



PATTERN OF CORONARY HEART DISEASE AMONG THE ADMITTED PATIENTS IN CARDIOLOGY DEPARTMENT AND ITS RELATION TO THEIR SOCIO-DEMOGRAPHIC CHARACTERISTICS

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Abstract

Coronary heart disease is a group of conditions affecting the functioning of the heart or blood vessels and is one of the leading causes of death globally. Like other countries, coronary heart disease prevalence is also rising among the adults in Bangladesh. Besides conventional risk factors for coronary heart disease, genetic predisposition and some novel issues like high salt intake, arsenicosis, hypovitaminosis D and air pollution may play important role in the aetiopathogenesis of coronary heart disease in this population. Formulation of appropriate policy and more emphasis on preventive strategy may help combat coronary heart disease in Bangladesh. The main aim of this study was to find out the pattern of coronary heart disease among the patients admitted in Cardiology department of Rajshahi Medical college Hospital and to relate their socio-demographic and economic characteristics with the disease. It was a cross sectional type of descriptive study during February 2019 to July 2019. A total of 352 patients of Cardiology department considered as sample who admitted for their heart problem during the study period selected by purposive sampling. Majorities (85.8%) of the respondents were >40 years among them 74.4% were male. Most (52.0%) of the respondents were from nuclear family and smokers (65.62%). They had history of diabetes mellitus (22.4%) and lead sedentary life (11.4%). Regarding coronary heart disease 74.7% had ischemic heart disease and right coronary artery disease (66.7%). About 42.1% were hypertensive patients and 94.0% took medical treatment. Type of heart disease was found significantly associated with age group of the respondents ($p < 0.01$), smoking habit ($p < 0.05$) and history of abuse substances currently ($p < 0.05$). High coronary heart disease prevalence along with an upward trend was observed in Bangladeshi adults and older age. Proper strategies are required for primary prevention of coronary heart disease so that a further increase can be alleviated and the morbidity and mortality associated with it can be reduced.

Key words: Coronary heart disease, Pattern, Smokers, Socio-demographic

Introduction

Coronary heart diseases are among the leading cause of death globally. According to the World Health Organization (WHO), 17.7 million people died from coronary heart diseases in 2015, representing 31% of all global deaths (WHO 2017). Coronary heart disease is responsible for 75% of the deaths occurring in developing countries like Bangladesh (Bangladesh Bureau of Statistics 2018). Analyzing the current situation, it has been predicted that 25 million people will face death due to coronary heart diseases by 2030

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(American Heart Association 2001, WHO 2017). The most prominent coronary heart diseases that prevail at present are ischemic heart disease, cerebrovascular disease (stroke), peripheral vascular disease, heart failure, rheumatic heart disease, congenital heart disease and acute myeloid leukaemia (AML) (WHO 2017, Kabiruzzaman 2010). Among these, coronary artery diseases and stroke are the most common causes of death from coronary heart diseases. The present review says that both mortality and morbidity due to coronary heart diseases is increasing in Bangladesh. According to the Government Health Bulletin (2013), the disease of the circulatory system that includes coronary heart diseases was the number one cause of death in 504 public hospitals across the country (DGHS, Bangladesh Health Bulletin 2013). High blood pressure, elevated blood glucose, and lipid levels are the most prominent prevalent risk factors of coronary heart diseases (Foley et al. 1998, O'Donnell and Elosua 2008, Celermajer et al. 2012, Koene et al. 2016). Obesity [in terms of high Body Mass Index (BMI)] comprises a major risk factor for coronary heart diseases directly and also as a catalyst for other intermittent risk factors such as diabetes mellitus and hypertension (Hubert et al. 1983). Higher incidences of coronary heart diseases in the developing countries occur mostly due to rapid urbanization, dietary changes, increased consumption of tobacco, and limited physical activity (Joshi et al. 2007). According to INTERHEART study (Yusuf et al. 2004), Bangladesh has the highest prevalence of coronary heart diseases risk factors among South Asian countries. In Bangladesh, 99.6% males and 97.9% females are exposed to at least one established coronary heart diseases risk factors (NIPORT 2011). However, the level of awareness among the people about coronary heart diseases risks factors is very low in Bangladesh. Concurrently, the detection and control rates were also poor possibly as a result of low literacy rate, lack of access to healthcare, or divergent priorities (Fatema et al. 2016). Furthermore, no attempts have been made to find an association between different socioeconomic variables and coronary heart diseases in particular. Moreover, Bangladesh lacks detailed morbidity and mortality data. The current paper aimed to find out the pattern of coronary heart disease and by measuring the relationship among socio-demographic factors, coronary heart diseases, and associated lifestyle factors among the Bangladeshi population, which will help future policy makers in decision making.

