



## PATTERN OF CONGENITAL HEART DISEASES IN CHILDREN IN A TERTIARY CARE HOSPITAL OF BANGLADESH

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### Abstract

The most common congenital anomaly and a major contributor to infant and toddler mortality is congenital heart disease (CHD). Although it has high mortality rate but majority of the cases are asymptomatic during early life and usually discovered during routine checkup. To determine the incidence and pattern of congenital heart disease in children in a tertiary care hospital of Bangladesh. This cross-sectional study was conducted among children aged 1 day to 10 years old with cardiac problems who were hospitalized to the Paediatric department of Rajshahi Medical College Hospital, Rajshahi, Bangladesh from August 2018 to August 2021. Early detection of CHD is possible by thoroughly analyzing heart murmurs, clinical manifestations, and outcomes. The data were analyzed utilizing IBM SPSS (version-23). A total of 3512 children under the age of 10 years were evaluated. Here 1.54% of the patients had a CHD murmur. In this study, the most common type of congenital heart illness was a ventricular septal defect (VSD) (37.05%). Atrial septal defect (ASD) (24.07%) was found second most common CHD. Rapid breathing (63%) and poor growth (44.4%) were major clinical presentation. According to types of murmur among patients, 27(50%) had pansystolic murmur, 15(27.77%) had ejection systolic murmur and 12(22.23%) had continuous murmur. Congenital heart disease is a major health concern for Paediatricians due to its significant health hazards and high mortality rate. Early identification of congenital cardiac disease is crucial for preventing complications, lowering mortality, and for proper therapy.

**Key words:** Cardiac abnormality, children, congenital heart disease, murmur.

### Introduction

The most prevalent congenital malformation among infants is CHD-congenital heart disease (Nikyar et al. 2011, Chowdhury et al. 2022). Additionally, it is a leading cause of death in the first year of life, with an incidence of 1% in live births (Jose and Gomathi 2003). Early diagnosis of these disorders has huge impacts. CHD can manifest at any age, from newborn to teenager (Amro 2009). It is crucial to understand the pattern of major birth defects in children since they are the most prevalent, have a severe psychological and financial impact on the families affected, and are expensive to treat (Hussain et al. 2010).

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Incidence of CHD was generally low in most developed nations and rather high in Asia and Africa (Wu et al. 2020). Global Burden of Disease 2017 reports that CHD was the cause of 261247 fatalities in 2017, 180624 of which were newborns (under one year old) (Zimmerman et al. 2020). Heart murmurs are frequently noticed in infants and young children, and the significant portion are caused by regular blood flow patterns without any vascular or heart abnormalities. These murmurs are considered to as physiological, harmless, or typical murmurs (Biancaniello 2005). After delivery, two-thirds of healthy newborns have unusual murmurs for several days (Wren et al. 1999).

It is already known that Congenital Heart Disease (CHD) is a significant contributor to neonatal morbidity and mortality. Due to a variety of undiagnosed birth lesions and a lack of medical expertise, the reported frequency of CHD in live newborns frequently varies greatly (Begum 2012). In Bangladesh, the public health system has trouble diagnosing and treating CHD. However, the nation does have some medical expertise, particularly in echocardiography, to identify and treat CHD. To understanding the pattern of congenital heart disorders in children was the goal of this study. The study's findings will aid in adapting the future management strategy for each CHD child and lessen the financial burden and long-term progression of issues related to CHD.

