



---

**PREVALENCE OF CONGENITAL HEART DISEASE IN NEONATES AND INFANTS IN RURAL TERTIARY CARE HOSPITAL**

**Pooja Patel<sup>1</sup>, Vivek Bhatt<sup>2</sup>, Darshvi Shah<sup>3</sup>, Disha Shah<sup>3</sup>, Priya Patel<sup>3</sup>, Anju Mohan<sup>3</sup>**

<sup>1</sup> Assistant Professor, Smt. B.K.Shah Medical Institute and Research Center, Dhiraj Hospital, Sumandeep Vidyapeeth, Pipariya, Waghodiya

<sup>2</sup> Consultant Pediatrician and Neonatologist, Sunshine Child care and Vaccination centre, Rajkot

<sup>3</sup> Resident Doctor, Smt. B.K.Shah Medical Institute and Research Center, Dhiraj Hospital, Sumandeep Vidyapeeth, Pipariya, Waghodiya

Corresponding author: Dr Pooja Patel

(email: poojakelawala@yahoo.co.in)

**ABSTRACT**

**Background:** congenital heart disease are relatively common congenital malformations with prevalence ranging from 3.5-17 per 1000 live births.

**Objective:** to study prevalence, age wise distribution, clinical spectrum and immediate outcome of CHD in neonate and infants.

**Materials and methods:** this is hospital based, prospective observational study conducted in 41 patients in Pediatrics department, Smt. B.K.Shah Medical Institute and Research Center, Dhiraj Hospital, Sumandeep Vidyapeeth, Pipariya during December 2019 to May 2021. Clinical examination followed by confirmation with 2D-ECHO and Colour Doppler done.

**Results:** Out of 41 patients, male:female ratio was 2.4:1. The prevalence of CHD amongst the term babies were around 32 (78%) and around 8 (19.5 %) in pre term infants. 82.7% CHD were acyanotic, where VSD (31.7%) was the most common followed by PDA (14.6%).

Out of 41 CHD infants around 23(56.1 %) were discharged and only 3 died which is 7.3 %. Surgical intervention was performed in 3 cases.

**Conclusions:** Acyanotic heart diseases were commonly found than cyanotic heart conditions in neonates and infants. Amongst those, VSD is the most common one followed by PDA.

**INTRODUCTION**

Congenital heart disease, accounts for 28% of all congenital birth defects, is the most frequently occurring congenital disorder.<sup>1</sup> The prevalence of CHD at birth is reported to be 8-12/1000 live births.<sup>2,3</sup>

Also, congenital heart diseases are one of the leading cause of mortality in 1<sup>st</sup> year of life.<sup>4,5</sup> According to the status report on CHD in India, 10% of the present infant mortality can be accounted solely by CHD.<sup>6</sup> Prevalence of CHD is also not uniform across the country. In some community based studies, prevalence is found to be 0.8-5.2/1000 live births.<sup>7,8</sup> Whilst in a large hospital based study in India, the incidence found is 3.9/1000 live births.<sup>9</sup>

There were more number of cases of CHD in rural population, which were underreported in studies, since most of the studies were from urban population. Hence, the exact prevalence of CHD in rural population is still less known. So, this study was planned to know the prevalence, age wise distribution and clinical spectrum of CHD in neonates and infants of rural tertiary care hospital.

#### **MATERIALS AND METHODS:**

The study was carried out in the department of Pediatrics, Smt. B.K.Shah Medical Institute and Research Center, Dhiraj Hospital, Sumandeep Vidyapeeth, Pipariya for a period of 18 months from December 2019 to May 2021. Interview and allocation of subjects, collection of samples and administration of medication were done in indoor wards, Paediatrics. This includes patients admitted in Neonatal Intensive Care Unit, Post-natal wards, Paediatric intensive care unit and Paediatric ward of Paediatrics Department in Dhiraj Hospital upto 1 year age of patient within the duration of 18 months for data collection.

**Study design:** single center, prospective observational study

**Sample size:** feasibility sampling done. All patients meeting the inclusion criteria were enrolled in the study

**Inclusion criteria:** all children (neonate and infants) born or admitted in Pediatrics Department with congenital heart disease

**Exclusion criteria:** patients who were already treated or corrective treatment already taken outside.

All the neonates and children upto age 1 year, fulfilling the inclusion criteria were included in the study after obtaining informed consent from their parents. Parents were provided with patient information sheet explaining regarding study. Babies who were already diagnosed outside and had taken corrective treatment as well as parents not willing to participate were excluded from the study. Clinical examination, 2D-Echocardiography and colour Doppler were done to establish the diagnosis. All data were collected and entered in the excel sheet and descriptive data were presented as percentages.

#### **RESULTS**

The study was conducted in Pediatrics Department of Dhiraj Hospital, Smt. B. K. Shah Medical institute and Research Center, Sumandeep Vidyapeeth, Pipariya. Total 41 patients, meeting the inclusion criteria were included in the study during the study period of 18 months.