Materials and Methods

Setting and participants

This cross sectional design study was carried out in all the patients of coronary heart diseases admitted in Cardiology department of Rajshahi Medical College Hospital, Rajshahi, Bangladesh. Sample size was 352 and that was selected purposively in 6 months (February 2019 to July 2019).

Inclusion/exclusion criteria

All the patients admitted in Cardiology department of Rajshahi Medical College Hospital for their cardiac problem during the study period considered as inclusion criteria. Patients who were not interested to participate were excluded from this study.

Data collection procedure

The researchers collected data from the patients and their attendants who admitted in Cardiology department of Rajshahi Medical College Hospital. Data were collected through a partially structured questionnaire. Baseline information on socio-demographic characteristics and pattern of coronary heart diseases among them was collected from the study participants through interviewer administered questionnaire by face to face interview. All efforts were made to collect data accurately. For open questions, the respondents were asked in such a manner way so that they could speak freely and explain their opinion in a normal and neutral way. No leading questions were asked.

Outcome variable: Pattern of coronary heart disease.

Independent variables

Age of the respondents, sex, occupation, monthly family income, type of family, smoking habit, food habit, hypertension status and physical exercise.

Ethical approval and consent of the participants

Prior to the commencement of the study, the research protocol was approved by the local research committee of Varendra University, Rajshahi, Bangladesh. The aim and objectives of the study along with its procedure, risks and benefits of the study was explained to the respondents in easily understandable language and then informed consent was taken from the each participant. The data were analyzed according to the objectives of the study by using IBM SPSS (Version-23). Chi-square test was performed to see the relationship with different variables. Descriptive variables were explained with mean and standard deviation. Statistical significance was found by applying relevant statistical tests at appropriate probability level (5% or 1%).

Results

Table 1 and 2 showed that the maximum respondents (51.4%) were in the age group of 40 to 59 years followed by 32.7, 12.8, 1.7 and 1.4% in the age group of 60-79 years, 20-39 years, up to 80 years and <20 years respectively. Around 74.4% respondents were male and 25.6% were female. Most (94.3%) were Muslim, 5.4% were Hindu and 0.3% was of other religious. It was revealed that 52% respondents belonged to nuclear family and 48% belonged to joint family. Regarding occupation of the respondents, 25.9% were farmers, another 25.9% were in service followed by 22.2, 15.3, 6.2 and 4.5% were in business, housewives, day labor and in other occupations respectively. It was found that 58% respondents' monthly family income was within BDT 6001-20000, 34.7% respondents' monthly family income was up to BDT 6000 and only 7.4% was in the monthly family income group of BDT 20001 or more. About 96.3% respondents did not abuse any substance, 3.1% abused alcohol, 0.3% abused Heroin and another 0.3% abused other substances. Majority (56.8%) respondents took red meat occasionally, 39.0% took it 2/3 days per week, 1.4% took red meat regularly and 2.8% respondents never took red meat. Out of 193 hypertensive respondents, about 68% respondents' blood pressure was controlled and 32% respondents' blood pressure remained uncontrolled. About 77.6% respondents were non diabetic and 22.4% were diabetic. Out of 79 diabetic patients 40.5% respondents DM remained controlled, about 34% respondents DM was fluctuating and 25.3% remained uncontrolled. It was revealed that 42% respondents used to do moderate activities. 35.8% were hard workers, 11.4% were sedentary workers and 5.7% had no activities. Around 74.7% respondents had ischemic heart diseases, 6% had coronary artery diseases about 5% had valvular disease and about 14% had other heart diseases. Out of 263 ischemic heart disease patients, 38.8% had acute Myocardial Infraction (MI), 38.4% had unstable angina, 19.4% had old MI, 1.9% had high lateral MI and 1.5% had post MI angina. About 66.7% respondents were suffering from right coronary artery diseases and regarding valvular diseases 55.6% was suffering from aortic stenosis. Among other heart diseases, 28% respondents were suffering from LVF and 94% respondents were advised to take medical treatment. In table no. 3 relationship between age group, smoking habit, history of abuse substances currently was significantly associated with type of heart disease of the patient which was diagnosed by the physician. The Fig. 1 showed that 65.62% respondents were smokers and 34.36% did not smoke. Regarding residence it was found that 66.48% respondents were from rural areas and 33.52% resided in urban areas (Fig. 2). It showed that most of the respondents (41.2%)

