

## RHEUMATIC HEART DISEASE IN SCHOOL GOING CHILDREN: A STUDY FROM LUMBINI PROVINCE NEPAL

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### ABSTRACT

### INTRODUCTION

Rheumatic Heart Disease is declining from developed countries but still is important cause of morbidity and mortality in under-developed and developing countries.

### MATERIAL AND METHODS

It was a prospective observational study conducted at Lumbini Province Nepal. Seven thousand six hundred and forty school going children were evaluated to look for presence of Rheumatic Heart Disease.

### RESULTS

Out of total 7640 school going children 56.6% were male and 43.4% were female. Majority (74%) of children evaluated belonged to Government school. Most of the children (54.7%) were of more than 10 years of age. Clinically murmur was present in 8.9%. RHD was found in total 14 children with prevalence of 1.83 per thousand children. RHD was more common in female (64%) than male (36%). Most common valve involvement was Mitral valve and most common lesion was Mitral Stenosis.

### CONCLUSION

RHD is still of major health concern among school going children in Lumbini Province Nepal. Strategies to reduce its occurrence in the community is important to reduce its complications.

### KEYWORDS

Rheumatic Heart Disease, Mitral Valve, Lumbini Province, Nepal

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## INTRODUCTION

Rheumatic heart disease (RHD) ranks among the important non communicable diseases in low- and middle income countries. It is a sentinel of social inequality and a physical manifestation of poverty and continues to be a substantial health care challenge in less privileged regions of the world. An autoimmune response to group A  $\beta$ -hemolytic streptococcal pharyngitis results in acute rheumatic fever, affecting the large joints, brain, skin, and heart. Recurrent bouts of rheumatic fever insidiously propel clinically silent valvular damage to clinically manifest heart disease, resulting in a quarter of a million premature deaths every year.<sup>1</sup>

The mean prevalence of clinically silent RHD is 21 per 1000 children, with large heterogeneity among reports across various endemic regions. This prevalence outweighs the prevalence of manifest disease by a factor of 7 to 8.<sup>2</sup> A previous cross-sectional study using echocardiographic screening for RHD in Nepal found that 10.2 per 1000 children had evidence of RHD, with 4 of 5 cases being latent.<sup>3</sup> Early detection of subclinical stages of RHD and timely initiation of secondary antibiotic prophylaxis for latent disease may reverse subclinical valvular lesions, prevent disease progression, and contain the reservoir for further spread.<sup>4</sup> In developing countries RHD has implications not only restricted to young age but is associated with long term complications as evidence suggest RHD being most common cause of atrial fibrillation<sup>5</sup> and most common heart disease in pregnancy.<sup>6</sup>

Various studies have done in Nepal to evaluate prevalence of RHD in various parts of country. The prevalence of rheumatic heart disease among school children is reported 1.35 per thousand in rural community of the hill region<sup>7</sup> and 1.2 per thousand in Kathmandu city.<sup>8</sup> Similarly prevalence was found 1.57 per thousand in Central Nepal<sup>9</sup> and 7.32 per thousand school children in Karnali Province Nepal.<sup>10</sup> We wanted to evaluate the prevalence of RHD in Lumbini province of Nepal by screening of school going children.

## MATERIAL AND METHODS

This was cross-sectional observational study. This study was conducted at Lumbini Province Nepal. School children from seven districts Rupandehi, Nawalparasi, Kapilvastu, Pyuthan, Gulmi, Arghakhanchi and Palpa of Lumbini province were evaluated. Both Government and Nongovernment schools were included for study. This study was conducted using human resource and equipments from Gautam Buddha Community Heart Hospital, Ramnagar, Butwal. After getting Institutional ethical approval schools were contacted and fixing of appointment for clinical evaluation of school children was done. They were evaluated by cardiologist using stethoscope. Clinically suspected cases based on murmur were subjected to echocardiography. World Heart Federation (WHF) criteria for diagnosis of RHD was used to confirm presence of RHD.

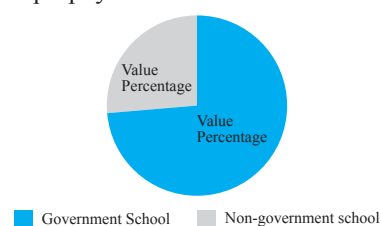
## RESULTS

Out of total 7640 school children 4321 (56.6%) were male and 3319 (43.4%) were female. Children evaluated were of age between 4 to 16 years. Most children were of age group more than 10 years (Table 1). Mean age was 11.1 years and median age was 12 years.

