ORIGINAL ARTICLE

PATTERN OF HEART DISEASES IN CHILDREN OVER FIVE YEARS PERIOD IN JIMMA UNIVERSITY HOSPITAL: A RETROSPECTIVE STUDY.

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ABSTRACT

BACKGROUND: ***Cardiovascular diseases are highly prevalent and leading causes of death in the developed nations. Worldwide, the pattern and type of cardiovascular diseases in children is different from that of adults. Most heart problems in children being due to congenital heart defects in developed counties while rheumatic heart diseases in developing countries.***

METHODS: ***A retrospective study on was conducted with the aim of determining the pattern of pediatrics heart diseases and its relative prevalence in Jimma University Hospital during September 1998 to August 2002.***

RESULTS: ***During the study period, 254 new cardiac patients were examined and investigated. The age ranged 3 months to 14 years with median age of 7 years. The male to female ratio was 0.79:1. Of the 254 children, 178 (70%) had acquired heart diseases and 76 (30%) patients had congenital heart diseases. Among children who were diagnosed to have acquired heart diseases 132 (74.5%) had rheumatic and 46 (25.5%) non-rheumatic origin heart diseases. Among those who had congenital heart diseases, ventricular septal defect was the most common lesion, affecting 47 (62%) children followed by tetralogy of Fallot, which affected 12 (16%) children. Eighteen percent of children with heart diseases defaulted from regular follow up.***

CONCLUSION: ***This study showed that high relative prevalence of heart diseases with increasing trend of new cases, affection of more girls than boys, high defaulter rate from follow up and majorities of the cases from rural area. Acquired heart diseases, in particular rheumatic heart diseases continue to be an important cause of suffering among children.***

Rheumatic heart diseases being the commonest problem identified during the study period. preventive measure should be done by educating and raising awareness of the community about primary prevention and the danger of the disease and of course the advantage of follow up for those with heart diseases.

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INTRODUCTION

Cardiovascular diseases are highly prevalent diseases and are the leading causes of death in the developed nations. The prevalence is rising alarmingly in some developing countries as malnutrition and infectious causes of morbidity and mortality are declining (1, 2).

However, worldwide, the pattern and type of cardiovascular diseases in children is different from that of adults. Most heart problems in children are due to congenital heart defects. The frequency of congenital

heart disease in various countries and different ethnic group is about the same with incidence of 4 – 10/1000 live births. Of acquired heart diseases, rheumatic heart disease is common in developing countries (3,4).

Studies done in Pakistan to determine the pattern of pediatrics heart diseases showed that 63-67% children had congenital heart diseases while 19-35% had acquired heart diseases. Of the congenital heart disease, acyanotic heart lesion was the commonest. Among acquired heart diseases 43% had rheumatic heart diseases while 50.6%, had myocardial diseases. Another community based study revealed 5.7 in 1000 prevalence of rheumatic heart disease, and females were affected more (5,6,7).

In the Sudanese study, more than half of the children with heart diseases had congenital heart diseases; ventricular septal defect (VSD), tetralogy of fallot (TOF), pulmonary stenosis (PS), patent ductus arteriosus (PDA) and atrio-ventricular septal defect (AVSD) being the specific defects seen in descending order (8).

Of 375 Malaysian children with congenital heart diseases, 83.2% had acyanotic cardiac lesion and 16.5% had cyanotic lesions. VSD was the commonest lesion, followed by PDA and atrial septal defect (ASD). On a descriptive study on 286 Zimbabwean children with congenital heart diseases, the predominant lesions were VSD, TOF and PDA (9,10).

Even though, there are no proper documentation of cardiovascular diseases in Ethiopia, it is estimated that about 50,000 Ethiopian children are born annually with heat diseases. It is estimated that as many as 200,000 new cases of heart diseases occur each year and is among the top killers in the country (11,12). On a study done in Addis Ababa on 468 children with heart disease, 168 had congenital heart disease, 278 (59.4%) had rheumatic heart disease and only 14 (3%) had acquired heart diseases of non-rheumatic origin (13). Organic heart diseases were found in 77 out of 95 children suspected to have heart diseases on a study in Jimma, of whom 38 (49.4%) had rheumatic heart disease and 27 (35%) had congenital heart disease. VSD was the commonest (48.1%) lesion among patient with congenital heart disease followed by PDA accounting for 7% (14).

