

# Frequency & Pattern of Chronic Rheumatic Heart Disease in Patient Undergoing Echocardiography: Experience in a Tertiary Level Hospital of Bangladesh

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## ABSTRACT

**Background:** Rheumatic heart disease & rheumatic fever is important public health issue. overall incidence and prevalence of acute rheumatic fever is in downtrend in Bangladesh. But exact incidence & prevalence of chronic rheumatic heart disease (CRHD) is unknown. **Objective:** We wanted to find out prevalence of CRHD among adult patients undergoing echocardiography in a tertiary level hospital of Bangladesh. **Methods:** The study was conducted in the department of cardiology, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka between January 2018 to December 2018. Echocardiography was done with VividE9® machine. Patients who underwent echocardiography for various indication on indoor and outdoor basis were screened for this study. Among them 1000 male & female patients, age between 18-65 years who had their echo done by the investigators were enrolled for analysis. CRHD was defined as per latest echocardiography guideline. Frequency & pattern of CRHD were calculated. **Results:** Out of 1000 patients 74 cases were diagnosed as CRHD (7.4%), among them 52 patients were female. Mitral stenosis (MS) was found in 28.3% cases, Isolated mitral regurgitation (MR) in 5.4%, MS with MR in 18.9%, Aortic stenosis (AS) in 8.1%, Aortic regurgitation (AR) in 10.85%, AS with AR in 13.5%, involvement of both aortic & mitral valve in 27%, involvement of mitral, aortic & tricuspid valve in 1.3%. **Conclusion:** Findings of the study will help to set public health programs for primary & secondary prevention of CRHD. Further population-based study is required to know the exact prevalence of the disease.

**Keywords:** Chronic rheumatic heart disease, frequency & pattern, Bangladesh.

## INTRODUCTION

Rheumatic heart disease (RHD) & rheumatic fever is important public health issue as over 15 million people around the world suffering from RHD and this is especially true for developing countries like ours. Although overall incidence and prevalence of acute rheumatic fever is decreasing in Bangladesh, chronic RHD continues to be a common cardiovascular health problem.<sup>[1]</sup> RHD is one of the leading causes of non-communicable diseases in low-income & middle-income countries and it is responsible for 250,000 premature death worldwide.<sup>[2]</sup> Overall prevalence of RHD varies among different studies and population studied. In

2014 a systematic review & meta-analysis showed considerable improvement in detection of RHD among <18 years age group. Prevalence of RHD was found 2.9 per 1000 people by cardiac auscultation and 12.9 per 1000 people by echocardiography.<sup>[3]</sup> A retrospective study by Mahmoud et al. in 2007 showed 9.8% people with abnormal echocardiographic results have acute or chronic form of RHD.<sup>[4]</sup> Being a temperate and poverty afflicted crowded country Bangladesh is always considered to have high prevalence of RHD. But it is surprisingly true that exact incidence & prevalence of RF & RHD in our country is unknown.<sup>[1]</sup> In 1976 RF & RHD were considered the second most prevalent cardiac disease after hypertension (7.5 per 1000 vs. 11 per 1000, respectively).<sup>[5]</sup> Subsequently in a school survey during the year 1984-85 showed prevalence of RF & RHD was 43.9 & 5 per 1000 children respectively. As mentioned earlier, till 2016 current prevalence of RF & RHD was largely unknown and by convention it was held that it may be <1 per 1000 in general population. In our study

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we wanted to find out prevalence of CRHD among adult patients who underwent echocardiography in a tertiary level hospital.

### MATERIALS AND METHODS

The study was conducted in the department of cardiology, Bangabandhu Sheikh Mujib Medical University (BSMMU) between January 2018 to December 2018. Echocardiography was done with VividE9® machine from General Electric company. Patients who underwent echocardiography due to various problem on indoor and outdoor basis were screened for this study. It is worth mentioning that outdoor echocardiography lab of BSMMU has a good mix of Bangladeshi population as many patients are referred from different locations of our country. Around fifty patients undergo 2D, M-mode & Doppler echocardiography every day in our Echo lab. 1000 male & female patients between 18-65 years who had their echo done by the investigators was enrolled for analysis.

