

Demographic Characteristics of Patients of Acute Rheumatic Fever in Bangladesh.

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Abstract

Background: Acute rheumatic fever (ARF) is rare in most developed countries, but in some developing countries like Bangladesh it is an important public health burden. Limited number of studies on ARF has been

conducted in Bangladesh and there is much scarcity of information about this disease.

Objective: The objective of this study was to analyze the demographic characteristics of patients of ARF.

Methods: This cross-sectional study was conducted

from January 2019 to March 2021 in National Center for Control of Rheumatic Fever and Heart Diseases, Dhaka. A total of 185 diagnosed patients of ARF irrespective of age and sex were enrolled. Data regarding demographic profile of patients was collected using a preformed data collection form.

Result: Acute rheumatic fever was more prevalent in female (56.2%) and male to female ratio was 1:1.3. More than 63% patients were diagnosed between 8 to 13 years of age with 35.7% in 8-10 years' age. Household overcrowding were found in 51.4% cases and 9.7% of the children were living in boarding facilities. Sore throat was experienced by 59.5% children within last 4 weeks and 39.5% had multiple episodes of sore throat in last one year of ARF diagnosis. Recurrence of ARF was found in one fourth patients; among whom 17.3% were on oral prophylaxis and 8.1% on parenteral penicillin prophylaxis.

Conclusion: Findings of this study indicate that demographic characteristics of patients of ARF in Bangladesh are consistent with reports of previous studies. ARF was common in children of 5 to 13 years where household overcrowding and pharyngeal infections were important factors.

Keywords: Acute rheumatic fever, Bangladesh, demography, recurrence, sore throat.

Introduction

Acute rheumatic fever (ARF) is a post-infectious, autoimmune, non-suppurative sequel of streptococcal pharyngeal infection.[1] Upto 3% of people may develop ARF following group A beta-haemolytic Streptococcus (GAS) infection due to aberrant immune response.[2] Though ARF is very uncommon in most developed countries, it continues to be an important economic and social burden in some developing countries.[3] Globally

the mean incidence of ARF is 19 per 1,00,000 school-aged children with an estimated 4,70,000 new cases per year.[1,4] Incidence rate is very low ($\leq 10/1,00,000$ per year) in America and Western Europe but higher ($>10/1,00,000$) in Asia, Eastern Europe, Middle East and Australia.[4] Rheumatic fever and its common consequence rheumatic heart disease (RHD) are known as 'diseases of poverty' as they are prevalent in poor socio-economic settings.[5] Climate, geographical condition, few socio-economic aspects and inadequate health care facilities in Bangladesh act as risk factor for ARF.[6] Therefore, Bangladesh is considered vulnerable for RF and RHD.[7] Classically, rheumatic fever is a disease of children and young adults; it reaches the peak by the end of first decade, and then it wanes with age.[8] Maximum cases of RF occur in children of 5 to 15 years of age.[9] In Bangladesh, the occurrence of RF is most common in 5-22 years of age.[10] The incidence of ARF worldwide is usually similar in male and female, though in women, the risk of development of RHD is 1.6-2 times greater.[11,12] From research point of view, it is very important to have knowledge about the demographic characteristics of rheumatic fever. Epidemiology and pattern of presentation of ARF varies from region to region.[13] In Bangladesh, risk factors like overcrowding, malnutrition, history of repeated pharyngeal infection are present especially among underprivileged peoples. Only a few communities based studies on RF have been conducted in Bangladesh. Therefore, very limited data are available about the demographic elements of this disease. The objective of this study was to analyze the demographic characteristics of patients of ARF in a specialized center in Bangladesh.

Materials And Methods

This cross-sectional study was conducted from January 2019 to March 2021 in National Center for Control of Rheumatic Fever and Heart Disease (NCCRF&HD), Dhaka. Total 185 patients of clinically diagnosed acute rheumatic fever were included in this study. Patients of acute rheumatic fever irrespective of age and sex were enrolled in this study. Suspicion of ARF was based on complaints of patient, clinical history and physical examination. Specialist physician attended the patient and laboratory investigations including CBC with ESR, CRP, ASO titer ECG were done and cardiologists performed echocardiography. With collaboration of history, physical examination and investigation reports, a clinical diagnosis of ARF was made following Revised Jones criteria 2015. Quantitative ASO titer and CRP level were done in automated analyzer machine (ERBA Automated XL200). ASO titer ≥ 200 International unit/ml and CRP ≥ 3.0 mg/dL were considered as significant. [14] Complete blood count (CBC) was done in automated cell counter machine (ERBA Lyse, Germany) and ESR was performed in automated ESR machine (VESmtric 20). WBC count $\geq 11,000$ /cmm in adult and $\geq 11,500$ /cmm in children was considered as leukocytosis; ESR level ≥ 30 mm in first hour was considered as high level ESR.[14] Echocardiography was performed with a modern echocardiography machine (Philips, Affinity 30, Taiwan). Data were collected using a preformed data collection form and all information was recorded. All the relevant collected data were compiled on a master chart first and then statistical analysis was done using Microsoft Excel program.

