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The Prevalence of Congenital Heart Disease in The Clinical Services Department of MRCG and The Outcomes of Oversees Surgery between 2008- 2018 in The Gambia

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Abstract

Background: There is a high and largely undocumented burden of Congenital Heart Disease (CHD) in The Gambia. Many of this CHD are often oversighted during the time of policymaking as the authorities may not be aware of them.

Objective: To assess the prevalence, pattern, and outcome of congenital heart disease in the MRCG database in the Gambia.

Method: A retrospective descriptive study design was done. Records of 73 patients attending the clinic between 2008 and 2018 with a diagnosis of CHD in the MRCG database were reviewed. Study outcomes included the age at diagnosis, the sex distribution, the types of CHD, and the outcome of CHD surgical intervention.

Results: Seventy-three patients were studied, consisting of 30 males (41.1%) and 43 females (43%). The majority of cardiac lesions were detected between ages one to five years. The age of the mother during pregnancy is generally unknown (97,3%). The types of heart defects are Tetralogy of Fallot (31.5%) and VSD (31.5%), PDA (16.4%), ASD (6.8%), TGA (2.7%), TA (1.4%), CA(1.4%). PS and AS (1.4%). Prevalence VSD and TOF were higher in the males with 36.7% and 33.3% respectively. In the studied sample, 34 patients had the corrective heart repair and the success rate was 100% regardless of the place of the surgery.

Conclusion: It was concluded that the majority of CHD, from 2008 to 2018, in the Clinical Service Department of MRCG, The Gambia, occurred in female children (58.9%), generally from the W Madinca tribe (43.8%), type of CHD was Tetralogy of Fallot (31.5%). The diagnostic intervention was generally based on Chest-X-Ray (67.1%). In general, surgery abroad with an indication of congestive heart failure (32,4%) and type of surgery was corrective. The outcome of surgical intervention was alive and well but generally lost to follow up (55.9%).

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INTRODUCTION

Congenital heart disease (CHD) refers to the presence of a structural abnormality of the heart and/or great vessels that is present at birth and is of actual or potential functional significance.[1,2] Congenital heart disease (CHD) is the most common cause of major congenital anomalies, representing a major global health problem. Twenty-eight percent of all major congenital anomalies consist of heart defects. Reported birth prevalence of CHD varies widely among studies worldwide. The estimate of 8 per 1,000 live births is generally accepted as the best approximation. CHD, by definition, is present from birth. The most practical measurement of CHD occurrence is birth prevalence per 1,000 live births.[3]

Their clinical importance lies in the fact that, depending on the severity, they may affect the quality of life, and maybe life-threatening. Besides, we should not ignore the associated high costs of managing people with congenital heart disease.[4] With the advancement in technology and surgical expertise the management of congenital malformations of the heart has improved tremendously in the developed world such that even very complicated lesions are now being treated with high success rates.[3,4] Consequently, more patients with CHD reach adulthood, creating a completely new and steadily growing patient population: patients with grown-up congenital heart disease (GUCH). The prevalence of CHD is estimated to be 4 per 1,000 adults. Patients with GUCH often need long-term expert medical care and healthcare-related costs are high. Therefore, the global health burden as a result of CHD increases quickly. It is important to have reliable information about the global birth prevalence of CHD because this may lead to better insight into its etiology and disease magnitude. Besides, dedicated care could be better planned and provided to the affected individuals.[3]

The situation in many of the developing countries is very different as only very few children born with congenital heart disease are properly diagnosed at the correct time and receive timely management. Most of them suffer high morbidity and mortality.[1,5] This is due to several factors that may be considered obstacles or challenges for congenital heart disease management in these regions. Thus, thousands of children die, many undiagnosed, each year from congenital heart disease, while millions more remain in desperate need of treatment in these regions, even after diagnosis. Alleviating the sufferings of such children and their families is a major challenge to our health systems.[1,6,7]

There is a high and largely undocumented burden of congenital heart disease in the Gambia. Many of these congenital heart diseases are often oversighted during the time of policymaking as the authorities may not be aware of them. Efforts made to cut down the under-five mortality particularly focused on the communicable diseases with little or no regard to congenital heart disease which is also a significant contributor.[8] These abnormalities can sometimes be life-threatening in early childhood, and children born with severe form are at higher risk of dying before their first birthday. Thus, multiples of children die as a result of these conditions and many are living in desperate conditions particularly in Africa.[9]

