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The Burden Of Cardiac Diseases: A Study In Selected Cardiac Hospitals In Bangladesh

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Abstract

Introduction: *Cardiac diseases are considered as one of the major causes of death and disability globally. There are quite a number of dedicated cardiac service hospitals in Bangladesh, both in the public and private sectors. There is a paucity of data on the exact burden of cardiac diseases in these cardiac centers for local and national level planning care and delivery of services. Innovative strategies are needed to halt the progression of the cardiac disease epidemic in resource-poor settings in Bangladesh.*

Aim of the study: *This study aimed to assess the burden of cardiac diseases requiring hospitalization in public cardiac hospitals in two major cities in Bangladesh.*

Methods: *This was a prospective observational study conducted in two tertiary-level hospitals in Bangladesh namely, the National Institute of Cardiovascular Diseases & Hospital (NICVD) and Chittagong Medical College Hospital (CMCH)from January 2019 to June 2019.By using a consecutive sampling technique, 383cardiac disease patients admitted to the adult Cardiology units of NICVD and CMCH were enrolled in this study as the study participants. Data were collected through face-to-face interviews with the participants or from attendants if the patient cannot respond appropriately. Laboratory data were taken from hospital records and data on pre-hospital treatment were collected from previous treatment records of the patients. All data were cleaned and analyzed by using MS Excel and SPSS version 22.0 as per need.*

Result: *Among the total respondents, previously 42%, 38%, 30% and another 38% took aspirin, clopidogrel, atorvastatin, and beta-blockers respectively. The majority of the cases (59%) had chest pain and 34% had breathlessness as the main symptoms. In total 361 (94%) respondents received medical treatment in the hospital, 30 (8%) received thrombolysis, 2 of them received pacemaker (Temporary) and none received acute coronary interventions. In total 119 cases had diabetes mellitus, 176 had HTN, 47 had dyslipidaemia and 161 had a history of chewing tobacco as risk factor. In total 190 (50%) of the total respondents had a full recovery, 21 (5%) were dead, 13 (3%) were referred, 29 (8%) were discharged on request (DOR), and another 6 (2%) of them left the hospital of their own.*

Conclusion: *The prevalence of cardiac diseases among the newly hospitalized younger age (<70 years) population is higher. Among such cases, chest pain and breathlessness are found as the most common presenting symptoms whereas diabetes mellitus, HTN, dyslipidaemia and a history of chewing tobacco are observed as the most well-known risk factors. Aspirin, clopidogrel, atorvastatin and beta-blockers are the most frequent drugs for these patients.*

Keywords: *Disease burden, Cardiac diseases, CVD, Cardiovascular disease, DM, HTN*

