Section: Paediatrics

Original Research Article

PREVALENCE OF CONGENITAL HEART DISEASE AMONG CHILDREN IN KANYAKUMARI DISTRICT, TAMIL NADU: A DESCRIPTIVE CROSS-SECTIONAL STUDY

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ABSTRACT

Background: Congenital heart disease (CHD) is the most common congenital anomaly worldwide and a major contributor to childhood morbidity and mortality, yet population-based data on its prevalence and spectrum in southern India remain limited. This study aimed to determine the prevalence, clinical spectrum, and treatment outcome of CHD among children in Kanyakumari district. **Materials and Methods:** In this descriptive cross-sectional study, 17,502 children aged 0–18 years presenting to Kanyakumari Government Medical College and Hospital (paediatric outpatient department, triage, Rashtriya Bal Swasthya Karyakram screening, and neonatal intensive care unit) between June 2024 and May 2026 were screened by clinical examination and echocardiography. Children with abnormal cardiovascular findings underwent confirmatory two-dimensional echocardiography and colour Doppler study. **Result:** CHD was confirmed in 87 children, giving a prevalence of 4.97 per 1000 children screened (95% CI 4.03–6.13). Ventricular septal defect was the most common heart disease (32.2%), followed by atrial septal defect (28.7%); tetralogy of Fallot (2 cases) was the most common cyanotic lesion. Acyanotic CHD accounted for 96.6% of cases. Male children were marginally more affected (54.0% vs. 46.0%; M:F = 1.18:1, p = 0.45). Children between 1–5 years formed the largest diagnosed group (27.6%); mean age at diagnosis was 6.36 ± 5.65 years. Surgical intervention was performed in 45 children (51.7%); the remainder were managed medically with close follow-up. **Conclusion:** CHD prevalence in this cohort was comparable to other Indian studies, with ventricular septal defect as the predominant lesion. Strengthening newborn and early-childhood cardiac screening protocols is essential for early diagnosis and intervention.

INTRODUCTION

Congenital heart disease is the most common group of congenital anomalies worldwide and contributes substantially to childhood morbidity and mortality. Population-level data on the prevalence and pattern of CHD remains limited, particularly in resource-constrained settings.[1] The reported prevalence of CHD in India ranges from 8 to 10 per 1000 live births, and CHD accounts for approximately one-fourth of all congenital malformations and 10% of current infant mortality.[1,2] India faces unique challenges in managing CHD: healthcare infrastructure, particularly in rural areas, remains underdeveloped, and paediatric cardiac centres are limited, resulting in delay in diagnosis and intervention. A clear understanding of the epidemiology of CHD provides the foundation for investigating the causes of cardiac dysmorphogenesis and for developing strategies to prevent and manage the condition.[2-4]

MATERIALS AND METHODS

The primary objective of this study was to determine the prevalence and spectrum of congenital heart disease among children in Kanyakumari district, with secondary objectives of describing its age- and sex-wise distribution and identifying the rate of surgical intervention among diagnosed cases. This descriptive cross-sectional study was conducted at Kanyakumari Government Medical College and Hospital among children aged 0–18 years residing in the district, from

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June 2024 to May 2026. A total of 17,502 children—drawn from the paediatric outpatient department and triage, RBSK screening, and the neonatal intensive care unit—were screened using universal sampling, with all children undergoing clinical examination and those showing abnormal cardiovascular findings referred for echocardiography and colour Doppler study. Children between 0–18 years diagnosed with CHD on echocardiography were included, while those with acquired or rheumatic heart disease or myocarditis were excluded. Data were collected using a structured proforma capturing demographic variables (age, sex, place of residence) and clinical variables, with diagnosis confirmed by two-dimensional echocardiography performed by a qualified paediatric cardiologist. The primary outcome was the prevalence of CHD, calculated as the number of diagnosed cases per 1000 children screened, while secondary outcomes included the distribution of CHD by age and sex, the frequency of specific lesions, the proportion of cyanotic versus acyanotic disease, and the proportion of children undergoing surgical intervention. Data were entered in Microsoft Excel and analysed using IBM SPSS version 32; categorical variables were expressed as frequencies and percentages, prevalence was reported per 1000 children with 95% confidence intervals, and sex-wise differences were assessed using the chi-square test, with $p < 0.05$ considered statistically significant.

