

## Rheumatic Heart Disease Burden and Need of Cardiovascular Surgery Service in Bharatpur Hospital

Mani Prasad Gautam,<sup>1\*</sup> Keshab Prasad Acharya<sup>2</sup>

<sup>1</sup>Department of Medicine, <sup>2</sup>Department of Cardiology, Bharatpur Hospital, Chitwan.

**Received:** 16<sup>th</sup> August, 2022

**Accepted:** 10<sup>th</sup> October, 2022

**Published:** 28<sup>th</sup> December, 2022

**DOI:** <https://doi.org/10.3126/jnhls.v1i1.52866>

### Correspondence:

\*Dr. Mani Prasad Gautam, Department of Medicine, Bharatpur Hospital, Chitwan, Nepal. Email: manigautam@gmail.com Phone: +977-9851076043

**Citation:** Gautam MP, Acharya KP, Rheumatic heart disease burden and need of cardiovascular surgery service in Bharatpur Hospital, JNHLS. 2022; 1(1):3-6.

### ABSTRACT

**Background:** Rheumatic heart disease is one of the major public health concerns in Nepal. Depending on the severity of valvular involvement, these cases are managed either medically or surgically. As our centre is planning to develop cardiovascular surgery, we wanted to study the burden of valvular cases requiring on surgical management in our hospital.

**Methods:** A cross-sectional study was conducted in the Department of Cardiology, Bharatpur Hospital, Chitwan, Nepal. During one year 4636 echocardiography conducted, 220 rheumatic heart disease cases were identified and included in the study.

**Results:** The Mean±SD age was 24.5±12.4 years. Eighty percent subjects had valvular lesions suitable for medical management. Twenty percent subjects had severe valvular lesions requiring surgery or intervention. Out of these, only 30 subjects (13.6%) were operable, 4 (2.2%) were severe mitral stenosis cases suitable for balloon valvotomy and 10 subjects (4.5%) were unfit for surgery because of reduced ejection fraction.

**Conclusion:** The majority of rheumatic heart disease were manageable by medical treatment. Small proportion of subjects required surgical management and a few of them were fit for balloon valvotomy. We conclude that the development of cardiovascular surgery setup in our hospital is a must and certainly will upgrade the rheumatic heart disease management.

**Keywords:** Rheumatic Heart Disease; Valvular Surgery; Spectrum of Rheumatic Heart Disease.

### INTRODUCTION

Rheumatic Heart Disease (RHD) is one of the most common acquired heart diseases in people under the age of 25 years.<sup>1</sup> It claims more than three hundreds lives each year; the large majority in low middle income countries.<sup>2</sup> Nepal, a low middle income country hosts significant RHD cases, RHD is one of the major public health concerns in Nepal.<sup>3</sup> Although the incident is decreasing in recent years, it is still prevalent in some pocket areas, mostly in areas with low socioeconomic status.<sup>3</sup> Pathophysiology of RHD comprises the damage to heart valves caused by repeated episodes of rheumatic fever (RF).<sup>4</sup> It is a preventable disease, but once developed, a gradual progression is the rule if prophylactic treatment is not followed.<sup>4-6</sup> Depending on the severity of valvular involvement, these cases are managed either medically or surgically. In severe valvular lesions, the mortality is significant in the absence of surgical management. Moreover, surgical intervention in advanced stage of RHD has high mortality. So, timely surgical intervention is the best way in treatment. However, the cardiac surgery facility is not well developed in many countries where the disease burden is significant.<sup>7</sup>

In Nepal, cardiovascular surgery (CTVS), especially the valve surgery is not available outside Kathmandu valley, except few surgeries conducted by the team of CTVS surgeons from Kathmandu in some hospitals outside the valley.<sup>8</sup> Bharatpur Hospital, a federal government owned central hospital, is planning to expand its services with the addition of cardiovascular surgery setup in near future. As there is no data regarding the exact burden of RHD cases requiring surgical interventions in our setup, the sustainability of this service is still illusive. Therefore, we designed this study to fill this knowledge gap on the burden of valvular heart disease cases requiring on surgical management in our hospital.