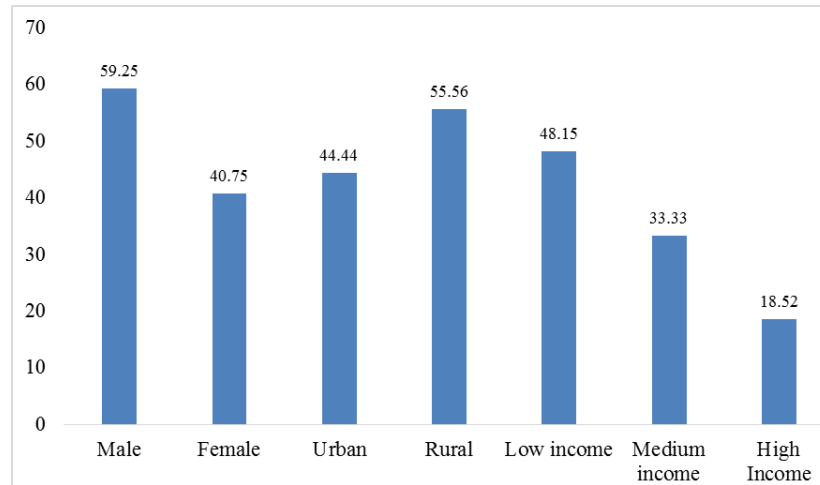
### **Methodology**

This cross-sectional study conducted among children (1 day to 10 years aged) with cardiac problems who were hospitalized to the Paediatric department of Rajshahi Medical College Hospital, Rajshahi, Bangladesh, during a three-year period (August 2018 to August 2021). The researchers conducted interviews with the parents of children who had been brought with cardiac murmurs to the Paediatric unit of the selected Hospital. The parents of the study population were informed about the purpose of the study in detail and consent from every individual was taken with assurance of maintenance of secrecy. For each participant, a code number was used both in questionnaire and in the specimen label. Data were gathered using a semi-structured questionnaire. By properly evaluating heart murmurs, clinical presentations, and results, CHD can be detected early. The socio-demographic characteristics of the study participants as well as the prevalence of coronary heart disease (CHD) were obtained by a face-to-face interview. We made every effort to collect accurate data. Respondents were given the opportunity to openly express their opinions in open-ended questions in a neutral and friendly tone. The data were analyzed utilizing IBM SPSS (version-23) in keeping with the objectives of the study.

### **Results**

During the study, in total 3512 children under the age of 10 were assessed. CHD murmur was discovered in 54 (1.54%) of the patients. Ventricular septal defect (VSD) was the most prevalent form of congenital cardiac disease in this study. The second most frequent CHD was found to be atrial septal defect (ASD). According to socio-demographic profile, among 54 CHD murmur positive patients 32 (59.25%) cases were male and 22

(40.75%) were female. The majority of patients, 30 (55.56%), came from rural areas, while 24 (44.44%) were from urban. 26 (48.15%) of the residents were from low socio-economic group, 18 (33.33%) were from medium and 10 (18.52) were from the high socio-economic group (Fig. 1).



**Fig. 1:** Socio-demographic profile (%).

According to pattern of CHD among children, 37.05% had a ventricular septal defect (VSD), 24.07% had an atrial septal defect (ASD), 20.37% had a patent ductus arteriosus (PDA), 14.81% had a tetralogy of fallot (TOF), and 3.7% had an aortic coarctation (COA) (Table 1).

**Table 1:** Pattern of CHD among children.

Pattern of CHD	n = 54	%
Ventricular septal defect	20	37.05
Atrial septal defect	13	24.07
Patent ductusarteriosus	11	20.37
Tetralogy of fallot	08	14.81
Coarctation of aorta	02	3.70

According to clinical presentation of children Table 3 revealed that, 63% had rapid breathing, 44.4% had poor growth, 29.60% had cough, 14.80% had feeding difficulties, 13% had increased temperature, and 5.60% had excessive sweating (Table 2).

**Table 2:** Clinical presentation of children.

<b>Clinical presentation</b>	<b>n = 92</b>	<b>%</b>
Rapid breathing	34	63.0
Poor growth	24	44.4
Cough	16	29.6
Feeding difficulties	8	14.8
Increase temperature	7	13.0
Excessive sweating	3	5.6

According to clinical findings among the study subjects 35 (64.82%) had chest retractions, 18.52% had abnormal pulsation, 11.1% had cyanosis and 5.56% had edema (Table 3).