were illiterate, 33.2% were educated up to class V, 13.4% belonged to the education group class VI-XII and 12.2% were Graduates or Masters (Fig. 3).

Table 1. Distribution of the respondents by socio-demographic characteristics (n = 352)

Variables	Respondents		Variables	Respondents	
	No.	%		No.	%
Age of the respondents			Type of family members		
<20 years	5	1.4	Nuclear	183	52.0
20-39 years	45	12.8	Joint	169	48.0
40-59 years	181	51.4	Monthly family income		
60-79 years	115	32.7	Up to BDT 6000	122	34.7
80+ years	6	1.7	BDT6,001-20,000	204	58.0
$X \pm SD = 51.92 \pm 12.80$ years			More than BDT 20,001	26	7.4
Sex of the respondents			$\bar{X} \pm SD = BDT11434.09 \pm 7993.09$		
Male	262	74.4	Occupation		
Female	90	25.6	Service		
Religion of the respondents			Farmer	91	25.9
Islam	332	94.3	Day labor	91	25.9
Hindu	19	5.4	Business	22	6.2
Christian	1	0.3	Housewife	78	22.2
History of abuse substances currently			Others	54	15.3
No	339	96.3	Eating habit of red meat	16	4.5
Alcohol	11	3.1	Regular		
Heroin	1	0.3	2/3 days per week	5	1.4
Others	1	0.3	Occasional	137	39.0
Hypertensive status			Never	200	56.8
Controlled	131	67.8	Status of DM (n=79)	10	2.8
Uncontrolled	62	32.1	Controlled		
Suffering from DM			Uncontrolled	32	40.5
Yes	79	22.4	Fluctuating	20	25.3
No	273	77.6		27	34.2

Table 2. Distribution of the respondents by coronary heart disease related characteristics (n = 352)

Variables	Respondents		Variables	Respondents	
	No.	%		No.	%
Life style in relation to physical activities			Type of ischemic heart disease (n = 263)		
Sedentary	40	11.4	Acute MI	102	38.8
Moderate activity	166	47.2	Unstable angina	101	38.4
Hard working	126	35.8	Old MI (Anterior)	51	19.4
No activities	20	5.7	High lateral MI	5	1.9
Type of heart disease (Diagnosed by physician)			Post MI Angina	4	1.5
Ischemic heart disease	263	74.7	Type of Coronary artery disease (n = 21)		
Coronary artery disease	21	6.0	Left coronary artery disease	7	33.3
Valvular disease	18	5.1	Right coronary artery disease	14	66.7
Other heart disease	50	14.2	Type of valvular disease (n = 18)		
Doctors' advice to patients			Mitral regurgitation	7	38.9
Medical treatment	331	94.0	Aortic stenosis	10	55.6
Surgical intervention	21	6.0	Aortic regurgitation	1	5.5
Type of other heart disease (n = 50)			Blood pressure status		
Atrial septal defect (ASD)	1	2.0	Normotensive	125	35.5
Ventricular septal defect (VSD)	5	10.0	Hypertensive	148	42.1
Ischemic cardio myopathy (ICM)	7	14.0	Hypotensive	79	22.4
Dilated cardio myopathy (DCM)	11	22.0			
Heart block	11	22.0			
Left ventricular failure (LVF)	14	28.0			
Ventricular tachycardia (VT)	1	2.0			

