



ORIGINAL ARTICLE

Clinical profile of acute rheumatic fever in children in Pakistan: A study at a tertiary care hospital.

Sohaib Riaz¹, Veena Kumari², Khurram Shahnawaz³, Farhan Zahoor⁴, Muhammad Asif Khan⁵, Sadaf Liaqat⁶, Fazal ur Rehman⁷

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ABSTRACT... Objective: To determine the clinical profile of children presenting with acute rheumatic fever (ARF) at a tertiary care healthcare facility. **Study Design:** Cross-sectional study. **Setting:** Department of Pediatrics, Rai Medical College Teaching Hospital, Sargodha Pakistan. **Period:** January 2021 to December 2022. **Material & Methods:** We analyzed children of both genders aged between 1 month to 18 years and presenting with ARF. At the time of enrollment, medical history was obtained and physical as well as clinical examinations were performed. The demographical and clinical information were recorded. ARF was labeled as per "Modified Jones Criteria". A special proforma was formed to record study data. **Results:** In a total of 154 children, 96 (62.3%) were female while the mean age was 9.3 ± 4.6 years. Forty four (28.6%) patients were having first episode of ARF while 110 (71.4%) had recurrence of ARF. Fever was noted to be the most common presentation noted in 121 (78.6%) patients of ARF. Arthritis was significantly more common among patients with first episode of ARF when compared to recurrence of ARF (70.5% vs. 29.1%, $p < 0.0001$). Degree of carditis was significantly more severe among patients with recurrence of ARF ($p < 0.0001$). **Conclusion:** Majority of the acute rheumatic fever patients present with recurrence of acute rheumatic fever. Fever was the commonest clinical presentation while arthritis was significantly more prevalent among patients with first episode of acute rheumatic fever.

Key words: Acute Rheumatic Fever, Arthritis, Carditis, Echocardiography, Subcutaneous Nodules.

INTRODUCTION

Rheumatic fever (RF) is known to be the commonest cause of acquired heart disease (AHD) among pediatric age groups and adults globally.^{1,2} In Pakistan, rheumatic heart disease (RHD) is an important cause of morbidity and mortality among children.³ A recent school survey found a prevalence of 21.9/1000 in the urban slums of Lahore and 5.6/1000 in the rural population, making it one of the highest rates in the worldwide.^{4,5}

The central nervous system and connective tissue of the body are impacted by acute rheumatic fever (ARF). Tonsil or throat infection brought on by group A beta-hemolytic streptococci are the frequent mechanisms behind ARF. The streptococci infection itself does not cause

rheumatic fever; it is a complication of the infection.⁶ Rheumatic fever causes subcutaneous nodules, Sydenham's chorea, and adverse effects on the heart, joints, and skin, including a unique rash known as erythema marginatum.⁷

In the developed countries, ARF and rheumatic recurrence have milder clinical profiles than in other parts of the world.^{8,9} This conclusion has been reached as a result of the initial bout of rheumatic fever not being distinguished from subsequent occurrences. Patients with their first episode have a lower clinical profile and disease severity than those with recurrent episodes.¹⁰ The fact that may of RF cases present late when they have already developed severe carditis whereas first outbreaks of silent carditis are frequently ignored which could potentially be connected to

1. FRCPC, Assistant Professor Pediatrics, University Medical and Dental College, Faisalabad.
2. FCPS (Pediatric Medicine), FCPS (Pediatric Cardiology), Assistant Professor Pediatric Cardiology, NICVD Karachi.
3. FCPS (Pediatric Medicine), Associate Professor Pediatrics, Sahara Medical College Narowal.
4. FCPS (Pediatric Medicine), Assistant Professor Pediatrics, Fatima Jinnah Medical University/Sir Gangaram Hospital, Lahore.
5. FCPS (Paediatric Medicine), FCPS (Pediatric Cardiology), Assistant Professor and Head Paediatric Cardiology, National Institute of Cardiovascular Diseases, Nawabshah.
6. FCPS (Pediatric Medicine), Associate Professor Pediatrics, Rai Medical College, Sargodha.
7. FCPS (Pediatric Medicine), Fellow Pediatric Cardiology Pediatric Cardiology, NICVD, Karachi.

Correspondence Address:
Dr. Fazal ur Rehman
Department of Pediatric Cardiology,
NICVD, Karachi.
fazal171@gmail.com

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this.¹¹

RF is still prevalent in Pakistan and is a significant contributor to heart failure admissions, despite the fact that they are less common in western countries nowadays. The present study was conducted to determine the clinical profile of children presenting with ARF at a tertiary care healthcare facility.

