

A Clinical Study on the Pattern of Mitral Valvular Disease in a Peripheral Tertiary Hospital in Bangladesh

AKM M Islam¹, MA Azhar², MF Islam³, MZ Haque⁴, L Yeasmin⁵

¹Registrar, Department of Cardiology, National Institute of Cardiovascular Diseases, Dhaka,

²Principal & Professor of Medicine, Sir salimullah Medical College and Mitford Hospital, Dhaka,

³Senior Consultant, Department of Heart Failure, Lab Aid Cardiac Hospital, Dhaka, ⁴Assistant Professor, Department of Medicine, Rajshahi Medical College, Rajshahi, ⁵Dental Surgeon, Department of Periodontology, Dhaka Dental College, Dhaka.

Abstract:

Key Words:
Rheumatic,
Mitral valvular
disease,
Clinical.

Background: Rheumatic mitral valvular disease (MVD) is a common cause of cardiovascular morbidity and mortality in Bangladesh. Many patients are diagnosed late, get maltreated, and develop complications, which can be minimized if early diagnosis could be made.

Objectives: The study was carried out to determine the common symptoms and signs of mitral valvular disease in our population, to find out the incidence and pattern of complications, to list the pattern of valve lesions, to identify the common findings in different investigations and to find out the causes of delay in diagnosis.

Methods: Fifty consecutive cases of isolated MVD of rheumatic origin admitted in Rajshahi Medical College Hospital, Rajshahi, Bangladesh, from July, 2002 to March, 2003 were included. Detailed history was taken, and clinical examination was performed. Chest skiagram, 12-lead ECG and echocardiography were performed in all patients. Other investigations include complete blood counts, anti-streptolysin O (ASO) titre, C-reactive protein (CRP), blood sugar, serum creatinine and routine urinalysis.

Results: The peak incidence of MVD was found in the third decade (34%), 14 (28%) patients were <20 years of age. Thirty two (64%) patients had poor socio-economic condition. A previous history suggestive of rheumatic fever was found in 28 (56%). Twenty six (52%) patients received treatment from the registered medical practitioners and/or from the hospitals, 11 (22%) consulted with the quacks only, 5 (10%) had treatment from both sources. Significant delay was found in 28 (56%) patients. Illiteracy and ignorance was found to be the cause in 14 (28%) cases, poverty in 12 (24%) and misdiagnosis in 7 (14%). Six (12%) patients adopted indigenous treatment. Forty three (86%) patients experienced moderate to severe limitation of day-to-day activities all had breathlessness. Palpitation, fatigue and cough were found in 49 (98%), 45 (90%) and 42 (84%) cases respectively. Nineteen (38%) patients had haemoptysis, 15 (30%) had dysphagia. Apex beat was normally situated in 32 (64%), and shifted in 16 (32%) cases. Forty two (84%) patients had left parasternal heave and palpable P₂ was found in 41 (82%) patients. Diastolic thrill was palpable in 28 (56%) cases, systolic thrill in 8 (16%) patients. The first heart sound (S₁) was loud in 34 (68%) and soft in 8 (16%) cases. Mid-diastolic murmur of MS was audible in 46 (92%) cases, pansystolic murmur of mitral regurgitation in 19 (38%) patients and pansystolic murmur of tricuspid regurgitation in 10 (20%). Opening snap was found in 30 (60%), and presystolic accentuation in 27 (54%) cases. Roentgenographic study revealed moderate to huge enlargement of cardiac shadow in 29 (58%), straightening of the left border of the heart with fullness or outward bulging of the pulmonary conus in 43 (86%), double contour of the right border in 35 (70%), upper lobe diversion of pulmonary vasculature in 31 (62%), Kerley B lines in 10 (20%) and pulmonary oedema in 16 (32%) patients. The ECG showed P-mitrale in 32 (64%), atrial fibrillation in 14 (28%) and atrial flutter in 2 (4%) cases. Echocardiography revealed thickening of mitral valve leaflets in all patients, changes in subvalvular apparatus in 28 (56%) and calcification in mitral valve apparatus in 3 (6%) cases. Mitral valve area was <1 cm² in 33 (66%), 1.0 to 1.4 cm² in 14 (28%) and eⁿ1.5 cm² in 1 (2%) patients. The left atrial size was 41 to 50 mm in 20 (40%) and >50 mm in 10 (20%) cases. Two patients had left atrial thrombus. Evidence of pulmonary hypertension was found in 34 (68%) patients.

