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Original Research Article

The spectrum of congenital heart defects among children at federal medical centre, Asaba, Nigeria

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ABSTRACT

Background: Congenital heart disease (CHD) is a common problem in the pediatric age group with significant morbidity and mortality when early diagnosis and prompt treatment are not instituted. Recent reports have shown an increasing burden of this disease. This study was aimed at documenting the prevalence and patter of CHD among children at Federal Medical Centre (FMC), Asaba.
Methods: This was a hospital based retrospective observational study. The records of all children seen at the department of pediatrics FMC Asaba who did cardiac echo-cardiogram between 2019 and 2022 were reviewed. The clinical, demographic and echocardiogram details were retrieved, descriptive analysis was done using Statistical Package for Social Science (SPSS), version 21.
Results: A total of 324 children were identified to have CHD of which 178 (54.9%) were male and 146 (45.1%) were female given a male to female ration of 1.2:1. Ventricular septal defect (27.7%) was the most common congenital heart disease seen while tetralogy of fallot 25 (7.7%) was the most prevalent cyanotic congenital heart disease. Trisomy 21 (5.5%) was the most frequently identified chromosomal abnormality identified among the subjects. A total of 61 (18.8%) of the subject died.
Conclusions: The spectrum of CHD in our study was largely similar to previous documentation in the literatures. The mortality rate among children with CHD in our environment is still high largely due to non-availability of surgical intervention.

Keywords: Atrial septal defect, Congenital heart disease, Ventricular septal defect

INTRODUCTION

Congenital heart disease (CHD) is defined as an abnormality in the cardio-circulatory structure or function, which is present at birth, even if it is discovered later.[1] Congenital heart defects are the leading cause of birth defects seen with an incidence in the general population of 7/1000 live births with 2-3 out of 1000 new born infants being symptomatic with heart disease in the first year of life.[2] Congenital heart disease constitutes about 57% of all congenital anomalies among neonates in Asaba, Nigeria.[3] Though no comprehensive national data on the prevalence of CHD in Nigeria, report from different part of the country has shown an increasing prevalence. The incidence of CHD in Nigeria has increased over the years from 3.5 per 1000 population that was documented about 3 decades ago to 14.4 per 1,000 reported few years ago.[4,5]

Congenital heart disease is often classified as acyanotic and cyanotic heart lesions. Amongst the acyanotic cardiac lesions, various studies have shown that ventricular septal

defects (VSD) were the commonest CHD seen while tetralogy of Fallot and transposition of the great arteries are the commonest cyanotic lesions seen depending on the population studied.[6,7]

Most of the children with CHD tend to die if prompt and adequate interventions are not instituted. It is estimated that children with CHD are at approximately twelve times likely to die within the first year of life.[8] Regrettably, in Africa and in Nigeria, the percentage of such children that die from CHDs are even higher due to factors such as: poor diagnostic stools, lack of skilled personnel, ignorance and poverty ravaging the people. Echocardiographic evaluation remains the gold standard for the diagnosis of structural cardiac disease. Pediatric echocardiography is still not widely available in Nigeria as there are few pediatric cardiologists and very few cardiothoracic surgeons. To the best of our knowledge there has not been any report on the pattern of CHD in Delta State, Nigeria.

The aim of this study was to document the prevalence and the patterns of CHD seen in FMC Asaba, Nigeria. This information will not only contribute to the available data on CHD, but will also help to improve policies regarding the services offered to these children.

METHODS

Study design

A retrospective descriptive study of all children seen in both the in- and out-patient units of the department of pediatrics, Federal Medical Centre (FMC), Asaba who had a cardiac echo carried out on them between January 1, 2019 and May 31, 2022.

Study setting

Federal Medical Centre, Asaba, is a Federal owned tertiary health facility that serves the Delta State and receives referral from neighboring states such as Anambra, Edo and Kogi. The pediatric cardiology unit is headed by a Pediatric Cardiologist with resident's doctors that do rotational postings in the unit.

Data collection

The records of all the children seen (both the in- and out-patients) in the pediatric cardiology units of FMC Asaba who had cardiac echo done on them were reviewed. Diagnosis was analyzed based on echocardiographic reports. Those without echocardiographic confirmation of their diagnosis were excluded from the final analysis.

Procedure

The diagnosis of CHD was established using a cardiovascular ultrasound system-the GE Healthcare Vivid S6 with a pediatric high frequency (6-8 Hz) probe. Echocardiographic examination consisted of interrogation via the apical, subcostal, parasternal and supra parasternal windows using 2 dimensional (2D), M mode and Doppler echocardiography. Detailed transthoracic echocardiography was performed and interpreted by the pediatric cardiologists using the recommendation of the American Society of echocardiography.

Ethical considerations

Ethical clearance was obtained from the ethics committee of Federal Medical Center, Asaba before commencement of the study.

