Original Article

Congenital Heart Disease For Echocardiogram By Pediatrician

Echocardiographic Evaluation Reveals the Prevalence and Patterns of Congenital Heart Disease in Pediatric Populations: Insights from a Peripheral Cardiac Center in Azad Jammu and Kashmir

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ABSTRACT

Objective: The objective of this study to assess the pattern of congenital heart disease in patients who were referred for echocardiogram by pediatrician

Study Design: Prospective Observational study

Place and Duration of Study: This study was conducted at the Kashmir Institute of Cardiology Mirpur and Department Biochemistry of Mohtarma Benazir Bhutto Shaheed Medical College, Mirpur, AJK from March 2021 to October 2022.

Methods: The study's primary objectives were to investigate the potential presence of congenital heart disease in patients referred by pediatricians, gather socio-demographic information, document echocardiographic findings, and evaluate the final outcomes of these patients, with the assistance of statistical analysis conducted through SPSS version 21.

Results: The study identified a total of 341 CHD cases out of 3,800 cases seen in our hospital, making CHD approximately 8.97% of the total cases. A breakdown of CHD subtypes revealed that ASD secundum was the most common, followed by sinus venosus ASD2, ASD primum, and sinus venosus ASD.

Conclusion: The pattern of congenital heart disease (CHD) observed in our dataset diverges from that reported in the CDC's data. It's important to note that our data was exclusively collected by adult cardiologists who have received specialized training in pediatric echocardiography

Key Words: congenital heart disease, echocardiogram pattern

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INTRODUCTION

There are estimated 2 million adults in USA living with congenital heart disease. Congenital heart disease affects nearly 1% of about 40,000—births per year in the United States. The prevalence or mild type congenital heart diseases is increasing, while the prevalence of other types has remained stable.[1-4] Cardiovascular Disorders: A Major Cause of Mortality in Developed Regions and the Prevalent Form of Congenital Defects in Humans.

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Challenges in Advancing Human Heart Organoid Models for Cardiovascular Disease Research Compared to Other Organs (e.g., Kidney, Colon, Intestine, Brain)[5-8] Unlocking the Potential of Human Pluripotent Stem Cells (hPSCs) for Cardiac Cell Differentiation: Addressing the Discrepancy in Structural and Cellular Complexity Compared to Native Tissues. Overcoming Isolated Cell Type Focus and Neglected Interactions for Enhanced In Vitro Models of the Human Heart in Research and Translational Medicine.[9-12]

Heart disease were found to be of serious and life threatening nature. In our study we have tried to find out the pattern of congenital heart disease in children and adults who were referred for echocardiogram by pediatrician and in adults who presented to us in our outdoor clinic at Kashmir Institute of Cardiology. Total of 3800 echos performed.

The majority of these defects exhibit a multifactorial inheritance pattern, arising from the interplay of genetic and environmental factors, with a smaller proportion associated with chromosomal aberrations.[13] Notably, the pattern of risk factors for congenital heart disease (CHD) varies across different regions of the world. In

developing countries, consanguinity is relatively common, and a significant portion of mothers are homemakers, non-smokers, and non-drinkers.[13] It is regrettable that only a limited number of studies have explored perinatal risk factors within these populations.[14]

METHODS

The research project centered on a group of patients who were specifically referred by pediatricians to undergo echocardiograms due to suspicions of congenital heart disease. This referral was based on a thorough assessment of the patients' medical history and clinical evaluations. The study collected and analyzed various types of data, including socio-demographic information, echocardiographic findings, and the eventual outcomes of these patients. The analysis of this data was conducted using statistical software, specifically SPSS version 21.

In summary, the study's primary objectives were to investigate the potential presence of congenital heart disease in patients referred by pediatricians, gather socio-demographic information, document echocardio-graphic findings, and evaluate the final outcomes of these patients, with the assistance of statistical analysis conducted through SPSS version 21.

RESULTS

Out of a total of 3,800 cases that were examined in our hospital, 341 cases were diagnosed with congenital heart disease (CHD). This means that CHD constituted approximately 8.97% of all cases seen in our hospital.

