

Profile of newly diagnosed adult patients with rheumatic heart disease in sub-Himalayan region – A 5-year analysis

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ABSTRACT

Introduction: Rheumatic heart disease (RHD) is one of the leading acquired causes of cardiac diseases affecting the young population, worldwide. **Aims and Objectives:** The primary objective was to study the prevalence, profile, and complications of patients with RHD in a tertiary care hospital of Uttarakhand. The secondary objective was to assess the demographic and clinical parameters of patients with RHDs. **Materials and Methods:** All adult patients above the age of 18 years, diagnosed with RHD, over a period of 5 years from July 2008 to June 2013 were enrolled in the study. Detailed clinical data of the patients were obtained retrospectively from the hospital record section. Information regarding prevalence of RHD, profile, and complications of patients with RHD was collected from patient's case sheet and tabulated. **Results:** In all, 1001 patients age more than 18 years with RHD presented to either medical or cardiology outpatient departments over a period of 5 years from July 11 to June 2018. Mitral regurgitation ($n = 610$, 61.9%) was the most common RHD. Females ($n = 538$, 53%) outnumbered males ($n = 464$, 46.2%). Heart failure ($n = 353$, 35.1%), severe pulmonary arterial hypertension ($n = 118$, 11.7%), and atrial fibrillation ($n = 212$, 21.1%) were common complications. A total of 75 (7.4%) patients presented with bacterial endocarditis, whereas 32 (3.2%) patients succumbed to death due to RHD.

Keywords: Cardiac diseases, heart failure, pulmonary hypertension

Introduction

Rheumatic heart disease (RHD) is an important and a preventable contributor of cardiovascular disease. It is a major public health problem especially in countries with lower and middle socioeconomic status. The true burden of RHD especially from the state of Uttarakhand is still unknown. Acute rheumatic fever is an alarming and undertreated cause of RHD. The socioeconomic contributing factors of acute rheumatic fever are poverty, improper sanitary facilities, and overcrowding.^[1-3] There are standard guidelines of primary and secondary prevention

and treatment of acute rheumatic fever released by the World Health Organization (WHO). As a consequence, many countries in the world have reported significant reduction in the incidence of RHDs. However, it is still a major public health issue in developing countries.^[4,5] There is a growing curiosity in establishing the diagnosis of RHD due to increasing availability of echocardiographic facilities in developing countries.^[4,5] This will aid in achieving the benchmark of minimizing the incidence of morbidity and mortality due to cardiovascular ailments. The WHO aims to achieve 25% reduction in mortality due to cardiovascular causes by 2025.^[6,7] In this study, we aim to study the types, demographic pattern, clinical profile, and complications in adult patients age >18 years of age with RHD in the state of Uttarakhand. Most of the studies done in the past have focused on screening of RHD in the pediatric age group based

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in the school setup only; only fewer studies have highlighted the burden of RHD in the adult population. RHD, by 2015, was responsible for 320,000 deaths globally. There is an urgent need for developing a chronic care model and linking it with other models of noncommunicable disease for effective secondary and tertiary preventive measures of RHD. The approach of prevention and treatment of RHD involves four essential steps in the form of primordial prevention, primary secondary, and tertiary prevention. It is based on similar lines of model as used for other noncommunicable disease such as coronary artery disease and communicable diseases such as tuberculosis.^[8] Detailed research studies are needed to consolidate preventive measures for RHD in the form of national program in adult population.

Materials and Methods

This retrospective study was carried out at a tertiary care hospital of Uttarakhand over a period of 5 years from July 2011 to June 2016. All the patients with symptoms of RHD such as shortness of breath, chest pain, palpitation, and hemoptysis, attending medical and cardiology outpatient departments were screened using two-dimensional (2D) echocardiography. The World Heart Federation criteria were used for echocardiographic diagnosis of RHD. Both pathological and morphological criteria were used.^[9] The morphological criteria can be divided as static criteria and dynamic criteria. The static criteria are analyzed on frozen 2D images. The dynamic criteria are analyzed using frame-by-frame analysis of the images. Detailed demographic parameters, clinical history, echocardiographic, and chest X-ray findings were noted from the patient hospital records. Interventional procedure in the form of percutaneous balloon mitral valvulotomy was decided using Wilkins score.^[10]

Results

Over a period of 5 years, there were 1001 adult patients with RHD who attended medical and cardiology outpatient departments. Females ($n = 538$, 53%) dominated males ($n = 463$, 46.2%). Around 30% patients of the patients were educated. In all, 674 (67.3%) patients presented with shortness of breath, which was the most common symptom. The other common symptoms were palpitation ($n = 585$, 58.1%), hemoptysis ($n = 25$, 2.4%), and syncope (153, 15.2%). Signs of heart failure in the form of raised juglar venous pulse (JVP) ($n = 346$, 34.5%) and tender hepatomegaly ($n = 233$, 23.2%) were present in around one-third of patients with RHD. Complications such as clinical evidence of pulmonary congestion, anemia, renal dysfunction, bacterial endocarditis, and prior history of stroke were present in 20.3%, 8.7%, 21.8%, 7.4%, and 11.1%, respectively [Table 1]. Around 60% of the patients were on loop diuretics and aldosterone inhibitors 365 (36.4%) presented with symptoms of acute rheumatic fever. As evident in Table 2, approximately 40% ($n = 410$) patients had mild to moderate mitral regurgitation, and 623 (62.2%) patients had atrial fibrillation [Table 3]. Right-axis deviation on ECG was present in 561 (56%) patients.

