

SAINT PAUL'S HOSPITAL MILLINIUM MEDICAL COLLEGE

**PREVALENCE OF RHEUMATIC HEART DISEASE AND ITS
ASSOCIATED RISK FACTORS IN PEDIARIC PATIENTS AGE
BETWEEN 5-14 YEARS ADMITTED TO PEDIATRIC WARD
FROM 2014- APRIL 2018**



PREPARED BY MAHLET ARKEBE (INTERN)

ADVISOR MR. KINFE HAILE (MHA)

DR. ATNAFU MEKONNEN (MD)

**A STUDENT RESEARCH REPORT TO BE SUBMITTED TO SPHMMC
PUBLIC HEALTH DEPARTEMENT IN PARTIAL FULFILLMENT OF THE
REQUIRMET FOR THE DEGREE OF DOCTOR OF MEDICINE**

AUGUST 2018 ADDIS ABEBA, ETHIOPIA

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Abstract

Background

Rheumatic heart disease, a sequel of rheumatic fever, is a major cause of heart disease in pediatric age group in low and middle income countries. In population based study in a rural area of Ethiopia showed an overall prevalence of 37.5 cases of RHD per 1000 population. The disease has great impact on our nation's health care system due to its high morbidity and mortality rates. It demands great resources to treat and affects the young adult generation of the country having a great impact on the countries socioeconomic activities.

Objective

The research aims to find the prevalence of rheumatic heart disease and its associated risk factors in pediatric age group of 5-14 admitted to Saint Paul's hospital millennium medical college pediatric ward from 2014-April of 2018.

Methods

The study was a hospital based retrospective cross sectional study to assess the prevalence of rheumatic heart disease and its associated risk factors in children whose age was between 5- 14 years admitted to SPHMMC pediatric ward 2014-April of 2018. 91 cases were identified from the HMIS log books. The data was collected from March 15- May 4 2018 by the researcher from patient charts through a template designed after review of multiple researches and entered to SPSS 20 after it was checked for completeness. The analysis was made by cross tabulation and association between the variables was assessed by using chi-square test and if $p < 0.05$ it was taken as statistically significant. The data collected was confidential and used for research purpose only.

Results

In this study it was found that 14.2% of the admissions are children affected by RHD. The study found no significant association between the disease and the risk factors like malnutrition,

overcrowding, low income, history of sore throat, number of siblings, maternal education status and maternal occupation.

Conclusion and recommendation

RHD accounts for 14.2% of total patient admission to the pediatric wards. The research showed ARF is not being identified early and all of discharged patients are not having follow up.

Educating mothers and community influencers about the disease can lead to early identification and prevention of the disease. Counseling parents on strict follow up is also recommended.

Acknowledgement

I would like to show my deepest gratitude to those people who have helped me in the completion of this research. Most importantly, I would like to thank my advisors Mr. Kifle Haile and Dr. Atnafu Mekonnen for their advice and support.

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Acronyms

CRP- C reactive protein

CI- Confidence interval

CHF - Congestive heart failure

ESR – Erythrocyte sedimentation rate

GrAS – Group A streptococcus

IE- Infective endocarditis

PEM- Protein energy malnutrition

RF- Rheumatic fever

RHD -Rheumatic heart disease

SPHMMC – Saint Paul’s Hospital Millennium medical College

TIA- Transient ischemic attack

Chapter 1

Introduction

1.1. Back Ground

Rheumatic heart disease (RHD) is the most common cause of acquired heart disease among children in developing countries. (1) Rheumatic heart disease is the result of valvular damage due to the abnormal immune response to group A streptococcal infection usually during childhood.(2)

RHD is the final result of acute rheumatic fever (ARF), that develops from untreated throat infection (pharyngitis) caused by a bacterium called Group A Streptococcus.(1) the most important determinants of RHD are poor living conditions like Overcrowding, poor housing , under-nutrition, and lack of access to antibiotics to treat a simple throat infection. (2)

Even though acute rheumatic fever and Group A streptococcus pharyngitis are communicable diseases, WHO classifies RHD as a non communicable diseases. (3) Acute rheumatic fever develops 3 weeks after Group A streptococcus pharyngitis and it affects the joints, skin, brain, and heart. More than 50% of patients with acute rheumatic fever show manifestation of cardiac inflammation mainly involving the valvular endocardium. Initial attack might lead to severe valvular disease but RHD develops from cumulative valve damage due to recurrent paucisymptomatic episodes of ARF. (4)

RHD can be diagnosed in a patient with a known ARF attack but it is often diagnosed in patients who were previously asymptomatic or had no recollection of experiencing ARF symptoms. Most patient's presents with a complaint of shortness of breath. Clinical diagnosis is made when pathological valvular heart murmur detected during auscultation. The most common valvular lesion in patients with RHD is Mitral valve incompetence. It is the most common valvular lesion in patients with rheumatic heart disease, especially in the early stages of the disease.