RESULT

During the two-year study period, 12 of 4727 newborns delivered at Kanyakumari Government Medical College and Hospital were diagnosed with congenital heart disease. Of the 17,502 children screened, 87 were confirmed to have CHD on echocardiography, giving an overall prevalence of 4.97 per 1000 children screened (0.497%; 95% CI 4.03–6.13).

Ventricular septal defect was the most common lesion (32.2%), followed by atrial septal defect (28.7%); patent ductus arteriosus and patent foramen ovale accounted for 16.1% and 6.9% of cases, respectively. Tetralogy of Fallot (2 cases) was the most common cyanotic lesion identified. Acyanotic CHD accounted for 96.6% of cases, while cyanotic CHD accounted for 3.4%.

Male children were marginally more affected than females (54.0% vs. 46.0%; M:F ratio 1.18:1), a difference that was not statistically significant ($\chi^2 = 0.56$, $p = 0.45$). Children between 1–5 years formed the largest diagnostic group (27.6%), followed closely by children younger than 1 year (25.3%) and those aged 11–18 years (26.4%). The mean age at diagnosis was 6.36 ± 5.65 years (median 6.0 years; range 0.1–18 years).

Of the 87 children diagnosed with CHD, 45 (51.7%) underwent surgical intervention, while the remaining 42 (48.3%) were managed medically with close follow-up. Full details are presented in [Table 1].

Table 1. Spectrum of Congenital Heart Disease Across Study Variables

Overall Prevalence		**Value**
Total screened		17,502
Total CHD cases		87
Prevalence (per 1000)		4.97
Prevalence (%)		0.497
95% CI (per 1000)		4.03–6.13
Sex Distribution		
Sex	n	%
Male	47	54.0
Female	40	46.0
Total	87	100.0
M:F ratio = 1.18:1; $\chi^2 = 0.56$, $p = 0.45$ (not significant)		
Age Distribution		
Category	n	%
<1 year	22	25.3
1–5 years	24	27.6
6–10 years	17	19.5
11–18 years	23	26.4
>18 years	1	1.1
Total	87	100.0
Mean age 6.36 ± 5.65 years; median 5.0 years; range 0.1–18 years		
Type of CHD Lesion		
Category	n	%
VSD	28	32.2
ASD	25	28.7
PDA	14	16.1
PFO	6	6.9
Others	14	16.1
Total	87	100.0
Cyanotic vs. Acyanotic CHD		
Category	n	%
Acyanotic	84	96.6
Cyanotic	3	3.4
Total	87	100.0

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Surgical Intervention		
Category	n	%
Done	45	51.7
Not done	42	48.3
Total	87	100.0

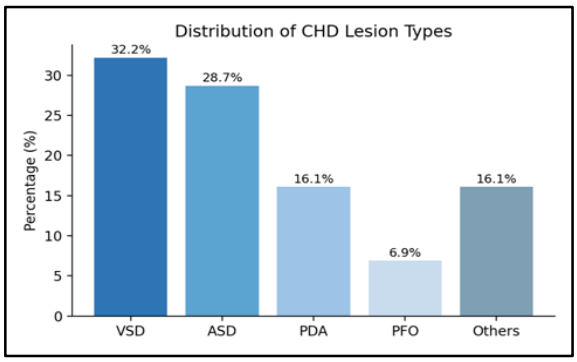

Figure 1: Distribution of CHD Lesion Types (%).

