

Determinants of Rheumatic Heart Disease in School Age Children at National Institute of Cardiovascular Disease

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ABSTRACT

Introduction: In the modern era, the double burden of diseases is increasing day by day around the World; rheumatic heart disease is one of these diseases. Millions of the peoples suffering from rheumatic heart diseases in which 2500,000 deaths occur throughout the world each year, whereas a high ratio found in developing countries.

Objectives: Assess the determinants of rheumatic heart disease in school-age children and explore the environmental factors which contributing of rheumatic heart diseases.

Materials and Methodology: This study was an analytical cross-sectional study in which a Non-probability convenient sampling method was used. This study conducted at the National Institute of Cardiovascular Disease, Sukkur satellite.

Results: The sample size was 196. Age group 11 to 15 years seen more prone to develop RHD. Male gender dominating as compared to female. Male seen 1.25-time greater risk for developing the disease. Residential from rural areas have a sound contributor to Rheumatic heart disease.

Conclusion: This study successfully found determinates of rheumatic heart disease; residents of rural areas, joint family, illiteracy of parents, unemployment, and more than 3 peoples per room, and also explored the environmental factors which are the good contributor to this disease. Further, this study also analyzed the significant association of rheumatic heart disease with living patterns.

Keywords: Rheumatic heart disease; Living pattern; School-age children; Environmental factors

INTRODUCTION

The globally double burden of diseases increasing day by day; Rheumatic Heart Disease (RHD) is one of these diseases. Millions of the peoples suffering from rheumatic heart diseases in which 2500,000 deaths occur throughout the world each year, whereas a high ratio found in developing countries [1]. Pakistan is one of the developing countries; most of the rural areas bear the burden of Rheumatic heart disease, in Pakistan majority of births take place in the home by birth attendants, it happens mainly due to lack of resources, poverty furlong distance from the health care system [2]. School going children become a major victim of RHD and can easily transmit through the skin to skin contact, contaminated

water and mostly found among particular people having a low socioeconomic background [3,4].

Level of education, unemployment, and crowding are triggering factors of rheumatic heart disease; besides, 16% of rheumatic heart disease is observed to be connected infected from scabies, utilizing of soil water in household usage, sharing home with domestic animals as well as what kind of house is made up of either cemented or mud, RHD is in fact a disease of poverty and exists in poor environmental conditions; its severity is higher in the unhealthier environment as compared to a healthy environment, rheumatic

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heart disease can transmit from parents to offspring [5,6].

Rheumatic heart disease is a result of Group A streptococcus which disorder of the immune response leads to joints pain, soreness in the throat and involves the brain [7] World health organization demanded that should be at least a 25% reduction in a fatality due to the Cardiovascular disease including rheumatic heart diseases by the year 2025 [8]. In Mozambique, RHD is a silent killer of 5-15 years children, most of the time does not develop significant signs, this disease involved in maternal death and also causes loss of fetal during pregnancy; this burden carries barriers to achieve Millennium Development goals and least prevalence of RHD is 15/1000 in developing countries [9,10].

There, multiple studies conducted throughout the country using different aspects to rule out rheumatic heart disease. Currently, no study conducted which shows the association of determinants of rheumatic heart disease with the living pattern.

Aim of study

To investigate the relationship of living pattern with the determinants of Rheumatic heart disease, in which this disease become pathogenesis.

Objectives of study

- Assess the determinates of rheumatic heart disease in school age children.
- Explore the environmental factors which contributing of rheumatic heart diseases.

Operational definitions

Determinants: Characteristics in which rheumatic heart disease become pathogenesis; age, gender, resident area, type of house and people living in a room.

Rheumatic heart diseases

Rheumatic heart disease is a condition in which the heart valves have been permanently damaged by rheumatic fever. The heart valve damage may start shortly after untreated or under-treated streptococcal infection such as strep throat or fever.

Living patterns

The way and environment in which rheumatic heart disease patients experiencing (daily life style).

MATERIALS AND METHODOLOGY

Study design and settings

This is analytical cross sectional study in which Non-probability convenient sampling technique is used for data collection. In this study, school age children (05 to 15 years) patients of rheumatic heart disease were enrolled. Further. Data was collected from the parents of the subjects or guardian.

Study duration

Three months followed by approval of ethical review committee,

(ERC LUHMS) Liaquat University of Medical & Health Sciences Jamshoro from 1st October, 2019 to 31st December, 2019.

Study population

School age children (5-15years) Patients of rheumatic heart disease both acute and chronic and data has been collected from parents or guardian.