MATERIAL & METHODS

This cross-sectional study was conducted at the department of Pediatrics, Rai Medical College Teaching Hospital, Sargodha, Pakistan from April 2021 to March 2023. We included children of both genders aged between 1 to 18 years and presenting with ARF. Children having diabetes mellitus or RHD with no activity were excluded. Approval from "Institutional Ethical Review Board" (ERC/2020/095) was acquired. Informed as well as written consents were obtained from parents/caregivers.

We analyzed all cases as per inclusion/exclusion criteria presenting at the study center during the study period. At the time of enrollment, medical history was obtained and physical as well as clinical examination were performed. The demographical and clinical information were recorded. Twelve lead electrocardiogram (ECG) was performed along with chest x-ray. Essential laboratory investigations were also sought. Two-dimensional Echocardiography was performed in all cases. Institutional facilities were utilized for all laboratory investigations. ARF were labeled as per "Modified Jones Criteria".¹² Carditis was graded as "no carditis" if there was no sleeping tachycardia and cardiac murmur (valvitis as per echocardiography findings). Mild carditis was labeled as cardiac murmur, cardiothoracic ratio 0.45-0.5 and absence of congestive heart failure. Moderate carditis was termed as cardiac murmur, cardiothoracic ratio 0.60-0.70, absence of frank congestive heart failure and existence of mild pulmonary hypertension. Severe carditis was labeled as signs of congestive heart failure along with pulmonary arterial hypertension and cardiothoracic ratio ≥ 0.7 .

Data was analyzed employing "Statistical Package for Social Sciences (SPSS)", version 26.0. Mean and standard deviation were calculated for numeric data. Frequencies and percentages were shown for categorical data. Comparisons were made employing chi-square test whereas $p < 0.05$ was taken as significant.

RESULTS

In a total of 154 children, 96 (62.3%) were female and 58 (37.7%) male. The mean age was 9.3 ± 4.6 years while 68 (44.2%) patients were aged between 5-12 years. Socio-economic status of 102 (66.2%) patients was low. Maternal education status of 34 (22.1%) patients was illiterate. Details about the characteristics of studied cases are shown in Table-I.

Characteristics		Frequency (%)
Gender	Male	58 (37.7%)
	Female	96 (62.3%)
Age (years)	<5	39 (25.3%)
	5-12	68 (44.2%)
	>12	47 (30.5%)
Socio-economic status	Low	102 (66.2%)
	Medium	41 (26.6%)
	High	11 (7.1%)
Maternal education	Illiterate	34 (22.1%)
	Literate	120 (67.9%)
Duration of symptoms (days)	≤ 30	61 (39.6%)
	>30	93 (60.4%)

Table-I. Socio-demographic and clinical characteristics (n=154)

Out of a total of 154 patients, 44 (28.6%) were having first episode of ARF while 110 (71.4%) had recurrence of ARF. Fever was noted to be the most common presentation noted in 121 (78.6%) patients of ARF. Arthritis was significantly more common among patients with first episode of ARF when compared to recurrence of ARF (70.5% vs. 29.1%, $p < 0.0001$). Degree of carditis was significantly more severe among patients with recurrence of ARF ($p < 0.0001$). The details about the clinical profile of all patients with ARF are shown in Table-II.

Echocardiographic examination revealed that mitral regurgitation along with aortic regurgitation

and tricuspid regurgitation were the most frequent abnormality revealed in 48 (31.2%) patients. Isolated mitral regurgitation was noted in 31 (20.1%) patients. Degree of echocardiographic

abnormalities was relatively exaggerated among cases with recurrence of ARF when compared to those with first episode of ARF. Table-III is showing details of echocardiographic abnormalities.

Clinical Profile		Total (n=154)	First Episode of Acute Rheumatic Fever (n=44)	Recurrence of Acute Rheumatic Fever (n=110)	P-Value
Joint pain		45 (29.2%)	9 (20.5%)	36 (32.7%)	0.1303
Fever		121 (78.6%)	37 (84.1%)	84 (76.4%)	0.2911
Arthritis		63 (40.9%)	31 (70.5%)	32 (29.1%)	<0.0001
Subcutaneous nodules		66 (42.9%)	17 (38.6%)	49 (44.5%)	0.5032
Chest pain		8 (5.2%)	3 (6.8%)	5 (4.5%)	0.5659
Breathlessness		7 (4.5%)	3 (6.8%)	4 (3.6%)	0.3918
Carditis	No	8 (5.2%)	8 (18.2%)	-	<0.0001
	Mild	31 (20.1%)	24 (54.5%)	7 (6.4%)	
	Moderate	50 (32.5%)	11 (25.0%)	39 (35.5%)	
	Severe	65 (42.2%)	1 (2.3%)	64 (58.2%)	