Table 1: Demographic and clinical profile of patients with rheumatic heart disease

Parameters	Number (%)
Males	463 (46.2%)
Females	538 (53%)
Educated	345 (34.4%)
Mean age	37.08±14.6 years
Asymptomatic cases	127 (12.6%)
Shortness of breath	674 (67.3%)
Palpitations	583 (58.1%)
Hemoptysis	25 (2.4%)
Raised JVP	346 (34.5%)
Tender hepatomegaly	233 (23.2%)
Anemia	88 (8.7%)
Renal dysfunction	219 (21.8%)
Loop diuretics	664 (66.3%)
Aldosterone inhibitors	567 (56.6%)
Heart failure	352 (35.1%)
Presentation with acute rheumatic fever	365 (36.4%)
Pulmonary congestion	204 (20.3%)
Family history of ARF	213 (21.2%)
Prior hospitalization of RHD during pregnancy	164 (16.3%)
History of acute rheumatic fever treatment	373 (37.2%)
Mean heart rate (bpm)	78±16
Presentation with bacterial endocarditis	75 (7.4%)
Balloon mitral valvotomy	178 (17.7%)
Valve repair	24 (2.3%)
Valve replacement	36 (3.5%)
Syncope	153 (15.2%)
History of stroke	112 (11.1%)

RHD: rheumatic heart disease

A total of 832 (83%) had increased cardiothoracic ratio as evident in chest X-ray [Table 4]. Severe pulmonary arterial hypertension was present in 188 (11.7%) patients, coexistence of mitral regurgitation and aortic regurgitation was present in 132 (13.1%) patients, and MS (mitral stenosis) with MR (mitral regurgitation) was present in 126 (12.5%) patients. About 178 (17.7%) patients underwent balloon mitral valvotomy, whereas only 36 (3.5%) patients had valve replacement surgery. Among electrocardiographic findings, right-axis deviation (561, 56%) followed by left atrial enlargement (248, 24.7%) were the most common findings [Table 3]. The most common chest radiographic finding in patients with RHD was cardiomegaly ($n = 832$, 83.1%) followed by pulmonary hypertension (592, 59.1%) [Table 4].

Discussion

RHD is one of the most underestimated public health issues. There are very few prevalence studies done in the past related to RHD in the adult population. Also, these studies have reported lower prevalence of RHD in adult population when compared with prevalence in children of school-aged group. This could be attributed to strict and ill-defined criteria of diagnosis of RHD in adult population, lack of motivation to participate, and overestimation of diagnosis to initiate secondary prophylaxis

Table 2: Echocardiographic findings of patients with rheumatic heart disease

Findings	Number (%) (n=1001)
Mild to moderate mitral stenosis	327 (32.6)
Severe MS	148 (14.7)
Mild to moderate MR	410 (40.9)
Severe MR	210 (20.9)
Severe AR	62 (6.1)
Mild to moderate AS	52 (5.1%)
Severe AS	26 (2.5%)
Mild to moderate TS	3 (0.2%)
Severe TS	2 (0.1%)
Mild to moderate TR	381 (38%)
Severe TR	57 (5.6%)
Mitral valve thickness	218 (21.7%)
Aortic valve thickness	100 (9.9%)
Tricuspid valve thickness	3 (0.2%)
Dilated left atrium	608 (60.7%)
Dilated right atrium	141 (14.0%)
Dilated left ventricle	144 (14.3%)
Dilated right ventricle	124 (12.3%)
Severe PAH	118 (11.7%)
Mild to moderate PAH	288 (28.7%)
Mild to moderate AR	326 (32.5%)
MR and AR	132 (13.1%)
MS and MR	126 (12.5%)
LVEF<60%	79 (7.8%)
Mortality	32 (3.2%)

MS: mitral stenosis; MR: mitral regurgitation; AR: aortic regurgitation; AS: aortic stenosis; TS: tricuspid stenosis; TR: tricuspid regurgitation; PAH: pulmonary hypertension

Table 3: Electrocardiographic findings of patients with RHD

ECG findings	Number (%)
Right-axis deviation	29 (2.8%)
Left-axis deviation	561 (56%)
Left atrial enlargement	118 (11.7%)
Right atrial enlargement	248 (24.7%)
Atrial fibrillation	75 (7.4%)
LBBB	623 (62.2%)
RBBB	63 (6.2%)

