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PREVALENCE AND CLINICAL FEATURES OF CARDIAC MURMUR WITH ITS SUBTYPES OF CONGENITAL HEART DISEASE IN RAJSHAHI, BANGLADESH

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Abstract

Congenital heart disease (CHD) is a congenital defect affecting the structure of the heart. Early detection can be done by auscultating the murmur and this could help to diagnosis the disease. This study was aimed to detect CHD by rapid evaluation of clinical features, findings and cardiac auscultation which will help to customize the future management plan in each CHD child and reduce the progression of complications and financial burden associated with CHD on this region over time. This descriptive cross-sectional study was conducted on children hospitalized to the paediatric department. A systematic sampling technique was implemented. Total 3978 children were taken during the study period among them 54 were detected as CHD. Total 3978 children under 10 years were examined during the study. Among them-murmur with CHD was found in 54 (1.36%) cases and it was found that 30 (55.6%) were male and most (53.7%) of them from rural area came from 42.6% middle socio-economic group. It was revealed that, among the study cases 40.70% had ventricular septal defect (VSD), 63% had rapid breathing regarding clinical presentation. Regarding clinical findings among the study cases 33 (61.10%) had chest retractions. Among 54 murmur positive cases 29 (53.70%) had pansystolic murmur which help to assess regarding CHD before completing echo. Congenital heart disease, especially in the newborn era, is a pediatric cardiology emergency due to the high morbidity and mortality rates. This research could aid in the early diagnosis of CHD and save the lives of youngsters.

Key words: Congenital heart disease, Murmur disease, Pediatric cardiology, Subtypes.

Introduction

Congenital heart disease is a structural disorder of the heart or intrathoracic great vessels that is present at birth (Mitchell et al. 1971). Despite the fact that this anomaly is present at birth, it may initially be clinically asymptomatic and manifest symptoms only later in life (Brickner et al. 2000). The prevalence and pattern of CHD vary between and within nations (Tchoumi et al. 2011). Estimates vary considerably, and there may be distinctions between low, middle and high income nations. Both the development of health systems in each country and the elucidation of probable etiologies of CHD in different contexts require the collection of reliable data on CHD in various situations (Van der Linde et al. 2011). Heart murmurs are a common observation in newborns and children, and the majority comes from normal flow patterns with no anatomical or anatomic abnormalities of the heart or arteries. These murmurs are referred to be innocent, physiological, or normal murmurs (Biancaniello 2005). Two-thirds of normal babies experience harmless murmurs for many days after delivery, according to one study (Wren et al. 1999). Another study indicated 7.38/1,000 live infants had a heart murmur within the first week of life (Laohaprasitiporn et al. 2005). The government-funded public

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health system provides clinical care to the majority of Bangladesh's population. The public health system in Bangladesh confronts difficulties in both diagnosing and treating CHD. However, the country has some skills, particularly echocardiography, to diagnose and manage CHD medically. This study was done to assess the prevalence of heart murmur in children and its relationship to congenital heart disease.

Methodology

Setting and participants: This cross-sectional study was conducted on all children aged 1 day to 10 years admitted to the Paediatric department of Rajshahi Medical College Hospital, Rajshahi, Bangladesh, with cardiac issues. The sample size was 3978, and it was selected on purpose in three years (August 2018 to August 2021).

Inclusion/exclusion criteria: Inclusion criteria were all children aged 1 day to 10 years with heart murmur admitted to the Paediatric department of Rajshahi Medical College Hospital during the study period. Patients who had a murmur (usually soft mid-systolic) on auscultation without significant clinical characteristics and findings were considered to have an innocent murmur and were eliminated from this study only after it was determined by echocardiogram that they did not have congenital heart disease (CHD). In addition, patients who were unwilling to participate were omitted from this study.

Data collection procedure: Children and their caregivers who were admitted to the Paediatric department of the Rajshahi Medical College Hospital with heart murmur were interviewed by the researchers. A slightly structured questionnaire was used to obtain the data. Through a questionnaire presented by an interviewer and a face-to-face interview, socio-demographic variables and the prevalence of coronary heart disease (CHD) were gathered from the study participants. Every effort was made to acquire correct data. For open-ended questions, respondents were asked in such a way that they may freely express their views and do so in a natural and impartial manner. There were no leading questions posed.

Outcome variable: Early detection of CHD through proper assessment of cardiac murmurs, clinical presentations & findings.

Independent variables: Age of the respondents, sex, residence, socio-economic status, pattern of CHD and types of murmur.

Ethical approval and consent of the participants: Prior to the start of the investigation, the ethics committee of the Institute of Biological Sciences, University of Rajshahi, Bangladesh, authorized the research protocol. The purpose and objectives of the study, as well as its protocol, risks, and advantages, were given to the responders in clearly comprehensible language, and then each participant provided informed consent.