The investigators have considerable expertise in echocardiography and consulted with senior cardiologist & echo-cardiographer whenever any suspicion aroused. Patients were evaluated with 2D, color flow mapping and Doppler study. As the study was done on adult population nearly all patients had chronic form of rheumatic heart disease (CRHD). CRHD was defined as per latest echocardiography guideline for morphological and Doppler changes in chronic rheumatic heart disease. Thickening & calcification of valve leaflet and cusps at the margin, restricted mobility, sub-valvular changes, commissural fusion, stenosis of valve orifice, non-coaptation of leaflets, color flow & Doppler findings etc. were considered as favorable findings for CRHD. Patient's age & sex also aided to define rheumatic changes. Patient having RHD & other cardiac problem was not excluded, as our intention was to detect prevalence of CRHD among patients attending in our Lab. Then frequency & pattern of CRHD were calculated. Patient's identity was not disclosed during data collection and analysis. Prior consent was taken from the department of cardiology, BSMMU to use the data for study purpose.

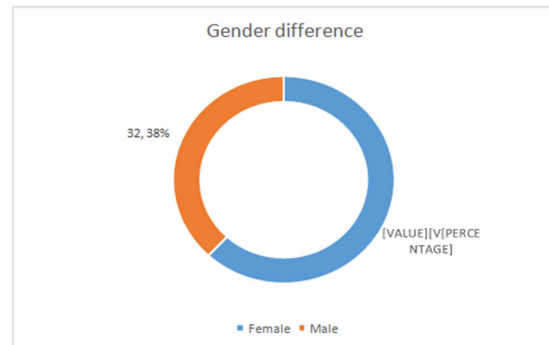
### RESULTS

**Table 1: Characteristics of patients in the study.**

Traits	Number of patients	Percentage (%)
CRHD absent	926	92.6
CRHD present	74	7.4
Female with CHRHD	52	5.2
Male with CHRHD	32	3.2
	N= 1000	100

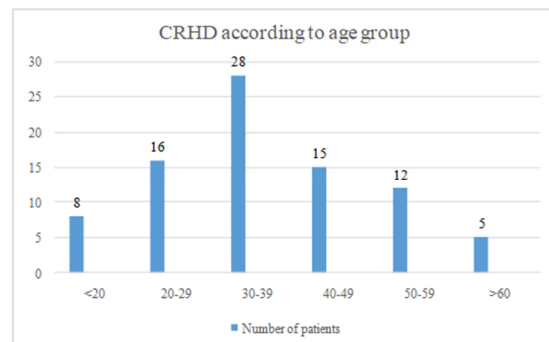
Out of 1000 patients who underwent echocardiography 74 cases were diagnosed as CRHD, among them 52 patients were female and rest 32 patients were male [Table 1].

So male to female ratio of diagnosed CRHD was 1:1.6 [Figure 1]. That indicates majority of patients suffering from CRHD were female.



**Figure 1: Pie chart showing frequency of CRHD according to sex**

We have stratified number of cases according to age group which showed maximum number (28 cases) of patients fell in 30-39 age group [Figure 2] and mean age of patients having CRHD was 37±12 years.



**Figure 2: Number of patients according to age group**

**Table 2: Pattern of valvular involvement is depicted**

Valvular involvement	Number of patients (out of 74)	Percentage (%)
Mitral Stenosis (MS)*	21	28.3
Isolated Mitral Regurgitation (MR)	4	5.4
MS with MR	14	18.9
Isolated Aortic Stenosis (AS)	6	8.1
Aortic Regurgitation (AR)	8	10.8
AS with AR	10	13.5
Mitral valve with aortic valve	20	27.0
Mitral, aortic and tricuspid valve	1	1.3

\*alone or in combination

Mitral stenosis (MS) was found in 28.3% cases, Isolated mitral regurgitation (MR) in 5.4%, MS with MR in 18.9%, Aortic stenosis (AS) in 8.1%, Aortic regurgitation (AR) in 10.85%, AS with AR in

13.5%, involvement of both aortic & mitral valve in 27%, involvement of mitral, aortic & tricuspid valve in 1.3%.