RHD: rheumatic heart disease; ECG: electrocardiogram; LBBB: left bundle branch block; RBBB: right bundle branch block

Table 4: Chest X-ray findings of patients with RHD

Chest X-ray findings	Number (%)
Normal	26 (2.5%)
Cardiomegaly	832 (83.1%)
Pulmonary hypertension	592 (59.1%)
Pulmonary edema	253 (25.2%)
Right-sided pleural effusion	67 (6.6%)

RHD: rheumatic heart disease

in this population.^[11,12] In our study, we diagnosed 1001 adult cases of RHD. Patients attending medicine and cardiology outpatient department who had symptoms such as shortness of breath, palpitations, chest pain, and hemoptysis were screened using echocardiography to diagnose RHD. We diagnosed

127 (12.6%) cases of RHD who were not symptomatic but were screened using clinical examination and confirmed by 2D echocardiography. However, they did not reflect the true percentage of subclinical cases. These subclinical cases are often missed and they undergo clinical progression and deterioration. A study done in Myanmar highlighted the importance of diagnosing these subclinical cases.^[13] These studies also supported the fact that milder diseases are not diagnosed timely and progress to severe symptomatic disease.^[14] Acute rheumatic fever is caused by untreated, streptococcal pharyngitis infection. The most devastating complication of acute rheumatic fever is RHD. The socioeconomic determinants that determine the transmission of acute rheumatic fever are illiteracy, poor hygiene, lower socioeconomic status, and poor healthcare facilities in developing countries.^[14,15] In our study, around 70% patients with RHD were found to be uneducated. In this study, 674 (67.3%) presented with shortness of breath, 582 (58.1%) presented with palpitations, and 25 (2.4%) had hemoptysis. Similar results were seen in a study conducted by Sliwa *et al.*^[16] They also observed that complications such as renal dysfunction and anaemia were seen in 22% and 8.2% of patients, respectively. In our study, similar number of patients presented with renal dysfunction and anemia. Anemia was defined as hemoglobin level less than 11 g/dL in men and less than 10 g/dL in women. As evident in Table 2, the most common valvular lesion was mitral regurgitation followed by mitral stenosis. As evident in a study conducted by Mirabel *et al.*,^[17] mitral regurgitation and mitral stenosis were the most common valvular lesions. They observed 37 (9.3%) patients had left ventricular ejection fraction (LVEF) <60%. In our study, 79 (7.8%) patients had systolic dysfunction. In a previous study done in Myanmar, right-axis deviation (61, 60%), atrial fibrillation (60, 60%), left-axis deviation (12, 13%), and left atrial enlargement (23, 26%) were common echocardiographic findings. Our study also supported this observation.^[13] In our study, more than two-third of the patients had cardiomegaly on chest X-ray, and around 60% patients had features on pulmonary hypertension. Previous studies reported similar findings.^[13] The management of RHD is not only affected by social and economic factors but also it is a major burden on the healthcare system of the country as it involves lifelong therapy and prophylaxis.^[18] The major causes of mortality are stroke, heart failure, and endocarditis.^[19] In our study, 353 (35.1%) patients with RHD had heart failure, 75 (7.4%) patients presented with bacterial endocarditis, and 112 (11.1%) had history of stroke. In a previous study done by Mirabel *et al.*,^[17] around 50% of patients had history of RHD. In our study, around 35% patients presented with acute rheumatic fever. The reason for lower incidence of patients with acute rheumatic fever could be attributed to underreporting and delayed diagnosis of acute rheumatic fever due to lack of healthcare amenities in developing countries. Also, problems such as illiteracy and overcrowding contribute to it.^[20] In our study, 178 (17.7%) patients underwent balloon mitral valvulotomy. In the study conducted by Mirabel *et al.*, 20% of patients underwent RHD valve intervention.^[17] In our study, 32 (3.2%) patients succumbed to illness due to various complications of RHD such as heart failure, stroke, and bacterial endocarditis. Similar

results were reported by Lawrence *et al.*, who reported mortality of 3.9% over a period of 5 years in patients with RHD.^[21] The role of a family physician is of paramount importance in the treatment of patients with RHD. These patients can be benefitted by echocardiographic screening and initiation of primary and secondary prophylaxis of acute rheumatic fever at the earliest by a family physician. Treatment of patients with acute rheumatic fever also involves understanding the socioeconomic factors contributing to the same and overriding them. Thus, the role of training of a family physician in early identification and treatment of these patients is of paramount importance.

Conclusion

This study added to limited data on the burden of RHD in adult population in the state of Uttarakhand. Early diagnosis of RHD can prevent complications such as heart failure, stroke, and infective endocarditis. Thus, the role of family physician is pivotal for initial screening of these prevents and initiating secondary prophylaxis in patients with acute rheumatic fever. Echocardiographic screening for RHD in young adults should be routinely done in both symptomatic and asymptomatic patients.

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Conflicts of interest

There are no conflicts of interest.

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