Researches on pediatric heart diseases are very few in the country as a whole and in this part of the country in particular, this study could be used as baseline information for further studies and the finding could help policy makers and managers for evidence based decision-making.

So, the aim of this study is to show pattern of heart diseases among children visited Jimma University Hospital pediatrics and child health department.

METHODS

A retrospective study was done in Jimma University Hospital pediatrics and child health department, among children visited the hospital during September 1998 to August 2002. The hospital has 65 beds and offers different services such as out patient, referral clinics, immunization and nutritional rehabilitation.

Children under the age of 14 years diagnosed to have heart diseases and attended the cardiac clinic at least once were included in the study.

Data were collected from the hospital morbidity recording book and patient's card using prepared format. The variables included were age, sex, type of heart diseases, status at presentation, laboratory results, echocardiography finding when available and admission history and its outcome after treatment. Health personnel that had a half-day briefing on how to retrieve the relevant data undertook the data collection. Using the entire clinical, laboratory and imaging findings the pediatrician working in cardiac clinic made

the final diagnosis.

Congenital heart disease was defined as an anatomical abnormality of cardiovascular structure evidenced by characteristic clinical, chest X-ray and/or echocardiographic findings. Heart diseases with the exception of congenital defects were considered as acquired one. Rheumatic heart disease was defined as a delayed non-suppurative sequel of pharyngeal infection with group A streptococcus manifested with inflammation of heart and the diagnosis was based on WHO criteria for the diagnosis of rheumatic fever and rheumatic heart disease (15,16). Pericarditis was defined as the presence of distant heart sound or pericardial friction rub and pericardial fluid accumulation on echocardiography.

Before commencing the data collection, written request were delivered to the Hospital Director and other appropriate bodies. Confidentiality of information as well as accuracy of data was maintained. Cards of the diseased children served as checklist for verifying the accuracy of the registration book records. The data were cleaned and entered in to a computer and analyzed using SPSS for windows version 11.5. The findings were described and discussed.

RESULTS

During September 1998 – August 2002 a total of 17,852 newly sick children visited the JUH pediatrics and child health outpatient department; of these 287 were diagnosed to have heart diseases making the relative prevalence for heart disease 1.6%. Thirty-three patients were excluded from the study due to incompleteness of records making a response rate of 88.5%. Seventy-five (29.5%) were from Jimma town and 179 (70.5%) from out side the town. One hundred and twelve (44.1%) of the children diagnosed to have heart disease were male and 142 (55.6%) female making the male to female ratio 0.79:1. The age at initial presentation ranged from 3 months to 14 years with the median age of 7.4 years (Table1).

Table 1. Frequency distribution of type heart diseases by sex, age and address of affected Children (Sept. 1998 to Aug 2002), JUSH.

Variables	AHD (n=178)	CHD (n =76)	Total (n = 254)
	No. (%)	No. (%)	No. (%)
Age in year			
0 – 4	22 (37.3)	37 (62.7)	59 (23.2)
5 – 9	78 (77.2)	23 (22.8)	101 (39.8)
10 – 14	78 (83.0)	16 (16.0)	94 (37.0)
Sex			
Male	81(72.3)	31 (27.7)	112 (44.1)
Female	97 (68.3)	45 (31.7)	142 (55.9)
Address			
Jimma town	44 (56.7)	31 (43.3)	75 (29.5)
Outside Jimma	124 (73.4)	45 (26.6)	169 (70.5)

JUSH (Jimma University Specialized Hospital), AHD (Acquired Heart Disease), CHD (Congenital Heart Disease)

Over the past five years, the number new heart disease cases per year increased from 40 in 1998 to 48 in 2002, which is mainly of increment of new cases of acquired heart diseases. There was upsurge of acquired heart disease (69 new cases) in 2000 but on the decline there after (Fig 1).