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I. INTRODUCTION

Cardiovascular diseases, a group of heart as well as blood vessel disorders, are considered as the number one cause of death and disability globally. Worldwide, cardiovascular diseases (CVD) have collectively remained the leading causes of death which substantially contribute to the loss of health and excess health system costs. [1] CVD (cardiovascular disease) encompasses coronary heart disease, stroke, peripheral arterial disease and aortic disease. [2] Cardiac diseases, especially coronary heart disease (CHD), have assumed epidemic proportions worldwide, with 17.7 million each year and 31% of all deaths. Of these deaths, an estimated 7.4 million were due to coronary heart disease and 6.7 million were due to stroke. [3] On the other hand, it is also mentioned in another study that, coronary heart disease is the leading cause (43.8%) of deaths attributable to cardiovascular disease in the US, followed by stroke (16.8%), heart failure (9.0%), high blood pressure (9.4%), diseases of the arteries (3.1%), and other cardiovascular diseases (17.9%). [4] Trends in improvements in overall cardiovascular health metrics are projected to reduce coronary heart disease deaths by 30% between 2010 and 2020. In contrast to developed countries, where mortality from CHD is rapidly declining, it is increasing in developing countries. This increase is driven by industrialization, urbanization, and related lifestyle changes and is called epidemiological transition. Despite heterogeneity in the prevalence of risk factors across different regions, CVD is the leading cause of death in all parts of Bangladesh, including the rural areas. [3] A systematic review of population-based studies of Atrial Fibrillation that were published from 1980 to 2010 estimates the burden of Atrial fibrillation both globally and regionally. The incidence of infective endocarditis is approximately 30 cases per million individuals per year. [5] Some diseases are directly related to pregnancy, such as hypertensive disorders of pregnancy and peripartum cardiomyopathy, or where pregnancy increases the risk of a disease, for example, the risk of myocardial infarction. These diseases can have long-term implications for the life of the affected women and their families. [6] On the other hand, rheumatic heart disease (RHD) remains an important cause of morbidity and mortality in low- and middle-income countries [7]. Performance on inpatient quality-of-care measures or quality-of-care measures at discharge in patients after MI or stroke remains high (>90% for most measures). Of incident hospitalized HF events, 53% had HF with reduced ejection fraction and 47% had preserved ejection fraction [8]. The frequency and adverse consequences of clinically unrecognized and asymptomatic atrial fibrillation (AF) are increasingly reported, particularly in older adults. Overall, inpatient quality of care for patients with acute coronary syndromes, HF, and stroke continues to show gains, with compliance rates above 95% for some measures. [9]The major objective of this study was to assess the burden of cardiac diseases requiring hospitalization in public cardiac hospitals of two major cities in Bangladesh.

II. METHODS

This was a prospective observational study that was conducted in two tertiary-level hospitals in Bangladesh namely, National Institute of Cardiovascular Diseases & Hospital (NICVD) and Chittagong Medical College Hospital (CMCH) from January 2021 to June 2021. By using consecutive sampling techniques, 383 cardiac disease patients admitted through an emergency to the adult Cardiology units of NICVD and CMCH were enrolled in this study as the study population. The study was conducted following the principles of human research specified in the Helsinki Declaration [10] and executed in compliance with currently applicable regulations and the provisions of the General Data Protection Regulation (GDPR) [11]. Ethical clearance was obtained from the National ethical committee of Bangladesh Medical Research Council (BMRC). Before data collection, informed written consent from the study subject was obtained. All necessary data were collected through face-to-face interviews from the patients or from attendants if the patient cannot respond appropriately. Laboratory data were taken from hospital records and data of pre-hospital treatment were collected from previous treatment records of the patients. General information was described irrespective of age, sex occupation and socio-economic status of the deceased in percentage with their corresponding 95% CI. Continuous data were described using the median and interquartile range. Age, sex, phenomena of suicide, homicide and accident were evaluated for determining the prevalence of them. Analysis was performed using SPSS version 20.0.

III. RESULTS

In this study, among the total of 383 respondents, 133 (35%) were from the age group of 51-60 years. The numbers of males were higher in both hospitals than the female. Among the total respondents, 161 (42%) took aspirin, 145 (38%) took clopidogrel, 116 (30%) took atorvastatin, and 145 (38%) took beta blockers previously. In analyzing the past disease history of participants, we observed that, in 46% of cases HTN, in 48% of cases of asymptomatic angina and 38% cases the history of hospitalization for cardiac disease were found which were noticeable. Among the total respondents, 119 had diabetes mellitus where 68 of them suffered from DM from 1 to 5 years and 81 of them had it under control. In total 176 respondents had HTN among whom 82 were suffering for 1 to 5 years and 130 of them had it under control. Besides, 47 of the respondents had Dyslipidaemia