Mitral stenosis develops later due to the persistent or recurrent valvulitis. (5)

Preventing the disease before it manifests is the most effective way of disease control in developing nations. Most of the time medical intervention is based on eradicating the bacteria

with penicillin which can prevent the initial ARF attack. Currently, there is no treatment for RHD except for its complications. Medical treatments other than antibiotic prophylaxis have not been that successful in improving patient's prognosis. Interventional treatment like surgery and cardiac catheterism is allowed when patients with severe valvular lesions become symptomatic.
(3)

In population based study in a rural area of Ethiopia with a total participants' of 987 aged 6-25 years chosen using cluster sampling and RHD was assessed by using the current consensus world health federation criteria it was found that 37 definite cases of RHD and a further 19 borderline cases, giving an overall prevalence of 37.5 cases per 1000 population.(6)

A national cross-sectional echocardiography survey was conducted from April 01, 2013 to December 10, 2014 in Ethiopia. Total of 3238 schoolchildren were screened with response rate of 98.1%. Two thirds (66.9%) of the children were from schools in rural areas. Overall age range for both males and females was 6 to18 years with a median age of 14 years. From the 3238 school children screened, 44 (1.4%) of the children were diagnosed to have definite RHD making the prevalence 14/1000. RHD involved the mitral valve in 42 children; and the aortic valve in 6 of the participants.(3)

1.2. Statement of the problem

Even though rheumatic heart disease (RHD) is not a major problem in developed nations it remains an important public health problem in developing nations. Countries with middle and low income are frequently attacked by the disease it is estimated that 15 million people worldwide are affected by this disease. The disease is widely spread in countries of the Middle East and Asia and also in some poor indigenous populations of some developed countries. RHD is frequently prevalent in sub Saharan Africa and it is one of the major causes of heart disease. In these poor countries the lack of specialized treatment centers and the availability of cardiac surgery results in poor prognosis on the patients. (6)

RHD is the common reason resulting in cardiovascular morbidity and mortality in young people. 62-78 million individuals are estimated to have RHD in recent study findings. Also RHD is estimated to be the potential cause of 1.4 million premature deaths per year worldwide. The disease is also responsible for the higher cardiovascular-related loss of disability among 10-14 years old world wide and the second highest in children aged 5-9years. (3)

RHD has a great economic impact on developing nations it is estimated to result in school absenteeism in about two thirds of affected individuals and also the disease progress during early adulthood causing chronic disability it has the potential to undermine the nations productivity rate. The diseases economic impact in the continent Africa was estimated to be 791million to 2.37 billion US dollars in the year 2010. treating GrAS pharyngitis, ARF, and RHD puts additional pressure on African health systems, treatment of GrAS pharyngitis is much less costly than treatment of either ARF or RHD given its prophylaxis nature. (7)

Developing nations are facing a great economic challenge in addition to the suffering and mortality rates associated with the disease. The costs are great headaches to the health care system and to the national economy. In a study done in South Africa for example showed that 2% to 3% of the country's gross national income was devoted to the treatment of cardio vascular diseases. (8)

The economic problem is further exacerbated by the fact that the burden of the disease occurs earlier among adults of working age in developing nations. In a survey done in five different

countries Brazil, India, China, South Africa and Mexico it was estimated that 21 million years of future productive life are lost as a result of CVD each year. (9)

The study assessed the prevalence and its associated risk factors rheumatic heart disease in pediatric patients aged 5 to 14 admitted to SPHMMC pediatrics ward between 2014 and April 2018GC.

1.3. Significance of the study

Hospital-based studies in Africa report that RHD accounts for up to 34.0% of cardiovascular disease-related hospital admissions.⁽¹⁵⁾ The disease is particularly prevalent in sub-Saharan Africa where it is one of the commonest causes of heart disease and where it carries a grim prognosis because of the lack of specialized centers and the availability of cardiac surgery.⁽⁶⁾

In population based study in a rural area of Ethiopia with participants aged 6-25 years gave an overall prevalence of 37.5 cases per 1000 population, the prevalence of definite disease increased progressively in participants aged 6-10 years, which shows the magnitude of the burden of the disease in children and the country.⁽⁶⁾ The disease has great impact on our nation's health care system due to its high morbidity and mortality rates. Also the expensive nature of the disease and its affecting the young adult generation of the country it has a great impact on the countries socioeconomic activities.

This particular research aims to identify the factors associated with RHD and use these findings to give recommendations on how to alleviate the disease burden to the college and concerned authorities.

