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Original Article

Prevalence of rheumatic fever and rheumatic heart disease in Bangladeshi children

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ABSTRACT

Background: Recent prevalence data on rheumatic fever (RF) and rheumatic heart disease (RHD) are lacking in Bangladeshi population.
Aim: We have done this national level cross-sectional survey to determine the prevalence of RF and RHD in Bangladeshi children.
Methods: Samples were drawn from three out of seven divisions of Bangladesh from both urban and rural areas. Trained and experienced enumerators visited households to suspect cases of RF or RHD in 5–19 years children by asking structured questions on symptoms and signs of RF and RHD (n = 56,827). Then trained doctors again took history and examined them for RF/RHD. RF was defined according to the Modified Jones Criteria 1992. Doppler echocardiography was done to confirm the diagnosis in all suspected cases of RF/RHD.
Results: A total of 36 RF cases (new and old) and 16 Doppler echocardiography confirmed RHD cases were identified. Prevalence of RF and RHD was 0.9 per 1000 (95% confidence interval: 0.7–1.2) while prevalence of RF was 0.6 per 1000 (95% CI: 0.4–0.9) and RHD 0.3 per 1000 (95% CI: 0.2–0.5).
Conclusion: Observed prevalence of RF and RHD indicates that RF/RHD is disappearing from Bangladesh. However, studies using new technology of portable echocardiographic screening are needed.

1. Introduction

Rheumatic heart disease (RHD) has become rare in developed countries but it is still considered to be a public health problem among children and young adults in developing countries including Bangladesh.[1] Several studies in Bangladesh[2–6] have reported prevalence of RHD but they differed in terms of sample and case definitions. Most of them were done in schools,[3–5] one in rural community[6] and one in

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mixed samples drawn from hospitals, community and worksites.[2] Because of low enrollment and frequent absenteeism, the school-based studies are unlikely to accurately reflect the RHD burden in Bangladesh. The last community based study, having a potential of true prevalence for Bangladesh (1.3 per 1000 children), was done more than two decades ago.[6]

A study from the National Center for Control of Rheumatic Fever and Heart Diseases (NCCRFHD) has reported that rheumatic fever (RF) commonly happens in 5–22 years age group in Bangladesh contrary to the previous belief that RF occurs usually in 5–15 years age group.[7] Therefore studies, which include children, adolescent and young adults, are required to understand the exact burden of RF & RHD in this population. To assess and further strengthen the RF & RHD control programme, the disease burden from community at large is required. We conducted a cross sectional population-based study in rural and urban areas of Bangladesh to determine the prevalence of RF and RHD.

2. Methods

2.1. Settings and sampling techniques

Bangladesh has seven administrative divisions (Dhaka, Chittagong, Rajshahi, Rangpur, Barisal, Sylhet and Khulna). One in ten Bangladeshi people live in Dhaka city. Therefore we selected purposively one urban area in Dhaka city and two rural areas, one each from Rajshahi and Chittagong divisions. A cross sectional survey was done simultaneously in all selected areas in July–December 2005 using a standardized common protocol. All children and adolescents aged 5–19 years (hereinafter referred to children) of the study areas were targeted. Children were recruited at their households, which were first listed by trained enumerators.

In the Dhaka division, the study was done in Mohammadpur area of Dhaka City. This is a densely populated residential area inhabited by people of all income groups. This area is divided into seven wards. Approximately five percent of households from all wards were selected consecutively beginning from house number one of each ward to recruit 9000 children. However 7863 children (response rate 87%) could be recruited. In Chittagong division, the survey was done in three unions of Matlab North upazila (sub-district) of Chandpur district. This is a classical rural area and people are mainly dependant on their agricultural incomes. A total of 14,764 children out of targeted 15,000 consecutive children (response: 98%) could be recruited. In Rajshahi division, the survey was done in five unions of Dinajpur Sadar upazila having some degree of urbanization. A total of 34,200 children out of targeted 36,000 (response: 95%) could be recruited. In total 56,827 children (95%) out of targeted 60,000 participated. Surveys were done by four partner organizations (NCCRFHD, Ekhlaspur Center of Health (ECOH), Zia Heart Foundation (ZHF) and National Heart Foundation (NHF)).

2.2. Training of field team

All enumerators were health assistants working for NCCRFHD, ECOH and ZHF. They had experience in conducting health surveys in the past also. They were trained in Dhaka on the administration of the survey questionnaire. There were lecture sessions on signs/symptoms of RF/RHD. They were taken to the outpatient departments and cardiac wards to see for themselves cases of RF and RHD. A meticulous training was given in detecting normal and abnormal heart sounds in real situation. In addition, audio-visual aids were used to acquaint them with abnormal sounds. Emphasis was given to detect more false positives and avoid false negatives. All these trainings were attended by the research physicians also. One research physician was assigned for each divisional team of enumerators. A group of laboratory technicians were also trained centrally to aid diagnosis of RF and RHD. All investigators also remained present during all these training courses.

2.3. Screening of subjects

After obtaining consent from the household head, enumerators gathered demographic information from each household. If any households had anyone aged 5–19 year living at the time of visit, then they were interviewed and examined for common sign symptoms of RF or RHD. The subjects were identified as suspected RF or RHD if s/he had any of the following features in last six weeks: 1. sore throat, 2. arthralgia, 3. breathlessness, 4. leg swelling, 5. skin rash suggestive of erythema marginatum, 6. subcutaneous nodule, 7. abnormal physical movement (chorea), 8. abnormal heart sound on auscultation during the survey. (Although sore throat is not a symptom of RF, it was included for primary prevention of RF in the area.) Suspected cases were listed for examination by the survey doctor next day in the field at a convenient place. A random check of non-suspected subjects was also given by the survey physician to ensure that enumerators' suspicions are more than 100% sensitive. Enumerators also referred old cases of RF/RHD receiving prophylaxis from any physician for further evaluation by the survey physician. The physician then invited possible cases to the respective clinics (NCCRFHD in Dhaka, ECOH in Chittagong and ZHF in Rajshahi) for laboratory (anti-streptolysin O (ASO), erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) and echocardiographic evaluation. Updated Jones Criteria 1992[8] were used to guide the diagnoses done by the survey physicians. These diagnoses were validated by one of us responsible for assigned area. In next phase Doppler echocardiography was carried out in all clinically diagnosed cases of RF/RHD in the echo lab of NCCRFHD (for Dhaka), NHF (for Chittagong) and ZHF (for Rajshahi). However, between-centre variations were not tested.

2.4. Data analyses

We entered the data in to a spreadsheet after thorough checking of the completeness of data. Residence (urban–rural) and sex specific prevalence of RF and/or RHD with their 95% confidence intervals were calculated.

3. Results

We report here prevalence of RF and RHD in 56,827 children aged 5–19 years having a fair representation of Bangladesh. A