Results

A total of 185 patients with clinically diagnosed acute rheumatic fever were enrolled in this study. Among 185 patients of acute rheumatic fever female was predominant (56.2%) and male to female ratio was 1:1.3. Thirty-five percent patients were diagnosed in 8-10 years' age group followed by 11-13 years' age group (27.6%). About 77% patients were diagnosed between 5 to 13 years of age (Figure 1). Among the study population 60% were from urban area and 13.5% were residing in slum areas. Residence of 16.8% patients was kancha whereas 47% were residing in semi-pacca houses and 51.4% patients had ≥ 4 people sleeping in same room. Seventy-five percent children were school going and 9.7% of them were living in boarding facilities. Among the patients of ARF, 14.6% were malnourished and malnutrition was more prevalent in male children than female. Sore throat was experienced by 59.5% children within last 4 weeks of ARF diagnosis and 39.5% gave history of multiple episodes of sore throat in last one year. History of diagnosed ARF that means recurrence of ARF within five years was found in 25.4% patients; among whom 17.3% were on oral antibiotic prophylaxis and 8.1% were on parenteral penicillin prophylaxis. History of ARF in family members was reported in 24.3% patient whereas family history of RHD was present in 5.9% patients (Table 1)

Table 1: Demographic profile of patients of acute rheumatic fever. (N=185).

Characteristics		Frequency (n)	Percentage (%)
Gender	Male	81	43.8
	Female	104	56.2
Residence	Rural	74	40.0
	Urban	111	60.0
	Slum	25	13.5
House	Pacca	67	36.2
	Semi-pacca	87	47.0
	Kancha	31	16.8
Household crowding	<4 person-per-room	90	48.6
	≥4 person-per-room	95	51.4
	Children ≤15 yrs. in household	127	68.6
Education	School going	140	75.7
	Boarding facility	18	9.7
Nutrition	Malnourished	27	14.6
Sore Throat	In last 4 weeks	110	59.5
	In last year	73	39.5
History of ARF/ Recurrence	History present	47	25.4
	On oral prophylaxis	32	17.3
	On injection prophylaxis	15	8.1
Family History	ARF	45	24.3
	RHD	11	5.9

*ARF- Acute rheumatic fever, RHD- Rheumatic heart disease

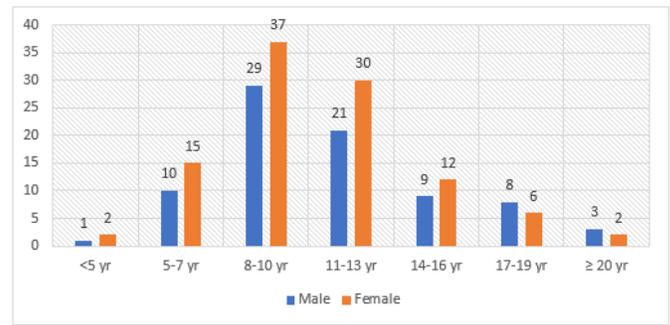


Figure 1: Column chart showed distribution of patients of ARF according to age and sex. (N=185).

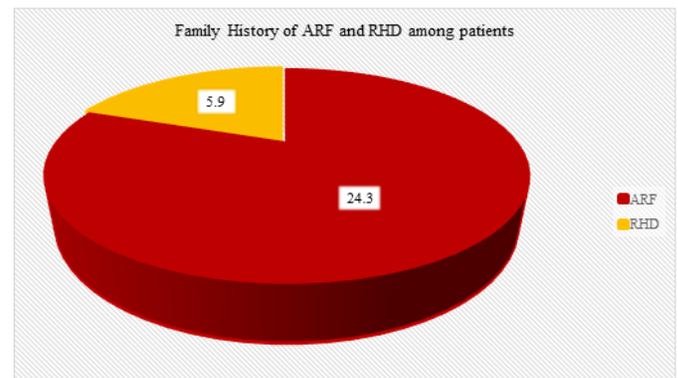


Figure 2: Pie chart showing family history of AFR and RHD in study population (N=185).