**Table 1. Age Distribution**

Age years	Number (Percentage)
Less than 10	3463 (45.3%)
More than 10	4177 (54.7%)

Out of total school children evaluated majority belonged to Government school (Figure 1). Clinically murmur was detected in 68 children (8.9%). Out of 68 clinically suspected cases 14 were diagnosed to have definite RHD after echocardiographic evaluation using WHF criteria. History of some form of joint involvement (Arthritis/Arthralgia) was present in 11 children (16%) of clinically suspected cases. One case was diagnosed previously as RHD and was on penicillin prophylaxis.



**Figure 1. Distribution of school children**

Out of 14 cases of definite diagnosis of RHD 9 were female (64%) and 5 were male (36%). Mitral valve involvement was most common (Table 2). Mitral stenosis was most common lesion followed by Mitral regurgitation. Isolated Aortic regurgitation was found in one case.

**Table 2. Valve Involvement in Diagnosed Cases of RHD**

Valve Involvement	Number of patients
Mitral Stenosis (MS)	5
Mitral Regurgitation (MR)	4
Aortic Regurgitation (AR)	1
MS with MR	2
MS with AR	1
MR with AR	1
Total	14

Appointment was fixed with parents of all children diagnosed with RHD. Detail description of etiology, pathogenesis, diagnosis and possible course of disease was explained to them. Need for penicillin prophylaxis was explained. Advised for constant follow up in future.

## DISCUSSION

We evaluated school going children from seven districts of Lumbini Province Nepal. This school going population is representative of both Hilly and Terai area. It does not represent Himal region. It represents children from mixed population. Majority of our children under study were from Government school. Shrestha NR et al<sup>3</sup> found RHD more common in Government school than Private school. He postulated that more students from low or poor economic status in Nepal go to Government school.

Most of the studies from Nepal with clinical screening has resulted in prevalence of RHD to be less than 2 per thousand school children. We found RHD in 1.83 per 1000 school children. The result is similar to other studies from different

parts of Nepal including Regmi PR et al<sup>8</sup> in Kathmandu city 1.2 per 1000 and Laudari S et al<sup>9</sup> in Central Nepal 1.57 per 1000. High prevalence was found in Jajarkot District of Karnali Province Nepal by Regmi PR et al<sup>10</sup> of 7.32 per 1000.

Clinical screening for RHD is easy with less time consuming and less economic burden. But evaluation of school children by echocardiographic screening helps to detect subclinical RHD. This has found to be important tool to detect cases otherwise go silent and undetected leading to its crippling complications. In a study by Shrestha NR et al<sup>3</sup> echocardiographic screening for RHD in Nepal found that 10.2 per 1000 children had evidence of RHD which was much higher than with clinical screening. Similar results was found by Marijon E et al<sup>11</sup> in a study from Cambodia and Mozambique.

Most common valve involved in RHD was mitral valve in our study. Similar results are seen in other studies from different parts of Nepal.<sup>3,7-9</sup> Isolated valve involvement was more common in our study. Most common valvular lesion was Mitral stenosis and Mitral Regurgitation was second most common valvular lesion. Mitral Regurgitation was more common in study by Laudari S et al<sup>9</sup> and Regmi PR et al.<sup>10</sup>

## LIMITATIONS OF STUDY

This was observational study which lacks follow up of patients to know the prognosis of disease and pattern of progress in current era. This study represents mixed population of Hilly and Terai area. Study comparing Terai, Hill and Himalayan region would be better to evaluate the impact of geographical region in development of RHD. Because lifestyle, socioeconomic conditions vary in different geographical locations. Similarly study subjected to different clusters of community with different ethnicity may elaborate any difference in prevalence of RHD. Similarly we studied school children of age group 4 to 16 years. If we study above the age of 16 years there may be more undetected cases which get detected and treated reducing complications of RHD. Further studies involving College students and young adults in community may elaborate further prevalence with advancing age and more representative of growing adult population.

## CONCLUSION

Prevalence of RHD in school going children in Lumbini Province Nepal was 1.83 per 1000. This represents mixed population of Hill and Terai region. Mitral valve involvement is most common with Mitral Stenosis most common valvular lesion. Further studies with larger population as well as age above 16 years of age is recommended to know about true scenario in school going children as well as young adults.

## CONFLICT OF INTEREST

None

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