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Pattern of cardiac diseases among children in a tertiary hospital in North Central, Nigeria: A three and half years retrospective cohort echocardiographic study

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Abstract*: Background:* Cardiac disease is an important non-communicable disease encountered among paediatric populations with varying patterns in different regions. This study is aimed at finding the spectrum of cardiac diseases among the paediatric patients seen at Benue State University Teaching Hospital (BSUTH), Makurdi Nigeria.
Method: A retrospective review of all cardiology patients seen at both in- and out-patient units of the paediatric department of BSUTH between June 2012 to December 2015. Data on age, gender, presenting complaints, final diagnosis, investigations, intervention and treatment outcome were obtained from the case folders. The analysis of the data was done with Excel spreadsheet and the results were presented as frequency and percentages.
Results: Of the 8590 patients seen, 39 (0.45%) had cardiac diseases. The mean age of the patients was 60.2±59 months with Male: Female of 1.1:1. Twenty-eight (71.7%) of them had congenital heart disease (CHD) with the most prevalent type been acyanotic CHD among 21(53.8%). Ventricular septal defect (VSD) accounted for 15(71.4%) of the 21 (53.8%) patients. Hypertensive heart disease was found in one (2.6%) patient who was an obese adolescent.
Conclusion: Congenital heart disease (CHD) and acquired heart disease (AHD) were all represented in this cohort with CHD being the most prevalent.

Keywords: Cardiac disease, Children, Pattern, Tertiary Hospital, Echocardiography

Introduction

Africa is believed to have one of the highest prevalence of heart diseases among children with an epidemiological pattern that is quite different from what is obtainable in the developed countries of the world.[1] Though the prevalence of Congenital heart disease (CHD) is reported to be similar in all countries at an approximate rate of 8 per 1000 live births,[2] Africa has been shown to have the lowest rate due to paucity of data.[3]
In Nigeria, heart disease has been recognized as a major contributor to childhood morbidity and mortality.[4] Although data on national prevalence of heart disease among children is lacking, reports of studies conducted by individuals from different parts of the country[4-7] have documented the various type of cardiac diseases and the prevalence encountered among children in those areas.

To the best of our knowledge, study on cardiac diseases in children have not been carried out in our study location. Our health facility is a relatively young one and it would be good to know what the cardiac problems of the children seen here are as it could help in determining what should be priority in both manpower and infrastructural development.
The objective is to assess the pattern of cardiac diseases encountered among the paediatric patients seen in Benue State University Teaching Hospital (BSUTH), Makurdi, Nigeria.

Materials and method

Study Design: A retrospective cohort study of all available secondary data of children seen in both the in- and out-patient units of paediatrics department in the hospital. The period under review was June 2012 to December 2015.

Study Setting: Benue State University Teaching Hospital (BSUTH) is a state owned tertiary health facility that serves the State and receive referral from neighbouring States of Taraba, Kogi, Nassarawa and other States of the Federation. Clinical services commenced in January 2012 in the Paediatric department and these includes emergency services, in- and out-patient services with an average yearly patient turnover of two thousand seven hundred and fifty-seven.

Data Collection

The records of all the children seen in both the in- and out-patient units of the Department for cardiac problem were traced and their case folders retrieved. Data obtained from the case folders were age, gender, presenting complaints, final diagnosis, investigation results, intervention and treatment outcome. Diagnosis was analyzed based on echocardiographic reports. Those without echocardiographic confirmation of their diagnosis were excluded from the final analysis.
Ethical clearance was sought from the health research ethics committee of BSUTH before commencement of the study.

Data analysis

The data were analyzed with Excel spread sheet and presented as frequencies and percentages.

Results

Of the total of 8590 patients seen within the study period, 39 (0.45%) had cardiac diseases. This corresponds to cardiac disease prevalence rate of 0.45%. Table 1 and 2 presents the demographic information of the 39 patients and the distribution of patients by the type of congenital cardiac disease respectively. Males were 22 (56.4%) with a M:F 1.1:1. The age of the patients range from 1.5 to 180 months with a median age of 36 months.

Table 1: Age Distribution of Patients with cardiac diseases (n=39)

Age (months)	Frequency	Percent
<12	13	33.3
12-59	7	17.9
>60	19	48.7
Total	39	100

Twenty-eight (71.7%) of the patients had congenital heart disease (CHD) with acyanotic congenital heart defects (ACHD) been the most prevalent (53.8%). Ventricular septal defect (VSD) was the most common type (71.4%) of ACHD followed by Patent ductus arteriosus (PDA) which accounted for 19.0%. Tetralogy of Fallot (TOF) was the commonest type of cyanotic congenital heart defects (42.9%) among the patients.

Table 2: Frequency distribution of Congenital heart disease

Type	Frequency	Percent
Acynotic congenital heart defects		
Ventricular septal defect(VSD)	15	71.4
Patent ductus arteriosus(PDA)	4	19.0
Atrial septal defect(ASD)	2	9.5
Total	21	100.0
Cyanotic congenital heart defects		
Tetralogy of Fallot (TOF)	3	42.9
Double outlet right ventricle (DORV) +VSD	1	14.3
Transposition of Great arteries (d-TGA) +ASD**	1	14.3
Complex cyanotic heart defect (TOF+ ASD+ PDA+MR)	2	28.6
Total	7	100.0

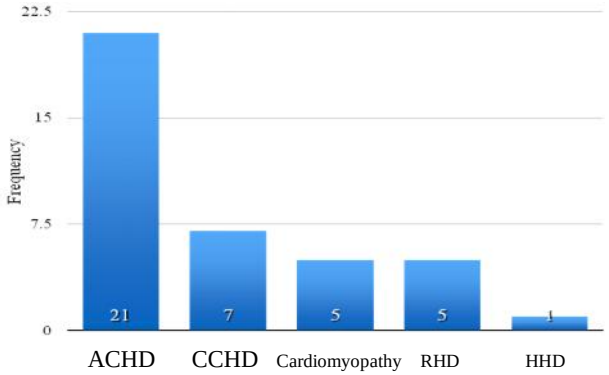
The most common presenting complaint among the patients was cough in 17 (43.6%), followed by difficulty in breathing in 12 (30.8%), fever in 10 (25.6%) and fast breathing in 8 (20.5%). Table 3 gives the frequency distribution of the symptoms.