Mitral Stenosis (MS) alone or with combination was the most common presentation of CRHD. On the contrary, Isolated MR was relatively uncommon presentation. Aortic valve involvement in association with mitral valve changes was more common than isolated aortic valve changes. In nearly one third of cases (27%) both mitral and aortic valve were affected.

## DISCUSSION

We conducted this study in a tertiary level hospital to find out frequency and pattern of chronic rheumatic heart disease among adult population (age 18-65 years). Current prevalence of RF & RHD is unknown in our country.<sup>[1]</sup> As our sample population was adult virtually all of the rheumatic heart disease patients had chronic presentation.

Average age of our study population was 37±12 years which is higher in comparison to other study as we have conducted this study among adult population attending in BSMMU echo lab. Sani et al, in 2007, showed mean age of RHD was 24±12 years in Nigeria and that was due to they had sampled 5 to 60 years old patients.<sup>[4]</sup>

74 patients out of 1000 sample had chronic rheumatic heart disease. So prevalence of CRHD among adult population is 7.4% according to this study. It is noticeable that this prevalence is higher than previous studies. In 1976 prevalence of RF & RHD was 7.5 per 1000 in "general population" and in current years it is considered may be less than 1 per 1000 in "general population". This scenario might be due to referral bias, as our center is a referral center. Our result is consistent with other similar Nigerian study where prevalence of RF & RHD among patients aged 5 to 60 years was 9.8%.<sup>[4]</sup> Out of 74 patients with features of CRHD there was 52 female and 32 male patients. So male to female ratio was 1:1.6, which is consistent with other study. Female patients with rheumatic fever have more chance to develop chronic changes. Whether this trend is as a result of innate susceptibility, increased exposure to streptococcal throat infection due to child rearing or less access to medical care is yet to discover.

Among 74 patients maximum (28 person) were in the age group 30-39 years. So from these findings we can extrapolate average age of CRHD presentation falls in 3rd decade. Here it should be noticed that only 8 patients had CRHD before 20 years of age.

Mitral Stenosis alone or in combination with other valvular involvement was the commonest presentation as 28% patients had some form of MS out to total patients with CRHD. 5% patient had isolated mitral regurgitation. This picture is quite

opposite to total rheumatic fever presentation as mitral regurgitation is common presentation if we consider acute rheumatic fever.<sup>[6-8]</sup> As our study was on CRHD, mitral stenosis was common presentation. Both mitral and aortic valve involvement was the second common abnormality. We frequently find some rheumatic changes in aortic valve like thickening, calcification, fusion of cups along with mitral valve involvement that is why combined valvular changes got a higher position. Organic tricuspid valve & pulmonary valve involvement were rare (<1%). It is also known from other workers that tricuspid valve is rarely affected by rheumatic carditis.<sup>[9]</sup>

### Limitation:

We have investigated prevalence of CRHD among only adult population in a tertiary care hospital. Young age group was not included as this study was done in adult cardiology department. As a result, prevalence of both rheumatic fever and rheumatic heart disease cannot be extrapolated from this study. Scenario of other cardiac center is unknown as this was a single center study.

## CONCLUSION

Though prevalence of CRHD among patient undergoing echocardiography in a tertiary care hospital is predictively higher than general population, overall prevalence of RHD in our country is largely unknown. We need more population based studies including all age group to get exact information & scenario. As echocardiographic screening has higher prevalence rate of RHD, a nationwide systematic echocardiographic survey is needed to know the real situation.

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