Table 3. Relationship between type of heart disease of the patients and other conditions

Variables	Type of heart disease of the patient (Diagnosed by physician)				Total	
	Ischemic heart disease	Coronary artery disease	Valvular disease	Other heart disease		
Age in years						
<20	2(40.0%)	0 (0.0%)	2(40.0%)	1(20.0%)	5(1.4%)	
20-39	26(57.8%)	2(4.4%)	6(13.3%)	11(24.4%)	45(12.8%)	$\chi^2 = 32.99$
40-59	137(75.7%)	15(8.3%)	7(3.9%)	22(12.2%)	181(51.4%)	
60-79	94(81.7%)	4(3.5%)	3(2.6%)	14(12.2%)	115(32.7%)	(p<0.01)
80+	4(66.7%)	0(0.0%)	0(0.0%)	2(33.3%)	6(1.7%)	
Smoking habit						
Yes	184(79.0%)	13(5.6%)	6(2.6%)	30(12.8%)	233(66.2%)	$\chi^2 = 10.62$
No	79(66.4%)	8(6.7%)	12(10.1%)	20(16.8%)	119(33.8%)	(p<0.05)
History of abuse substances currently						
No	255(75.2%)	17(5.0%)	18(5.3%)	49(14.5%)	339(96.3%)	
Alcohol	6(54.5%)	4(36.4%)	0(0.0%)	1(9.1%)	11(3.1%)	$\chi^2 = 19.64$
Heroin	1(100.0%)	0(0.0%)	0(0.0%)	0(0.0%)	1(0.3%)	
Others	1(100.0%)	0(0.0%)	0(0.0%)	0(0.0%)	1(0.3%)	(p<0.05)

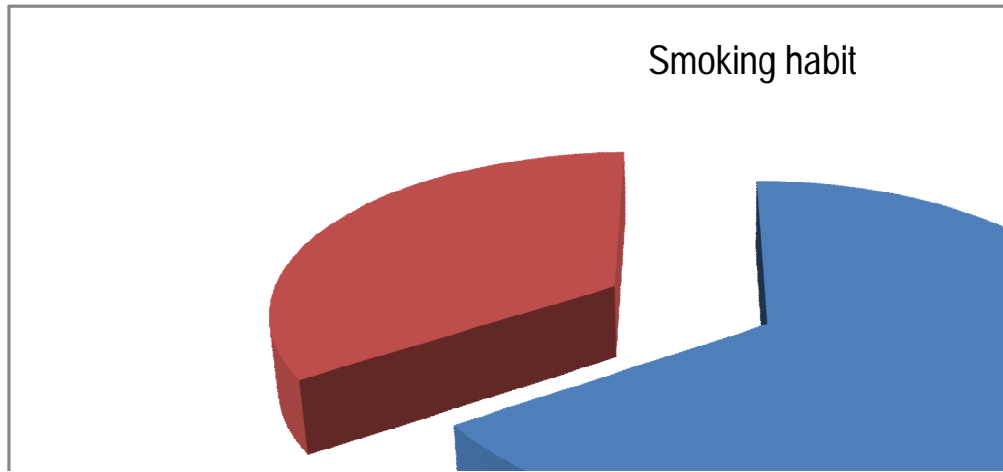


Fig. 1: Distribution of the respondents by smoking habit.