Sample size

Sample size of the study was 196.

Data collection method

After receiving approval from Ethical review committee Liaquat University of Medical and Health Science Jamshoro; the permission was taken from higher authority of National Institute of Cardiovascular Diseases of Satellite Sukkur. Further, a formal written consent /agreement was also taken from every parent or guardian of subject.

Data presentation

The data was presented through frequency and charts and for the association of variables Chi-square test will also be computed. Further, $\leq .05$ was kept significant.

RESULTS

Table 1 showing that there is significant association between age of the subject and the throat irritation and pain ($p=.03$), joints pain and inflammation ($p=.039$), tiredness ($p=.038$), and there is no any significant association find between the age of the subjects and palpitation ($p=.92$), chorea ($p=.29$), scabies ($p=.98$).

Table 2 showing that there is significant association find between the gender of the subjects joints pain and inflammation ($p=.045$) palpitation ($p=.002$), and chorea ($p=.001$), and there is no significant association find between the gender of subject and throat pain & irritation ($p=.095$), history of scabies ($p=.304$).

Table 3 showing there is no significant association between area of resident and throat irritation ($p=.447$), throat pain($p=.081$), throat inflammation ($p=.802$), joint pain ($p=.234$), joints inflammation ($p=.216$), palpitation ($p=.235$), Skin infection ($p=.611$), C-RP ($p=.524$), and ASO titer ($p=.05$) and there is association find in chorea ($p=.001$) and area of residence of the subjects.

Table 4 showing there is significant association between the type of house and throat pain and irritation ($p=.002$), joint pain and inflammation ($p=.000$), tiredness ($p=.041$) and there is no significance association find in palpitation ($p=.30$), chorea ($p=.26$), skin infection ($p=.72$), C-RP ($p=.250$) and ASO titer ($p=.144$).

Table 5 showing there is significant association between the peoples per room and throat irritation and pain ($p=.001$) the chorea ($p=.008$), History of Tiredness ($p=.000$), feeling of palpitation ($p=.040$), and there is no significant association find between joints pain and inflammation ($p=.588$), history of scabies ($p=.55$).

Table 1: Contingency table of Age of the subjects and study variables.

Age of the subject	Throat Irritation and pain		Total	P value
	Yes	No		
5 to 10 years	37	8	45	0.03
11 to 15 years	142	9	151	
Total	179	17	196	
Joint pain and inflammation				
5 to 10 years	38	9	47	0.039
11 to 15 years	142	7	149	
Total	180	16	196	
Feeling of palpitation				
5 to 10 years	30	15	45	0.92
11 to 15 years	102	49	151	
Total	132	68	196	
Chorea				
5 to 10 years	9	36	45	0.29
11 to 15 years	42	109	151	
Total	51	145	196	
Tiredness				
5 to 10 years	29	16	45	0.038
11 to 15 years	120	31	151	
Total	149	47	196	
History				
5 to 10 years	16	29	45	0.98
11 to 15 years	54	97	151	
Total	70	126	196	

Table 2: Contingency table of gender of subject and the study variable.

Gender of Subject	Throat irritation and pain		Total	P value
	Yes	No		
Male	65	43	188	0.095
Female	63	25	88	
Total	128	68	196	
Joint pain and inflammation				
Male	103	5	108	0.045
Female	77	11	88	
Total	180	11	196	
Feeling of palpitation				
Male	83	25	108	0.002
Female	49	39	88	
Total	132	64	196	
Chorea				
Male	43	93	136	0.001
Female	8	52	60	
Total	51	145	196	
History of Scabies				
Male	16	29	45	0.304
Female	54	97	151	
Total	70	126	196	
Tiredness				
Male	98	10	108	0.158
Female	74	14	88	
Total	172	24	196	

Table 3: Contingency table of area of residence and the study variables.

Area of resident	Throat irritation and pain		Total	P value
	Yes	No		
Rural	36	101	137	0.081
Urban	23	36	59	
Total	81	137	196	
Joints pain and inflammation				
Rural	127	9	136	196
Urban	53	7	60	196
Total	180	16	196	196
Feeling of palpitation				
Rural	88	48	136	196
Urban	44	16	60	196
Total	132	64	196	196
Chorea	196	196	196	196
Rural	45	91	136	196
Urban	6	54	40	196
Total	51	145	196	196
History of scabies				
Rural	47	89	136	196
Urban	23	37	60	196
Total	70	126	196	196

Table 4: Contingency table of type of house and the study variables.