Table-II. Clinical profile of patients with acute rheumatic fever (N=154)

Echocardiographic Abnormalities	Total (n=154)	First episode of Acute Rheumatic Fever (n=44)	Recurrence of Acute Rheumatic Fever (n=110)	P-Value
Mitral regurgitation	31 (20.1%)	25 (56.8%)	6 (5.5%)	<0.0001
Aortic regurgitation	2 (1.3%)	2 (4.5%)	-	0.0244
Mitral regurgitation + Aortic regurgitation	30 (19.5%)	2 (4.5%)	28	0.0031
Mitral regurgitation + Aortic regurgitation + Tricuspid regurgitation	48 (31.2%)	-	48	<0.0001
Left ventricular dysfunction	3 (1.9%)	-	3	0.2855

Table-III. Echocardiographic findings (N=154)

DISCUSSION

Even though rheumatic heart disease is preventable, underestimating its incidence, particularly among poorer countries, results in a failure to prioritise primary prevention in national health policies, which in turn leads to the progressive occurrence and causative morbidity of the disease in children and young adults.^{13,14} In the present study, 44.2% of patients with rheumatic fever were aged between 5-12 years of age. RF frequently affects school-age children who had preceding infection of group A streptococcus that exhibits clinical symptoms.¹⁵ Poverty, poor nutritional status, overcrowding and inaccessibility to healthcare services are some of the major contributors to group A streptococcus infection among developing countries.¹⁶

In this study, fever (78.6%), subcutaneous nodules

(42.9%) and arthritis (40.9%) were the most frequent clinical features among patients with ARF. Regional data by Suman S et al showed that joint pain (70%) and fever (42%) were the most frequent clinical features among patients with acute rheumatic fever.¹⁷ Although being a primary requirement for ARF, subcutaneous nodules are less common in emerging as well as wealthy nations.¹⁸ In this study, we identified that 94.8% patients had carditis. The literature highlights that 50 to 78% patients with RF exhibit carditis while arthritis (35 to 88%) is another very common clinical feature among patients with RF.¹⁹ We found that degree of carditis was significantly more severe among patients with recurrence of RF and these findings are very consistent with what has been reported by Sheikh AM et al in another local study from Rawalpindi.²⁰ Post-rheumatic valvulopathies is the major contributor to heart failure in pediatric

age groups and adults.¹⁵ To reduce the severity of cardiac damage, individuals with clinical signs of ARF need to get prompt treatment and be directed for a precise diagnosis and long-term care. Patients frequently arrive to tertiary care in underdeveloped nations like Pakistan, where access to healthcare services is challenging for the whole population, with existing incapacitating symptoms like congestive heart failure and pulmonary hypertension. All patients should use secondary penicillin prophylaxis to stop the reactivation of RHD, however patient compliance and long-term care have proven difficult.

The present study showed that 71.4% patients reported with recurrence of ARF. Local data has reported 75% of patients to be presenting with recurrence of ARF.²⁰ In the present study, most children were already treated by general practitioners that could have delayed their admission to tertiary care facilities. If we wish to limit RF in our community, the preventative initiatives should be aimed at these healthcare professionals. As hospital-based initiatives are not likely to decrease acute rheumatic fever, awareness campaigns should be conducted among communities regarding primary as well secondary prevention of RF.

Being a single center study, our findings need further verification in large metacentric trials. Patients with ARF need to be followed for prospective evaluation and the impact of their clinical presentation on outcomes.

CONCLUSION

Majority of the ARF patients present with recurrence of acute rheumatic fever. Fever was the commonest clinical presentation while arthritis was significantly more prevalent among patients with first episode of ARF. Degree of carditis was significantly more severe among patients with recurrence of ARF.

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




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AUTHORSHIP AND CONTRIBUTION DECLARATION

No.	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Sohaib Riaz	Introduction, Proof reading.	
2	Veena Kumari	Literature review, Methodology.	
3	Khurram Shahnawaz	Proof Reading.	
4	Farhan Zahoor	Literature Review, Methodology.	
5	Muhammad Asif Khan	Literature Review, References.	
6	Sadaf Liaqat	Data collection, Final Approval.	
7	Fazal ur Rehman	Drafting.	