Chapter 2

Literature Review

In surveys done using traditional diagnostic criteria, 15.6-19.6 million people worldwide have RHD. The data originated from studies done on school children in whom diagnosis is made by clinical assessment. Prevalence turned out to be highest in adults aged 20-50 years. Distribution of the disease differs between continents and countries with sub Saharan Africa and indigenous Australians seem to have the highest prevalence. In pacific islanders and indigenous Australians the prevalence is 5-10 per 1000 school children and roughly 30 per 1000 adults aged 35-44 years. (11)

Rheumatic heart disease prevalence varies in the continent Asia, in the rural area of Pakistan community as high as 12 per 1000 people. In South and Central America RHD has a lower reported prevalence rate. The global incidence of acute rheumatic fever in Children aged 5–14 years is roughly 300,000–350,000 per year, though incidence varies substantially by region.(11)

Between January 2010 and November 2012, 3343 patients from 25 centers in 14 low and middle income countries in Africa and Asia were enrolled and followed for two years to assess mortality, congestive heart failure (CHF), stroke or transient ischemic attack (TIA), recurrent acute rheumatic fever (ARF), and infective endocarditis (IE). Vital status at 24 months was known for 2960 (88.5%) patients. Two thirds were female. Even though patients were young (median age 28 years), the two year case fatality rate was high (500 deaths, 16.9%). Mortality rate was 116.3/1000 patient-years in the first year and 65.4/1000 patient-years in the second year. Median age at death was 28.7 years. (12)

Patients from low and lower middle income countries had significantly higher age and sex adjusted mortality compared to patients from upper-middle income countries. Valve surgery was significantly more common in upper-middle income than in lower-middle- or low-income countries.(12)

In a community based survey for prevalence of RF/RHD was done in four villages of different districts of Himacahl, India with no definite sampling technique it was found that from total population of 1882 subjects 11 people were found to have RF/RHD ,one with valvular lesion and ten without. Ten of the people who were affected by the disease are females and the youngest age with the disease was found to be 13.(13)

In a research done Bangladesh a total of 412 subjects were interviewed for the case-control study. The average age of the participants was 24.1 ± 9 years, and 55% were women. Of the participants, about 48% were from urban area, about 16% were from semi-urban area, 6.8% were from slum area, and 30% were from rural area.(16)

Two-thirds of the RF patients were aged less than 20 years, around 38% of the RHD patients were aged less than 20 years, and among controls, the percentage was 16%. The proportions of women were more in both RF (OR=2.5) and RHD (OR=1.9) patients. The proportion of subjects with ≥ 5 members in the family was significantly more in both RF and RHD patients than the reference population. The proportion of subjects with ≥ 2 siblings and overcrowding (>3 persons sharing a living room) (OR=1.7) have been reported more among the RHD patients.(16)

The monthly family income and education level of patients showed no significant difference across the three groups. The characteristics of parents, particularly education and occupation of both parents, were compared across the three groups. The numbers of mothers with low or no education and working mothers were more in RF and RHD patients compared to the reference group ($p < 0.05$). (16)

In a randomly selected school children from 4 to 25 years of age in Bonteheuwel and Zanga communities of cape Town, South Africa were screened for RHD according to standardized evidence based echocardiographic diagnostic criteria of the WHF 2720 students were selected to participate. Out of the 55 subjects with RHD 13, 23.6% had a definite and 42, 76.4% had borderline RHD. (14)

In a case control study done in Uganda in which rheumatic heart disease cases and normal controls aged 5–60 years were recruited and investigated for socioeconomic and environmental risk factors such as income status, employment status, and distance from the nearest health

centre, number of people per house and space area per person. 486 participants (243 cases and 243 controls) took part in the study. At univariate level, cases tended to be more overcrowded than controls; 8.0+/23.0 versus 6.0+/23.0 persons per house and controls were better spaced. At multivariate level, the odds of rheumatic heart disease was 1.3 times higher for overcrowding (OR = 1.35, 95% CI = 1.1–1.56).(15)

The major findings of this study were that there was a trend towards increased risk of rheumatic heart disease in association with overcrowding. There was interaction between overcrowding and distance from the nearest health center, suggesting that the effect of overcrowding on the risk of acquiring rheumatic heart disease increases with every kilometer increase from the nearest health center.(15)

In population based study in a rural area of Ethiopia with a total participants' of 987 aged 6-25 years chosen using cluster sampling and RHD was assessed by using the current consensus world health federation criteria it was found that 37 definite cases of RHD and a further 19 borderline cases, giving an overall prevalence of 37.5 cases per 1000 population. The prevalence of definite disease increased progressively from 24 cases per 1000 among participants aged 6-10 years to peak of 60 cases per 1000 to those aged 16-20 years. From the participants with the definite disease 36 out of 37 had evidence of mitral valve involvement and seven had aortic valve disease. (6)

All the participants with the disease did not report any symptoms related to heart failure and none gave a convincing history to make conclusion of existing preceding rheumatic fever. One of the participant with definite disease reported taking monthly prophylactic penicillin. The source population had a low level of employment, one third of the participants claimed they were not attending schools , parental illiteracy was high and more than 70% of them were farmers and laborers living in poor conditions and half of them sharing space with domestic animals.(6)