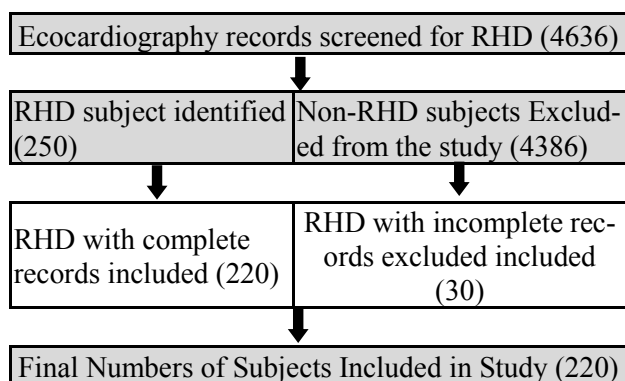
### METHODS

A descriptive study was designed and it involved a retrospective analysis of previous records of echocardiography registry. A cross-sectional analysis of one-year data of the echocardiography records from January 1 to December 31 of 2018 was conducted for this purpose. Out of total 4636 echocardiography conducted throughout the year, 250 rheumatic heart disease cases were identified and selected for further analysis. Completeness of the

data was assessed and only those cases with full records were included in the analysis. Only 220 cases had complete records and taken for final analysis. Various demographic data including ethnicity, age, sex was collected. Detail echocardiographic findings of RHD subjects were collected. The prevalence of various valvular lesions was calculated. For the study purpose, valvular lesions were classified as severe and non-severe. Severe valvular lesions were considered the lesions requiring intervention in the form of surgical and non-surgical interventions. Non-severe lesions were considered fit for guideline directed medical management. Subjects with severe valvular lesions but with advanced disease and low ejection fraction less than 40% were considered unfit for surgical management. Data was displayed in the form of tables and bar diagrams as appropriate. For categorical variables percentage was calculate while for continulus variable mean, SD were calculated.

**RESULTS**

Out of total 4636 subjects undergone echocardiography during study period, there were 250 rheumatic hear disease (RHD) cases. Thirty subjects had incomplete data and they were excluded while 220 were included in this research (Figure 1).



**Figure 1. Flow chart of Analysis.**

The mean±SD of age was 24.5 ±12.4years. Female to male ratio in overall was 1.2:1. This female preponderance was observed in most of the age groups except in 40-49 years; in this age group, sex ratio was 1:1. The various demographic features are presented in (Table 1).

**Table 1. Sociodemographic information. (n=220)**

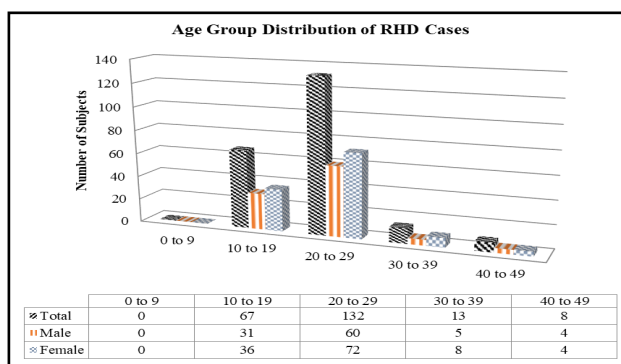
Variables	Values
Mean Age	24.5±12.4
Range of Years	12 – 48 Years
Female to male ratio	1.2:1
≤19 years of age	67 (30.45%)
Subjects in Age group 20-29 years	132 (60%)

Majority of the subjects were from the age group of 20-29 years; 60% subjects were from this age group Sixty-seven subjects (30.45%) were children (19 years and below) (Figure 2). One hundred seventy-six subjects (80%) had valvular lesions suitable for medical management. Various parameters related to surgical intervention in vale have been shown in (Table 2).

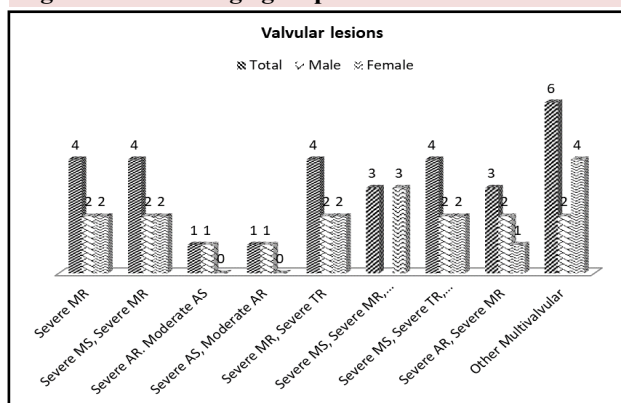
**Table 2. Important Echocardiographic parameters in study subjects. (n=220)**

Variables	Number (%)
Medically manageable RHD	176 (80%)
RHD requiring Surgery	44 (20%)
Operable RHD	30 (13.6%)
Severe MS suitable for PTMC	4 (1.82%)
RHD Unfit for Surgery	10 (4.54%)
Single Valve Surgical Intervention	10 (4.54%)
Multi Valve Surgical Intervention	20 (9.09%)

Only forty-four subjects (20%) had severe valvular lesions requiring surgery or intervention. Out of these, only 30 subjects (13.6%) were operable, 4 (2.2%) were severe mitral stenosis cases suitable for balloon valvotomy and 10 subjects (4.5%) were unfit for surgery because of reduced ejection fraction and other causes. Among operable, 9.09% and 4.51% had multi and single valvular lesions respec-



**Figure 2. Various age groups and RHD case numbers.**



**Figure 3. Various valvular lesions in study subjects.**

tively. Among severe valvular lesions requiring surgery, mitral regurgitation was the most common followed by mitral stenosis, then tricuspid regurgitation, aortic regurgitation and aortic stenosis (Figure 3). Ten subjects were unfit for the surgery; two cases had infective endocarditis and eight subjects had significant LV systolic dysfunction.