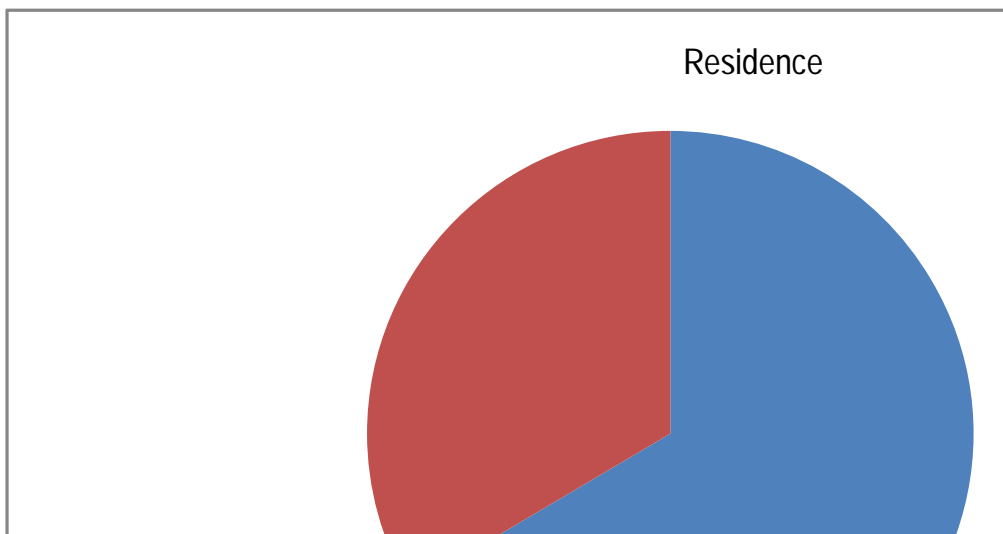


Fig. 2: Distribution of the respondents by residence.

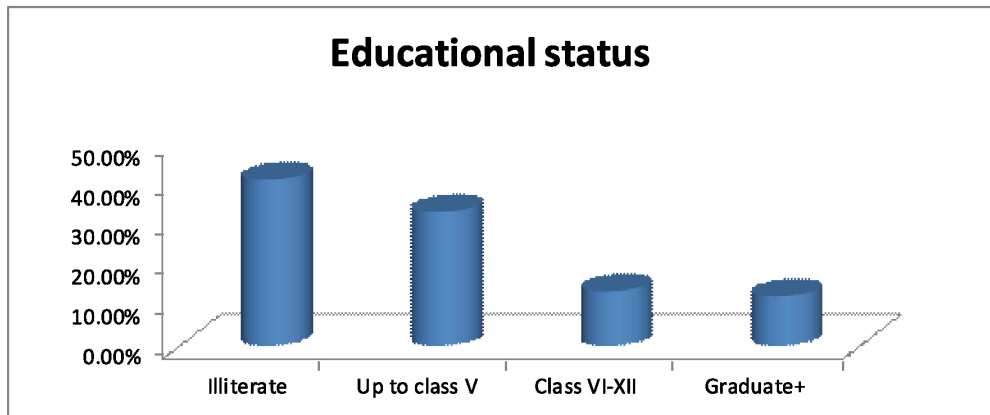


Fig. 3: Distribution of the respondents by educational status.