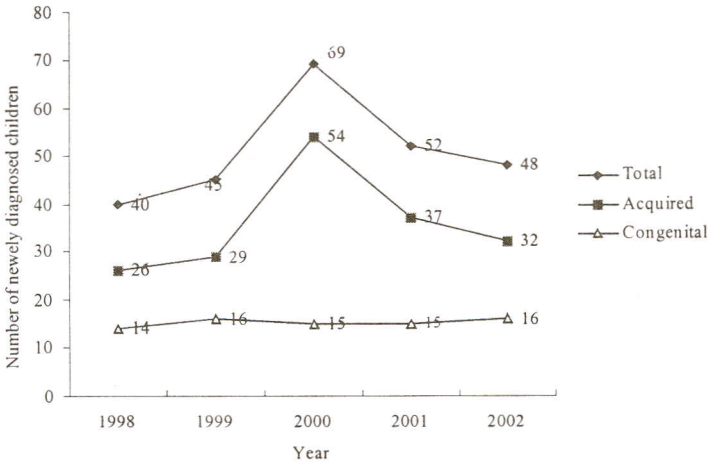

Figure 1. Pattern of heart diseases over five-year period (Sept. 1998-Aug.2002), JUSH.

Of 254 children included in the study, 178 (70%) had acquired and 76 (30%) congenital heart diseases. The proportion of congenital heart disease was found to be high (63%) in the under four years age group but in the age group of 5-9 and 10-14 years, acquired heart disease was predominant with proportion of 77% and 83%, respectively. Fifty six percent of the children affected by heart diseases were female which was true for both congenital (59.2%) and acquired (53.5%) heart diseases (Tables 1 and 2).

Among acquired heart diseases rheumatic heart disease affected 132 (74.1%) children followed by myocarditis affecting 19(10.7%). Pericarditis, cardiomyopathy and others (arrhythmias, systemic and pulmonary hypertension) affected 13 (7.3%), 8 (4.5%) and 6 (3.4%) children, respectively. In 98% children with rheumatic heart disease mitral valve was affected (table2).

Table 2. Type of heart diseases by sex over 5 year period (Sept. 1998 - Aug.2002), JUSH.

Type of heart diseases	Males	Female	Total
	No. (%)	No. (%)	No. (%)
VSD	18(38.3)	29(61.7)	47(61.8)
TOF	4(33.3)	8(66.7)	12(15.9)
PS	3(50.0)	3(50.0)	6(7.9)
ASD	3(60.0)	2(40.0)	5(6.6)
AVSD	2(100.0)	0(0)	2(2.6)
PDS	0(0)	2(100.0)	2(2.6)
AS'	0(0)	1(100.0)	1(1.3)
Others	1(100.0)	0(0)	1(1.3)
Total	31(40.8)	45(59.2)	76(100.0
Acquired heart disease			
RHD	61(46.2)	71(53.8)	132(74.1)
Myocarditis	8(42.1)	11(57.9)	19(10.7)
Pericarditis	7(53.8)	6(44.2)	13(7.3)
Cordiomyopathies	3(37.5)	5(62.5)	8(4.5)
Others†	2(33.3)	4(66.7)	6(3.2)
Total	81(46.5	97(53.5)	178(100.00)

† Includes arrhythmias, systemic and pulmonary hypertensions.

Combined mitral valve lesion (regurgitation and stenosis) being the commonest seen in 89 (67.4%), followed by isolated mitral regurgitation (MR) in 26 (19.7%) and mitral stenosis (MS) in 7 (5.3%). Isolated aortic regurgitation (AR) and combined mitral regurgitation and aortic regurgitation (MR/AR) each was found in 3 children (table 3).

Table 3. Type of valvular lesions by sex over 5-year period (Sept. 1998 - Aug.2002), JUSH.