## DISCUSSION

Result showed that majority (60%) of the RHD patients were from age group 20-29 years with mean±SD was 24.5±12.4. Nearly one-third (30.45%) patients were <20 years and more in female by gender. Mitral valve was the most commonly affected valve and mitral regurgitation was the most common isolated lesion. Mitral stenosis and mitral regurgitation were the most common combination. Eighty percent of these RHD subjects were manageable medically and 20% subjects needed surgical management. One-third among RHD subjects requiring surgery were unfit for the surgery due to various reasons. Most of the subjects above 40 years of age were unfit for surgery. Mitral regurgitation was the most common lesion requiring surgery. Multivalvular involvement was very common. Our findings, in overall, are consistent with similar studies from various parts of the world, most commonly from developing countries. Our findings were consistent with the findings of a study from Indonesia with some exceptions.<sup>2</sup> In this study of clinical profile and management of RHD in children and young adults at a Tertiary Cardiac Center in Indonesia, 38% subjects were children (below 20 years of age). This higher proportion of children in this study can be explained based on its focus on children and young adults whereas our study was more focused on overall RHD population. Their study also highlights similar tendency of the female preponderance among RHD subjects as in our study, female to male ratio was 1.5:1 in their study. Most commonly affected valve was mitral, it was affected in 39.3% and 44.81% in children and young adults respectively. Isolated mitral regurgitation was the most common lesion in children (61.9%), but in young adults, isolated mitral stenosis was the most common (44.81%). Rheumatic involvement of tricuspid valve was noted in 69.17% subjects. As in our study, multivalvular involvement was also more common in this study; mitral and tricuspid regurgitations were more common in children (69.17%), mixed mitral lesions and tricuspid regurgitation were more common in young adults (30.56%). Valve repair was more common in children (49.07%), whereas valve replacement was more common among young adults

(32.16%). Kumar RK et al<sup>8</sup> reported that most of the RHD subjects were young with mean age 28 years, two-third of study subjects were female (66%). Multivalvular involvement was more common (64%), 33% subjects had congestive heart failure, 22% had atrial fibrillation and 7% had stroke as complications. Among those who were gone under intervention, mitral balloon valvuloplasty had low rate of complications (2.5%) and high rate of long-term benefits (75%). Among surgery cases, mitral valve repair was the most common (75%). As per this report, the access to cardiothoracic and vascular surgeon was limited in most of the part of the world; there were 3 surgeons per million population in North Africa and 1 per 3.3 million in Sub-Saharan Africa. Similar scarcity of CTVS specialists can be observed in Nepal too, that is more so outside the Kathmandu valley. In a data analysis of RHD subject which included children below 15 years of age from Gangalal Heart Centre,<sup>3</sup> the mean age was 11 years with standard deviation of 2.2 years, 52.6% subjects were female. In this study, mitral valve was the most commonly affected valve (96.5%) and isolated mitral regurgitation was the most common lesion (55.9%). Isolated aortic involvement was less common (3.5%). The combination of mitral and aortic regurgitation was seen in 23.7% subjects. Involvement of mitral valve was more common female and aortic valve in male. When compared with our current study, most of the findings such as female preponderance, common mitral valve involvement, and common mitral regurgitation were similar. Only the mean age in this study was low as the study had included only children below 15 years of age. In another study from Eastern part of India,<sup>9</sup> regarding most common RHD lesions among RHD subjects, combination of mitral stenosis and mitral regurgitation (35.23%) was the most common lesion followed by mitral stenosis (31.21%) and then mitral regurgitation (25.5%). Regarding the complications, pulmonary artery hypertension was the most prevalent (37.41%) followed by congestive heart failure in one-third (32.68%). Infective endocarditis, atrial fibrillation and pericardial effusion were noted in 6.37%, 5.53% and 1% subjects respectively. Some of the findings from this study are consistent with ours. But the findings related to complications in RHD were not explored in our study. Similarly, another study from Uttarakhand,<sup>10</sup> India had similar findings to ours regarding the commonest valve involvement, commonest lesion and female preponderance. In their study, mitral valve was the commonest valve involved, mitral regurgitation was the commonest lesion (61.9%) with 53% females among study subjects. Regarding complications,

