Original Articles

Prevalence of Rheumatic Fever and Rheumatic Heart Disease in School Children of Bharateswari Homes of Bangladesh

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Abstract:

Key words:
Acute rheumatic fever,
Rheumatic heart disease,
Jones'criteria.

Background: *Rheumatic fever (RF) and rheumatic heart disease (RHD) continue to affect millions of people around the world, including Bangladesh. Children and adolescents are especially susceptible to this disease. Classical risk factors, i.e. poverty, overcrowding, ignorance and insufficient health care services are responsible for the high incidence and prevalence of these diseases. To assess the prevalence of RF and RHD among children, a school survey was conducted in Bharateswari Homes, in the district of Tangail, Bangladesh.*

Methods: *A total of 947 students were examined. Revised Jones' criteria (1992), and clinical examination were used for the diagnosis of RF and RHD.*

Results: *Four cases of RF/RHD were found giving the prevalence of 4.22/1000. This is lower than the prevalence reported in eighties, but is consistent with those found in nineties.*

Conclusion: *Among the school children, there is a declining trend in the prevalence of RF/RHD.*

Introduction:

RF is a delayed, non-suppurative sequel to upper respiratory tract infection with groups A beta haemolytic (GABH) streptococci. It predominantly affects children and young adults, causes significant morbidity and occasional mortality, and may lead to irreversible damage to the heart valves, i.e. RHD. In the 21st century, RF and RHD are neglected diseases of marginalized communities, though globally, RHD remains the most common cardiovascular disease in young people aged <25 years.[1]Excluding the developed economies, the global burden of RHD in the 5-14 year old children has been estimated to be 0.8-5.7/1000 with a median of 1.3/1000,[2,3] while the overall incidence of acute RF varies from 5 to 51/100,000 population with a mean of 19/100,000.[4] In a recent systematic review, the greatest burden of RF and RHD was found in sub-Saharan Africa, the lowest in North America, the highest mortality rates in the indigenous populations of Australia (23.8/100,000), and among the countries with World Health Organization (WHO) vital registration data, the highest mortality was found in Mauritius (4.32/

100,000).[5]The exact incidence and prevalence of RF and RHD in Bangladesh are not known. Only a limited number of small-scale hospital, school and community surveys are available. In the 2nd half of last century, RF and RHD constituted a significant proportion of admissions in general hospitals, and a lion's share of cardiovascular admissions.[6-8] Probably the community prevalence of RF and RHD was first reported in 1976, which was 7.5/1000 in general population.[9] Subsequent surveys found lower prevalence.[10-12] High prevalence of RF (43.9/1000) and RHD (5.05/1000) was reported in a school survey in Dhaka City in 1984-85.[13]Over the past 3 decades, like many other parts of the world, the incidence and prevalence of acute RF in Bangladesh decreased; however, RHD continues to be an important public health problem here. The present study was planned to know the more recent prevalence of RF and RHD in school children in Bangladesh.

Materials and Methods:

The study was conducted in Bharateswari Homes (Figs. 1&2), situated in Mirzapur, Tangail,

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about 72 km from Dhaka, the capital city of Bangladesh. It is a residential school with children mostly from middle and lower middle class. In the lower classes, both male and female students are enrolled. A total of 947 school children in the age group 4-18 years were screened during the school time. A team comprising of cardiologists, medical graduates, and health assistants visited the school in 2005. Necessary permission was taken from the school authority beforehand. A protocol was prepared based onrevised Jones' criteria, 1992 and clinical examination, and for individual student a printed protocol was filled up by the health assistants. A brief history including history of past medical illness was taken and physical examination including detailed cardiovascular examination was done by the physicians. Dynamic auscultation was performed whenever necessary.Sore throat, joint pain with or without swelling, breathlessness on exertion, haemoptysis and ankle oedema were specially observed. Cases with murmurs of grade 2 or above, pan systolic murmur, diastolic murmur and cases with past history of RF but without murmur were noted as suspected cases and were requested to attend Cardiology Department of National Institute of Cardiovascular Diseases (NICVD), Dhaka, for further evaluation.

Fig.-1: *Bharateswari Homes in Mirzapur, Tangail.*

Fig.-2: *Bharateswari Homes in Mirzapur, Tangail.*

Results:

Of the 947 children, 916 were girls and 31 were boys, so the male female ratio was 1:30. Majority (53.6%) children were in the age group 12-15 years. The mean age of girls was 12.7 ± 2.4 years ranging from 4 to 18 years, while the mean age of boys was 9.0 ± 2.2 years ranging from 5 to 14 years. (Table I). Chest pain and joint pain were present in equal number of cases i.e. 43 (4.5%), fever and breathlessness were found in 4.2% and 2.1% of students respectively. 7.4% students complained of sore throat at the time of examination or in the recent past. A significant cardiac murmur was found in 8 subjects (prevalence rate 8/1000) (Table II). Out of 947 school children, 4 satisfied the clinical diagnosis of RF/RHD, giving a prevalence of 4.22/1000 in general. All the cases were female, and none were male, so the prevalence of RF/RHD was 4.37% in girls. Majority (2) of the RF/RHD cases were in 12-15 year age group (Table III).