A national cross-sectional echocardiography survey was conducted from April 01, 2013 to December 10, 2014 in Ethiopia and a total of 3238 schoolchildren were screened. 44 (1.4%) of the children were diagnosed to have definite RHD making the prevalence 14/1000. Two thirds (66.9%) of the children were from schools in rural areas. Female students contributed to almost

half (48.5%) of those screened. Overall age range for both males and females was 6 to 18 years with a median age of 14 years. (3)

Children with borderline RHD were found to be fifteen (0.5%), making the prevalence 5/1000 with mitral regurgitation constituting the majority. Definite RHD is about three times higher than borderline RHD. The prevalence of definite RHD was seen slightly more often in females, students of age group 10–12 years, those from urban area, family size of 7 and above, The prevalence of RHD was lowest in children aged 6–9 years and is uniformly distributed in those aged 10–18 years. (3)

Chapter 3

Objective

3.1. General objective

To assess the prevalence of rheumatic heart disease and its associated risk factors in children whose age is between 5- 14 years admitted to SPHMMC pediatric ward 2014- April of 2018.

3.2. Specific objective

1.To assess the prevalence of rheumatic heart disease in children whose age is between 5- 14 years admitted to SPHMMC pediatric ward 2014-April of 2018.

2. To assess the associated risk factors of rheumatic heart disease in children whose age is between 5- 14 years admitted to SPHMMC pediatric ward 2014- April of 2018.

Chapter 4

Research methods and materials

4.1 Study area

The study was done in Addis Ababa, the capital and largest city in the country. According to the 2007 population census the city has a total population of 2,739,551. The research was conducted at Saint Paul's Hospital Millennium Medical collage which was established in 1968 but became a medical school in 2007. The college has more than 2800 clinical, academic, administrative and supportive staff. It provides service to an average of 1200 emergency and outpatient clients daily and has an inpatient capacity of more than 700 beds.

4.2 Study design

The study was a hospital based retrospective descriptive study to assess the prevalence of rheumatic heart disease and its associated risk factors in children whose age is between 5- 14 years admitted to SPHMMC pediatric ward 2014-April of 2018.

4.3 Source population

All patients admitted to SPHMMC pediatric ward.

4.4 Study population

Patients between 5-14 years of age with rheumatic heart disease admitted at SPHMMC from 2014 to April of 2018.

4.5 Study time

The research was conducted from December 2017 to July 2018.

4.6. Sample size determination

All cases of rheumatic heart disease admitted to SPHMMC pediatric ward whose age is between 5 -14 from 2014 to April of 2018.

4.7 Sampling technique

All cases of rheumatic heart disease admitted to SPHMMC pediatric ward whose age is between 5 -14 from 2014 to April of 2018.

4.8. Study variables

4.8.1. Independent variables

Age

Sex

Address

Family income

Mother's education and occupation

Family size

Number of siblings

Number of rooms

Number of people living per room

History of sore throat

Malnutrition

4.8.2. Dependent variable

Rheumatic heart disease

4.9. Data collection

Chart numbers of patients with RHD were obtained from HMIS log books. Data collection was through review of patient charts and collected by template designed after review of different literatures to assess the prevalence of RHD and its associated risk factors like residence, family income, mother's education, mothers occupation, family size, number of siblings, number of rooms, number of people living per room, history of sore throat and malnutrition in patients admitted to the wards. The data was collected by the researcher.

4.10. Data processing and analysis

The collected data was entered using SPSS 20. The analysis was made by cross tabulation and association between the variables was assessed by using chi-square test and if $p < 0.05$ it was taken as statistically significant

4.11. Ethical considerations

After approval from the SPHMMC public health department was received, access to patient charts was asked to the respective office. Any information gathered through this research was confidential and used for research purpose only.

4.12. Data quality assurance

The data quality was maintained mainly through two steps: before and after data collection. Before the data was collected template was developed after reviewing different literatures. On each day of the data collection period the data was checked for its completeness and incomplete charts were excluded from analysis.

4.13. Operational definitions

Pediatric age group is children between the ages of 5 and 14.

Overcrowding is people >5 living in a room.

Low income represents patients from families who can't afford to pay for treatment

4.14. Dissemination of findings

Research findings will be disseminated to the hospital and local authorities so that it aids in reflecting the disease burden at the hospital and community level and also aid in the management of rheumatic heart disease at hospital level so that admitted patients have good outcome.

Chapter 5

Results

A total of 637 patients were admitted to the pediatric ward from 2014- April 2018 of which 117 were cardiac patients accounting 18.3 % of the admissions. 91 of the admitted patients had RHD, accounting 14.2% of the whole admissions.

A total number of 91 charts were reviewed for this study and the average age of patient was 9.6 years of these 73.6% were male. 80.2% were from rural areas and 19.8% were from urban areas.

