ISSN (Print): 2617-0817 ISSN (Online): 2789-5912

Original Article

Incidence, Pattern, and Clinical Profile of Congenital Cyanotic Heart Disease in Combined Military Hospital, Dhaka

DOI: dx.doi.org

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Received: 08 Aug 2022
Accepted: 13 Aug 2022
Published: 15 Aug 2022

Published by:
Sher-E-Bangla Medical College, Barishal

ABSTRACT

Introduction: *Congenital heart disease (CHD) is defined as structural, functional, or positional abnormalities of the heart that are present from birth and can appear at any point after birth or not at all. Congenital heart illnesses are a dynamic set of abnormalities that begin in fetal life and alter significantly during postnatal development, rather than a permanent anatomic abnormality that appears at birth. The majority of congenital cardiac defects appear six weeks after conception, and most defects that are compatible with six months of intrauterine life allow for live delivery. Numerous studies conducted in many places throughout the world have determined that the incidence of congenital cardiac disease is 8-10 per 1000 live births. The incidence of congenital cardiac disorders was estimated to be up to 25/1000 live births in research done at CMH Dhaka. Congenital cyanotic heart disease makes up only about a quarter of all congenital cardiac abnormalities. These days, newborn children with various kinds of congenital cyanotic heart disease are a typical occurrence. Early diagnosis and treatment of newborns with congenital cyanotic cardiac disorders is now a priority for neonatologists and pediatricians. Diagnostic services are also accessible in a number of locations. So, to detect congenital cyanotic heart disease an individual incidence, pattern and clinical profile record from an ideal center of our country is a demand of the time which led to carrying out this study.* ***Aim of the study:*** *The aim of the study was to find out the incidence, pattern, and clinical profile of congenital cyanotic heart diseases in children who are admitted to Combined Military Hospital, Dhaka.* ***Methods:*** *This cross-sectional study was carried out at the Pediatric Cardiology Department of Combined Military Hospital, Dhaka Cantonment, Dhaka, from 1st January 2015 to 31st December 2015. A total of 48 patients were selected among patients with congenital cyanotic heart disease who were admitted to the Combined Military Hospital, Dhaka during the study period.* ***Result:*** *Amongst the 48 patients who were finally analyzed, the incidence of congenital cyanotic heart*

(The Planet 2022; 6(1): 271-278)

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disease was 4.9 per 1000 hospitalized patients and tetralogy of Fallot was the most common (56%) pattern of congenital cyanotic heart disease, others were transpositions of great vessels, a total anomaly of pulmonary venous return and Ebstein anomaly. Most of the patients presented with bluish discoloration of the skin, and mucus membrane. The majority had cyanosis and murmur. Hundred percent of cases ECHO was abnormal. Maximum patients were male and the mean age was 3.44 ± 3 yrs. The economic status of the families affected the disease process significantly. ***Conclusion:*** *Incidence of congenital cyanotic heart disease was 4.9 per 1000 hospitalized patients and Tetralogy of Fallot was the commonest cyanotic heart disease with a frequency of 56%, Bluish skin was the commonest symptom 38(79%)*