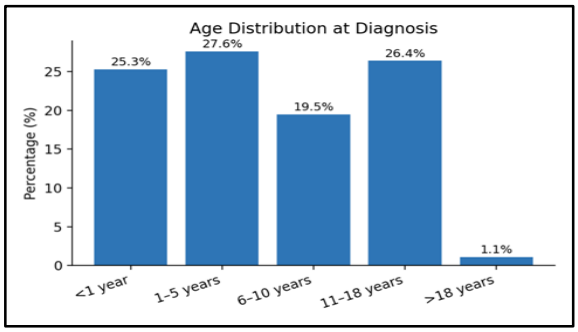

Figure 2: Age Distribution at Diagnosis (%).

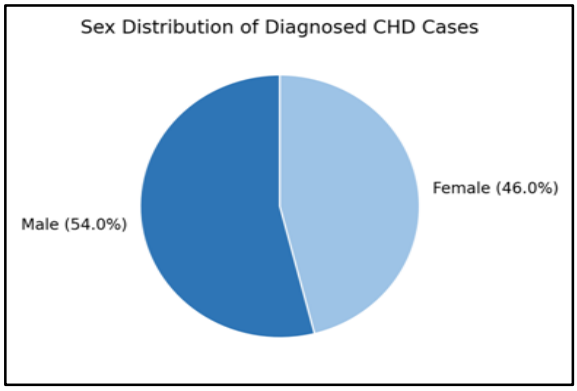

Figure 3: Sex Distribution of Diagnosed CHD Cases.

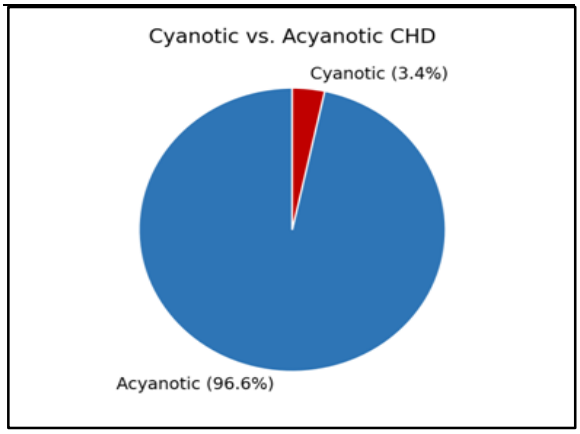

Figure 4: Cyanotic vs. Acyanotic CHD.

DISCUSSION

Congenital heart disease constitutes a significant proportion of anomalies in the paediatric population and is an increasingly important contributor to infant mortality. Accurate estimation of its prevalence and case burden is therefore essential for informing health policy.[3] In the present study, ventricular septal defect was the most common acyanotic lesion (32.2%), consistent with several Indian studies, including those by Meshram and Gajimwar (20.7%), Kapoor and Gupta (21.3%), and Wanni et al. (31.9%), all of which identified VSD as the predominant CHD subtype.[6-8]

A male predominance was observed in this study (54.0% of cases; M:F ratio 1.18:1), similar to findings reported by Wanni et al. (52.4%) and Chatterjee et al. (51.9%), although lower than the 60.3% reported by Qazi and Saqib.[9-11]

Limitations: Kanyakumari district has multiple speciality hospitals, and a proportion of children with suspected CHD may have been referred directly to dedicated cardiac centres rather than presenting to the study site, potentially underestimating the true community prevalence. Additionally, stillborn infants and those with severe critical illness attributed to CHD could not be evaluated by echocardiography and were therefore not included in this study.

CONCLUSION

This study found a CHD prevalence of 4.97 per 1000 children screened in Kanyakumari district, with ventricular septal defect as the predominant lesion and a slight male predominance. These findings underscore the need for robust screening and diagnostic protocols to enable early detection and timely intervention. Routine four-limb pulse oximetry screening in postnatal wards and targeted echocardiographic evaluation of newborns born to high-risk mothers may help facilitate earlier diagnosis and reduce CHD-related morbidity.

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