Conclusion: Rheumatic MVD and the accompanying complications can be detected with an appreciable degree of accuracy by skillful clinical assessment and judicious use of simple investigations like roentgenography, electrocardiography and echocardiography which are available in many parts of our country at affordable costs. So every effort should be made to utilize these invaluable resources to tackle this public health problem more efficiently.

(Cardiovasc. j. 2010; 3(1) : 11-21)

Introduction:

Rheumatic heart disease (RHD) is still a major cause of cardiovascular morbidity and mortality in Bangladesh (Islam et al, 1987).¹ Its prevalence among school children was found to be 7.5 per 1000 in 1976.² In another more recent community-based study on 5923 rural Bangladeshi children aged 5-15 years, the prevalence of rheumatic fever and rheumatic heart disease was found to be 1.2 per 1000 for rheumatic fever defined by revised Jones criteria and 1.3 per 1000 for Doppler echocardiography-confirmed rheumatic heart disease.³ In India, there are more than one million cases of RHD (Vijaykumar 1994).⁴

Involvement of mitral valve, either alone or in combination, with other valves, was found to 90% cases of rheumatic valvular disease (Islam et al, 1987).¹ In Western World, mitral stenosis takes many years to develop and is mostly a disease of adult life (Taranta 1989).⁵ This is in striking contrast in our country, where the disease follows a malignant course, and the natural history is accelerated in our patients, as evidenced by lower mean age of the patients, younger age for initial attack of rheumatic fever, and shorter interval between the initial attack and the onset of symptomatic valvular disease (Islam et al, 1987).¹ Many patients of valvular heart disease in our country are diagnosed late, get maltreated, and develop complications, which can be minimized if early diagnosis could be made. If physicians are made aware of the common clinical presentations and investigation findings of mitral valvular disease, they will be able to make the diagnosis well beforehand.

Methodology:

The present study was conducted in the Department of Medicine and Cardiology of Rajshahi

Medical College Hospital, Rajshahi, Bangladesh, from July, 2002 to March, 2003. The study was carried out to determine the common symptoms and signs of mitral valvular disease in our population, to find out the incidence and pattern of complications, to list the pattern of valve lesions, to identify the common findings in different investigations and to find out the causes of delay in diagnosis.

Fifty consecutive cases of isolated mitral valvular disease of rheumatic origin admitted in different medical units, as well as, in the Cardiology Department who were diagnosed clinically and later confirmed by echocardiography were included in the study. Patients with any other organic valvular disease, congenital heart disease, hypertensive heart disease and dropped-out cases were excluded.

Detailed history was taken, and clinical examination was performed. Background information, including age, sex, occupation, socioeconomic condition, previous history of rheumatic fever, duration of illness, treatment sought or not, previous treatment status, cause of delay in diagnosis and/or treatment, if any, and impact of illness on productivity were noted. Symptoms were documented and signs were elicited. Available papers were scrutinized for relevant information. Chest skiagram, 12-lead ECG and echocardiography were performed in all patients. Other investigations done in selected cases include complete blood counts, anti-streptolysin O (ASO) titre, C-reactive protein (CRP), blood sugar, serum creatinine and routine urinalysis.