Keywords: *Congenital, Cyanotic, Pattern, Heart Disease*

INTRODUCTION

Congenital heart disorders (CHD) are one of the most common types of birth abnormalities, accounting for around 1% of all human deformities. Numerous studies conducted in many places throughout the world have determined that the incidence of congenital cardiac disease is 8-10 per 1000 live births. In research done at CMH Dhaka, the incidence of congenital cardiac disorders in Bangladesh was estimated to be up to 25/per 1000 live births in a year.[1] The incidence is higher in stillborn (3-4%), spontaneous abortuses (10-25%), and premature infants. Infants with congenital cardiac abnormalities have a wide range of severity: around 2-3 out of 1,000 newborns will develop symptoms of heart illness within the first year of life. In 40-50 percent of patients with congenital heart disease, the diagnosis is made by one week of age, and in 50-60 percent of patients 35, the diagnosis is made by one month of age. Congenital cyanotic heart disease makes up only about a quarter of all congenital cardiac abnormalities.[2] Common congenital cyanotic heart defects includes-Tetralogy of Fallot (TOF) 5-7%, Transposition of great arteries (TGA) 3-5%, Hypoplastic left ventricle 1-3%, Truncus arteriosus 1-2%, Total anomalous pulmonary venous return (TAPVR) 1-2%, Tricuspid atresia 1-2%, Single ventricle 1-2%, Double-outlet right ventricle (DORV) 1-2%. Congenital cyanotic heart disease refers to a group of many different heart defects that are present at birth that results in a low blood oxygen level.[3] A common symptom is a bluish tint to the skin, called cyanosis. Congenital cyanotic heart disease has become increasingly important in recent years because it is one of the important causes of morbidity and mortality in infancy. In many cases, an infant will be born with cyanotic heart disease because of a genetic factor. An infant is more at risk when there is a family history of congenital heart diseases. Down syndrome, Turner syndrome, Marfan syndrome, and Noonan syndromes, as well as Ellis-van Creveld syndrome, can all be accompanied by abnormalities that cause cyanotic cardiac disease.[4] During pregnancy, infections (such as TORCH) and diabetes are additional factors.[4] Congenital cyanotic heart disease can be caused by a variety of physical cardiac abnormalities. Some babies are born with several defects. This study is undertaken to see the incidence, pattern, and clinical profile of congenital cyanotic heart disease among the patients reported to the combined military hospital in Dhaka. Patients were selected by appropriate inclusion criteria and sampling was done by the purposive convenient method. No other studies had documented this incidence, pattern, and clinical profile of congenital cyanotic heart disease. This study will help to find out the incidence, pattern, and clinical profile of congenital cyanotic heart disease admitted to the Pediatric cardiology ward, CMH Dhaka. Congenital heart disorders are significant structural cardiac and/or major vascular abnormalities

that are evident at birth or continue after birth.[5] Due to a lack of access to medical treatment and funding to conduct extensive population research, the real incidence and prevalence of congenital cyanotic heart disease in Bangladesh remains unclear. This study will help to determine the incidence, pattern, and clinical profile of various congenital cyanotic cardiac lesions present in the neonatal period and thereafter. These findings will have implications for the development of cardiac services in other tertiary care Centres in Bangladesh.

OBJECTIVE

General Objective

- To find out the incidence of congenital cyanotic heart diseases in children who are admitted to Combined Military Hospital, Dhaka
- To find out the pattern of congenital cyanotic heart diseases in children who are admitted to Combined Military Hospital, Dhaka
- To find out the clinical profile of congenital cyanotic heart diseases in children who are admitted to Combined Military Hospital, Dhaka

METHODS

This cross-sectional study was conducted at the Department of Pediatric Cardiology, Combined Military Hospital, Dhaka Cantonment, Bangladesh. The study duration was 1 year, from 1st January 2015 to 31st December 2015. A total of 48 patients with congenital cyanotic heart disease were taken who were admitted to Combined Military Hospital, Dhaka during the study period. Informed written consent was obtained from the participants of the present study, and ethical approval was also obtained from the ethical review committee of the study hospital. Data was collected from the parents or guardians of the patients as well as from examination findings of the patients and investigation reports eg. Chest X-rays, ECG, and Echocardiography. Collected data were processed and analyzed using computer software SPSS (Statistical Package for Social Sciences). Data were presented as the percentage of the total number of observations. The test statistics used were descriptive statistics, the Chi-square test, and 'the t-test (for comparison of categorical data). P values less than 0.05 were considered statistically significant. Data was collected using a structured questionnaire containing all the variables of interest and from investigation reports. Collected data was checked daily and edited (if necessary).

Inclusion Criteria

- Age <12 years
- Patients whose guardians had given consent to participate in the study.
- Cases of congenital cyanotic heart disease diagnosed clinically and by the non-invasive procedure.