**Table 3:** Clinical findings of children.

<b>Clinical findings</b>	<b>n = 54</b>	<b>%</b>
Chest retractions	35	64.82
Abnormal pulsation	10	18.52
Cyanosis	06	11.1
Edema	03	5.56

According to types of murmur among patients, 27 (50%) had pansystolic murmur, 15 (27.77%) had ejection systolic murmur and 12 (22.23%) had continuous murmur (Table 4).

**Table 4:** Types of murmur among the patients.

<b>Types of murmur</b>	<b>Number</b>	<b>%</b>
Pansystolic	27	50.00
Ejection systolic	15	27.77
Continuous	12	22.23

## Discussion

A total of 3512 children under the age of 10 were evaluated in this study, which was conducted among children (1 day to 10 years old) with cardiac issues who were hospitalized to the Paediatric department at Rajshahi Medical College Hospital. Among them-murmur with CHD was found in 54 (1.54%) cases. Due to

various factors, including the size of the sample, the method of detection and early assessment by a neonatologist or pediatrician, its incidence varies from center to center.

A study conducted by Hussain et al. (2014), congenital heart defect was found in 87 of the 5800 neonates, or 1.5%, giving the incidence of congenital heart defects as 15/1000 live births. There were more male than female infants (Hussain et al. 2014). Our study found that male predominated (59.25%), which is in accordance with some previous study (Li and Wang 2001, Farooqui et al. 2010). According to our study's analysis of the CHD pattern in children, 37.05% of those affected had a ventricular septal defect (VSD), 20.07% had an atrial septal defect (ASD), 20.37% had a patent ductus arteriosus (PDA), 14.81% had a tetralogy of fallot (TOF), and 3.7% had an aortic coarctation (COA). Another study conducted in Bangladesh found in their research that study subjects were all new-borns, many of whom had small-sized VSD, and the majority of those who had TOF may not have shown symptoms at that point (Begum and Ahmed, 2001). Previous studies reported that TOF was the most prevalent form of cyanotic congenital heart disease (Faud 1998, Rehan et al. 2002, Farooqui et al. 2010).

According to the clinical data from our study, 63% of children experienced rapid breathing, 44.4% had poor growth, 29.60% had a cough, 14.80% had trouble feeding, 13% had a temperature increase, and 5.60% had excessive sweating. These findings correlate with other study findings (Mollah et al. 2002, Sharmin et al. 2008). Depending on the kind and extent of the problem, congenital heart disease presents differently clinically (Kitchiner 2003). Clinical findings among the study subjects, 35 (64.82%) had chest retractions, 18.52% had abnormal pulsation, 11.1% had cyanosis, and 5.56% had edema. The most prevalent clinical presentation was characterized by rapid breathing and low weight growth (George and Frank-Briggs 2009). The disease can manifest in a variety of ways, including with or without cyanosis, congestive heart failure, cyanotic episodes, and in some children, asymptotically with a cardiac murmur discovered during a checkup for another condition. The types of murmur among patients in this study, 27 (50%) had pansystolic murmur, 15 (27.77%) had ejection systolic murmur and 12 (22.23%) had continuous murmur. After a few weeks after birth, as pulmonary resistance starts to decline, cardiac murmurs brought on by CHD are simpler to give a good indication (Chatelain et al. 1993).

### **Conclusion**

The leading cause of early mortality and morbidity in the world is cardiovascular disease, which is also the most prevalent cause of death internationally. For this issue to have the best outcome, early diagnosis and prompt treatment are essential. In this study the commonest type of Congenital heart disease was ventricular septal defect. Therefore, by examining clinical symptoms, findings, and cardiac auscultation in children from low- and middle-income socioeconomic groups in this area, the results of this study shed light on the feasibility of early detection of congenital heart disease in rural parts of the country. Finding of the study will be helpful for the diagnosis and management of congenital heart diseases thereby help to reduce CHD related complications.

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**Conflict of interest:** The authors declare that there is no competing interest.

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