Discussion

This cross sectional type of descriptive study provided us information about pattern of coronary artery disease and its relation to their socio-economic characteristics. This study was carried out among the patients who admitted in Cardiology department of Rajshahi Medical College for their cardiac problem. In this study the mean age of the respondents was 51.92 years and maximum (51.4%) of them were in the age group of 40-59 years. About 74% of the respondents were male and 26% were female. In another study, there were more females than males (55.2% vs. 44.8%). The patients who were younger than 60 years old represented 39.2% of the study population (Altaieb et al. 2017). Majority of the respondents (41.2%) were illiterate, 33.2% had primary education and only 12.2% were graduates or master's degree holders. Majority of the respondents (25.9%) were service holders followed by 25.9%, 22.2% and 15.3% as farmers, businessmen and housewives respectively. In another study, whereas 61.1% had no education, only 6.6% had completed a secondary or higher level of education. More than half the respondents (56.6%) were unemployed (homemaker, beggar, jobless, and disabled) (Khanam et al. 2019). Mean monthly family income of the respondents was BDT 11434.09 and majorities (58.0%) were from middle income group i.e.; whose income was BDT from 6001-20000 only. The household wealth index is found to be positively associated with the risk of CVD, which is similar to the findings of other studies in developing countries, whereas in developed countries an inverse association was found (Clark et al. 2009). In developing countries such as Bangladesh, individuals in the well-off category have access to high-calorie foods and a luxurious lifestyle with limited physical activity, which ultimately leads them to obesity as well as to have greater chances of hypertension, diabetes, and/or CVD(s). Most of the respondent in our study found in service (25.9%) and in business (22.2%). Unemployed people were found to have a higher risk of developing CVD than the employed, which is consistent with the findings from other studies (Daly et al. 2006). Majority of the respondents (94.3%) were Muslims. Regarding family type 52% belonged to nuclear family and 48% came from joint family. In a study (Sayeed et al. 2010) it was found that a total of 6235 subjects of 10 villages were found eligible for the study. Of them, 414 (m/f = 1749/2392) volunteered for the study. The mean (SD) age of the participants was 37.6 (15.2) years. The participants, as mentioned, were categorized into hyperglycemic (FBG \geq 5.6) and normoglycemic (FBG <5.6) groups. The crude prevalence of CHD was 1.8% (m/f = 1.5/2.0%) and the age adjusted (20-69 years) prevalence was 1.85% with 95% CI, 1.42-2.28. In this study it was found that 65.62% of the respondents were smokers, 22.4% had DM and 11.4% lead a sedentary life. Similar findings was found in another study, 77.4% of the respondents either ever smoked or consumed

smokeless tobacco, and it was higher among males than females (81.5% vs. 73.5%, $p < 0.001$) (Khanam et al. 2019). Bangladesh ranks the highest among the South Asian countries in respect of physical inactivity (Ng et al. 2009). Among the coronary heart disease, 74.7% had ischemic heart disease, 6% had coronary artery disease, 5.1% had valvular disease and 14.2% had other heart disease. Among the patients of IHD, 38.8% had anterior MI, 38.4% had unstable angina and 19.4% had old MI. Among the patients of coronary artery disease, majority (66.7%) had right coronary artery disease and most common valvular disease was aortic stenosis (55.6%) followed by mitral regurgitation (38.9%). Among the other heart diseases, 28% was LVF, 22.0% heart blocks, 22.0% DCM, 14% ICM, 10% VSD and 2% ASD. None of these variables showed any significant association with CHD in another study (Sayeed et al. 2010). In another study, most (56.9%) of the respondents were hypertensive, 95.4% had up to 200 mg/dl as total cholesterol level (Haque et al. 2017). Relationship between age group, smoking habit, history of abuse substances currently was significantly associated with type of heart disease of the patient which was diagnosed by the physician. Regarding residence it was found that 66.48% respondents were from rural areas and 33.52% resided in urban areas. In a community-based study, the prevalences of prehypertension and hypertension accounted for 32% and 16%, respectively, among adults in rural Bangladesh (Khanam et al. 2015).

Conclusion

The present study highlighted that CVD is pervasive and the associated risk factors such as hypertension, diabetes, obesity, physical inactivity and smoking were ubiquitous in Bangladesh. Any prudent public health decisions should not wait. Therefore, the result of this study sheds light on the pattern of coronary heart disease in Bangladesh to initiate effective interventions to address this issue by policymakers and public health physicians.

Conflict of Interest

There is no conflict of interest among the authors in relation, profession, financial or any other conditions.