Exclusion Criteria

- Patients 12 years or older
- Afflicted with other chronic conditions

RESULTS

During the study period a total of 48 patients were included and final analysis was done. Details of the study observations and results are described in the following.

Table 1: Incidence of congenital cyanotic heart disease in this study patients

Month	Total no of hospitalized patients	No of new patients	Incidence
Jan	820	04	
Feb	795	03	
March	837	05	
April	840	04	

May	816	05	**4.99/1000** of hospitalized patients
June	845	03	
July	832	06	
Aug	835	03	
Sep	804	04	
Octo	816	04	
Nov	768	04	
Dec	788	03	
Total	**9796**	**48**	

Table I shows incidence of congenital cyanotic heart disease in hospitalized patients is 4.99 per 1000 of hospitalized patients

Table 2: Age distribution of the study patients (n=48)

Age (years)	Frequency	Percent (%)	Mean ± SD (Age)
1D - 2	21	43.75	3.44 ± 3 yrs
>2 - 5	13	27.08	
>5	14	29.16	

Table II shows the age distribution of the study patients. The majority of the patients belonged to 1 Day - 2 years of age group (43.75%). The mean age was found 3.44 ± 3 years.

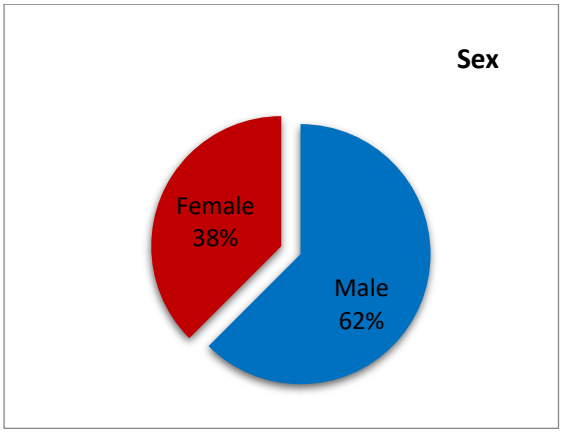

Figure 1: Pie chart showing the sex distribution of the study patients

Figure 1 shows maximum (62%) patients were male and 38% were female.

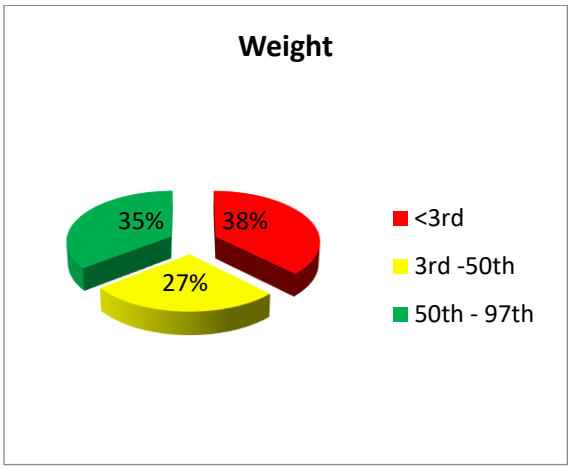

Figure 2: Pie chart showing the weight distribution of the study patients

Pie chart shows 18(38%) of patient were in below 3rd centile, 13(27%) in between 3rd to 50th centile and 17(35%) in between 50th to 97th centile.

Table 3: Sex distribution with pattern of congenital cyanotic heart disease (N-48)

Pattern	No of patient	Male	Female	M: F
Tetralogy of Fallot	27	18	09	**2:1**
Transposition of great arteries	12	07	05	**1.4:1**
Total anomalous pulmonary venous return	03	2	1	**2:1**
Ebstein anomaly	03	2	1	**2:1**
Truncus arteriosus	02	1	1	**1:1**
Tricuspid atresia	01	1	0	**1:0**

Table 4: Pattern of congenital cyanotic heart disease in all patients (N-48)

Pattern	No of patient	Percentage
Tetralogy of Fallot	27	56%
Transposition of great arteries	12	26%
Total anomalous pulmonary venous return	03	6%
Ebstein anomaly	03	6%
Truncus arteriosus	02	4%
Tricuspid atresia	01	2%
Total	**48**	**100%**

Table 4 shows the pattern of congenital cyanotic heart diseases in this study patients. TOF was found in 27(56%) cases. TGA was seen in 12(26%) and TAPVR in 3(6%) patients. 3(6%) subjects had Ebstein anomaly and 2(4%) had Truncus arteriosus. Tricuspid atresia was found in 1(4%) patient.

