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A STUDY OF PREVALENCE AND PATTERN OF CONGENITAL HEART DISEASES AT DEPARTMENT OF PEDIATRICS SGGIM&HS, PATEL NAGAR DEHRADUN, UTTRAKHAND, INDIA.

Paediatrics

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ABSTRACT

Background: Congenital heart disease (CHD) is one of the major causes of mortality and morbidity in the pediatric population of both the developing and developed countries. Early detection of congenital heart disease is important to prevent mortality and morbidity among CHD patients. Aim was to study the prevalence, age and sex wise distribution, and clinical spectrum of congenital heart diseases (CHDs) at Department of pediatrics SGGIM&HS, Patel Nagar, Dehradun, India.

Methods: Around 28620 children from birth (completed gestation age ≥37week) to 18 years were screened for congenital heart defects. Clinical examination and NADAS criteria were used for screening patients for CHDs, patients suggestive of CHD were evaluated using echocardiography and color Doppler as diagnostic tools.

Results: A prevalence of 7.5 per 1000 population was observed. PDA (patent ductus arteriosus) in 36.7 % was the commonest lesion followed by VSD (ventricular septal defect) 28.9% and ASD (atrial septal defect) in 22.2%. Tetralogy of Fallot 69.4% was the commonest among cyanotic heart diseases. Maximum numbers of children with heart disease were diagnosed in the age group 0 to 6 weeks.

Conclusions: For better estimation of prevalence of congenital heart diseases, more elaborate community and hospital based studies are needed. Community based studies can be done easily. Community screening programs helps in detecting silent cardiac ailments, their prevalence and pattern, and early therapeutic intervention. A few prevalence studies have been carried out in piecemeal manner in different locations of India; and more such studies are required to be conducted for estimation of the CHD load in community, required for policy formulation and implementation.

KEYWORDS

Congenital heart disease, PDA, Prevalence, VSD

INTRODUCTION

Congenital heart disease (CHD) is defined as a gross structural abnormality of the heart or intrathoracic great vessels that is actually or potentially of functional significance[1]. Congenital heart disease is one of the most common congenital defects and along with neural tube defects accounts for two-thirds of all congenital malformations [2]. Despite advanced diagnostic facilities and improved medical care, CHD is considered one of the leading causes of neonatal mortality [3]. According to a status report on CHD in India, 10% of the present infant mortality may be accounted for by CHD [4].CHD may present at different ages from birth to adolescence [3]. Many cases are asymptomatic and discovered incidentally during routine health check-up[5]. Other presentations can range from cyanosis, clubbing of fingers, fatigue to full blown congestive cardiac failure[3,5]. The prevalence of CHD is not uniform in our country as various studies have reported it ranging from 1.3 to 50.89 per 1000 live births [6,7]. Also several studies from abroad report a changing pattern and incidence of CHD in various geographical locations [8,9]. Early recognition of such diseases has great implications. CHD has not been studied thoroughly in India, as in western countries. Accurate assessment of prevalence of CHD in a population is critical in understanding the social and economic burdens placed on the patients and their families, demands placed on the health care system and health planning.

METHODS

This was a hospital based prospective study done at Department of pediatrics SGGIM&HS, Patel Nagar Dehradun, Uttrakhand, India from 1st January 2015 to 30th june 2016 for a duration of 18 months. There were total of 28620 patients screened for CHDs duing 18 months of duration at hospital.

All full term newborn patients ≥37 week of life to 18 years were included into the study, term babies were evaluated for CHD at time of discharge, as ductus arteriosus functionally close in term infants by 12-24 hrs of life[10]. PDA is a major morbidity seen in preterm infants with its incidence being inversely related to gestational age i.e. 15-40% in very low birth weight infants to 50 to 65% in extremly low birth infants (<28wk gestational age)[11,12].

When term infant is found to have PDA, the wall of the ductus is deficient in both the mucoid endothelial layer and the muscular media, where as in premature infant , the PDA usually has a normal structure[13]. Thus PDA persisting in term babies rarely close spontaneously as is seen in preterm babies. All preterm infants were excluded from the study because of high prevalence and increased spontaneous closure of PDA.