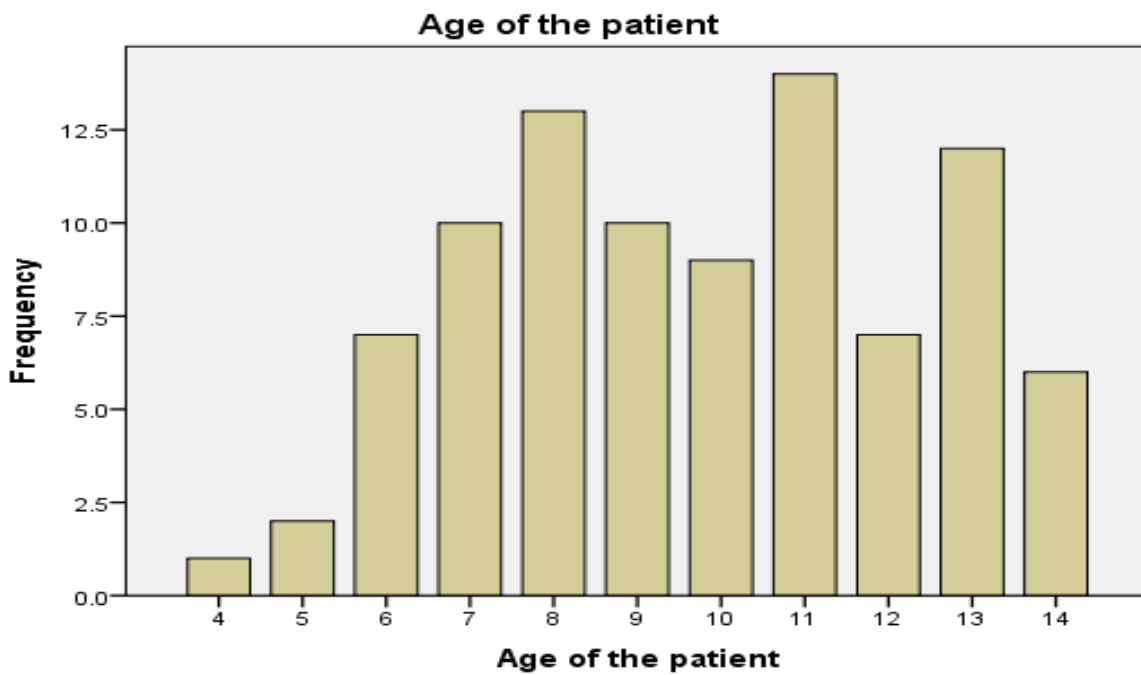


Figure 1 Distribution of age

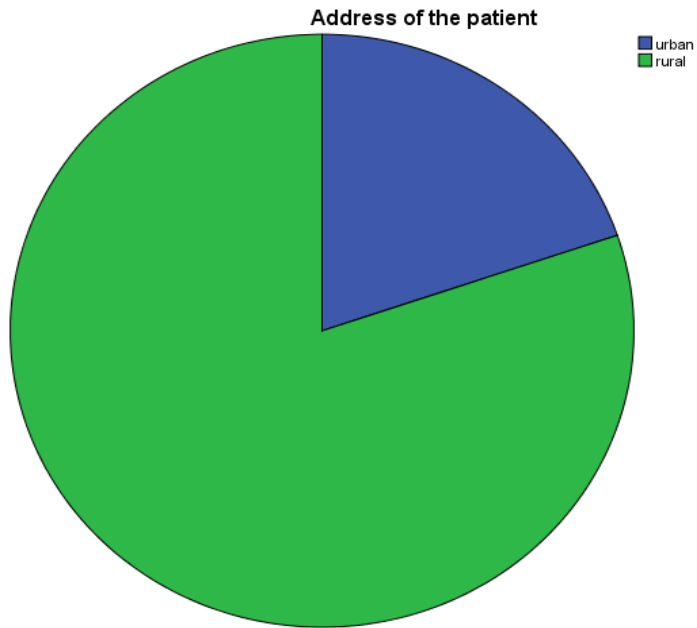


Figure 2 : Distribution of patients based on residence

Seventy one percent families of the admitted patients couldn't afford treatment at SPHMMC. 61.5 % of the families live in a one room house with 72 (79.1%) patients had a family number of >5 and 69.2% had > 5 people living per room. The proportion of patients with sibling's ≥ 2 is 81.2%. No significant association was seen between family income, family size, number of room, number of people occupying a room and number of siblings.