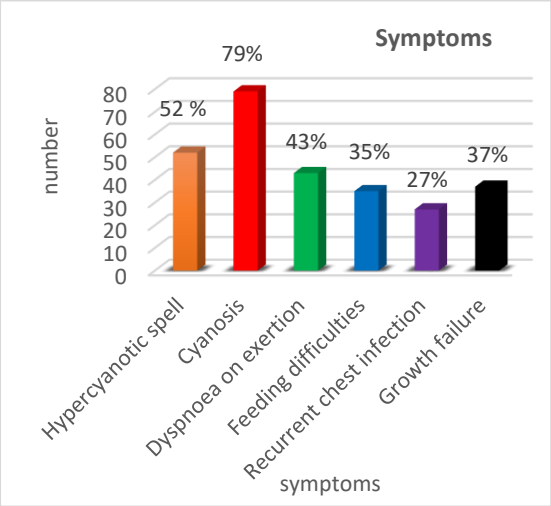

Figure 3: symptoms of congenital cyanotic heart disease of the study patients

*Multiple symptoms were present in singular patients

Figure 3 is showing the symptoms of the study patients. Hypercyanotic spell was found in 25(52%) cases. Bluish skin was seen in 38(79%) and dyspnea on exertion in 21(43%) patients. 17(35%) subjects had feeding difficulty and 18(37%) had growth failure. Recurrent RTI was found in 13(27%) patients.

Table 5: Important physical findings in congenital cyanotic heart disease (N=48)

Physical findings	No of patient	Percentage
Cyanosis	32	67 %
Clubbing	13	27 %
Precordial bulging	03	06 %
Palpable P2	00	00%
Murmur	39	81 %
Abnormal heart sound	07	15 %
Tachycardia	05	10 %
Hypertension	02	04 %

* Multiple findings were present in singular patients

Table 5 showing the physical findings of the study patients. Cyanosis was found in 32(67%) cases. Clubbing was seen in 13(27%) and murmur in 39(81%) patients. 7(15%) subjects had abnormal heart sound and 5(10%) had tachycardia. Hypertension was found in 2(4%) and precordial bulging in 3(6%) patients.

Table 6: Positive Investigations findings in congenital cyanotic heart disease (N=48)

Investigation	No of patient with positive finding	Percentage
Chest X ray	31	65 %
ECG	35	73 %
ECHO	48	100 %

Table 6 shows 48(100%) patients had positive ECHO findings, 35(73%) had positive ECG and 31(65%) patient had positive chest x-ray.

Table 7: Economic status of children (n=48)

Economic Status	**Frequency**	**Percent (%)**
High average	08	17
Average	38	79
Poor	02	04
Total =	48	100.0

In this study economic status was evaluated by following income range of the families. The social groups were determined as shown below;

High average: >15,000 taka/month

Average: 7,000- 15,000 taka/month

Poor: <7,000 taka/month

Most of the patients (79%) are belongs to the average socioeconomic status.

