficacy. *J Cardiovasc Nurs*. 2003;18(4):245-55.
 24. Smith SC. Reducing the global burden of ischemic heart disease and stroke. *Am Heart Assoc*; 2011.
 25. Khan MS, Jafary FH, Jafar TH, Faruqui AM, Rasool SI, Hatcher J, et al. Knowledge of modifiable risk factors of heart disease among patients with acute myocardial infarction in Karachi, Pakistan: a cross sectional study. *BMC Cardiovasc Dis*. 2006;6(1):18.
 26. Assiri AS. Knowledge about coronary artery disease among patients admitted to Aseer Central Hospital

- with acute coronary syndrome. *West Afr J Med* 2003;22(4):314-7.
27. Baberg H, Jäger D, Kahrman G, de Zeeuw J, Bojara W, Lemke B, et al. Health promotion and cardiovascular risk factors. The level of knowledge among 510 inpatients of an acute coronary care unit. *Medizinische Klinik (Munich)*. 2000;95(2):75-80.
28. Redfern J, Briffa T, Ellis E, Freedman SB. Choice of secondary prevention improves risk factors after acute coronary syndrome: 1-year follow-up of the CHOICE (Choice of Health Options In prevention of Cardiovascular Events) randomised controlled trial. *Heart*. 2009;95(6):468-75.
29. Dracup K, McKinley S, Doering LV, Riegel B, Meischke H, Moser DK, et al. Acute coronary syndrome: what do patients know? *Arch Int Med*. 2008;168(10):1049-54.
30. Memiş S, Evci ED, Ergin F, Be'er E. A population-based study on awareness of heart attack in Aydın city, Turkey. *Anatolian J Cardiol*. 2009;9(4).
31. Zhang Q-T, Hu D-Y, Yang J-G, Zhang S-Y, Zhang X-Q, Liu S-S. Public knowledge of heart attack symptoms in Beijing residents. *Chinese Med J*. 2007;120(18):1587-91.
32. Nouredine S, Arevian M, Adra M, Puzantian H. Response to signs and symptoms of acute coronary syndrome: differences between Lebanese men and women. *Am J Crit Care*. 2008;17(1):26-35.