Observations and Results:

Table I
Age and sex distribution of mitral valvular disease patients. (N=50)

Age (Years)	Male		Female		Total	
	No	Percentage	No	Percentage	No	Percentage
11-20	7	14	7	14	14	28
21-30	8	16	9	18	17	34
31-40	5	10	4	8	9	18
41-50	3	6	4	8	7	14
51-60	1	2	1	2	2	4
61-70	0	0	1	2	1	2
71-80	0	0	0	0	0	0

Table-II
Occupation of the patients with mitral valvular disease. (N=50)

Occupation	Male		Female		Total	
	No	Percentage	No	Percentage	No	Percentage
Farmer	10	20	0	0	10	20
Day labourer	4	8	1	2	5	10
Businessman	5	10	0	0	5	10
Serviceman	1	2	0	0	1	2
Student	2	4	2	4	4	8
Housewife	-	-	23	46	23	46
Others	2	4	0	0	2	4

Table-III
Distribution of patients by socio-economic status N=50)

Socio-economic status	Number of patients	Percentage
Poor	32	64
Middle class	16	32
Rich	2	4

Table-IV
Distribution of patients by previous history of rheumatic fever (N=50)

Previous history of rheumatic fever	Number of patients	Percentage
Positive history present	28	56
Single attack	15	30
Recurrent attack	13	26

Table-V
History of previous treatment in patients with mitral valvular disease (N=50)

Pattern of previous treatment	Number of patients	Percentage
No treatment received	7	14
Treated by quacks only	11	22
Treated by registered medical practitioners and/or in hospitals	26	52
Treated by quacks, as well as, by registered medical practitioners and/or in hospitals	5	10

Table-VI
Causes of delay in diagnosis and treatment in patients with mitral valvular disease (N=50)

Causes of delay	Number of patients	Percentage	
Illiteracy and ignorance	14	28	
Difficult access to healthcare facilities	0	0	
Poverty	12	24	
Adoption of indigenous treatment	6	12	
Treated as a case of some other disease, hence delay	Bronchial asthma Pulmonary TB	6 3	12 6
No obvious delay	22	44	

Table-VII
Analysis of symptoms in patients with mitral valvular disease (N=50)

Symptoms		Number of patients	Percentage
Dyspnoea	NYHA class I	4	8
	NYHA class II	11	22
	NYHA class III	29	58
	NYHA class IV	6	12
Paroxysmal nocturnal dyspnoea		9	18
Cough		42	84
Haemoptysis		14	28
Palpitation		49	98
Chest pain		26	52
Leg swelling		13	26
Abdominal swelling		10	20
Dysphagia		15	30
Fatigue		45	90
Limb weakness		3	6

Table-VIII
Analysis of signs in patients with mitral valvular disease (N=50)

Signs		Number of Patients	Percentage
Pulse	Regular	33	66
	Irregularly irregular	14	28
	Occasional drop beats	3	6
Jugular venous pressure	Normal	39	78
	Raised	17	34
Apex beat	Normally situated	32	64
	Shifted	16	32
	Tapping	41	82
Left parasternal heave	Thrusting	7	14
		42	84
Palpable P ₂		41	82
Thrill	Systolic	8	16
	Diastolic	28	56
First heart sound	Normal intensity	1	2
	Loud	34	68
	Soft	8	16
	Variable intensity	14	28
Loud P ₂		43	86
Murmur	Mid diastolic murmur of MS	46	92
	Pansystolic murmur of MR	19	38
	Pansystolic murmur of TR	10	20
Opening snap		30	60
Presystolic accentuation		27	54
Pericardial rub		0	0
Congestive cardiac failure	Dependent oedema	16	32
	Engorged neck veins	17	34
	Hepatomegaly	13	26
Signs of CVD		3	6
Breath sound	Vesicular	42	84
	Vesicular with prolonged expiration	8	16
	Rhonchi	8	16
	Crepitations	18	36

Table-IX
Radiological findings in patients with mitral valvular disease (N=50)

Chest skiagram findings	Number of Patients	Percentage	
Enlarged cardiac shadow	Mild to moderate enlargement	25	50
	Huge enlargement	4	8
Straightening of left cardiac border	43	86	
Fullness or outward bulging of pulmonary conus	43	86	
Double contour of right cardiac border	35	70	
Upper lobe diversion of pulmonary vasculature	31	62	
Kerley B lines	14	28	
Pulmonary oedema	16	32	

Table-X
ECG findings in mitral valvular disease patients (N=50)

