



## RHEUMATIC HEART DISEASE (RHD); SOCIO-ECONOMIC AND ENVIRONMENTAL RISK FACTORS FOR ACUTE RHEUMATIC FEVER (ARF) AND RHEUMATIC HEART DISEASE (RHD) PATIENTS IN PAKISTAN

Dr. Ahsan Beg<sup>1</sup>, Dr. Muhammad Younas<sup>2</sup>, Dr. Touseef Asma Ch.<sup>3</sup>

1. MBBS, FCPS  
(Paeds and Paeds Cardiology)  
Assistant Professor Paeds  
Cardiology  
CPE Institute of Cardiology, Multan.
2. MBBS, FCPS  
(Paeds and Paeds Cardiology)  
Assistant Professor Paeds  
Cardiology  
CPE Institute of Cardiology, Multan.
3. MBBS, FCPS  
(Paeds and Paeds Cardiology)  
Senior Registrar Paeds Cardiology  
CPE Institute of Cardiology, Multan.

### Correspondence Address:

Dr. Ahsan Beg  
MBBS, FCPS  
(Paeds and Paeds Cardiology)  
Assistant Professor Paeds Cardiology  
CPE Institute of Cardiology, Multan.  
dr.ahsan.beg@gmail.com

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**ABSTRACT... Objectives:** To investigate the role of socio-economic factors for Acute Rheumatic Fever (ARF) and Rheumatic Heart Disease (RHD) in Pakistan. **Methodology: Study Design:** Descriptive cross-sectional. **Setting:** OPD of Pediatric Cardiology Department, CPE Institute of Cardiology, Multan. **Period:** July 2014 to December 2014. Convenience Sampling was done. Sample size of 130 cases with ages between 5 to 12 years were selected for the study. **Results:** Overcrowding was noticed in 61% and 85% in urban and rural areas, respectively. In rural areas, most parents were illiterate; similar status was seen in urban areas (64.4%; 67.1% respectively). 60% and 55 % patients have habit of hand washing in rural and urban patients respectively. Toilet facility is available to 60% and 55.6% in rural and urban patients respectively. Economic status of the family is even worse. Average income per family was only Rs.3800 per month. **Conclusion:** There is a high prevalence of Rheumatic heart disease (RHD) and acute rheumatic fever (ARF) in Pakistan. Overcrowding, poor hygienic conditions, low socio-economic status, illiteracy are major risk factors for ARF and RHD in Pakistan. In order to address this alarming situation, platforms like Pakistan Pediatric Cardiac Society and Pakistan Pediatric Association need to be mobilized.

**Key words:** Acute Rheumatic Fever (ARF), Rheumatic Heart Disease (RHD), Risk Factors

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## INTRODUCTION

Acute Rheumatic fever (ARF) and rheumatic heart disease (RHD) have high prevalence in Pakistan.<sup>1,2</sup> In the modern world, RHD contribution toward valvular heart disease is uncommon cause. In Pakistan RHD is still a major cause of valvular heart disease.<sup>3,4,5</sup> The prevalence of RHD in Pakistan is 22/1000 in a Lahore and 5.7/1000 in rural Pakistan.<sup>6,7</sup> However the data is totally different in developed countries where RHD is no longer a reportable disease with a prevalence of less or equal to 0.7 %.<sup>8,9</sup> India has prevalence varying from 1-5.4/100 while Bangladesh has prevalence of 1.2/1000.<sup>10,11</sup>

Genetic predisposition, Group A streptococcal virulence and environmental factors are important in the pathophysiology of RHD. However, the environmental factors are most important among these. Prevalence of ARF decreases by improving living conditions.<sup>12,13</sup>

Environmental factors predisposes to more frequent streptococcal infections. Many studies have shown poverty as an independent risk factor for development of ARF / RHD<sup>14, 15</sup>. However, the mechanism of increase of ARF/RHD by poverty is not clear. Perhaps poverty is a proxy marker of crowding and crowding is the main effector of ARF/RHD by promoting transmission of group A-streptococci. One Study in 1950's showed increased rates of acquirement of streptococci when soldier's camp beds were moved much closer, in a military base camp in USA<sup>16</sup> Further studies in Baltimore in the 1960's found that rates of ARF were related with the number of people per room<sup>17</sup> More contemporary studies used a variety of study designs and had found an association between crowding and ARF/RHD at the level of the home, the bedroom, and even the bed.<sup>18,19</sup>

There is large burden of ARF and RHD in Pakistan

but little has been studied about predisposing factors of ARF and RHD. Therefore we decided to investigate the role of socio-economic factors for ARF and RHD in Pakistan.

## MATERIALS AND METHODS

This was a descriptive cross-sectional study, carried out at Out Patient Department (OPD) of Pediatric Cardiology Department at CPE Institute of Cardiology, Multan from July 2014 to December 2014. Sample size of 130 cases with ages between 5 to 12 years were selected for the study. Subjects are identified to have rheumatic heart disease (RHD) or acute rheumatic fever (ARF) on the basis of history, physical examination, lab tests and echocardiogram. 2D and Doppler echocardiogram were done by Consultant Pediatric Cardiologist at OPD of CPE Institute of Cardiology. Echocardiography machine used was Vivid 7 GE with 2D and Doppler modes. Convenience sampling was done. Informed consent taken from parents/guardian. Questionnaire is filled by post-graduate registrar enrolled for FCPS part-II training.