#### Gender Distribution among the CHD infants

Gender	No. of Cases	Percentage	No. of cases in inborn CHD babies (20)
Male	29	70.7 %	15 (75%)
Female	12	29.3 %	5 (25%)

Out of 41 patients, male:female ratio was 2.4:1. Total 20 patients were inborn neonates, rest were referred from outside. Amongst the inborn patients, male: female ratio was 3:1.

#### Distribution of CHD by gestational maturity

Gestational Maturity	Cases (Percentage)	Cases in inborn (20)
Preterm	8 (19.5%)	6 (30.0%)
Term	32 (78%)	13 (65.0%)
Post term	1 (2.5%)	1 (5.0%)

The prevalence of CHD amongst the term babies were around 32 (78%) and around 8 (19.5 %) in pre term infants and 1 (2.4%) in post term infant. 6 (30%) inborn babies were born preterm.

The distribution of CHD based on birth weight of the babies showed that 15 (36.6%) babies weight were < 2.50 kg. 1 baby weight was > 3.5 kg. Majority of babies weight was < 2.50 kg (excluded whose weight were not known). 11 (55.0%) babies weight were <2.50 kg in inborn babies

#### Distribution of CHD by cyanotic and acyanotic

CHD	Cases (41)	Percentages
Cyanotic	7	17.1 %
Acyanotic	34	82.9 %

#### Distribution of CHD by presenting chief complaint

Presenting chief complaint	Cases	Percentages
Breathing Difficulties	25	61.0 %
Feeding Difficulties	5	12.2 %

Cyanosis	7	17.1 %
Not gaining weight	1	2.4 %
Asymptomatic	3	7.3 %

Majority of the patients (61%) presented with complaints of breathing difficulties. 5 patients out of 41 had congestive cardiac failure.

#### Distribution of CHD based on ECHO findings

CHD	Types	Cases	Percentages
<b>Acyanotic</b>	VSD	13	31.7 %
	ASD	5	12.2 %
	PDA	6	14.6 %
	TOF	2	4.9 %
	ASD+PDA	3	7.3 %
	ASD+VSD	3	7.3 %
	COA+PDA	1	2.4 %
	VSD + DORV + Pulmonary atresia	1	2.4 %
	<b>TOTAL</b>	<b>34</b>	
	<b>Cyanotic</b>	PDA + PS +TS	1
ASD+PDA + Pulmonary Atresia		1	2.4 %
TGA+VSD+PDA		1	2.4 %
TGA + PDA		1	2.4 %
Hypoplastic RV + Malposed great vessels		1	2.4 %
PDA + TS + Pulmonary atresia		1	2.4 %
VSD + Tricuspid atresia + Pulmonary atresia		1	2.4%
<b>TOTAL</b>		<b>7</b>	

The various 2D echo findings were also assessed as shown in the table shown above. Out of them only isolated VSD were most common in 13 (31.7%) cases. 6 (14.6%) babies had PDA. However 6 cases had VSD with other CHD and 9 cases had PDA with other CHD.

#### Distribution of extra cardiac anomalies with CHD

Anomalies	Cases	Percentages
-----------	-------	-------------

U/L Cleft palate	1	2.4%
U/L Cleft palate + Congenital Cataract	1	2.4%
U/L cleft lip + palate	2	2.4%
Polydactyly	2	4.8 %
Clinodactyly + B/L Absent Testis	1	2.4%
Diastematomyelia	1	2.4 %
Imperforate Anus	1	2.4%
Tracheo-oesophageal fistula	2	4.8 %
U/L Absent Kidney	1	2.4%
U/L Ectopic Kidney	1	2.4%
Rt Absent thumb + Lt rudimentary thumb	1	2.4%
Midgut Volvulus	1	2.4%

#### Immediate outcome of CHD

Outcome	Cases	Percentages
Discharged	23	56.2 %
DAMA (Moribond)	6	14.6 %
DAMA (Nonmoribond)	3	7.3 %
Death	3	7.3 %
Referred	6	14.6 %

The frequency of various outcomes amongst the CHD were analysed and it was found out of 41 CHD infants around 23(56.1 %) were discharged and only 3 died which is 7.3 %. Surgical intervention was performed in 3 cases.6 babies were referred for surgical intervention.

#### DISCUSSION

CHD remains as one of the leading cause of mortality in children with malformations.<sup>10</sup> Large amount of structural malformations of heart occurs as a isolated anomaly, but about 33% have associated major congenital anomaly.<sup>11</sup> malformations of heart are also associated with significant medical morbidity, which requires use of intensive medical care as well as costly medications.<sup>12</sup>

In present study male to female ratio in inborn CHD babies was 3:1 .In Nepal, Shah GS et al<sup>13</sup> showed male to female ratio of 1.5:1. Farooqui R et al<sup>14</sup> showed male to female ratio was 1.6: 1. 8 (19.5%) of CHD were preterm. The incidence of PDA in preterm infants varies between 40 to 60% on the third day of life.<sup>15</sup> However, in present study 3 preterm babies had PDA.

48.8% cases of CHD constituted by low birth weight in the current study. Laursen HB et al<sup>16</sup> reported higher incidence of CHD in LBW full term babies. Study by Humayun KN et al<sup>17</sup> reported 31% babies were low birth weight and 69% were appropriate for gestational age.