and 161 had a history of chewing tobacco. In total 127 respondents were mildly physically active and 128 had an intake of fruits and vegetables <2 servings. The mean Abdominal Girth, Height (Inch), Weight (kg) and BMI were 84.29, 62.04, 62.77 and 25.33 with a standard deviation of 12.5, 3.9, 11.3 and 4.5 respectively. In the systematic review of current illness among participants we found the contribution of the history of pulmonary (7%), renal (3%), gastrointestinal (2.6%) and neurological (2%) diseases in single-digit ratio. In assessing the presenting symptoms among the participants, we observed that the majority of the cases (59%) were with chest pain and more than one-third of the total cases (34%) were with breathlessness which was noticeable. Besides these, in some cases, syncope, impaired consciousness, hemiparesis, shock and some other symptoms were found. In this study, 151 (39%) respondents were diagnosed with UA, 130 (34%) were diagnosed with HTN, 73 (19%) were diagnosed with AMI, 47 (12%) were diagnosed with ALVF and 18 (5%) were diagnosed with CAG. In total 361 (94%) of our respondents received medical treatment, 30 (8%) respondents received thrombolysis only 2 of them received pacemakers (Temporary).In total 190 (50%) of the total respondents had a full recovery, 21 (5%) were dead, 13 (3%) were referred, 23 (6%) were DOR, 6 (2%) were DORB and another 6 (2%) of them left the hospital of their own.

Table-1: Previous history of using medicine by participants (N=383)

Medicine	**n**	%
Aspirin	161	42%
Clopidogrel	145	38%
Warfarin	4	1%
Atorvastatin	116	30%
Rosuvastatin	15	4%
ACEI	58	15%
ARB	65	17%
CCB	36	9%
Beta-Blocker	145	38%
Insulin	37	10%
OHA	82	21%
Steroid Inhaler	22	6%
Other Inhaler	23	6%
Contraceptive	5	1%
Others	15	4%

Table-2: Past diseases history of participants (N=383)

Diseases status			n	%
HTN			177	46%
GI problem			53	14%
Pulmonary Disease	COAD/ Emphysema		30	8%
	Asthma		12	3%
	Others		1	0%
Neurological	TIA/RIND		2	1%
	History of Ischemic stroke	Full recovery	6	2%
		Residual deficit	18	5%
	History of Hemorrhagic Stroke	Residual deficit	11	3%
	Others		3	1%
Angina CCS class	Asymptomatic		182	48%
	Ordinary physical activity does not cause angina		52	14%
	Slight limitations of ordinary physical activity		89	23%
	Marked limitation of ordinary physical activity		60	16%
Dyspnea (NYHA class): limitation of physical activity		Slight	66	17%
		Marked limitation	43	11%
		Inability/discomfort	15	4%
History of previous MI			80	21%
History of hospitalization for cardiac disease			144	38%
Previous Cardiac Intervention		Thrombolysis	18	5%
		Previous PCI	10	3%
Previous mitral valvuloplasty			1	0%
CABG			2	1%
Previous cardiac/vascular/thoracic surgical interventions			9	2%

Table-3: Risk factor for coronary disease(N=383)

Risk factors		n	%
Diabetes Mellitus			
Diabetes Mellitus	Yes	119	31%
	No	262	68%
	Unknown	2	1%
Duration of DM	1-5 Years	68	18%
	6-10 Years	35	9%
	11-15 Years	7	2%
	16-20 Years	5	1%
	21 Years Above	4	1%
If yes, Controlled?	Yes	81	21%
	No	32	8%
	Unknown	6	2%
HTN			
HTN	Yes	176	46%
	No	205	54%
	Unknown	1	0%
Duration of HTN	1-5 Years	82	21%
	6-10 Years	67	17%
	11-15 Years	9	2%
	16 Years Above	10	3%
If yes, Controlled?	Yes	130	34%
	No	38	10%
	Unknown	7	2%
Dyslipidaemia			
Dyslipidaemia	Yes	47	12%
	No	164	43%
	Unknown	172	45%
Duration	1-5 Years	30	8%
	6-10 Years	9	2%
	11 Years Above	1	0%
If yes, Controlled?	Yes	29	8%
	No	5	1%
	Unknown	13	3%
Smoking history/Chewing tobacco			
Smoking history/Chewing tobacco	Yes	161	42%
	No	123	32%
	Unknown	97	25%
Duration	1-10 Years	38	10%
	11-20 Years	39	10%
	21-30 Years	38	10%
	31-40 Years	19	5%
	41 Years Above	11	3%
Physical Activity (METS)			
Physical Activity (METS)	Mild (<3)	127	33%
	Moderate (3-6)	117	31%
	Heavy (>6)	17	4%
Intake of Fruits & Vegetables (Servings)	< 2	128	33%
	4-Mar	90	23%
	>5	42	11%