Table-I

Age and sex distribution of school children(N=947).

Age in year	Boys (n=31)		Girls (n=916)		Total (N=947)		p value
	Number	%	Number	%	Number	%	
4-7	9	29.0	26	2.8	35	3.7	
8-11	18	58.1	292	31.9	310	32.7	
12-15	4	12.9	504	55.0	508	53.6	
16-18	0	0.0	94	10.3	94	9.9	
Mean ± SD	9.0 ± 2.2 (5-14)		12.7 + 2.4 (4-18)		12.6 + 2.4 (4-18)		0.001[S]

Table-II

Distribution of symptoms and signs of school children (N=947).

Symptoms and signs	Number	Percentage
Chest pain	43	4.5
Breathlessness	20	2.1
Joint pain	43	4.5
Sore throat	70	7.4
Fever	40	4.2
Murmur	8	0.8

Table-III

Age distribution of rheumatic fever and rheumatic heart disease cases.

Age in year	Number of RF cases	Number of RHD cases
8-11	1	0
12-15	2	0
16-19	1	0

Discussion:

This study was conducted to determine the prevalence of RF/RHD in school children aged 4-18 years in Bangladesh at the advent of new millennium.In this study, out of 947 students, 4 were diagnosed to have RF/RHD. The diagnosis was made clinically, and strict differentiation among acute RF, recurrence of RF and RHD were not made. The murmur found in 8 cases may actually represent RHD cases; however, other possibilities including congenital heart disease and innocent murmur remain. In 1984-85, in a school survey involving 4349 children aged 4-17 years in Dhaka City, the prevalence of RF and RHD was reported as 43.9/1000 and 5.05/1000 respectively,[13] which is much higher than the value obtained in the present study.The prevalence of acute RF was 8.5/1000 in a concurrent study.[14] In late eighties (1989), the prevalence of RF and RHD was found to be 0.85/1000 and 2.8/1000 respectively among 5011 urban school children.[15] In the study involving 10538 school children of Dhaka City, Begum et al. reported the prevalence of RF 2.37/1000, and RHD 0.189/1000 among school children. In both the studies, echocardiography was used in selected cases.[16] Analyzing these studies, it seems that the prevalence of RF/RHD was <10/1000 among school children of Dhaka City at that time, and the unusually high prevalence found by Banoo et al. may be due to some methodological factors. As a result of socioeconomic development and better preventive and promotive services, there was a definite trend towards steady decline in incidence and prevalence of RF in the country.[17]So, the prevalence of 4.22/1000 found in the present study carried out in the first decade of 21[st]century seems to be reasonable. Traditionally, RHD was diagnosed by auscultation for a heart murmur with a stethoscope in those with a history of acute RF. Subsequently,

conventional and portable echocardiography were introduced in studies concerning RF and RHD, and echocardiography has proven to be more sensitive and specific than auscultation.[18]RHD detected on echocardiography without an associated clinically pathological cardiac murmur is referred to as 'subclinical RHD'.[19]Use of echocardiography leads to detection and inclusion of previously unrecognized cases of subclinical carditis, the latter exists at rates up to 10 times higher than that diagnosed by examination alone. [20-25] Recently in 2012, World Heart Federation (WHF) proposed new criteria for echocardiographic diagnosis of RHD.[26]To the best of our knowledge, no studies were carried out to find out the echocardiography-based prevalence of RF/RHD in Bangladesh. So, the prevalence of RF and RHD estimated so far may not be accurate, and the true prevalence of RHD may be much higher in Bangladesh as well.

The main drawback of the present study is that, the diagnosis of RF and RHD was made predominantly on clinical findings. So, there was chance of under-diagnosis of RHD. On the other hand, murmur found in some cases might actually be due to diseases other than RHD. In the study population, there was female preponderance with male female ratio 1:30, so representation by male sex was poor. This was a single-centre study, so the data obtained may not be suitable for generalization to all school children of the country.

Conclusion:

RF and RHD are still prevalent in Bangladeshi children. In order to include subclinical carditis more efficiently, echocardiography-based studies should be carried out to determine the current'true'prevalence of RF and RHD. The information available thereby, would help to combat this public health problem more efficiently in future.

Conflict of Interest - None.

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