DISCUSSION

A congenital heart defect (CHD) is an anatomic abnormality of the heart or major vessels that develop during fetal development, regardless of age at presentation.[6] Congenital cardiac defects can be classified as acyanotic or cyanotic depending on whether the individuals develop clinical cyanosis. Due to systemic venous blood bypasses, the pulmonary circulation is shifted to the left side of the heart in cyanotic congenital cardiac defects. As a result, there is systemic arterial desaturation. Cyanosis produced by intrapulmonary right-to-left shunting and pulmonary venous desaturation due to congestive heart failure is not classified as cyanotic CHD.[6] Right-to-left shunts are frequently caused by numerous cardiac abnormalities. Right-to-left shunts and cyanosis are caused by obstructions to pulmonary blood flow (such as tetralogy of Fallot), a complete admixture of pulmonary and systemic venous returns (such as total anomalous pulmonary venous return and double-inlet left ventricle), and parallel rather than in-series circulation (such as transposition of the great arteries). This is a cross-sectional study that was carried out in Combined Military Hospital Dhaka during the study period. To the best of our knowledge, no such study was conducted in Bangladesh prior to this one. During the period January 2015 to December 2015, a total number of 48 admitted patients were included in this study. The present study findings are discussed and compared with previously published relevant studies. In the current study, it was observed that a total of 9796 patients and total of 48 new congenital cyanotic heart disease patients were admitted to CMH, Dhaka during the study period. The incidence rate of congenital cyanotic heart disease was 4.99 per thousand among hospitalized patients. This finding is consistent with the study of NN Fatema[7] et al (5.2%) and NN Fatema[8] et al (3.89%). In this study majority of the patients belonged to 1Day - 2 years of age group (43.75%) and the Mean ± SD (Age) was 3.44 ± 3 years. This finding is consistent with the findings of Fazlur Rahman[9] et al (46%) and MH Sadiq [10] (74%). Similarly, NN Fatema46 et al (45%) and Mujibul[11] et al (59.83%) found almost the same age range in their studies. In this study, we found most of the patients were male (62%) and 38% were female. This finding is also consistent with the study of H Khadija N[12] et al (77%). Similarly, this

finding is also comparable with the findings of NN Fatema[7] et al (58%), L Shamima Sharmin[13] et al (56.5%), and Mujibul[11] et al (63.25%). We have also seen that most of the patients had growth failure (38%). This finding is also consistent with the study of L Shamima Sharmin[13] et al (41.7%) and MH Sadiq[10] (33.4%). 27% of patients in between the 3rd to 50th centile and 35% in between the 50th to 97th centile. In this study, we have seen most of them the had Tetralogy of Fallot (56%). This finding is consistent with the findings of Fazlur Rahman[9] et al (25%). TGA was seen in 26% and TAPVR in 6% of patients. 6% of subjects had Ebstein anomaly and 4% had Truncus arteriosus. Tricuspid atresia was found in 4% patients. In TOF, the male and female ratio was 2:1. This finding is consistent with the findings of MH Sadiq[10] (1.6:1) and L Shamima Sharmin[13] et al (4.25:1). Other congenital cyanotic heart diseases also had male predominance. In the study patients- Hypercyanotic spell was found in 52% cases. Bluish skin was seen in 79% and dyspnea on exertion in 43% of patients. 35% of subjects had feeding difficulty and 37% had growth failure. Recurrent RTI was found in 27% patients. We have seen most of the had cyanosis (67%). This finding is consistent with the findings of Sadiq et al (91%). Murmur had 81% patients. Clubbing was seen in 27% and murmur in 81 patients. 15% subjects had abnormal heart sound and 10% had tachycardia. Hypertension was found in 4% and precordial bulging in 6% patients. All patients had positive echocardiographic findings, 73% had positive ECG and 65% patient had positive chest x-ray findings. In this study most of the patients belongs to average socio-economic status.

Limitations of The Study

The study was conducted in a single hospital with small sample size. So, the results may not represent the whole community.

CONCLUSION

This study gives an overview of the incidence, pattern and clinical profile of congenital cyanotic heart disease in Bangladesh armed forces populations. Incidence of congenital cyanotic heart disease is 4.99 per thousand of hospitalized patients. Tetralogy of Fallot and transposition of the great arteries, are the most common cyanotic congenital heart defects in children, are discussed. The clinical presentation, laboratory findings are described. These defects have sufficiently distinctive features such that they can be diagnosed.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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