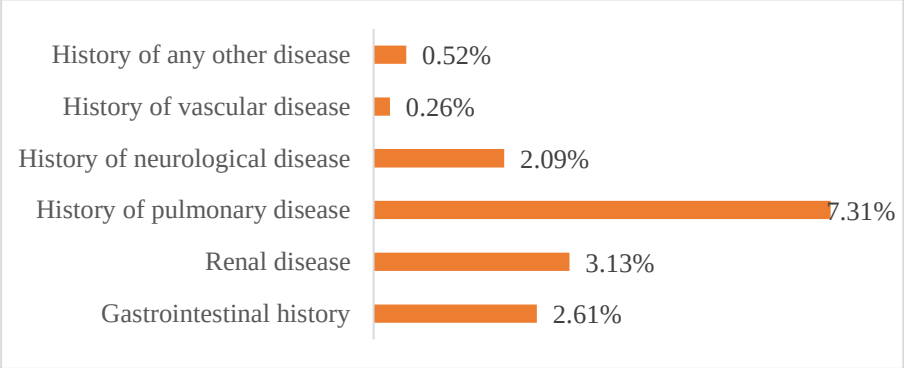

Figure-1: System review of current illness among participants (N=383)

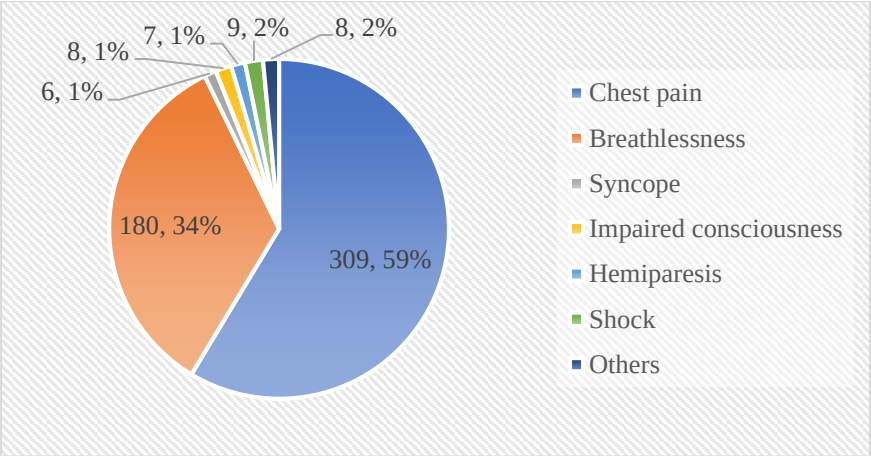

Figure-2: Presenting symptoms among the participants (N=383)

Table-4: Diagnosis of the respondents (N=383)

Name	n	%
AF	6	2%
ALVF	47	12%
AMI	73	19%
CAG	18	5%
CRHD	12	3%
ICM	20	5%
NSTEMI	57	15%
HTN	130	34%
DM	110	29%
UA	151	39%
LVF	37	10%
COPD	30	8%
OMI	38	10%
Others	145	38%

Table-5: Treatment given to the participants (N=383)

Treatment	n	%
Medical treatment	361	94%
Emergency PCI	2	1%
Thrombolysis	30	8%
Pacemaker (Temporary)	2	1%

Table-6: Outcome of the respondents (N=383)