ECG features	Patient No	Percentage	
Rhythm	Sinus rhythm	33	66
	Atrial fibrillation	14	28
	Atrial flutter	2	4
	Ectopics	3	6
P wave	Broad, bifid	32	64
	Tall, peaked	0	0
	Broad, bifid and tall, peaked	1	2
	Biphasic in V ₁ with deep, wide terminal negative force	21	42
QRS complex	R>S in V ₁	27	54
	R≤S in V ₁	23	46
Voltage criteria of left ventricular hypertrophy	3	6	
Mean frontal plane	Normal	35	70
QRS axis	Right axis deviation	15	30
	Left axis deviation	1	2
Recent inferior myocardial infarction	1	2	

Table-XI
Echocardiographic findings in mitral valvular disease patients (N=50)

Echocardiographic features	Patient No	Percentage
MITRAL VALVE		
Thickening of valve leaflets	50	100
Calcification	3	6
Vegetations	0	0
AML mobility- Diastolic doming	50	100
Changes in subvalvular apparatus	28	56
Mitral valve area		
	Mild stenosis (1.5-2.5 cm ²)	1 2
	Moderate stenosis (1.0-1.4 cm ²)	14 28
	Severe stenosis (<1.0 cm ²)	35 70
EF slope	Mild reduction (2.6-3.5 cm/sec)	0 0
	Moderate reduction (1.5-2.5 cm/sec)	15 30
	Severe reduction (<1.5 cm/sec)	35 70
LEFT ATRIUM (LA)		
LA size	21-30 mm	1 2
	31-40 mm	8 16
	41-50 mm	20 40
	>50 mm	10 20
LA thrombus	2	4
PULMONARY HYPERTENSION	34	68
FUNCTIONAL TRICUSPID REGURGITATION	10	20
PERICARDIAL EFFUSION	2	4
MITRAL REGURGITATION	Grade I	1 2
	Grade II	9 18
	Grade III	7 14
	Grade IV	1 2

Table-XII
Findings of other investigations in patients with mitral valvular disease.

Test	Test done in Number of Patients	Result in Number of Patients
Total leucocytic count	50	
	Leucocytosis	5
ESR	50	
	<20 mm	43
	21-100 mm	7
	>100 mm	0
CRP	18	
	Positive/Raised	5
ASO titre (TU/ml)	20	
	<200	14
	200-400	5
	400-600	1
	>600	0
Blood urea/S. creatinine	33	
	Abnormal	1
Blood sugar	27	
	Elevated	2
Urinalysis	15	
	Abnormal	1
Abdominal USG	16	
	Hepatomegaly	10
	Ascites	11
	Pleural effusion	3
Sputum for AFB staining	9	
	Positive	0

Discussion:

Rheumatic heart disease (RHD), although decreasing in developed countries, remains a major public health problem in various developing countries, including Bangladesh. In the present study, 50 cases of mitral valvular disease (MVD) were diagnosed clinically and later, evaluated by non-invasive investigations available now-a-days in many parts of this country. There was a good correlation between the clinical attributes and the investigation findings. The peak incidence of MVD was found in the third decade (34%). Fourteen (28%) patients were in below-20 age group which supports the findings of Sen et al⁶, Roy et al⁷, Islam et al¹ and Mohibullah et al⁸. However, data from western countries contradict with these findings, where juvenile mitral stenosis ranges from 0.5 to 13%. There was almost equal sex distribution with male-female ratio 1:1.08. Among the 50 patients,

10 (20%) were farmers. Most of the female patients were housewives. Thirty two (64%) patients had poor socio-economic condition and 16 (32%) belonged to the middle class. These observations support the views that RHD is prevalent among the economically disadvantageous group. However, there might be some biasness, as the present study was carried out in a public hospital where the low-income people tend to dominate the service-receiving population. A previous history suggestive of Rheumatic fever was found in 28 (56%) out of 50 patients; 13 (26%) experienced single attack, whereas 15 (30%) had recurrent attacks. These findings are close to those of Islam et al¹, Sen et al⁶ and Bayana et al⁹. Twenty six (52%) patients received treatment from the registered medical practitioners and/or from the hospitals. Eleven (22%) patients consulted with the quacks only, whereas 5 (10%) cases had treatment from both

the sources. The resting 7 (14%) patients received no treatment at all. So, in toto, 23 (46%) patients either received no treatment or were handled by the quacks only.