References

- American Heart Association. Heart and Stroke Statistical Update. Dallas, Tex.: American Heart Association, 2001.
- Bangladesh Bureau of Statistics (2018). Available at: <http://www.bbs.gov.bd/>.
- DGHS, Bangladesh Health Bulletin (2013). Government of the People's Republic of Bangladesh Ministry of Health and Family Welfare, Dhaka, Bangladesh, 2014.
- Celermajer DS, Chow CK, Marijon E, Anstey NM and Woo KS (2012). Cardiovascular disease in the developing world: prevalences, patterns, and the potential of early disease detection. *J Am Coll Cardiol.*, 60(14): 1207-16.
- Fatema K, Zwar NA, Milton AH, Ali L and Rahman B (2016). Prevalence of risk factors for cardiovascular diseases in Bangladesh: a systematic review and meta-analysis. *PLoS ONE.*, 11, e0160180.
- Foley RN, Parfrey PS and Sarnak MJ (1998). Epidemiology of cardiovascular disease in chronic renal disease. *J Am Soc Nephrol.*, 9: 16-23.
- Haque MJ, Awal MA and Akhter MP (2017). Circadian variation in the onset of acute MI and some selected characteristics of patients attending at Cardiology Department of Rajshahi Medical College Hospital. *J Universe Med. Coll.*, 1(1): 9-13.
- Hubert HB, Feinleib M, McNamara PM and Castelli WP (1983). Obesity as an independent risk factor for cardiovascular disease: a 26-year follow-up of participants in the Framingham Heart Study. *Circulation.*, 67(5): 968-77.

- Joshi P, Islam S, Pais P, Reddy S, Dorairaj P, Kazmi K, Pandey MR, Haque S, Mendis S, Rangarajan S and Yusuf S (2007). Risk factors for early myocardial infarction in South Asians compared with individuals in other countries. *The Journal of the American Medical Association*, 297(3): 286-94.
- Kabiruzzaman M, Malik F, Ahmed N, Badiuzzaman M, Choudhury S, Haque T, Rahman H, Ahmed M, Banik D, Khan M, Dutta A, Sayeed S, Khandaker R and Malik A (2010). Burden of heart failure patients in a tertiary level cardiac hospital. *Journal of Bangladesh College of Physicians and Surgeons*, 28(1): 24-29.
- Khanam F, Hossain B, Mistry SK, Afsana K and Rahman M (2019). Prevalence and Risk Factors of Cardiovascular Diseases among Bangladeshi Adults: Findings from a Cross-sectional Study. *Journal of Epidemiology and Global Health*, 9(3): 176-184.
- Khanam MA, Lindeboom W, Razzaque A, Niessen L and Milton AH (2015). Prevalence and determinants of pre-hypertension and hypertension among the adults in rural Bangladesh: findings from a community-based study. *BMC Public Health*, 15: 203.
- Koene RJ, Prizment AE, Blaes A and Konety SH (2016). Shared risk factors in cardiovascular disease and cancer. *Circulation*, 133(11): 1104-14.
- National Institute of Population Research and Training (NIPORT) 2013. Mitra and Associates, and ICF International, Bangladesh Demographic and Health Survey 2011, NIPORT/Mitra and Associates/ICF International, Dhaka/Bangladesh/Calverton, MD, USA.
- Ng N, Hakimi M, Minh HV, Juvekar S, Razzaque A, Ashraf A, Ahmed SM, Kanungsukkasem U, Soonthornthada K and Bich TH (2009). Prevalence of physical inactivity in nine rural INDEPTH Health and Demographic Surveillance Systems in five Asian countries, *Global Health Action*, 2: 1.
- O'Donnell CJ and R Elosua (2008) Cardiovascular risk factors. Insights from Framingham Heart Study. *Rev Esp Cardiol.*, 61(3): 299-310.
- Sayeed MA, Mahtab H, Sayeed S, Begum T, Khanam PA and Banu A (2010). Prevalence and risk factors of coronary heart disease in a rural population of Bangladesh. *Ibrahim Med.Coll. J.*, 4(2): 37-43.
- World Health Organization. Cardiovascular diseases. 2017. Available at: <http://www.who.int/mediacentre/factsheets/fs317/en/index.html>.
- Yusuf S, Hawken S, Ounpuu S, Dans T, Avezum A, Lanus F, McQueen M, Budaj A, Pais P, Varigos J and Lisheng L (2004). Interheart study investigators. Effect of potentially modifiable risk factors associated with myocardial infarction in 52 countries (the INTERHEART study): Case-control study. *Lancet*, 364(9438): 937-52.

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