Outcomes	**Total**	%
Complete recovery	190	50%
Incomplete recovery	126	33%
Death	21	5%
Referral	13	3%
DOR	23	6%
DORB	6	2%
Left hospital of their own	6	2%
Otherwise	2	1%

IV. DISCUSSION

In this study, among the total of 383 respondents, 133 (35%) were from the age group of 51-60 years. The numbers of males were higher in both hospitals than the female. Among the total respondents, 161 (42%) took aspirin, 145 (38%) took clopidogrel, 116 (30%) took atorvastatin, and 145 (38%) took beta blockers previously. Despite heterogeneity in the prevalence of risk factors across different regions, cardiac disease is the leading cause of death in all parts of Bangladesh, including the rural areas. The current prevalence of hypertension, CAD, rheumatic fever and rheumatic heart disease and stroke may be 20-25%, 4-6%, <1/1000, 0.3-1.0% respectively. A systematic review of population-based studies of Atrial Fibrillation that were published from 1980 to 2010 estimates the burden of Atrial fibrillation both globally and regionally. In analyzing the past disease history of our participants, we observed that in 46% of cases HTN, in 48% of cases asymptomatic angina and in 38% of cases the history of hospitalization for the cardiac disease was found which were noticeable. In a previous study, it was reported that the incidence of infective endocarditis is approximately 30 cases per million individuals per year. [7] In our study, in the systematic review of current illness among participants we found the contribution of the history of pulmonary (7%), renal (3%), gastrointestinal (2.6%) and neurological (2%) diseases in single-digit ratio. In total 190 (50%) of the total respondents had a full recovery, 21 (5%) was dead, 13 (3%) were referred, 23 (6%) were DOR, 6 (2%) were DORB and another 6 (2%) of them left the hospital of their own. The case fatality rate was 5.4% overall, with complete recovery (asymptomatic) in about 50% and incomplete recovery (symptomatic) in about 33% of cases, which is consistent with other studies from Bangladesh and other parts of the world which was similar to other studies. [8,9] About one-third of our patients could reach the hospital within 6 hours of the development of symptoms and travel time to the hospital was >1 hour in >80% of the cases. Both these factors narrowed the therapeutic window for thrombolysis treatment, showing somewhat similarity to other studies. [12,13] The mean time from the emergency room to the hospital bed was about 18 minutes, the mean door-to-needle time was 30 minutes and the mean time to death after hospitalization was 15 hours. All these factors suggest optimal treatment of acute cases in the study hospitals. However, thrombolysis was done in 30 cases only because of various reasons. In this study, among the total respondents, 119 had diabetes mellitus where 68 of them suffered from DM from 1 to 5 years and 81 of them had it under control. In total 176 respondents had HTN among whom 82 were suffering for 1 to 5 years and 130 of them had it under control. Besides, 47 of the respondents had Dyslipidaemia and 161 had a history of chewing tobacco. In many studies, the frequency of various risk factors was as DM, HTN, smoking, inadequate fruit and vegetables and inadequate physical activity were expected in patients with cardiac disease and was much higher compared to the general population. [14-16]All the findings of this study may be helpful for similar further studies and in the arena of the treatment of cardiac diseases.

V. Limitations of the study:

This hurriedly conducted study had many limitations including a smaller number of days included for data collection. Emergency troponin estimation, echocardiography and measurement of pro-BNP could not be done in many cases because of various reasons. In-hospital complications could not be documented.

VI. CONCLUSION&RECOMMENDATION

The prevalence of cardiac diseases among the newly hospitalized younger age (<70 years) population is higher. Many cases developed cardiac events taking preventing drugs like Aspirin, clopidogrel, atorvastatin, and beta-blockers. The most common presenting symptoms were chest pain and breathlessness. Well-known risk factors like diabetes mellitus, HTN, dyslipidaemia and a history of chewing tobacco were common. The major public hospitals lack emergency cardiac interventions. Major reforms in acute cardiac care are important in public

cardiac hospitals in Bangladesh. Many young cases in the series demand proactive prevention and control measures at the national level.