An important aim of the study was to look for the causes of delay, if any, in the diagnosis and treatment of the disease. Out of 50 cases studied, there was significant delay in 28 (56%) patients. Illiteracy and ignorance was found to be the principal cause in 14 (28%) cases; this group failed to realize the importance of seeking medical care for their illness in time, or they waited for spontaneous remission. Twelve (24%) patients pointed out poverty as the culpable factor for the undue delay. In case of 7 (14%) patients, misdiagnosis was responsible; 6 of them were treated as a case of bronchial asthma for their breathlessness, whereas another 3 had the treatment of pulmonary tuberculosis for the haemoptysis. Six (12%) patients adopted indigenous treatment. None complained difficult access to the health care facilities as a hindrance to the timely treatment of their illness. More than one cause was responsible in 7 cases. Twenty two (44%) patients denied of any undue delay.

The impact of MVD on the productivity showed that, 43 (86%) patients experienced moderate to severe limitation of carrying out day-to-day activities including profession. All complained of some sort of breathlessness, which was the principal symptom. Majority (70%) had New York Heart Association (NYHA) class III or IV dyspnoea, 22% experienced the dyspnoea of NYHA class II severity. These findings were very close to those of Islam et al¹, in whose study, majority of the patients were found incapacitated by the disease, and over 60% were in NYHA class III or IV dyspnoea. Paroxysmal nocturnal dyspnoea was found in 9 (18%) patients, which was close to the findings of Islam et al¹ and Wood^{10,11}. Palpitation, fatigue and cough were found in 49 (98%), 45 (90%) and 42 (84%) cases respectively. Nineteen (38%) patients had haemoptysis, which was found in 17% cases by Islam et al¹, but 44% by Wood^{10,11}. Dysphagia was present in 15 (30%) cases, all of them had left atrial size >40 mm in echocardiography.

The study revealed irregular pulse in 17 (34%), 3 (6%) of which had occasional drop beats. Raised

jugular venous pressure was found in 17 (34%) cases. Apex beat was found normally situated in 32 (64%), and shifted in 16 (32%) cases, presumably representing the combined stenotic and regurgitant mitral valvular lesions, later supported by echocardiographic findings. The character of apex beat was tapping in 39 (78%) and thrusting in 9 (18%) patients. Forty two (84%) patients had left parasternal heave and palpable P₂ was found in 41 (82%) patients, indicating high prevalence of pulmonary hypertension. These findings are close to those of Mohibullah et al⁸, Shaha et al¹² and Cherian et al¹³. However, Islam et al¹ found pulmonary hypertension in 65% of their studying population. Diastolic thrill was palpable in 28 (56%) cases. Eight (16%) patients had systolic thrill. The first heart sound (S₁) was loud in 34 (68%) and soft in 8 (16%) cases, the latter could be explained by the presence of significant mitral regurgitation (MR) in with mitral stenosis (MS). The intensity of S₁ was variable in 14 (28%) patients. Clinically, mid-diastolic murmur of MS was audible in 46 (92%) cases. Nineteen (38%) patients had pansystolic murmur of MR, whereas in 10 (20%) cases pansystolic murmur was best heard in the lower left parasternal area in inspiration, indicating the origin of the murmur at the level of tricuspid valve. Opening snap was found in 30 (60%) cases, whereas 27 (54%) had presystolic accentuation.

Sixteen (32%) patients had dependent oedema, 17 (34%) had engorged neck veins and tender hepatomegaly was found in 13 (26%) patients. These findings are close to those of Islam et al¹ who found clinical evidence of congestive cardiac failure in 33% cases. Breath sound was vesicular with prolonged expiration in 8 (16%) patients, who also had bilateral rhonchi. Six patients were treated as cases of bronchial asthma, but none had positive family history of asthma. All had clinical and echocardiographic features of pulmonary hypertension. They showed only partial improvement of bronchospasm with bronchodilators and diuretics. Probably, they were having chronic bronchitis, as the oedematous bronchial mucosa is more likely to be associated with chronic bronchitis, specially in cold and wet climates.¹⁴

In this study, 3 patients had ischaemic stroke; 2 had atrial fibrillation and 1 had atrial flutter with

2:1 block. Enlarged left atrium was found in all of them, but thrombus could not be found in all of them in echocardiography. Islam et al found thromboembolism in 3% of the cases.