Specifically, among the CHD cases, there were four distinct subtypes of atrial septal defects (ASD) that were identified. These subtypes and their respective frequencies were as follows:

Table No. 1: Percentage of CHD seen in our hospital

	Frequency	Frequency of congenital heart diseases.	Percentage of CHD seen in our hospital
Total Cases	3800	341	8.97%

Table No. 2: Prevalence of congenital heart diseases

ASD Types	Frequency	Total percentage of CHD
ASD secundum	111	32.5%
ASD PRimum	4	1.17%
Sinus venosus ASD	8	2.34%
Total	123	36%

Table No. 3: CDC data for Coronary heart disease

Disease	Percentage by CDC	Percentage of CHD in our Data
ASD	18%	36%
VSD	28.8	19%
PDA	9.6	10.26
COA	3.7	0.29%
BAV	2.4%	7.9%
TGA	3.4%	1.46%
TOF	3.7	4.10%

Atrial septal defect (ASD) secundum: This subtype was observed in 120 patients, representing approximately 32.5% of the total CHD cases. ASD primum: Four patients were diagnosed with ASD primum, accounting for about 1.17% of the total CHD cases.Sinus venosus ASD: Five patients were found to have sinus venosus ASD, making up around 1.46% of the total CHD cases. Sinus venosus ASD2: Another subtype of sinus venosus ASD was detected in 2.34% of the total CHD cases.In summary, the study identified a total of 341 CHD cases out of 3,800 cases seen in our hospital, making CHD approximately 8.97% of the total cases. A breakdown of CHD subtypes revealed that ASD secundum was the most common, followed by sinus venosus ASD2, ASD primum, and sinus venosus ASD.

DISCUSSION

Congenital heart disease (CHD) stands as a relatively prevalent congenital anomaly, with reported prevalence rates ranging from 3.5 to 17.5 per 1000 live births.[15] notably, it has become an increasingly significant contributor to pediatric mortality, particularly in developing nations.[16]

The clinical manifestation of CHD is remarkably versatile and varies depending on the age of presentation. Asymptomatic cases are commonplace and are often incidentally discovered during routine checkup visits. In contrast, other presentations span a spectrum from poor suckling, cyanosis, and shortness of breath to more severe presentations such as overt heart failure. [17]

A comprehensive examination of the epidemiology of congenital heart defects (CHDs) serves as a crucial foundation for the improved understanding of the factors contributing to cardiac dysmorphogenesis. This understanding, in turn, enables the development of effective prenatal prevention strategies.[18, 19] Regrettably, the epidemiology of CHDs has not been extensively explored in the context of Egyptian children. Consequently, this study was undertaken with the objective of assessing the portfolio of risk factors, the relative frequencies of various CHD types, demographic characteristics, age distribution, and modes of clinical presentation among Egyptian children with CHDs. The intention behind this investigation is to facilitate the implementation of appropriate alterations in preventive healthcare policies and ensure the delivery of optimal care for these patients."

The clinical presentation of congenital heart disease (CHD) is multifaceted and varies with the patient's age, necessitating a heightened level of suspicion to enable early diagnosis and timely intervention.[20]

Prevalence of different CHD types. For instance, we observed a higher incidence of atrial septal defects (ASD) at 36% in our data, as opposed to the 18% reported in the CDC dataset. In contrast, ventricular septal defects (VSD) were lower at 19% in our data compared to the 28.8% reported by the CDC. The percentage of patent ductus arteriosus (PDA) in our dataset closely resembled the CDC data, while coarctation of the aorta was much lower at 0.29% in our hospital, whereas it was 3.7% in the CDC dataset.

Moreover, bicuspid aortic valve was more prevalent in our data at 7.9% compared to the 2.4% reported by the CDC. Transposition of the great arteries (TGA) had a lower occurrence in our data at 1.46% as opposed to 3.4% in the CDC dataset. On the other hand, tetralogy of Fallot (TOF) had a similar prevalence in both our cases and the CDC data.

CONCLUSION

The pattern of congenital heart disease (CHD) observed in our dataset diverges from that reported in the CDC's data. It's important to note that our data was exclusively collected by adult cardiologists who have received specialized training in pediatric echocardiography. To ascribe this variance in CHD patterns to our institution, further investigations are warranted. Possible factors contributing to this divergence could include racial disparities and environmental influences."

Author's Contribution:

Concept & Design of Study:	Saeed Ahmed
Drafting:	Asnad
Data Analysis:	Asnad
Revisiting Critically:	Saeed Ahmed, Asnad
Final Approval of version:	Saeed Ahmed

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