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Conflict of interest: None declared.

Ethical approval: The study was approved by the National Ethics Committee of BMRC.

REFERENCES

[1] George A. Mensah, Gregory A. Roth, Valentin Fuster, The Global Burden of Cardiovascular Diseases and Risk Factors: 2020 and Beyond, Journal of the American College of Cardiology, Volume 74, Issue 20, 2019, Pages 2529-2532, ISSN 0735-1097, https://doi.org/10.1016/j.jacc.2019.10.009. (https://www. science direct. com/ science/article/pii/S0735109719379288).

[2] Nah, Ryan Guo Quan. Are illness representations of individuals living with chronic kidney disease predictive of levels of physical activity and associated to depression. Diss. University of Leicester, 2017.

[3] World Health Organization. Cardiovascular diseases (CVDs). Fact sheet. May 2017. http://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-(cvds).

[4] Benjamin, Emelia J., et al. "heart disease and stroke statistics—2018 update: a report from the American Heart Association." Circulation 137.12 (2018): e67-e492.

[5] Moran AE, Forouzanfar MH, Roth GA, Mensah GA, Ezzati M, Flaxman A, Murray CJ, Naghavi M. The global burden of ischemic heart disease in 1990 and 2010: the Global Burden of Disease 2010 study. 2014 Apr 8; 129(14):1493-501. doi: 10.1161/CIRCULATIONAHA.

[6] Sliwa K, Böhm M. Incidence and prevalence of pregnancy-related heart disease. Cardiovasc Res. 2014 Mar 15; 101(4):554-60. doi: 10.1093/cvr/cvu012. Epub 2014 Jan 23.

[7] Prasad, A., et al. "Mortality due to rheumatic heart disease in developing world: a preventable problem." J Clin Exp Cardiolog 8.503 (2017): 2.

[8] Pandey, Ambarish, et al. "Temporal trends in prevalence and prognostic implications of comorbidities among patients with acute decompensated heart failure: the ARIC study community surveillance." Circulation 142.3 (2020): 230-243.

[9] Benjamin, E. J., et al. "Comité de Estadísticas y del Subcomité de Estadísticas de Ataque Cerebral de la American Heart Association. Estadísticas de enfermedadcardíaca y de ataque cerebral. Informaciónactualizada para 2017: Informe de American Heart Association." Circulation 135 (2017): e146-603.

[10] World Medical Association. (2001). World Medical Association Declaration of Helsinki. Ethical principles for medical research involving human subjects. Bulletin of the World Health Organization, 79 (4), 373 - 374. World Health Organization. https://apps.who.int/iris/handle/10665/268312.

[11] Voigt, Paul, and Axel von dem Bussche. "Enforcement and fines under the GDPR." The EU General Data Protection Regulation (GDPR). Springer, Cham, 2017. 201-217.

[12] Chang, Patricia P., et al. "Incidence and survival of hospitalized acute decompensated heart failure in four US communities (from the Atherosclerosis Risk in Communities Study)." The American journal of cardiology 113.3 (2014): 504-510.

[13] Am J Cardiol. 2014 Feb 1;113(3):504-10. doi: 10.1016/j.amjcard.2013.10.032. Epub 2013 Nov 9.

[14] Increasing Prevalence of Diagnosed Diabetes — United States and Puerto Rico, 1995–2010. Atlanta, US, 2012.

[15] Islam AK, Majumder AA.Coronary artery disease in Bangladesh: a review. Indian Heart J. 2013 Jul-Aug;65(4):424-35. doi: 10.1016/j.ihj.2013.06.004. Epub 2013 Jul 10.

[16] Zaman MM, Ahmed J, Choudhury SR, Numan SM, Parvin K, Islam MS. Prevalence of ischemic heart disease in a rural population of Bangladesh. Indian Heart J. 2007 May-Jun;59(3):239-41.