Data analysis

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

RESULTS

Table 1 showed the demographic representation of the subjects. Majority of the patient 264 (81.4%), were less than 1 year of age at the point of diagnosis. Male subjects were 54.9% while the females were 45.1% given a male to female ratio of 1.2:1. Twenty seven percent of the subjects were born preterm (before 37 completed weeks of gestation), 88.8% had acyanotic CHD while 11.2% had cyanotic CHD.

Table 1: Demographic representation of the subjects.

Variables		Frequency	Percentage
Age (years)	<1	264	81.4
	1-5	43	13.2
	6-10	11	3.3
	11-15	6	1.8
Gender	Male	178	54.9
	Female	146	45.1
Gestation	Preterm	89	27.4
	Term	235	72.6
Outcome	Alive	91	28.0
	Dead	61	18.8
	Referred	172	53.2
Type	Acynotic	288	88.8
	Cyanotic	36	11.2
Associated syndrome	Trisomy 21	18	5.5
	Muscle dystrophy	1	0.3
	Undefined	3	1.0

Table 2 shows the distribution of different CHDs with gender. Ventricular septal defect (27.7%) was the commonest CHD followed by the atrial septal defect (26.5). Tetralogy of Fallot (7.7%) was the commonest acynotic CHD followed by transposition of the great vessels (1.8%).

Table 2: Distribution of different pattern of congenital heart disease.

Acynotic CHD	Male	Female	Total (%)
VSD	51	39	90 (27.7)
ASD	44	42	86 (26.5)
AVSD	21	26	47 (14.5)
PDA	16	14	30 (9.2)
ASD + PDA	10	6	16 (5.4)
VSD + PDA	2	1	3 (0.9)
AVSD + PDA	3	3	6 (1.8)
COA	1	1	2 (0.6)
Cyanotic CHD			
TGA	4	2	6 (1.8)
TOF	15	10	25 (7.7)
Truncus arteriosus	1	4	5 (1.5)
Tricuspid atresia	1	1	2 (0.6)
Complex heart disease	0	2	2 (0.6)
Univentricular heart	3	1	4 (1.2)

ASD: atrial septal defect; VSD: ventricular septal defect; AVSD: atrioventricular septal defect; PDA: patent ductus arteriosus, COA: coarcutation of the aorta, TGA: transposition of the great arteries; TOF: tetralogy of Fallot.

DISCUSSION

This study has highlighted the spectrum CHD seen in Asaba, South-South, Nigeria. Acynotic congenital heart disease (ACHD) constituted 288 (88.8%) of the subjects while cyanotic heart disease constitutes (CCHD) 36 (11.2%) of the subject, given a ratio of ACHD to CCHD of 8:1. The above finding is in agreement to other studies who reported more ACHD compared to CHD.[9-12]

Majority 264 (81.4%) of the subject were less than one year at the time of diagnosis. This observation similar to what was reported in Enugu, Nigeria.[11] The increasing awareness of CHD has led to early referral of suspected children to the cardiology unit. Our study showed a male preponderance with a male:female ration of 1.2:1. The high prevalence of male might be due to high health seeking behavior in parents of male children as male children are highly cherished in our locality. This observation was similar to what was reported by Kapoor et al though Khan et al did not find any gender disparity.[13,14]

Ventricular septal defect 90 (27.7%) was the most common CHD seen among the subjects. This finding is similar to what was reported in other studies done in both in Nigeria and elsewhere.[10-13,15-18] The prevalence rate of 27.7% for VSD in our study is however lower than 55.3% that Ibadin et al reported in Benin City, Nigeria.[9] Atrial septal defect (ASD) is the second most common CHD seen in our study and this is similar to what has been reported in India.[19,20] Tetralogy of Fallot was the commonest cyanotic CHD seen in our center. This pattern is also similar to other studies in Nigeria and other parts of the world.[10-16]

Trisomy 21 (Down syndrome) is the commonest syndrome seen among the children with congenital heart disease in this survey. Diagnosis of Down syndrome was made based on physical features as genetic testing is not readily available. This finding is not different from what was documented by Chimwa et al who also reported that Down syndrome 6.4% was the commonest syndrome seen in their survey.[21]

The mortality rate of 18.8% in this study is high compared to study by Abah et al in Markurdi, Nigeria who reported a mortality rate of 12.8%.[23] The non-availability and non-affordability of surgical intervention in our environment might have accounted for this finding. A large percentage 53.2% of the subject were lost to follow up. This trend is similar to other studies in Nigeria as most parents are often overwhelmed by the cost implication in managing such children hence they resigned to their fate hence seeking other traditional ways.

This study is the first in exploring the prevalence and pattern of CHD among children in Asaba, South-South, Nigeria.

The limitation of this study is that this was a single hospital-based study. A large multicenter study will be good in identifying the accurate prevalence and pattern of CHD among the children in our region.