Table 1: Cross tabulation between RHD and risk factors

		RHD confirmed using echo		Total	X ²	P value
		Yes	No			
Family income	Not able to afford treatment	65(72.2%)	0	65(71.4%)	2.5	0.112
	Able to afford treatment	25(27.8%)	1(100%)	26(28.6%)		
Total		90(100%)	1(100%)	91(100%)		
Number of family members	<5	16(17.8%)	0	16(17.6%)	0.216	0.642
	>5	74(82.2%)	1(100%)	75(82.4%)		
Total		90(100%)	1(100%)	91(100%)		
Number of people per room	<5	27(30%)	1(100%)	28(30.8%)	2.2	0.313
	5 and above	63(70%)	0	63(69.2%)		
Total		90(100%)	1(100%)	91(100%)		
Number of siblings	<2	17(18.9%)	0	17(18.9%)	0.232	0.630
	>2	73(81.1%)	1(100%)	74(81.3%)		
Total		90(100%)	1(100%)	91(100%)		

Educational status of the mother showed the following distribution; 11% attended secondary school and above with the remaining 22% and 61% who attended primary school and those who had no education respectively. 36(39.6%) mothers worked outside of the house and the remaining 54 (59.3%) were housewives. This study found no significant association between RHD and maternal education (p 0.78) and occupation (p 0.46).

Of the 91 admissions 69(76.7%) patients had prior history of sore throat and 21(23.3%) had no such history. Those who had malnutrition were 38(41.8%) and 53(58.2%) The study showed no association between prior sore throat, malnutrition and RHD (p 0.582), (p0.395) respectively.

Patients with identified RF which fulfills the Jones criteria were 10(11%) and those with prior unidentified RF were 90(89%). The study showed an association between prior RF and RHD (p 0.004).

Table 2: Cross tabulation between RHD and risk factors

		RHD confirmed using echo		Total	X ²	P value
		Yes	No			
Educational status of the mother	primary school	20(22.2%)	0	20(22.2%)	0.497	0.780
	secondary school and above	10(11.1%)	0	10(11.1%)		
	Illiterate	60(66.7%)	1(100%)	61(67%)		
Total		90(100%)	1(100%)	91(100%)		
Occupation of the mother	Working outside the house	35(38.9%)	1(100%)	36(39.6%)	1.54	0.462
	Housewife	54(60%)	0	54(60%)		
	Deceased	1(1.1%)	0	1(1.1%)		
Total		90(100%)	1(100%)	91(100%)		
Does the patient have malnutrition	yes	38(42.2%)	0	38(41.8%)	0.725	0.395
	No	52(57.8%)	1(100%)	53(58.2%)		
Total		90(100%)	1(100%)	91(100%)		
Prior sore throat	Yes	69(76.7%)	1(100%)	70(76.9%)	0.303	0.582
	No	21(23.3%)	0	21(23.1%)		
Total		90(100%)	1(100%)	91(100%)		
Identified RF	Yes	9(10%)	1(100%)	10(11%)	8.190	0.004
	No	81(90%)	0	81(89%)		
Total		90(100%)	1(100%)	91(100%)		

Majority of the patients stayed in the hospital up to 2 weeks (38.5%). 82.4% of the patients were discharged improved, 34.1% patients came for follow up and 52.7% were referred for surgical management.

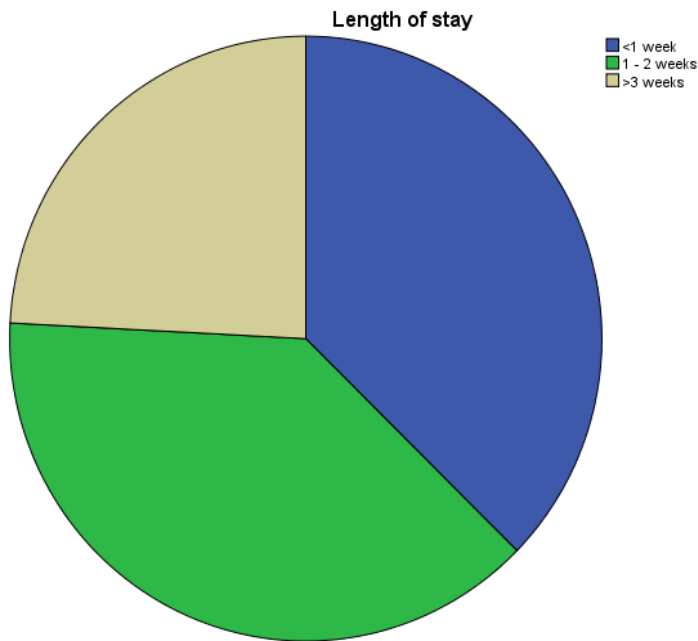


Figure 3: Distribution duration of stay
Multiple valve involvement with pulmonary arterial hypertension was seen in 44% of patients and the three valves (MR, TR, AR) were involved in 23.1%.