Roentgenographic study revealed moderate to huge enlargement of cardiac shadow in 29 (58%), 4 (8%) having huge enlargement. such a high incidence of increased cardiothoracic ratio could be explained by the presence of mixed MS and MR (36%), as well as, by the high incidence of pulmonary hypertension during echocardiographic evaluation.

The most consistent X-ray finding was straightening of the left border of the heart with fullness or outward bulging of the pulmonary conus, which was present in 43 (86%) cases. double contour of the right border was evident in 35 (70%) cases. Upper lobe diversion of pulmonary vasculature and Kerley B lines were found in 31 (62%) and 10 (20%) cases respectively, all of them had echocardiographic features of pulmonary hypertension. Sixteen (32%) patients had radiographic features of pulmonary oedema. Mohibullah et al¹ found Kerley B lines in 34.7% cases (Fig.-1).



Fig.-1: Chest X-ray postero-anterior view showing straightening of left cardiac border, double contour of right cardiac border and upper lobe diversion of pulmonary vasculature.

The electrocardiographic study showed atrial fibrillation in 14 (28%) cases and atrial flutter in 2 (4%) cases. These arrhythmias were most commonly associated with large left atrium; in half of the cases left atrial diameter ranged from 41 to 50 mm, and in 6 cases the chamber size was >50 mm. the finding was similar to that of Henry et al¹⁵ who came to the opinion that atrial fibrillation is closely related to the size of the left atrium. In half of the cases having arrhythmia, duration of illness ranged from 3 to 7 years. However, in 2 patients the duration was less than 2 years, and it was 25 years in another patient (Fig.-2).

Broad, bifid P wave of left atrial enlargement was the most commonly found ECG change in patients with MVD in this study. P-mitrale was found in 32 (64%) cases, which was exactly the value obtained by Mohibullah et al.¹ However, Wood¹¹ found P-mitrale in 79% cases.

Biphasic P-wave with deep, wide terminal negative force was found in 21 (42%) cases. One patient had broad, bifid and tall P wave of biatrial enlargement. The R:S>1 in 27 (54%) subjects, all of whom had pulmonary hypertension. These findings were close to those of Crosby et al¹⁶. The ECG of 3 patients met the criteria of left ventricular hypertrophy. These patients had echocardiographic evidence of grade III or IV mitral regurgitation. The mean frontal plane QRS axis was within normal limits in 35 (70%) cases, whereas right axis deviation was present in 15 (30%) patients. Clinical, radiological and echocardiographic features of pulmonary hypertension were present in all of these patients.

Echocardiographic study revealed thickening of mitral valve leaflets to varying extent in all patients. Changes in subvalvular apparatus were noted in 28 (56%) cases. There was moderate to severe reduction of EF slope in 46 (92%) subjects. Three cases had calcification in mitral valve apparatus, but none had vegetation. The study showed severe mitral stenosis (valve area <1 cm²) in 33 (66%), moderate mitral stenosis (valve area (1.0 to 1.4 cm²) in 14 (28%) and mild mitral stenosis (valve area e"1.5 cm² in 1 (2%) patients. The left atrial size was 41 to 50 mm in 20 (40%) and >50 mm in 10 (20%) cases, the largest one measuring 61 mm. Two patients had left atrial thrombus. Evidence of pulmonary hypertension was found in 34 (68%) patients, which was supported by the study conducted by Islam et al (Fig.-3).



Fig.-2: ECG in patients with MVD. The left panel shows sinus rhythm with right ventricular hypertrophy, biatrial enlargement and right axis deviation. The right panel reveals atrial fibrillation with right ventricular hypertrophy and right axis deviation; the patient presented with ischaemic stroke.