Since early diagnosis and prompt therapeutic intervention are vital to improving outcomes and quality of life of children with CHD. This research, therefore, will help to determine the baseline on the prevalence of congenital heart disease, their spectrum (describing pattern and to improve the understanding of indications for surgery and outcome among patients who underwent Congenital Heart Disease surgeries overseas.[10,11] It will also assist in prognosticating the life expectancy and quality of an individual living in The Gambia after undergoing heart surgeries. Also, these surgeries are expensive that an average Gambian cannot afford without being sponsored by the Government, philanthropic agencies, and individuals, the research will serve as a mirror from which these people can evaluate whether their efforts and resources are yielding the desired results or not.[10]

The Gambia is a resource-limited country, including our health sector. Notwithstanding we see our children being diagnosed with CHDs. Because we are lacking the human resources and the technology to deal with the challenges our CHD patients may face

an uncertain feature and fetal outcomes are frequent. Besides, the burden of congenital heart disease is largely unknown. It is therefore paramount to collect baseline data to inform policy. What is the burden of congenital heart disease among patients attending the clinical service department at Medical Research Council the Gambia (MRCG) and outcomes of patients who were referred for surgery overseas?

METHODS

This research was conducted in the Medical Research Council the Gambia (MRCG) clinical service department and entirely focused on Congenital Heart Disease. MRCG is a multi research institution that has built outstanding records globally in the area of medical research. The Clinical Service Department is a section, sited out purposely for alleviating suffering on the average Gambian and also decreasing the healthcare burden on the government of the Gambia. They rendered quality medical services through qualified medical and nursing staff. Patients come from many places countrywide to have their healthcare quality access. The general objectives of this study were to determine how many patients with congenital heart disease were seen and to determine the proportion of patients with congenital heart disease that had surgery among these patients. Specific Objectives were to determine the indication for surgery in those referred, to know the gender distribution of CHD among the patients, to establish the age distribution of CHD among the patients, to determine the commonest types of CHD, and to determine the outcome of surgery among those referred.

Study Designs

This research was a retrospective, descriptive cross-sectional study of patients diagnosed with congenital heart disease. Furthermore, included were those who were referred for surgery as a result of their condition in the Medical Research Council the Gambia Database. This study only covered MRCTG and no data from other hospitals were included.

Sample Selection

It included all patients with a diagnosis of congenital heart disease in the database. it was a convenient sample, determined by the number of cases available in the database. The commencement of the research followed after obtaining the ethical clearance from the Research and Publication Committee in the School of Medicine and Allied Health Sciences. Besides, consent was sought from the clinical director of the Medical Research Council the Gambia, and approval was granted.

The Variables with Operationalization

The variables considered were: age, sex, ethnicity, the type of congenital heart disease, the age at diagnosis, the type of treatment, the indication of surgical intervention and outcome, and maternal age.

Data Collection Tools

The data collection was done using the database of Medical Research The Gambia.

Inclusion and Exclusion Criteria

The individuals considered in the research were those with the diagnosis of congenital heart disease and were under the age of eighteen years. Patients with associated extracardiac malformations, genetic disorders, and congenital cardiac abnormalities that are not considered as CHD (long QT syndrome, cardiomyopathies) and acquired heart disease were excluded.

Statistical Analysis

The data collected for the research was compiled and processed, using the Statistical Package for Social Sciences (SPSS) software 20. The entire variable was subjected to analysis with the aid of the statistician and translated to charts, tables, and graphs. Both sets of data forms, qualitative and quantitative variables were interpreted and comparisons made with the previous studies. The proportion of each congenital heart disease type was worked out and the variable was categorized.

Ethical Considerations

Ethical clearance to carry out this study was sought from the Research and Publication Committee at the School of Medicine and Allied Health Sciences, University of the Gambia, and approval were granted. The research was done according to the World Medical Association's Helsinki Declaration regarding ethical principles for medical research involving human subjects. No personal identifiers were used. All patients in the study remained anonymous.