Type house	Throat irritation and pain		Total	P value
	Yes	No		
Kacha	28	100	128	0.002
Kacha-Paka	17	22	39	
Paka	14	14	28	
Total	59	136	196	
Joints pain and Inflammation				
Kacha	40	89	129	0
Kacha-Paka	22	17	39	
Paka	19	9	28	
Total	81	115	196	
Feeling of palpitation				
Kacha	84	45	129	0.3
Kacha-Paka	26	13	39	
Paka	22	6	28	
Total	132	84	196	
Feeling of Tiredness				
Kacha	102	27	129	0.041
Kacha-Paka	31	8	39	
Paka	16	12	28	
Total	149	47	196	
Chorea				
Kacha	34	95	129	0.26
Kacha-Paka	7	32	39	
Paka	10	18	28	
Total	51	145	196	
History of scabies				
Kacha	44	85	129	0.72
Kacha-Paka	16	23	39	
Paka	10	18	28	
Total	70	126	196	

Table 5: Contingency table of peoples per room and the study variables.

N0.of peoples /Room	Throat irritation and pain		Total	P value
	Yes	No		
< 3 peoples /room	25	33	58	0.001
3 Peoples/room	20	8	28	
>3 Peoples /room	36	74	110	
Total	81	115	196	
Joints pain and inflammation				
<3 peoples /room	55	3	58	0.588
3 Peoples/room	25	3	28	
>3 Peoples /room	100	10	10	
Total	180	16	196	
Feeling of palpitation				
< 3 peoples /room	22	20	42	0.04
3 Peoples/room	30	7	37	
>3 Peoples /room	80	37	117	
Total	132	64	196	
Chorea				
< 3 peoples /room	8	50	58	0.008
3 Peoples/room	5	23	28	
> 3 Peoples /room	38	72	110	
Total	51	145	196	
History of Tiredness				
<3 peoples /room	32	26	58	0
3 Peoples/room	23	5	28	
>3 Peoples /room	94	16	110	
Total	149	47	196	
History of scabies				
< 3 peoples /room	24	34	58	0.55
3 Peoples/room	9	19	28	
>3 Peoples /room	34	73	110	
Total	70	126	196	

DISCUSSION

Rheumatic heart disease mostly victimizing the world poor community School age, gender and environmental factors know as main risk factor of RHD; WHO. Further, The many environmental factors such as poor housing, crowding, limited income and health resources as well as unhygienic found solid for multiplication of GAS [11].

This analytical cross-sectional study analyzed that rheumatic heart disease is still dominating in Sukkur and its slum areas. It mostly affects school-age children from 10 to 15 years as compared to 5 to 10 years of school-age children, as compared to a study conducted in Lahore in 2016 determined that age group from 6 to 15 years of age mostly affected from RHD [12].

Gender is one of the main determinants of RHD. As compared to females this study revealed that males seen more prone to develop RHD. The further male was seen more than one higher than female for developing RHD pathogenesis, as compared to conducted in Bangladesh in 2017 revealed that female seen higher as male to develop the disease [7]. This situation is quite changed from my study. This may be due to biological changes.

Poor environmental condition is solid medium for Group a streptococcus for transmitting and its vulnerability to pathogens. In this study, area of Residence finds another determinant of RHD.

This revealed that the majority of the study population belongs from rural, and it is also statically proven that rural residents have a significant association with the pathogenesis of RHD. Additionally, rheumatic fever is result of GAS, which commonly victimizing children in rural areas as compare to urban ounces [13].

The several risk factors of rheumatic fever are associated with the type of houses either kacha, kacha-paka or pakka Group A Streptococcus (GAS) found more pathogenies kacha/tent houses [14]. This study revealed that a slum of subjects of the study living in kacha houses, further this study also analyzed that type of house have significant association, as compared to a study cross sectional study, conducted in Ethiopians study 2017, also determined that, children living in mud/kacha house found more common with RHD [6].

ARF have sound contribution with crowding, due to crowding recurrent episodes of rheumatic fever adverse rheumatic heart disease, which leads to millions of mortality throughout the years [15]. This study revealed that majority of the study population was living with more than 3 peoples in a room. Further, this study also analyzed the significant association with number of peoples living in a room, which compared with the Yemen study revealed that, 65% of study population suffered with RHD have sound relation with the overcrowding [16].

CONCLUSION

This study successfully found determinates of rheumatic heart disease; residents of rural areas, joint family, illiteracy of parents, unemployment, and more than 3 peoples per room, and also explored the environmental factors which are the good contributor to this disease. Further this study also analyzed the association of rheumatic heart disease with rural area, and Kacha type houses.