CONCLUSION

The pattern of various CHDs in our study is largely similar to pre-existing literature. The high mortality might be attributed to non-availability of surgical intervention. The establishment of cardiothoracic center with the support of government and non-government agencies (NGO) may help in the outcome.

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REFERENCES

1. Brickner ME, Hillis LD, Lange RA. Congenital heart disease in adults: first of two parts. New Engl J Med. 2000;342:256-63.

2. Driscoll, DJ. Principles of inheritance and genetics of congenital heart disease. In: Lippincott Williams and Wilkins, editors. Fundamentals of Pediatric Cardiology. Philadelphia: Edwards Brothers; 2006:61.
3. Chima OU, Emeagui KN, Ajaegbu OC, Anazor CV, Ossai CA, et al. Congenital malformations: prevalence and characteristics of newborns admitted into Federal medical center, Asaba. Health Sci Rep. 2022;5:e599.
4. Gupta B, Antia AU. Incidence of congenital heart disease in Nigerian children. Br Heart J. 1967;29:906.
5. Otaigbe BE, Tabansi PN. Congenital heart disease in the Niger delta region of Nigeria: a four-year prospective echocardiographic analysis. cardiovasc J Afr. 2014;25:265-8.
6. Sani MU, Mukhtar-Yola M, Karaye KM. Spectrum of congenital heart disease in a tropical environment: an echocardiographic study. J Nat Med Assoc. 2007;99:665-9.
7. George IO, Frank-Briggs AI. Pattern and clinical presentation of congenital heart diseases in Port-Harcourt. Niger J Med. 2009;18:211-14.
8. Aburawi EH. The burden of congenital heart disease in Libya. Libyan J Med 2006;1:120-2.
9. Ibadin MO, Sadoh WE, Osarogiabon W. Congenital heart disease at the University of Benin Teaching Hospital. Nig J Pediatr. 2005:32(2):20-32.
10. Bode-Thomas F, Okolo SN, Ekediwge JE, Kwache IY, Adewunmi O. Pediatric echocardiography in Jos University Teaching Hospital; problems, prospects and preliminary audit. Nig J Paediatr. 2003;30(4):143-9.
11. Chinawa JM, Eze JC, Obi I, Arodiwe I, Ujunwa F, Daberechi AK, et al. Synopsis of congenital cardiac disease among children attending University of Nigeria Teaching Hospital Ituku Ozalla, Enugu. BMC Res Notes. 2013;6:1-6.
12. Asani M, Aliyu I, Kabir H. Profile of congenital heart defects among children at Aminu Kano Teaching Hospital, Kano, Nigeria. J Med Trop. 2013;15(2):131-4.
13. Kapoor R, Gupta S. Prevalence of congenital heart disease, Kanpur, India. Indian Pediatr. 2008;45:309-11.
14. Khan I, Muhammad A, Muhammad T. The pattern of congenital heart disease at Lady Reading Hospital Peshawar. Gomal J Med Sci. 2011;92:174-7.
15. Kennedy N, Miller P. The spectrum of pediatric cardiac disease presenting to an outpatient clinic in Malawi. BMC Res Notes. 2013;6:53-8.
16. Wu MH, Chen HC, Lu CW, Wang JK, Huang SC, Huang SK. Prevalence of congenital heart disease at live birth in Taiwan. J Pediatr. 2010;156:782-5.
17. Abqari S, Gupta A, Shahab T, Rabbani MU, Ali SM, Firdaus U. Profile and risk factors for congenital heart defects: a study in a tertiary care hospital. Ann Pediatr Cardiol. 20169:216-21.
18. Singh R. Rajaram Tawkwer N. The spectrum of congenital heart disease in children in the Andaman and Nicobar Islands: a five-year retrospective study. Cureus. 2022;14(9):e29109.
19. Karthiga S, Pathak S, Lazarus M. Clinical and anthropometric profile of congenital heart disease in children admitted in pediatric ward. Int J Sci Study. 2017;5:112-7.
20. Mahapatra A, Sarangi R, Mahapatra PP. A spectrum of congenital heart disease in a tertiary care center of Eastern India. Int J Contemp Pediatr. 2017;4:314-6.
21. Chinawa AT, Chinawa JM. Compendium of cardiac diseases among children presenting in tertiary institutions in southern Nigeria: a rising trend. Libyan journal of medicine. 2021;16(1):1966217.
22. Mundada S, Kathwate J, Bajaj M, Raut S. Clinical profile of patients with acyanotic congenital heart disease in pediatric age group in rural India. IOSR-J Dent Med Sci. 2014;13:06-12.
23. Abah RO, Ochoga MO, Audu OP, Idoko A, Esiegbe EE, Dabit JO. Pattern of cardiac diseases among children in a tertiary hospital in North central, Nigeria: a three and half year retrospective cohort echocardiographic study. Niger J Pediatr. 2018;45(1):6-9.

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