Valves affected with RHD	Males	Female	Total
	No (%)	No (%)	No (%)
MR	14 (53.8)	12 (46.2)	26(19.7)
MR+MS	38 (42.7)	51 (57.3)	89 (67.4)
MS	5 (71.4)	2 (28.6)	7 (5.3)
MR+MS+TR	2 (50.0)	2 (50.0)	4 (3.0)
AR	1 (33.3)	2 (66.7)	3 (2.3)
MR+AR	1 (33.3)	2 (66.7)	3 (2.3)
Total	61 (46.2)	71 (53.8)	132 (100.0)

Of children with congenital heart diseases, 62 (81.5%) had acyanotic and 14 (18.5%) cyanotic congenital heart disease. VSD was the commonest congenital heart defect occurring in 47 (61.8%) followed by TOF in 12 (15.9%). The frequency of PS, ASD, AVSD, PDA, aortic stenosis (AS) and single ventricle (SV) was 6 (7.9%), 5 (6.6%), 2 (2.6%), 1 (1.3%), 1 (1.3%) and 1 (1.3%), respectively. Among those children with VSD, three had associated chromosomal disorder (2 Down and 1 Turner syndrome) and another one had dextrocardia (table 2).

Among children with mitral valve disease, combined lesions (MR/MS) were detected at initial presentation in 79 (82.3%) of children while stenotic lesions were detected 5-9 years after the initial presentation in 57%. Almost all (96%) children with isolated regurgitant lesions were detected during initial presentation (Table4).

Table 4. Rheumatic mitral valve lesions by time of detection of Pediatrics cardiac patients over 5 year period (Sept., 1998 to Aug. 2002), JUSH.

Type of lesion	Time at detection		
	Initial presentation	5 – 9 year after initial presentation	Total
	No (%)	No (%)	No (%)
Combined ‡	79 (82.3)	17 (17.7)	96 (74.4)
Mitral regurgitation	25 (96.2)	1 (3.8)	26 (20.2)
Mitral stenosis	3 (42.9)	4 (57.1)	7 (5.4)
Total	107 (82.9)	22 (17.1)	129 (100)

‡ Includes MR+MS, MR+AR, MR+MS+TR

The commonest clinical finding was murmur in 228 children followed by body swelling and shortness of breath in 138 and 124 respectively. Fifty-one children had history of feeding interruption during early childhood period (table5).

Table 5. Distribution of the clinical manifestation of children with heart diseases over 5 year period (Sept. 1998 to Aug. 2002) In JUSH.

*Clinical manifestation	Number	Percent
Murmur	228	20.4
Body swelling	138	12.4
Shortness of breath	124	11.1
Cardiomegaly	121	11.0
Excertional dyspnea	117	10.5
Fever	116	10.4
Palpitation	107	9.6
PND	62	5.6
Interruption during feeding	51	4.6
Orthopnea	49	4.4
Raised ESR	14	1.3
Joint pain	13	1.2
Chorea	8	0.7
Subcutaneous nodule	7	0.6
Total	1115	100.0

Most patients have more than one clinical presentation.

During the study period, 221 children were admitted to the ward at least once, congestive heart failure being the main reason for admission in 173 (78.3%) children and other diseases like severe malaria, severe pneumonia and malnutrition were the reason for admission in 48 (21.7%) children. Congestive heart failure was attributed to rheumatic carditis (acute or recurrence) in 89 (68.5%), infective endocarditis in 15 (11.5%), congenital heart disease in 10 (7.7%), disease of the myocardium in 6 (4.6%), anemia in 5(3.8%), and drug discontinuation 5 (3.8%) cases. During the study period 15 (5.9%) children died of their illness, 46 (18.1%) lost from follow up and the remaining 193 are still on follow up (Figure 2).

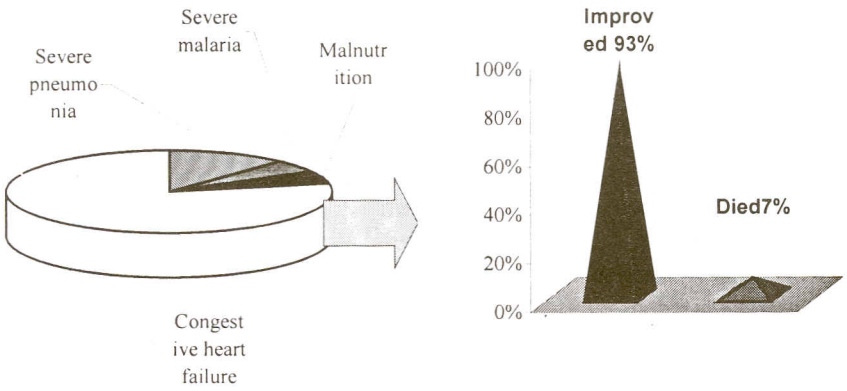

Figure 2 Reasons for hospital admission and the out come of the 221 admitted children with heart diseases, Sept. 1998- Aug. 2002.