Statistical analysis: Using IBM SPSS, the data were analyzed according to the study's objectives (Version-23).

Results

Data shows in Table revealed that, among the study cases 40.70% had ventricular septal defect (VSD), 20.40% had atrial septal defect (ASD), 22% had patetnt ductus arteriosus (PDA), 13% had Tetralogy of Fallot (TOF), and 3.70% had coarctation of aorta (COA). It was found 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. Regarding clinical findings among the study cases 33 (61.10%) had chest retractions, 25.92% had abnormal pulsation, 11.1% had cyanosis, and 3.70% had edema. Among 54 murmur positive cases 29 (53.70%) had pansystolic murmur, 13 (24.07%) had ejection systolic murmur and 12 (22.23%) had continuous murmur.

Total 3978 children under 10 years were examined during the study. Among them-murmur with CHD was found in 54 (1.36%) cases. Among the 54 murmur positive cases with CHD 30 (55.60%) were male and 24 (44.40%) were female. Regarding residence most 29 (53.70%) were rural resident 24 (46.30%) were urban resident with 11 (20.40%) were in high socio-economic group, 23 (42.60%) were in middle socio-economic group and 20 (37%) were low socio-economic group (Figs. 1-4).

Table 1: Distribution of the respondents with different clinical findings.

Variables	Groups	Type of TAH	
		No	%
Pattern of CHD	Ventricular septal defect	22	40.7
	Atrial septal defect	11	20.4
	Patent ductus arteriosus	12	22.2
	Tetralogy of fallot	7	13.0
	Coarctation of aorta	2	3.7
Clinical presentation	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
Clinical findings	Chest retractions	33	61.1
	Abnormal pulsation	14	25.92
	Cyanosis	6	11.1
	Edema	2	3.7
Types of murmur	Pansystolic murmur	29	53.70
	Ejection systolic murmur	13	24.07
	Continuous murmur	12	22.23

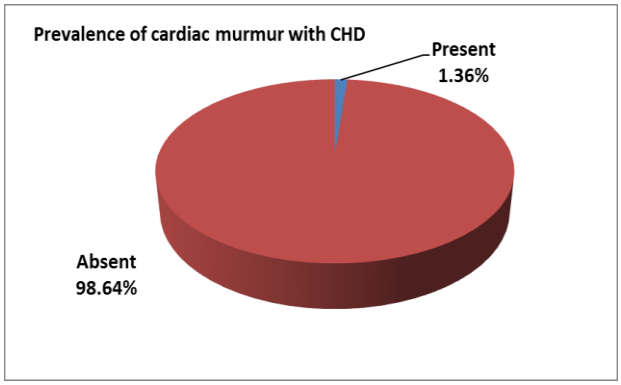

Fig. 1: Distribution of the respondents by cardiac murmur with CHD.

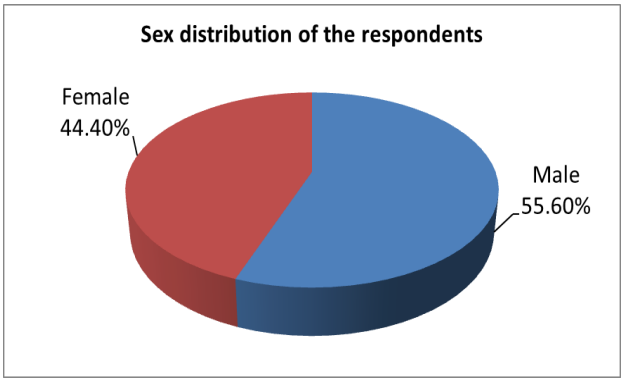

Fig. 2: Distribution of the respondents by sex.

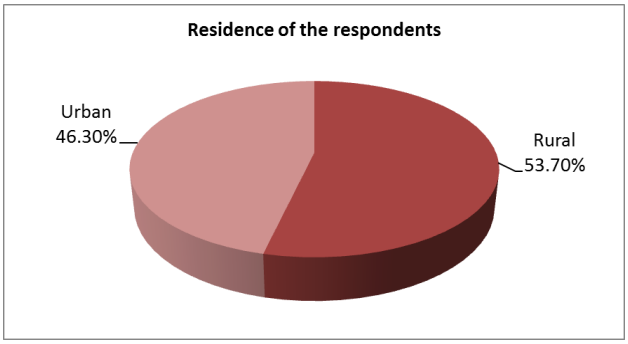

Fig. 3: Distribution of the respondents by residence.