All patients from 0 week to 18 years of age groups were asked about history of (H/O) palpitation/increased precordial activity in child, any H/O recurrent chest infection, or bluish discoloration of tongue/lips while attending OPD and emergency for screening CHDs. All suspected patients underwent a thorough clinical examination after a detailed history and were followed by investigations such as SpO2 , chest X-ray, ECG, echocardiography, and color doppler. The criteria to suspect heart disease was followed as formulated by Alexander Nadas named as NADA'S criteria[14]. NADA'S Criteria include **Major** (i) Systolic murmur grade 3 or more (ii) Diastolic murmur (iii) Cyanosis (iv) CCF and **Minor** (i) Systolic murmur < grade 3 (ii) Abnormal S2 (iii) Abnormal X-ray (iv) Abnormal BP (v) Abnormal ECG ; One major or two minor criteria are essential for diagnosis of suspected heart disease. Diagnosis of all suspected cases were confirmed by echocardiography, which was done by Cardiologist

RESULTS

Table 1 is showing age and sex distribution of total population screened. In present study authors have screened 14920 male and 13700 female children with total of 28620 patients in the age group 0 to 18 years of age. There were total of 4300 patients between 0 to 6 weeks, 6044 between 6 week to 6 years and 18276 patients between 6 to 18 years of age.

Table 2 shows that a total of 216 children had CHD, with acyanotic heart disease in 180 (83.3%) and cyanotic heart disease 36 (16.6%). With prevalence of congenital heart disease 7.5/1000 in total population screened at hospital.

Table1: Showing distribution of Males and Females across various age groups.

Total population age groups	Male	Female	Total
0 to 6 week	2460	1840	4300
6 weeks to 6 year	3224	2820	6044
6year to 18 years	9236	9040	18276
Total	14920	13700	28620

Table 2.showing distribution of congenital heart diseases across males and females.

Total population Screened N=28620	Male = 14920	Female =13700	
Congenital heart disease found n=216			7.5/1000
Acynotic Congenital heart disease (ACCHD) =180	102 (47.2%)	78 (36.1%)	83.3%
Cynotic congenital heart disease (CCHD) = 36	15 (6.9%)	21 (9.7%)	16.6%

Table 3 shows that the most common lesion among the acyanotic heart diseases (n=180) was isolated PDA in 66 (36.7%) followed by others like VSD 52 (28.9%), ASD in 40 (22.2%) and AV Septal defects 6(3.3%)

Table 4 shows that among the cyanotic heart diseases (n=36), TOF was seen in 25 patients (69.4%) followed by the transposition of the great vessels in 7 (19.4%).

Table 5 shows the age at diagnosis and most CHD were detected in age group 0 weeks to 6 weeks. The majority of acyanotic (86) and cyanotic heart diseases (19) in table 6 were diagnosed in age group 0 to 6 weeks of life .

Table 3. showing distribution of various types of ACCHDs (Acyanotic congenital heart diseases).

	ACCHD	n=180	N=216
1	PDA(patent ductus arteriosus)	66(36.7%)	30.6%
2	VSD(ventricular septal Defect)	52(28.9%)	24.1%
3	ASD(atrial septal defect)	40(22.2%)	18.5%
4	Complex anomalies	4(2.2%)	1.9%
5	AV Septal Defect	6(3.3%)	2.8%
6	ASD + PDA	2(1.1%)	0.9%
7	Pulmonic Stenosis	3(1.7%)	1.4%
8	Aortic stenosis	2(1.1%)	0.9%
9	Bicuspid Aortic Valve	2(1.1%)	0.9%
10	Mitral Valve prolapse	2(1.1%)	0.9%
11	Dextrocardia	0	-
12	CoA(coarctation of aorta)	1(0.6%)	0.5%

Table 4. showing distribution of various types of CCHDs (cyanotic congenital heart diseases).

	CCHD (cyanotic congenital heart disease)	n= 36	N =216
1	TOF (Tetrology of Fallot)	25(69.4%)	11.6%
2	TGV (Transposition of Great Vessels)	7 (19.4%)	3.2%
3	Single Ventricle	2 (5.6%)	0.9%
4	TAPVC(Total Anomalous Pulmonary Venous Circulation)	0	0
5	Tricuspid Atresia	1 (2.8)	0.5%
6	DORV (Double Outlet Right Ventricle)	1 (2.8%)	0.5%
7	Truncus Arteriosus	0	0

Table 5. Spectrum of age wise detection of congenital heart diseases in Acynotic CHD.