Fig.-3: Echo in patients with MVD. The left panel is of 2D echo parasternal long-axis view in diastole showing thickening of leaflets, hockey-stick appearance of AML, diastolic doming and dilated LA; the mid panel shows a large thrombus in the dilated LA cavity while the right panel is of continuous-wave tracing revealing increased pressure-half time of 334.8 ms and the calculated mitral valve area of 0.66 cm².

Leucocytosis and raised ESR were observed only in few cases, one of them had clinical impression of ongoing acute rheumatic process. C-reactive protein was elevated in 5 patients out of 18. ASO titre was raised in 6 out of 20 patients. Abdominal ultrasound examination of 16 patients revealed hepatomegaly and ascites in 10 and 11 cases respectively.

Limitations of the Study

Despite exercise of caution, the study has got some limitations. The sample size was relatively small. No control was used. Doppler echocardiography could not be done in all cases because of unavailability in the hospital at that time and low affordability of the study subjects.

Conclusion:

Mitral valvular disease of rheumatic origin is still a common cause of cardiovascular morbidity and mortality in Bangladesh. Younger people of lower socioeconomic condition are the common victims. Due to poverty, illiteracy and ignorance, the disease is often diagnosed late in advanced stage with

complications. Treatment then is accordingly more sophisticated, expensive but less satisfactory. Such a grave outcome can only be prevented by early diagnosis and proper treatment at lower levels of existing health care system. This study indicates that rheumatic mitral valvular disease and the accompanying complications can be detected with an appreciable degree of accuracy by skillful clinical assessment and judicious use of simple investigations like roentgenography, electrocardiography and echocardiography which are available in many parts of our country at affordable costs. So every effort should be made to utilize these invaluable resources to tackle this public health problem more efficiently.

Conflict of Interest: None.

References:

1. Islam MN, Khan LA, Mohibullah AKM, et al. Clinical profile of rheumatic heart disease in Bangladesh. *Bangl Med J* 1987;16:6-17.

2. Malik A. Congenital and acquired heart diseases (a survey of 7062 persons). *Bangladesh Med Res Council Bull* 1976; II: 115-9.
3. Ahmed J, Zaman MM, Hassan MMM. Prevalence of rheumatic fever and rheumatic heart disease in rural Bangladesh. *Trop Doct* 2005;35(3):160-1.
4. Vijaykumar M, Narula J, Reddy KS, et al. Incidence of rheumatic fever and prevalence of rheumatic fever disease in India. *Int. J. Cardiol* 1994;43:221-8.
5. Taranta A and Markowitz M. *Rheumatic Fever*. 2nd ed, Kluwer Academic Publishers, MA 1989;6,7,68-9.
6. Sen PK. Profiles of surgical management of rheumatic valvular heart disease in India. *Ann Ind Acad Med Sc* 1972;8:87.
7. Roy SB and Gopinath MI. Mitral stenosis. *Circulation* 1968;38(Suppl.):68.
8. Mohibullah AKM, Islam N, Ali M, et al. Juvenile mitral stenosis in Bangladesh. *Bangladesh Heart J* 1992;7:6-13.
9. Bayana JN, Khanna SK, Gupta BK, et al. Mitral stenosis in the young in developing countries. *J Thorac Cardiovasc Surg* 1974;68:126.
10. Wood P. Clinical features, an appreciation of mitral stenosis: Part 1. *BMJ* 1954;1:1051-63.
11. Wood P. Investigations and results, an appreciation of mitral stenosis: Part 2. *BMJ* 1954;1:1113-24.
12. Shaha SJ, Goyal BK, Sheth A, et al. Juvenile mitral stenosis in India. *Indian Heart J* 1975;27:6.
13. Cherian G, Vytilingam KI, Sukumar IP, et al. Mitral valvotomy in young patients. *Br Heart J* 1964;26:157.
14. Rahimtoola SH. Perspective on valvular heart disease: An update. *J Am Coll Cardiol* 1989;14:1-23.
15. Henry WL, Morgonroth J, Pearlman ISA, et al. Relation between echocardiographically determined left atrial size and atrial fibrillation. *Circulation* 1976;53:273.
16. Crsby RS, Levinson DC, Dimitroff SP, et al. The electrocardiogram in congenital heart disease and mitral stenosis. *Am Heart J* 1953;46:670.