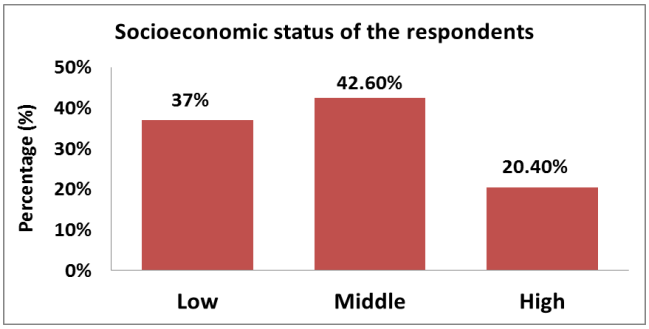

Fig. 4: Distribution of the respondents by socio-economic condition.

Discussion

This descriptive cross-sectional study supplied us with information regarding the prevalence of major subgroups and clinical characteristics of congestive heart disease with cardiac murmur. This research was conducted on youngsters admitted to the Paediatrics Department of Rajshahi Medical College. Among the study cases, it was discovered that 40.70% had ventricular septal defect (VSD), 20.40% had atrial septal defect, 22% had patent ductus arteriosus, 13% had tetralogy of fallot, and 3.70% had coarctation of aorta. Among the subtypes of CHD, shunt lesions such as VSD, atrial septal defect, and patent ductus arteriosus were detected most frequently, corresponding with the global frequency of CHD at birth (Van der Linde et al. 2011, Liu et al. 2019).It was bring into being that, 63% had rapid breathing, 44.4% had poor growth, 29.60% experienced cough, 14.80% had difficulty feeding, 13% had a higher temperature, and 5.60% had excessive sweating. To enhance clinical outcomes, early detection and appropriate therapy of congenital heart disease in newborns are crucial (Triedman and Newburger 2016, Jenkins et al. 2019). With the rise of artificial fertilization and preterm deliveries, the incidence of congenital heart disease is anticipated to rise in the future (Giorgion et al. 2018). Regarding clinical findings, 33 (61.10%) of the research cases had chest retractions, 25.92% exhibited irregular pulse, 11.1% exhibited cyanosis, and 3.70 % exhibited edema. In addition to the 54 murmur-positive cases, 29 (53.7%) had a pansystolic murmur, 13 (24.07%) had an ejection systolic murmur, and 12 (22.23%) had a continuous murmur. Except for one outpatient clinic-based study, primary heart murmur assessments and Echo were conducted simultaneously (Mackie et al. 2009). Cardiac murmurs caused by CHD are easier to auscultate following the decrease in pulmonary resistance that occurs several weeks after birth (Chatelain et al. 1993, Arlettaz et al. 1998). In this study, 3,978 children under 10 years old with heart issues were evaluated. During the study period, 54 (1.36%) of these children had a heart murmur associated with CHD. China had a prevalence of 62.10 per 10,000 PIs in 2016 (International Clearinghouse for Birth Defects Monitoring Systems, 1998) and Europe had a prevalence of 6.5 per 1000 births (Dolk et al. 2010). These disparities may be caused by genetic, environmental, socioeconomic, or ethnic variables; thus, further study should be warranted (Van der Linde et al. 2011). 30 (55.60%) of the 54 murmur-positive CHD cases were male, while 24 (44.40%) were female. we discovered that the prevalence of CHDs was considerably greater in male patients than in female which is agreement with some previous studies (Annas and Elias 1999, Li et al. 2013). Regarding domicile, the majority of respondents (29, 53.70%) lived in rural areas, while 24 (46.30%) lived in urban areas; 11 (20.40%) belonged to a high socioeconomic group, 23 (42.60%) to a moderate socioeconomic group, and 20 (37%) to a low socioeconomic group. This phenomenon is mostly attributable to greater health consciousness and the increased use of prenatal

diagnostic procedures in metropolitan settings, both of which enhance access to health care and reporting habits. Second, environmental exposure-increasing factors, such as industrialization and urbanization, affect the incidence of CHDs in metropolitan areas (Zhang et al. 2011).

Conclusion

Increased prevalence of congenital heart disease (mainly mild CHD disorders) during birth/infancy or early childhood is globally a problem. Concurrently, there has been a decline in school-aged children receiving their first CHD diagnosis. All of these indicate a favorable shift in CHD detection time to earlier in life. Despite this, considerable income disparities continue across countries with greater and lower incomes. There is a need for more healthcare resources for individuals born with CHD, particularly in less developed nations. In addition, complications in congenital heart diseases in this region, as well as their reasons of progression and appropriate techniques of intervention, warrant additional research. Therefore, the findings of this study shed light on the possibility of early diagnosis of congenital heart disease in rural areas by evaluating clinical features, findings, and cardiac auscultation without minimal radiological intervention in children from low- and middle-income socio-economic groups in this region. Lastly, this issue should be addressed by policymakers and public health physicians, as early diagnosis can reduce complications, financial burden, and save time, hence facilitating the determination of the most appropriate form of action for these individuals.

Conflict of interest

There is no conflict of interest (COI) between the authors in terms of their relationships, professions, finances, or other circumstances.

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