RESULTS

Seventy-three patients were studied. The majority of cardiac lesions were detected between ages one year to five years by chest x-ray and echocardiography. In the studied population, females had the highest frequency (n=43 patients) and males (n=30 patients) (Table 1). The frequency of VSD, TOF, PDA, AVSD ASD, and TGA which were the commonest forms in the study were 31.5% for both VSD and TOF,16.4%, 6.8%, 5.5%and 2.7% respectively. In terms of gender prevalence, VSD and TOF were higher in males with 36.7% and 33.3% respectively. PDA which is the third most common is high in the female gender (Table 2). With regards to the surgeries, thirty-four patients in the studied sample had the corrective heart repair and the success rate was 100% regardless of the place of the surgery (Table 4).

From table 1, 75.4 % of the patients fall into the age category 0-1 year and 2-5 years with every 31 and 24 patients respectively. A 16.4 % belongs to the age group 6- 10, 6.8 and 1.4 % belong to the age category 11-15 and 16- 18 years respectively. From the table above, 58.9 % of the patients with CHD were female compared to 41.1 % of males. From table 1, about 58.9 % fall into the Mandinka and Fula ethnic group (32 patients and 11 patients each respectively) while Wollof constitutes 8.2 % (6 patients). The rest are as follows: Jola's 6. 8 %, others 5.5 %. Nonavailable ethnicity constitutes 19.2 %. Mother's age at pregnancy is significantly unknown with a %age of 95.3. Only 2.7 % of the patients were born to mothers between the ages of 18-35 years old.

Tabel 1. Characteristic of the CHD Patients

VARIABLES	N	%
Age:		
0-1	31	42.5
2-5	24	32.9
6-10	12	16.4
11-15	5	6.8
16-18	1	1.4
Gender:		
Male	30	41.1
Female	43	58.9
Ethnicity:		
W Madinca	32	43.8
Fula	11	15.1
Wollof	6	8.2
Jola	5	6.8
Sarahulleh	1	1.4
Others	4	5.5
Not Available	14	19.2
Mother age at Pregnancy		
18-35	2	2.7
Not Available	71	97.3

From table 2, about 63 % of the patients had TOF and VSD with equal distribution (i.e 23 patients each). Patent ductus arteriosus was 16.4 %, AVSD was 6.8 %, ASD was 5.5 %, and TGA 2.7 % respectively. There was a single case of Truncus arteriosus, Coarctation of the aorta, VSD with ASD, and pulmonary with aortic stenosis each with 1.4 % respectively. Overall, the most prevalent CHD was either TOF or VSD. TOF and VSD were the commonest CHDS in both genders. However, males had the highest in both conditions with 33.3% and 36.6 % respectively. For PDA, females had the highest with 25.6% while males had 6.7%. There was no case of TrA in females and males too had no case of PS and AS, and ASD plus VSD combined.

Table 2. Distribution of Congenital Heart Disease

No	Type of Congenital Heart Disease	N	%	Female (%)	Male (%)
1	Tetralogy of Fallot (ToF)	23	31.5	27.9	33.3
2	Transposition of great arteries (TGA)	2	2.7	2.3	3.3
3	Truncus arteriosus	1	1.4	2.3	0.0
4	Ventricular septal defect (VSD)	23	31.5	27.9	36.7
5	Atrial septal defect	4	5.5	2.3	10.0
6	Patent Ductus Arteriosus (PDA)	12	16.4	25.6	6.7
7	Coarctation of the Aorta (CoA)	1	1.4	0.0	3.3
8	Atrioventricular septal defect (AVSD)	5	6.8	7.0	6.7
9	Pulmonary and aortic stenosis (PS and AS)	1	1.4	2.3	0.0
10	Atrial septal defect, Ventricular septal defect	1	1.4	2.3	0.0
	TOTAL	73	100	100	100

From table 3, we could see that the use of echocardiography is increasing. The majority (95.9%) had their diagnosis with it. In table 3, 32.4% of the patients had surgical intervention because of CHF, 3% because of recurrent chest infection. The majority 58.8% had surgical intervention but their indications were not recorded in the database.

The type of surgical intervention among patients with CHD can be seen di Table 4. Furthermore, the distribution of the outcome of the surgical intervention among the patients can be seen in Table 4 too.

Table 3. Estimated Number of Investigations Performed to Diagnosed Patients with CHD, Indication of Surgery.