Discussion

Acute rheumatic fever is more prevalent in children and young adults of some social and economic disadvantage like overcrowding environment, malnutrition. Even in some developed countries like New Zealand, northern and central Australia indigenous group of population and people living in poverty have high rates of ARF.[11] Almost all the cases (95.7%) of acute rheumatic fever were diagnosed between the age of 5 to 19 years which is consistent with studies in Bangladesh where it was reported that ARF affects children, most commonly between 5 to 22 years.[10,15] In this study ARF was more prevalent in female than male patients (56.2% vs 43.8%) that was in accordance with the data of World Health Organization which reported that male to female ratio was 2:3.[16] In Bangladesh, incidence of ARF was

found similar in male and female, and a recent report showed that it was more prevalent in male patients.[15,17] The discrepancies may be due to the difference between the study populations; previous study enrolled a small number of patients with joint pain whereas the present study was done on general population. Women are at greater risk of developing RHD than male and younger females of lower socioeconomic class are often affected by chronic RHD. [7,12] Females receive some negative attitudes towards them in our society especially in low social status. From this point of view, more emphasis should be given on counseling of the parents and family about the prophylaxis of ARF. In this study, more than 60% of the patients with ARF were from urban area. Being the only specialized center for management of rheumatic fever, NCCRF&HD often receives patients from all over the country. But due to its situation in the capital city most commonly people from urban area seek treatment here. Among the patients 13.5% were residing in the slum areas. There are about 14000 slums in Bangladesh and more than 95% of houses are either 'kancha' or semi-pacca in these slums. [18] Crowded and damp housing environment along with many other deprivations like malnutrition make this group of people more vulnerable to infections like pharyngitis. ARF develops as a post infection sequel of pharyngitis by Streptococcus. GAS is very infectious and condition (like cold) that increases its transmission is certainly a plausible risk factor. [19,20] Therefore, history of sore throat is very important in children. More than 59% children experienced sore throat within last 4 weeks of ARF diagnosis and about 40% had multiple episodes of sore throat in last one year. This finding is consistent with the report of a previous study. [21] Early diagnoses, prompt

and judicial treatment with antibiotics may reduce the risk of developing ARF in these patients. Maintaining respiratory etiquette is also very crucial. Counseling and proper health education of the family members may be a better tool for preventing RF. Housing conditions and overcrowding specifically number of people sleeping in same room is very important risk factor. Crowded, cold, damp housing increases transmission of GAS infections and number of RF rate is often associated with household crowding.[22,23] Our country is one of the highest densely populated countries in the world and on an average; each household consists of 4.06 persons.[24] Person-per-room in a dwelling unit is a practical indicator of extent of household crowding.[25] Household crowding was calculated by total number of household members divided by total number of bedroom and a person-per-room more than 4 was considered as an overcrowded house. Crowded sleeping room in family or living in boarding facilities increase the risk of infection. Among patients with ARF more than half had ≥ 4 people sleeping in a same room and 9.7% children were living in boarding facilities (mainly Madrasha). Malnutrition is another risk factor for ARF. Malnutrition makes the immune system weak and the child become prone to infections including streptococcal sore throat. In Bangladesh, about **35% of the population** remains food insecure and **severe acute malnutrition affects about 6 lacs children yearly.** [26,27] Calculating BMI of the children nutritional status was evaluated. Among the patients of ARF 14.6% were malnourished and malnutrition was more prevalent in male children than female in this study population. Recurrence of ARF within 5 years was found among one in four patients which is higher than the rate reported by Tal et al. [28] The rate of recurrence was higher (two third) in patients

on oral antibiotic prophylaxis compared to patients on parenteral prophylaxis. Recurrences of ARF in patients on penicillin injection was observed markedly reduced in this study in contrast to a previous study that reported 12.5% recurrence in case of 4-week regimen. [29] This data indicates improvement of quality of health care facilities, knowledge and also positive attitude of general people towards RF prophylaxis. Almost all the patients of recurrence on injection prophylaxis and more than three-fourth patients on oral prophylaxis gave history of discontinuation of antibiotic either by themselves or being advised by quacks or in some cases even by physicians. Discontinuation or irregular intake of prophylactic antibiotic might be the underlying causes of this recurrence.

Conclusion

Demographic characteristics of patients of acute rheumatic fever were consistent with reports of previous studies in Bangladesh and countries where ARF is prevalent. ARF was common in children of 5 to 13 years and there was no significant difference between male and female patients and between urban and rural areas. Household overcrowding and pharyngeal infections were important factors to be looked after. Emphasis should be given on early diagnosis and treatment of sore throat as well as on secondary prophylaxis especially injectable prophylaxis of ARF to prevent its recurrence and development of rheumatic heart disease.

Ethical Consideration

This protocol was approved by Ethical Review Committee of NCCRF&HD. Informed written consent was taken from each patient or authorized legal guardian. Participants were informed about purpose of the study and anonymity of the patients and confidentiality of information was maintained strictly.

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