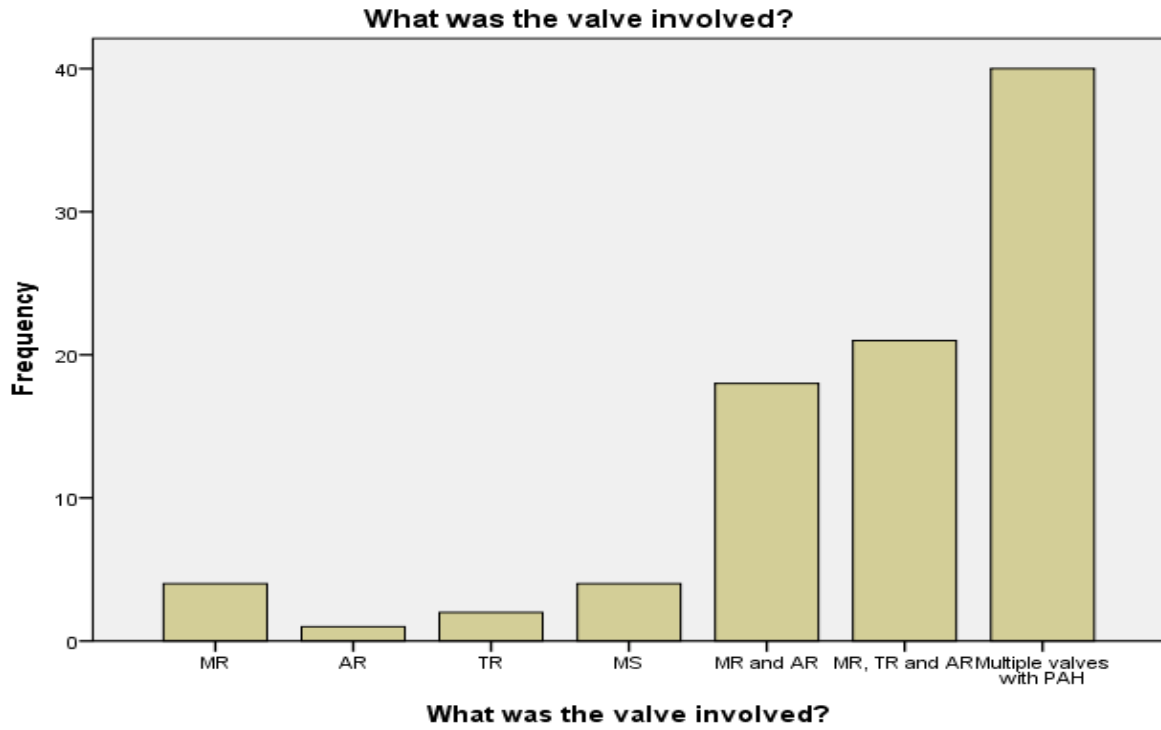


Figure 4: Distribution of valvular involvement

Chapter 6

Discussion

Rheumatic heart disease is an important public health issue in most middle and low income countries. Its impact is greatest at sub Saharan countries where it is the leading cause of acquired heart disease.

This research aimed to assess the magnitude of RHD and associated risk factors in pediatric patients that were admitted to SPHMMC. 91 of the admitted patients had RHD, accounting 14.2% of the whole admissions. Although I couldn't find prior hospital based studies in the country, a national cross sectional echocardiography survey conducted between 2013-2014 a total of 3238 school children were screened from these 44(1.4%) had definite RHD making the prevalence of the disease 14/1000(6). Hospital-based studies in Africa report that RHD accounts for up to 34.0% of cardiovascular disease-related hospital admissions, and it is the most frequent cause of heart failure among children.

In this particular research the average age of patients who are affected by RHD is 9.6 years with higher distribution seen in the ages between 8 and 11. But in a study done in Ethiopia in 2016 to assess the prevalence of RHD among school students, the average age of patients with RHD was 13.3 years with higher distribution in the ages of 10-12. In a hospital based study done in Bangladesh a comparable result was seen, the mean age being 10.8 years. Among various groups, maximum number of patients in the age group of 11-12 years (16). The difference in the average age in the study done in Ethiopia and this research could be due to the fact that the prior study enrolled patients who were in primary school.

Residence of the patient has a significant impact in the patient ability to access health care. 80.2% of the patients came from rural parts of Ethiopia but there was no statistical association between place of residence and RHD (p0.618). In a study done in Jimma region 88.2% of

patients resided in rural areas which also showed no association with RHD (p 0.320). In a study done in Pakistan to investigate the role of socioeconomic factors affecting RHD comparable results were seen with rural dwellers constituting 65.4% of the study population . In contrast to these findings in a research conducted in Bangladesh found majority of the patients (78.6%) with RHD were from urban areas but failed to find any correlation between RHD and place of residence (p0.358) (16).

The relationship between poverty and RHD may well be explained by its remarkable prevalence in resource-poor countries. In this study income was assessed based on the ability to pay for treatment after admission to the hospital. 65(72.2%) families couldn't afford treatment but this showed no relation in respect to it being a risk factor for RHD (p 0.112). Similar pattern was seen in community based studies conducted in Jimma and Bangladesh where there was no significant difference in their measures of socioeconomic background between cases and controls. A research in Uganda which aimed to evaluate the socioeconomic and environmental risk factors of RHD also found no significant difference in income in cases and controls. But a study conducted in Fiji showed a trend towards increased risk of RHD in association with lower socioeconomic status. This particular research defined low income as the inability to afford treatment which might not reflect the real income of the family suggesting even though the family can afford the treatment in the hospital their income might not still be sufficient enough for basic life necessities.