hear failure and atrial fibrillation were seen in 35.1% and 21.1% respectively. Pulmonary artery hypertension was seen in 11.7% and infective endocarditis in 7.4%. Mortality rate among RHD subjects was 3.2%. In our study, we have not focused on complications in our subjects. This study has certain merits and demerits. We were able to get some baseline data on RHD prevalence, demography and valve involvement patterns and these findings were comparable to worldwide literatures. However, our study has small sample size and it was descriptive in nature. It was designed to look into the requirement of cardiovascular surgery in our hospital. Case-loads of valvular surgery requirement was assessed by focusing on RHD cases among subjects undergone echocardiographic studies in a general hospital without cardiovascular surgery facility. Therefore, Lower number of subjects requiring surgery noted in our study could be due to unavailability biasness too as we do not have cardiac surgery in our setup. With the establishment of CTVS surgery, increase in numbers of surgical cases can be expected and we may have different case burden. There are various other limitations, mostly inherent to its design itself as Hospital based retrospective analysis of echocardiographic registry. Therefore, these findings cannot be generalized. Moreover, CTVS service have wider scope and RHD is just a small group of cases requiring cardiac surgery and relying on the burden of valvular disease to determine its requirement could be mis-

leading. After the availability of CTVS services, increase in surgical cases should be expected.

## CONCLUSION

Our result showed that the majority of rheumatic heart disease in our hospital had mitral valve involvement with mitral regurgitations as commonest lesion. There was female preponderance among RHD subjects. Although the multivalvular involvement was the rule among our surgical RHD subjects, aortic valve involvement was more common among males whereas female tended to have mitral valve involvement more common. Majority of RHD subjects were manageable by medical treatment. Small proportion required surgical management and few of them were fit for balloon valvotomy and some were unfit for any surgery due to terminal illness. We conclude that the development of cardiovascular surgery setup in our hospital is feasible and certainly will upgrade the rheumatic heart disease management.

## ACKNOWLEDGEMENT

We would like to acknowledge senior ANM staff Mrs Krishna Chaudhary and attendant Mrs Mina Thapa for the help and contribution in case identification and data collection. We are thankful to hospital development committee for providing research grant.

**Conflict of Interest:** None.

## REFERENCES

1. Chockalingam A, Prabhakar D, Dorairajan S, Priya C, Gnanavelu G, Venkatesan S, Chockalingam V. Rheumatic heart disease occurrence, patterns and clinical correlates in children aged less than five years. *J Heart Valve Dis.* 2004 Jan;13(1):11-4. PMID: 14765832.
2. Lilyasari O, Prakoso R, Kurniawati Y, Roebiono PS, Rahajoe AU, Sakidjan I, Harimurti GM. Clinical Profile and Management of Rheumatic Heart Disease in Children and Young Adults at a Tertiary Cardiac Center in Indonesia. *Front Surg.* 2020 Aug 12;7:47. doi: 10.3389/fsurg.2020.00047.
3. Sharma P, Shakya U, KC S, Shrestha M. (2016). Clinical Profile and Management in Children with Rheumatic Heart Disease in a Tertiary Cardiac Care Center of Nepal. *Nepalese Heart Journal*, 2016;13(2): 33–6. <https://doi.org/10.3126/njh.v13i2.15562>
4. Marijon E, Mirabel M, Celermajer DS, Jouven X. Rheumatic heart disease. *Lancet* 2012;379:953–64.
5. Faheem M, Hafizullah M, Gul A, Jan HU, Khan MA. Pattern of valvular lesions in rheumatic heart disease. *Journal of Postgraduate Medical Institute.* 2007;21(2):99-103.
6. Zühlke L, Mirabel M, Marijon E. Congenital heart disease and rheumatic heart disease in Africa: recent advances and current priorities. *Heart* 2013;99:1554–1561. doi:10.1136/heartjnl-2013-303896.
7. Reichert HA, Rath TE. Cardiac Surgery in Developing Countries. *J Extra Corpor Technol.* 2017 Jun;49(2):98-106. PMID: 28638158; PMCID: PMC5474895.
8. Kumar RK, Antunes MJ, Beaton A, Mirabel M, Nkomo VT et al. Contemporary Diagnosis and Management of Rheumatic Heart Disease: Implications for Closing the Gap. A Scientific Statement From the American Heart Association. *Circulation* 2020;Oct 19:[Epub ahead of print].
9. Rajbanshi BG, Pradhan S, Koirala B. Twenty-five years of Cardiac Surgery in Nepal: Trials, Tribulations and Triumph. *Nepalese Heart Journal* 2022; 19(2):1-3.
10. Ghosh S, Dey S. Clinical Profile of RHD in children and young people in Eastern India. *Review of Global Medicine and Healthcare Research* 2011;2:100.
11. Dhar M, Kaeley N, Bhatt N, Ahmad S. Profile of Newly diagnosed adult patients with rheumatic heart disease in sub-Himalayan region – A 5-year analysis. *J Family Med Prim Care*, 2019;8(9):2933-6.