Magnitude of Rheumatic Heart Disease among urban school children in West Bengal, India

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Abstract: *Rheumatic Heart Disease (RHD) remain significant public health problem throughout the world though the prevalence of the disease steadily declined during latter half of last century. But in the beginning of the 21st century there has been an increase in prevalence of RHD in India. In this background, an Observational Descriptive study was conducted during 2005-06 to find out the magnitude of Rheumatic Heart Disease among urban school children in West Bengal, India. The prevalence of RHD in the present study conducted in Uttarpara Kotrang Municipality area of Hooghly District of West Bengal (2005-06) is 1.84 per thousand school children in comparison to 4.45 in Kanpur (2000), 0.68 in Vellore (2001-02), 5.09 in Srinagar (1999-2000), 0.68 in Bikanier (2005) and 0.08 in Ernakulam (2004).*
Keywords - *Rheumatic Heart Disease (RHD), Prevalence.*

I. Introduction

Rheumatic fever (RF) and Rheumatic Heart Disease (RHD) remain significant cause of cardio vascular disease in the world today. Despite a documented decrease in the incidence of acute RF and a similar decrease in the prevalence of RHD in the industrialized countries during the past few decades, these remain medical and public health problems in both industrialized and industrializing countries at the beginning of the 21st century (**1**).

In India, in 1998, about 6 million children are affected, 86000 people died of RHD and 3 lakh 83 thousand DALYS were lost. (**2**).

To study the prevalence of RF and RHD in schoolchildren of 46 countries it was reported by Achuti et al (**3**) that prevalence was higher in the decade of the 70s compared with 80s when the study was repeated. However, the rapid decline in RF and RHD prevalence has been more attributed to ecology manipulation by public health engineers and socio-economic development, rather than use of antibiotics or physicians' skill.

Between 1940 and 1983 school surveys estimated average prevalence of 1.8 and 11 per 1000 schoolchildren, while from 1984 to 1995 the prevalence was reduced to 1 to 3.9 per 1000. (**4**). But recently the reports of school surveys reveal increase in prevalence of RHD (**5**). This observational descriptive study was conducted to find out the magnitude of Rheumatic Heart Disease among urban school children in West Bengal, India.

II. Material And Methods

Study Design: Observational descriptive study
Study Location: Schools in Uttarpara Kotrang Municipality area, Hooghly District of West Bengal.
Study Duration: One year - June 2005 to May 2006.
**Sample size:** 3571.
Sample size calculation: Minimumum sample size required 35963 (Using formula $4pq/l^2$, considering Prevalence of RHD 11 per 1000 and 10% allowable error). By considering administrative and feasible aspects a sample size of 20% of the total number of students were taken. There are 29 schools, 18 primary and 11 secondary, in Uttarpara Kotrang Municipality area of Hooghly District of West Bengal having 16152 students. Total 9 schools selected by systematic random sampling, 6 primary and 3 secondary schools. Total number of students in these schools, 3571 was taken as sample size.
Subjects & selection method: All the students present on the day of survey.
Inclusion criteria: Students whose guardians gave consent for clinical examination, interview and investigations (E.C.G. and Echo-Doppler).

Exclusion criteria: Students whose guardians did not give consent for clinical examination, interview and investigations (E.C.G. and Echo-Doppler).

Procedure methodology: The research activity included obtaining permission, structuring and pretesting of schedule, anonymous data collection, compilation, analysis and write up. Ethical clearance was obtained from the competent authority after ensuring confidentiality. The methodology adopted for detection of Rheumatic Heart Disease is clinical examination, interview followed by E.C.G., Echo-Doppler confirmation. After taking due permission from the school authorities and the guardians, all the students present on the day of survey were examined clinically by the researcher for detection of significant cardiac murmur (systolic murmur with intensity of 2/6 or more and or any intensity diastolic murmur). All the students were also screened by list of symptoms suggestive RHD namely; Fever with sore throat, Fever with pain and or swelling of any joint, Fever with palpitation, Fever with shortness of breath. Two symptoms suggestive of carditis (Fever with palpitation and Fever with shortness of breath) were taken into consideration. Suspected screening positive RHD cases were given a pre designed, pre tested and semi-structured questionnaire containing various symptoms of RHD. Cross-checking for suspected screening positive RHD cases was carried out by experienced Cardiologist. Cases were confirmed after Echo-Doppler and E.C.G. examination.

Fig 1
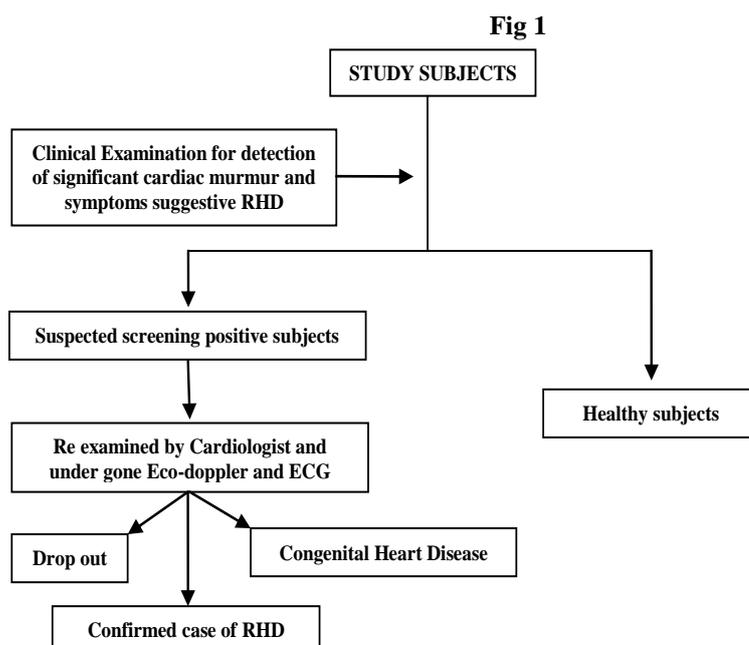
Statistical analysis: The data was compiled in Microsoft Excel and analyzed by using simple table.