DISCUSSION

During the last three decades, considerable changes have occurred in the profile of heart diseases in children regarding type of lesion, diagnosis and treatment modality. In terms of type of lesion and age of diagnosis, the essence of the change is due to marked decrease in the incidence of rheumatic heart diseases with increment in prevalence of congenital heart disease (5). This however, is not true in developing countries like Ethiopia, where infectious causes of heart diseases are common; and majority of births take place at home and there is no routine screening of newborns for possible congenital anomalies. Poor socio-economic status, overcrowding and poor access to medical care are important factors for high incidence of rheumatic heart disease. Jimma University Hospital is the only tertiary referral center for the entire southwest Ethiopia with an estimated catchments population of more than 10 million.

This study showed a high relative prevalence of heart diseases with predominance of acquired heart diseases. Though it does not give incidence or prevalence of heart diseases in the community, as it was an institutional study, the relative prevalence of acquired and congenital heart diseases from this study was 1% and 0.4% respectively. This finding is similar with previous studies done in Addis Ababa and Jimma where acquired heart diseases were the principal groups of heart diseases (10,13). In contrary to our finding, studies in some developing countries like Pakistan, Malaysia, Afghanistan and the Sudan (5,8,9,16) showed an increment in the incidence of congenital heart disease, which could be attributed to the improvement in the health delivery system and socioeconomic status. In our study, congenital heart disease was predominant in younger age groups while acquired heart disease after four years of age, which goes with the epidemiology of streptococcal pharyngitis and rheumatic fever (4). In contrary to the textbook facts (4), our study revealed as more girls were

affected than boys. Though the design and the setting was different this was true in the Pakistan studies (6,7). Rheumatic heart disease accounted for more than three quarters of the acquired heart diseases in our study. During the study period the number of new cases per year was increasing which may be explained by the existing poor socio-economic status, over crowding and poor access to medical care existing in the area. This was true in two similar previous studies in the country (10,13).

This study revealed as 98% of patients with rheumatic heart disease had involvement of the mitral valve; combined MR/MS being the commonest lesion followed by isolated MR. This is true in standard textbooks and most of the previous studies where mitral valve involvement was the commonest lesion (4,6,7,13). The high proportion of stenotic lesion may show recurrent attacks of rheumatic fever either due delay in seeking medical support or poor adherence to follow-up.

Myocarditis and cardiomypathies were found to be rare in this study accounting for less than 15% of acquired heart diseases, which is true in other studies as well (6,8). A study done in Addis Ababa revealed a 3% of non-rheumatic acquired heart diseases (13). The picture of heart diseases in our country is even grimmer, rheumatic heart disease continue to cause suffering in large number of children.

The picture of heart diseases in developed countries is quite different from developing countries with congenital heart disease being the commonest. Of all congenital heart diseases, acyanotic lesions were found to be common, VSD being the commonest defect and TOF was the commonest cyanotic heart diseases in this study, which is similar with many previous studies (8-10,13,16,17).

Since there was no tracer study done on defaulters, it is very difficult to give concrete reasons why significant proportion (18%) of children lost from follow up but one can assume as long distance, death at home, lack of transport and poor family knowledge about the disease could be some of them. The fact that, this study is hospital based may not be representative for heart diseases in the community.

In conclusion, this study showed that high relative prevalence of heart diseases with mean age of presentation was 7 years, increasing trend of new cases, affection of more girls than boys and majorities of the cases from out side Jimma. The study also revealed high proportion of rheumatic heart diseases, VSD to be the commonest congenital heart disease and high defaulter rate from follow up.

Therefore rheumatic heart diseases being the commonest problem identified during the study period, a preventive measure should be done by educating and raising awareness of the community about primary prevention and the danger of the disease and of course the advantage of follow up for those with heart diseases.

.Since the problem in most of these children is not amenable to medical treatment alone, arrangement should be made surgical intervention.

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