Maternal education level and occupation can impact the disease process in the line of identification of problem and early treatment seeking behavior. 33% of the mothers in this study with child having RHD attended primary school and above, with 67% of the mothers being illiterate but showed no significant association as a risk factor for RHD (p 0.780). The study in Jimma showed almost comparable figures with 72.2% of the mothers being illiterate and maternal education showing no significant association with the disease (p 0.412)(6). Patients with mothers who worked outside the house makeup 39.6% of the study population, the remaining patients had housewife mothers. This research didn't find significant relation between RHD and maternal occupation (p 0.462). In comparison to this the study in Bangladesh showed having a working mother was risk factor for developing RHD (p 0.001). Similarities between the Jimma

study and this study are seen because the study populations have the similar socioeconomic background.

Overcrowding in correlation with poverty and poor hygiene is one of the most important risk factor for the development of ARF and RHD. Societies where living conditions have improved, have recorded substantial decline in the prevalence of RHD. For instance, the recent decline in RHD in China and other emerging economies is apparently linked to economic development which translated into improved living conditions. Overcrowding defined in this study as >5 people living per room was not implicated as a risk factor to develop RHD (p 0.131).

But the study done in Bangladesh found sharing a living room by >3 people was detrimental for RHD (p 0.015)⁽¹⁶⁾. 82.2% of the patients live with a family size above 5 but it showed no significant association with RHD (p 0.112) and comparative result was seen in the Jimma study (p 0.731).

In contrast to these two findings, the research in Uganda suggest that irrespective of distance from the nearest health center, an individual's risk of acquiring RHD starts to increase when their household becomes overcrowded. Their study highlights the importance of overcrowding in the pathogenesis of RHD, especially in the developing world where rapid urbanization and poor housing predisposes suburban dwellers to overcrowding and consequently ARF and RHD. Similar findings with this was seen in the Bangladesh study where 66% of the patients lived in a family >5 and had a statistically significant relation with RHD (p 0.037). ⁽¹⁵⁾

The difference might be due to the fact that study in Bangladesh constituted mostly of sub-urban dwellers that lived in smaller rooms with increases number of people. Even though the number of people per family is high, patients from rural Ethiopia have spacious living conditions.

Limitations of the study

The problems faced in this particular study are incomplete charts and some card numbers that were registered in the HMIS log book were not located. Limited number of charts was discovered and reviewed which might make it difficult to conclude that this particular study is representative of the disease burden and the risk factors at the community level.

Chapter 7

Conclusion and Recommendation

7.1. Conclusion

RHD accounts for 14.2% of admissions in the pediatric wards. This study showed no significant association between RHD and the risk factors like low income family, illiterate mothers, overcrowding, sore throat, place of residence and malnutrition.

7.2. Recommendation

Based on the finding that ARF was only identified in 11% of patients and only 34.1% of the patients came for follow up of the study the following recommendations are made

- Educating mothers about ARF
- Educating the community to develop early treatment seeking behavior for pharyngitis.
- Parents must be counseled on strict follow up protocol
- To train health professionals in health centers to identify and treat or refer ARF at early stages.
- More hospital based studies should be conducted to analyze the burden of the disease on patients as well as the community

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10. Annex

1. Age
 - a. 5-10 years b. 10-14 years
2. Sex
 - a. Female b. male
3. Address
 - a. Urban b. rural
4. Income
 - a. Not able to afford treatment b. able to afford treatment
5. Mothers occupation
 - a. Working outside the house b. housewife
6. Mothers education
 - a. Primary school b. secondary school and above c. illiterate
7. Family size
 - a. <5 b. >5
8. Number of siblings
 - a. <2 b. >2
9. Housing
 - 9.1 number of rooms
 - a. 1 b. 2 c. 3 and above
 - 9.2 number of people living in a room
 - a. <5 b. 5 and above
10. Prior history of sore throat?
 - a. yes b. no
11. Does the patient have malnutrition?
 - a. yes b. no
 - 8.1 a SAM b MAM
12. Was echocardiography done?
 - a. yes b. no
13. Was antecedent RF identified?

If yes, does the diagnosis fulfill Jones criteria?

 - 13.1 major criteria
 - a. antecedent streptococcal infection

- b. carditis
- c. migratory polyarthritis
- d. subcutaneous nodules
- f. erythema marginatum

13.2 minor criteria

- a. raised ESR, CRP or leukocytosis
- b. fever
- c. arthralgia
- d. prior RF or RHD
- f. prolonged PR interval

14. Length of stay

- a. <1 week
- b. 1-2 weeks
- c. > 3 weeks

15. Outcome

- a. discharged improved
- b. left against medical advice
- c. death

16. Was the patient referred for surgical management?

- a. yes
- b. no

17. Did the patient have follow up?

- a. yes
- b. no