Table 3: Distribution of common Symptoms presented by patients

Symptoms	Frequency	Percent
Cough	17	43.6
Difficulty in breathing	12	30.8
Fever	10	25.6
Fast breathing	8	20.5
Leg swelling	8	20.5
Poor suck	6	15.4
abdominal swelling	5	12.8
Abdominal pain	4	10.3
Excessive cry	3	7.7
Chest pain	2	5.1
Easy fatiquability	2	5.1
Body weakness	2	5.1
Poor weight gain	2	5.1
Inability to talk	2	5.1
poor urinary output	2	5.1
Vomiting	2	5.1
Diarrhoea	2	5.1
Convulsion	1	2.6
Scrotal swelling	1	2.6
Catarrh	1	2.6

One patient (2.6%) was found to have hypertensive heart disease. The patient with the hypertensive heart disease was an obese adolescent. The five patients (12.8%) with rheumatic heart disease range in age from 84-132 months with one female and four males. Dilated cardiomyopathy was the most common form of cardiomyopathy identified among the five (12.8%) patients in this category, and they were much older (96-180 months of age).

Fig 1: Frequency distribution of types of cardiac diseases among patients (n=39)



ACHD: Acyanotic congenital heart defects, CCHD: Cyanotic congenital heart defects, RHD: Rheumatic heart disease, HHD: Hypertensive heart disease

Majority (61.5%) of the patients were admitted at one point or the other for congestive heart failure and were placed on anti failure drugs (Frusemide, Digoxin and Captopril) while some received antibiotics for treatment of pneumonia in addition. Other investigations carried out were chest radiography, electrocardiograph and full blood count.

The care givers were counselled about open heart surgery (OHS) and device closure as available options for definitive treatment for those patient with structural defects. Only two were able to access corrective surgery (one at Garki hospital, Abuja for VSD closure and the other in India). Majority of the patients were lost to follow-up as shown in the Table 4 below.

Table 4: Distributions of outcome

Outcome	Frequency	Percent
DAMA	2	5.1
Died	5	12.8
On Follow-up	7	17.9
Lost to Follow-up	25	64.1
Total	39	100.0

DAMA: Discharged against medical advice

Discussion

In our study there is no sex predilection in the occurrence of cardiac disease as the male to female ratio was almost equal. Chinawa et al.[5] reported similar finding among children in Enugu. However, a report by Asani et al.[8] and Kennedy et al.[9] gave a higher male preponderance of 3:2 and 1.5:1 respectively.

Majority of the patients (48.7%) were in the age group of over 60 months old. This shows late presentation considering that Congenital heart defects (CHD) accounted for over 70% of all the cases encountered, which are present at birth and most cause early clinical symptoms. This portends poor outcome for such patients as even simple lesions that are easily correctable would have developed permanent sequelae such as pulmonary hypertension. In developed countries, the diagnosis of CHD is usually in the prenatal/neonatal period with foetal echocardiography, pulse oximetry and neonatal echocardiography.[1] Delayed diagnosis often is due to limited resource in terms of skilled personnel as well as diagnostic services which when available are restricted to urban areas.[10]

The spectrum of cardiac diseases seen among these children in our study is similar to what has been documented in literature, with CHD been the most prevalent cardiac disease and VSD the commonest type.[4, 5, 8, 9, 11-13]

A recent review of the trends and patterns of congenital heart disease in Nigeria over a five decades period also showed that acyanotic CHD is the most common form with VSD as the most prevalent.[13] Of the cyanotic CHD, TOF was the most common type encountered. This is similar to what was reported from other part of the country and Malawi.[4,5,8,9,12] Most cases of uncorrected TGA usually die in infancy except when a shunt that allows for survival is present as was the case in the one patient here (at 84 months) who had an associated ASD. Similar reports in a 4 and 13 year olds had been documented.[4]

Of the Acquired heart disease (AHD) observed among this cohort, the presence of hypertensive heart disease in one of them is surprising. It is not a common finding among children. Nkoke et al.[14] reported on it in their series but unlike theirs which was in patients with chronic renal failure, here the patient was an obese adolescent with primary hypertension.

Only two patients (5.1%) were able to accessed corrective surgery. One within Nigeria while the other was in India. Given the cost of surgery[15] it is not surprising, as it is well beyond the reach of the average care giver who is often poor. Over 60% of the patients were lost to follow-up similar to what was reported from Jos and Enugu.[4,5] Most care givers are overwhelmed when confronted with the implications of the diagnosis of cardiac disease and often resigned to fate, resulting in them being lost to follow-up. The contribution of cardiac disease to childhood mortality might be more than it's being reported, given that in this small cohort 12.8% death was recorded.

Conclusion

The spectrum of cardiac diseases observed among this cohort shows that Congenital heart disease is most prevalent with majority being diagnosed late. Both the

medical and surgical cost of care for children with cardiac disease is beyond the reach of the average care giver leading to high rate of default from treatment. There is need for more advocacy on the part of Paediatricians who are saddled with management of these children for, regional centres for cardiothoracic services to be established to offer the needed care at affordable rates.

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