RECOMMENDATIONS

Community awareness programs should be conducted at every doorstep especially in rural areas for the prevention of the disease, and health education programs should be implemented by using communication resource especially print media and electronic media.

Further; The study recommended that there is need of more studies should be done on rheumatic heart disease with nearer factors such as patients in rheumatic heart disease in the family, blood relationship, in neighbor or same school.

LIMITATIONS

This study was conducted for academic purpose and conducted only in one health care setting with limited time period and limited resources.

SOURCE OF FUNDING

No any source of funding used.

CONFLICT OF INTEREST

No any conflict of interest seen between the authors.

REFERENCES

- Zühlke L, Karthikeyan G, Engel ME, Rangarajan S, Mackie P, Mauff BCK, et al. Clinical Outcomes in 3343 Children and Adults with Rheumatic Heart Disease from 14 Low-and Middle-Income Countries: Two-Year Follow-Up of the Global Rheumatic Heart Disease Registry (the REMEDY Study). *Circulation*. 2016;134(19):1456-1466.
- Rizvi SF, Mustafa G, Kundi A, Khan MA. Prevalence of Congenital Heart Disease in Rural Communities of Pakistan. *J Ayub Med Coll Abbottabad*. 2015;27(1):124-127.
- Steer AC, Carapetis JR, Dale JB, Fraser JD, Good MF, Guilherme L, et al. Status of research and development of vaccines for *Streptococcus pyogenes*. *Vaccine*. 2016;34(26):2953-2958.
- Sani UM, Ahmed H, Jiya NM. Pattern of acquired heart diseases among children seen in Sokoto, NorthWestern Nigeria. *Niger J Clin Pract*. 2015;18(6):718-725.
- Zhang W, Okello E, Nyakoojo W, Lwabi P, Mondo CK. Proportion of patients in the Uganda rheumatic heart disease registry with advanced disease requiring urgent surgical interventions. *Afr Health Sci*. 2015;15(4):1182-1188.
- Gemechu T, Mahmoud H, Parry EHO, Phillips DIW, Yacoub MH. Community-based prevalence study of rheumatic heart disease in rural Ethiopia. *Eur J Prev Cardiol*. 2017;24(7):717-723.
- Islam AKMM, Majumder AAS. Rheumatic fever and rheumatic heart disease in Bangladesh: A review. *Indian Heart J*. 2016;68(1):88-98.
- Zühlke L, Engel ME, Karthikeyan G, Rangarajan S, Mackie P, Cupido B, et al. Characteristics, complications, and gaps in evidence-based interventions in rheumatic heart disease: The Global Rheumatic Heart Disease Registry (the REMEDY study). *Eur Heart J*. 2015;36(18):1115-1122.
- Mayosi BM, Gamra H, Dangou JM, Kasonde J, Abul-Fadl A, Adeoye MA, et al. Rheumatic heart disease in Africa: The Mosi-o-Tunya call to action. *Lancet Glob Health*. 2014;2(8):e438-439.
- Palafox B, Mocumbi AO, Kumar RK, Ali SKM, Kennedy E, Haileamlak A, et al. The WHF Roadmap for Reducing CV Morbidity and Mortality Through Prevention and Control of RHD. *Glob Heart*. 2017;12(1):47-62.
- Asghar U, Ghauri F, Talha naeem M, Amjad M. Prevalence of rheumatic heart disease in different regions of Pakistan. *Pakistan J Med Heal Sci*. 2017;11(3):1049-1052.
- Sharma B, Marwah R, Raina S, Sharma N, Kaushik M, Kaushal SS. A study on the etiology of cirrhosis of liver in adults living in the Hills of Himachal Pradesh, India. *Trop Gastroenterol*. 2016;37(1):37-41.
- Cannon JW, Abouzeid M, de Klerk N, Dibben C, Carapetis JR, Katzenellenbogen JM. Environmental and social determinants of acute rheumatic fever: a longitudinal cohort study. *Epidemiol Infect*. 2019;147:e79.
- Oliver JR, Pierse N, Stefanogiannis N, Jackson C, Baker MG. Acute rheumatic fever and exposure to poor housing conditions in New Zealand: A descriptive study. *J Paediatr Child Health*. 2017;53(4):358-364.
- Susan UA, Nnena TP, Edewebe OB. Prevalence of Rheumatic Heart Disease Detected by Echocardiographic Prevalence of Rheumatic Heart Disease Detected by Echocardiographic Screening Among School Children in the Niger Delta Region of Nigeria. *J Clin Med*. 2019;7(2):56-62.