Age group	0 to 6 weeks M/F	6 week to 6 year M/F	6 year to 18 year M/F	M/F Total	Total
PDA	18/22	6/8	6/6	30/36	66
VSD	16/12	8/6	4/6	28/24	52
ASD	2/4	6/6	10/12	18/22	40
Complex anomalies	3/1	0/0	0/0	3/1	4
AV Septal Defect	3/1	1/1	0/0	4/2	6
ASD+PDA	1/0	1/0	0/0	2/0	2
PS	1/1	0/1	0/0	1/2	3
AS	1/0	1/0	0/0	2/0	2
Bicuspid Aortic Valve	0/0	0/0	2/0	2/0	2
MVP	0/0	0/0	0/2	0/2	2
Dextrocardia	0/0	0/0	0/0	0/0	0
CoA	0/0	0/0	1/0	1/0	1
Total	45/41	23/22	23/26	91/89	168

Table 6. Spectrum of age wise detection of congenital heart diseases in Cynotic CHD (CCHD) .

Age group of CCHD	0week to 6week M/F	6week to 6year M/F	6year to 12 year M/F	Total M/F	Total
TOF	6/5	4/4	2/4	12/13	25
TGV	2/3	1/1	0/0	3/4	7
Single Ventricle	1/0	1/0	0/0	2/0	2
TAPVC	0/0	0/0	0/0	0/0	0
Tricuspid Atresia	0/1	0/0	0/0	0/1	1
DORV	0/1	0/0	0/0	0/1	1
Truncus arteriosus	0/0	0/0	0/0	0/0	0
Total	9/10	6/5	2/4	17/19	36

DISCUSSION

School-based studies exclude a large portion of CHD patients below the age of admission to school, and a significant proportion of CHD lesions had not been considered because many patients with severe CHDs drop out of school because of their low socioeconomic status. These types of studies reported a prevalence of 1–5/1000 individuals, which cannot be considered a true picture of the prevalence rate.[15,16,17] Although community-based studies included all strata of society, there was only 1 such study in India, which gave a prevalence of 4.2/1000 individuals.[18] In present study authors found a prevalence of 7.5 per 1000. The prevalence is consistent with study done by Rajendra Kumar Jatav [19] et al. 2014 which is also a hospital based study having prevalence of 8.55/1000 patients. Sawant et al [20]have found prevalence of 13.28/ 1000 and these results were higher than found in the present study.

Most common congenital heart diseases found in our study was PDA 36.7%, followed by VSD in 28.9% cases, ASD in 22.2% and others 12.2% among acyanotic congenital heart diseases. These findings are not inconsistent with hospital based study done by Rajendra Kumar Jatav[19], 2014 in which VSD was the most common CHD among Acynoyic CHDs. The cause for increased PDA in our study could be the inclusion of newborns into our study group, which carry increased prevalence of PDA. Also the cause for increased prevalence of PDA in our study could be that the study was done in hospital at Dehradun, having catchment of patients living in high altitudes above sea level, similar results of high prevalence of PDA in high altitudes was seen by Asif Hasan [21]in another study.

In this study, TOF 11.6% of total CHD defects and 69.4% among cyanotic congenital heart diseases. The reported range of TOF prevalence is 4.6-18.3% of total defects. It is also the most frequent cyanotic CHD in Western countries, though it accounts for a relatively low proportion of total CHDs. The EUROCAT study reported 0.2/1000, while a study in Iceland estimated a maximum of 0.5/1000 CHDs, and the prevalence in Taiwan was 0.63/ 1000 births.[22-24] present study found a population prevalence of 0.8 /1000, which is slightly higher than in other studies.

In present study more males (102) than females were affected by acyanotic congenital heart diseases and more females (18) than males (12) were affected by cyanotic congenital heart diseases. But difference was statistically insignificant. In present study majority of CHD cases were detected in the age group 0 to 6 weeks age group.

CONCLUSION

Advancements in diagnostic technology and progress in therapeutic management have improved the life expectancy of CHD patients. For better estimation of prevalence of congenital heart diseases, more elaborate community and hospital based studies are needed. community based studies can be done easily. Community based screening programs helps in detecting silent cardiac ailments, their prevalence and pattern, and early therapeutic intervention. A few prevalence studies have been carried out in piecemeal manner in different locations of India; and more such studies are required to be conducted for estimation of the CHD load in community, required for policy formulation and implementation.

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