VARIABLES	N	%
Intervention Type :		
Chest-X-Ray	3	4.1
Echocardiografi	21	28.8
Chest-X-Ray, Echocardiografi	49	67.1
Indication of Surgery :		
Congestive Heart Failure	11	32.4
Recurrent chest infection	3	8.8
Not Available	20	58.8

Tabel 4. Type of Surgical Intervention and Outcome of Surgical intervention Among the Patients

VARIABLES	N	%
Type of Surgical Intervention :		
Corrective	34.0	100
Palliative	0.0	0,0
Outcome of Surgical Intervention:		
Alive and well and lost to follow up	19	55.9
Alive and well, stable on follow up	15	44.1

From table 4, the surgical interventions were 100 % corrective. About 55.9% had a successful outcome following the surgical intervention but were later lost to follow up. The other 44.1% also had successful surgical intervention and are still seen in the clinic for their routine follow-ups.

DISCUSSION

Congenital heart diseases (CHD) are one of the

important groups of birth defects and they contribute significantly to infant mortality.[12,13] The optimal care for patients with CHD requires an organized pediatric cardiac program. The development of such requires adequate financial and human resources. Therefore the knowledge of the local spectrum of CHD will provide the foundation for the rational allocation of health care resources.[3,4]

Indication of Surgical Interventions

From the results of the study, the major indication for surgical intervention was congestive heart failure. A small fraction had it because of recurrent chest infections. The majority of the patients (58%) had missing data for surgical indication. This points to the need for patient records to be properly filled as more than 50% cannot be analyzed in this study.

Age Distribution of Study Patients

The majority (42.5%) presented at the age of less than one year and 32.9% presented at 2-5 years. From the results, there was early detection of CHD among the study participants. As the ages increase the frequency of CHD at presentation decreases. This finding is in concordance with the researches done elsewhere.[5,14,15]

The Sex Distribution of Patient and The Various Type of CHD

The sex distribution in the study showed that females had a 58.9% prevalence of congenital heart disease which is higher than in males with 41.1%. These findings were in line with a study done in Egypt by Amal Bassili et al and Sara Amel-Shahbaz et al in Iran. However, it differs from the studies done in India and Netherland by RukeyaBegum et al and P. Engelfriet et al respectively.[14,16]

In terms of the distribution of various CHDs, this study found out that the commonest types were VSD, TOF, PDA, AVSD ASD, and TGA with the frequency of 31.5% for both VSD and TOF, 16.4%, 6.8%, 5.5%, and 2.7% respectively. For the sex prevalence, VSD and TOF were higher among the males with 36.7% and 33.3% respectively. The PDA which is the third most common in the study is high in female sex. These are in line with done in the other part of the world.[13,17]

The outcome of Surgery Among Those Referred

The majority of the study participant had their operation in the UK (47.1%), Germany was the second most common with 26.5% of the operations. In India, 20.6% of the surgeries were done while in Egypt was 2.9%. All these surgical interventions were corrective and had a success rate of 100%. These are in line with the findings gain by Kimberly et al and other studies.[8,13] However, when these patients came back to The Gambia, 44.1% of them are regularly seen at the clinic in MRCG and were alive and well and stable on follow up. The greater percentages (55.9%) of these patients upon return to the country were lost to follow up.

CONCLUSIONS

All in all this research revealed captivating results about the outcome of those who did congenital heart disease surgeries overseas and living in The Gambia. It also showed that we could have a similar prevalence of CHD compared to elsewhere in the world considering the similar distribution among different gender in other studies. Albeit the small sample size of the study done. It is paramount to keep in mind that this study concentrated on only one CHD follow-up clinic and the database used contained primarily those patients who were operated on or were referred for operation. Therefore, a further large study is hence needed to dig into the actual prevalence of CHDs in the country. Amazingly, the study also showed that the outcome of congenital heart disease surgeries is the same in most parts of the world.

RECOMMENDATIONS

The key area of improvement identified by this research study is the inadequate capturing and documentation of relevant information by the physician during clerking. There was a large amount

of valuable data missing in the database which if present would generate some valuable information for this study. Therefore all effort should be made to include any vital information that would have significance in the diagnosis of the disease. Physicians should have a high index of suspicion for CHDs when a child presents with fast breathing and cyanosis. A large study should be conducted in this area to reveal the actual burden of congenital heart disease in The Gambia. Concerted efforts should be made by the hospitals and the government at large to develop adequate diagnostic and treatment programs aimed at improving the outlook of congenital heart diseases in the developing world.

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