III. Result

Table no 1 Shows 58.6% of Study Subjects were Male of whom 66.7% were in the 11-15 age group and 41.4% of Study Subjects were Female of whom 87.9% were in the 11-15 age group.

Table no 1: AGE AND GENDER WISE DISTRIBUTION OF STUDY POPULATION

Age Group	Male		Female		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
6-10	637	34.9	1187	65.1	1824	100
11-15	1274	88.5	164	11.5	1438	100
Total	1911	58.5	1351	41.5	3262	100

Table no 2 Shows that 1.84 per 1000 study population was suffering from RHD while 3.37 1000 study population was suffering from CHD.

Table no 2: MAGNITUTE OF RHD (RHEUMATIC HEART DISEASE) AMONG STUDY POPULATION

DIAGNOSIS	MALE	FEMALE	TOTAL	PER 1000
RHD(Rheumatic Heart Disease)	4	2	6	1.84
C.H.D (Congenital Heart Disease)	7	4	11	3.37
No Heart Disease	1900	1345	3245	94.79
TOTAL	1911	1351	3262	

Table no 3 Shows that 3.14 per 1000 male study population of 6-10 years age group was suffering from RHD while 1.68 per 1000 female study population of the same age group was suffering from RHD and 1.57 per 1000 male study population of 11-15 years age group was suffering from RHD while none of the female study population of the same age group was suffering from RHD.

Table no 3: AGE AND GENDER WISE DISTRIBUTION OF STUDY POPULATION HAVING RHD
(Rheumatic Heart Disease)

Age Group	STUDY POPULATION								
	Male			Female			Total		
	Total	RHD	Per 1000	Total	RHD	Per 1000	Total	RHD	Per 1000
6-10	637	2	3.14	1187	2	1.68	1824	4	2.19
11-15	1274	2	1.57	164	-	-	1438	2	1.39
Total	1911	4	2.09	1351	2	1.48	3262	6	1.84

Table no 4: SUMMARY OF RESULTS

Sr. No.	Findings
1.	Total estimated sample size 3571
2.	Total No. of schoolchildren examined: 3262 (Absent on the day of screening (8.65%)
3.	Total No. of schoolchildren with significant cardiac murmur: 62(1.9%)
4.	Total No. of Suspected screening positive case examined by Cardiologist: 35(1.07%)
5.	Total No. of schoolchildren sent for Echo-Doppler examination:33
6.	RHD confirmed by Echo-Doppler examination: 6 (1.8 per 1000)
7.	C.H.D found by Echo-Doppler examination:11 (3.3 per 1000)

IV. Discussion

The prevalence of RHD detected in the present study was1.84 per thousand school children is consistent with findings with developing countries. As shown in Table no: 5, the prevalence ranges from 0.08 (Ernakulam) to 5.4 (Varanashi). In the largest study done in India in Vellore in 2001-02 with a sample size of 229829 the prevalence rate reported as 0.68 per thousand.

Table no 5: PREVALENCE OF RHD (RHEUMATIC HEART DISEASE) IN DIFFERENT PARTS OF INDIA

Sl. No.	Journal/Author	Place	Year	Prevalence of RHD per 1000
1	ICMR	Ballabhgarh	1982-90	1.0
2	ICMR	Varanasi	1982-90	5.4
3	ICMR	Vellore	1982-90	2.9
4	Padmavati	Delhi(Urban)	1984-94	3.9
5	Pal	Anand	1986	2.03
6	Grover	Raipur	1988-91	2.1
7	Avasthi	Ludhiana	1987	1.3
8	WHO	16 Developing countries	1986-90	2.2
9	WHO Bulletin;93	Chandigarh	1988-91	0.09
10	Ind. Paed. J. Jan'93	Agra	1991	0.14
11	J. Epi. C.H. Mar'03	Shimla	1992-93	2.98
12	Ind. Ht. J. Jul'92	Rajasthan	1982-90	3.34
13	JIMA Mar'92	JAMMU	1990	1.36
14	Lalchandani	Kanpur	2000	4.54
15	Ind. Ht. J. Mar'03	Vellore	2001-02	0.68
16	J.K.Practitioner Jul'05	Srinagar	1999-2000	5.09
17	JAPI Apr'06	Bikaner	2005	0.67
18	JIMA MAR 05	Ernakulam (Kochi)	2004	0.08

According to WHO pre-programme pilot study, report of 16 collaborating countries for the prevention of RF & RHD, the global average prevalence rate of RHD was 2.2 per thousand (ranges between 0.1 and 12.6) (**6**).

V. Conclusion

The prevalence of RHD in the present study conducted in Uttarpara Kotrang Municipality area of Hooghly District of West Bengal (2005-06) is 1.84 per thousand school children in comparison to 4.45 in Kanpur (2000), 0.68 in Vellore (2001-02), 5.09 in Srinagar (1999-2000), 0.68 in Bikanier (2005) and 0.08 in Ernakulam (2004).

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