Previous literature on environmental risk factors was searched. Factors included in the questionnaire were dwelling (rural / urban), overcrowding, income of the family, hygienic conditions (hand washing, toilet facility). Education status of the parents/guardian was also assessed. Overcrowding was taken as more than two persons in a room. Parents with primary education level were taken as literate parents.

## RESULTS

Out of 130 patients, 57.7% were males and 42.3% females (n=75/130, n=55/130 respectively) in rural and urban areas respectively. Mean age was  $10.8 \pm 2.9$  years. Among various groups, maximum number of patient line the age group of 11-12 years in both urban and rural areas. Dwelling areas were urban and rural in 34.6% and 65.4% respectively (n= 45/130; n=85/130). In urban areas, there was overcrowding in 61.2% (n=52/85) of the patients. However it was 84.4% in rural areas (n=38/45). In urban areas, literacy level was low (32.9%, n= 28/85).

Similar status was seen in rural areas (35.6%, n= 16/45). Considering hygienic conditions, 55.3% (n=47/85) and 60% (n=27/45) patients have habit of hand washing in urban and rural patients respectively. Toilet facility was available to 56.5% (n=48/85) and 60% (n=27/45) in urban and rural patients respectively. Average income per family was only Rs.3800 per month.

Variable	Percentage or mean value
Mean age (Y)	10.8±2.9
<b>Gender</b>	
Male	57.7
Female	42.3
<b>Dwelling areas</b>	
Urban area	34.6
Rural Area	65.4
<b>Overcrowding</b>	
Urban area	61.2
Rural Area	84.4
<b>Literacy Rate</b>	
Urban area	32.9
Rural Area	35.6
<b>Habit of Hand Washing</b>	
Urban area	55.3
Rural Area	60.0
<b>Toilet Facility</b>	
Urban area	56.5
Rural Area	60.0
Average Income per Family (Rs)	3800

Table-I. Socio-economic Characteristics of patients

## DISCUSSION

Acute rheumatic fever and rheumatic heart disease are endemic in Pakistan.<sup>1,2</sup> Rheumatic heart disease is causing premature death and disability.<sup>20</sup> In local studies, prevalence of rheumatic heart disease was 22/1000 and 5.7/1000 while prevalence is 5.4/1000 in India and 1.2/1000 in Bangladesh.<sup>10,1</sup>

In Uganda and Fiji environmental factors have been studied<sup>21, 22</sup> Previously local study in Rahim Yar Khan<sup>23</sup> has evaluated socio-demographic and house hold characteristics of rheumatic

heart disease patients, there were 30% cemented houses, latrine facility was available in 14% houses and 54% patients were illiterate. In our study, literacy level was low (32.9%) in urban population, and toilet facility was in 56.5% houses in urban population and 60% in rural population.

Previous studies have shown female dominance for RHD.<sup>24,25,26</sup> Our data showed male dominance in both rural and urban patients. We defined more than two peoples in a room as overcrowding. Overcrowding is important factor in the progression of rheumatic fever and thus of rheumatic heart disease. Studies have shown re-emergence of rheumatic heart disease in the inter mountain regions of US and in Italian army in 1980s due to overcrowding rather than poverty.<sup>27,28</sup> Recent decline of ARF in China and other emerging nations is apparently associated with economic development. Change in House Design has also shown to be associated with reduction in the prevalence of RHD<sup>29</sup>.

## CONCLUSION

Rheumatic heart disease (RHD) and acute rheumatic fever (ARF) have high prevalence in Pakistan. Overcrowding, poor hygienic conditions, low socio-economic status, illiteracy are major risk factors for ARF and RHD in Pakistan. In order to address this alarming situation, platforms like Pakistan Pediatric Cardiac Society and Pakistan Pediatric Association need to be mobilized.

## LIMITATIONS

Our data is based on information revealed by the parents or guardian who visited the OPD of the CPE Institute of Cardiology. We did not visit the house hold of the dwelling area of the participants. We also did not evaluate distance from nearest health centre. In addition, area and design of the houses are also not studied.

## RECOMMENDATIONS

Last but not least, the situation is alarming for hygienic condition and literacy level. There are several factors which need to be addressed through platform like Pakistan Pediatric Cardiac Society and Pakistan Pediatric Association. These

include:

1. Education of the parents / guardian
2. Medical education of the family/guardian regarding primary and secondary prophylaxis.
3. Policy of mopping up the floor with leaving faucet open need to be changed.

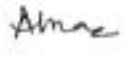

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### AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Dr. Ahsan Beg	Study planning, Designing, Coordination in data collection, Paper writing and editing	
2	Dr. M. Younas	Study planning, Designing, Data collection & editing	
3	Dr. Touseef Asma Ch	Study planning, Designing, Data collection and editing	