We found 17.1% cases belonged to cyanotic where as 82.9 % cases belonged to acyanotic group. Kasturi et al<sup>18</sup> noted, 19% belonged to cyanotic group where as 81% belonged to acyanotic group. In CHD, babies mostly babies presented with symptoms of breathing difficulty (60.78%) followed by cyanosis 7(17.07%), feeding difficulties 5 (12.20%) respectively. Kasturi et al<sup>18</sup> also observed that respiratory distress (70%) was the most common complaint and cyanosis (24.4%) was the second common complaint.

13 (31.7%) babies had isolated VSD followed by 6 (12.2%) cases had isolated PDA and 5 (12.2%) cases isolated ASD. 2 cases of CHD had Tetralogy of fallot (TOF). 1 baby had complex heart disease. Khalil et al<sup>19</sup> noted in his study that VSD and PDA were the common lesions found 34.8 % and 18.6% respectively. In present study extra cardiac malformation were found in 15 (36.6%) cases with CHD. We found that U/L Cleft lip + Palate, Tracheo-oesophageal fistula and Polydactyly were most common extra cardiac anomaly with CHD. Humayun KN et al<sup>17</sup> noted in his study about 31% of cases with CHD had extra cardiac anomalies. Khalil A et al<sup>19</sup> noted in his study about 17.9 % of cases with CHD had extra cardiac anomalies.

## CONCLUSION

Acyanotic heart diseases were commonly found than cyanotic heart conditions in neonates and infants. Amongst those, VSD is the most common one followed by PDA. Routine clinical cardiac examination needs to be done in all neonates followed by diagnosis by specific tests like 2D-ECHO and Colour Doppler. Early diagnosis always provide better prognosis. Hence, universal screening needs to be recommended for timely intervention and better outcome.

## REFERENCES

1. Dolk H, Loane M, EUROCAT Steering Committee. Congenital Heart defect in Europe: 2000-2005. NewtownAbbey, Northern Ireland: University of Ulster, March 2009.
2. Bernier PL, Stefanescu A, Samoukovic G, Tchervenkov CI. The challenge of congenital heart disease worldwide: epidemiologic and demographic facts. *Semin Thorac Cardiovasc Surg pediatr Card Surg Annu.* 2010;13:26-34
3. Hoffman JIE. The global burden of Congenital Heart Disease. *Cardiovascular J Africa.* 2013;24:141-45
4. Fyler DC, Buckley LP, Colin HE< Hellenbrand WE. Report of the New England regional infant care programme. *Pediatrics* 1980;65:375-461
5. Hoffman JI, Kaplan S. the incidence of congenital heart disease. *J AM Coll Cardiol*2002 June 19;39(12):1890-900
6. Saxena A. congenital heart disease in India: A Status Report. *Indian J Pediatr* 2005;72:595-8.

7. Gupta I, Gupta ML, Parihar A, Gupta CD. Epidemiology of rheumatic and congenital heart disease in school children. *J.Indian Med Assoc* 1992;90(3):57-9
8. Vashishtha VM, Kalra A, Kalra K, Jain VK. Prevalence of congenital heart disease in school children. *Indian Pediatr* 1993;30:1337-40
9. Khalil A, Aggarwal R, Thirupuram S, Arora R. incidence of congenital heart disease among hospital live births in India. *Indian Pediatr* 1994;31:519-27
10. Bernstein d. Congenital heart disease. In: *Nelson Textbook of Pediatrics*, 17<sup>th</sup> Edition. Behrman, Kleigman, Jenson. Philadelphia: Saunders, 2004;pp.1499-502
11. Noonan JA, Ehmke DA. Associated non cardiac malformations in children with congenital heart disease. *J Pediatr*.1963;63:468-71
12. Fixler DE, Pastor P, Chamberlin M, et al. Trends in congenital heart disease in Dallas county births, 1971-1984. *Circulation* 1990;81(1):137-42.
13. G S Shah , M K Singh, T R Pandey, B K Kalakheti, G P Bhandari Incidence of congenital heart disease in tertiary care hospital Kathmandu Univ Med J (KUMJ). Jan-Mar 2008.
14. Rehan Farooqui , Umme Farha Haroon ,Allauddin Niazi, Nosheen Rehan,.Tayaba Khawar Butt , Manal Niazi Congenital Heart Diseases in Neonates *Journal of Rawalpindi Medical College (JRMC)*; 2010;14(1):31-32
15. N.Evans Preterm patent ductus arteriosus : should we treat it? *Journal of Paediatrics and child Health*, vol. 48,no.9, pp. 753-758,2012
16. Laursen HB.Some epidemiological aspects of congenital heart disease in Denmark.*Acta Peditr Scand* 1980, 69:619-624
17. Humayun KN ,Atiq M. Clinical profile and outcome of cyanotic congenital heart disease in neonates.*J Coll physician Surg Pak* 2008; 18 : 290-293
18. L Kasturi, A V Kulkarni, A Amin, V A Mashankar Congenital heart disease: clinical spectrum L Kasturi et al. *Indian Pediatr*. 1999 Sep.
19. Khalil, Aggarwal, et al. "Incidence of congenital heart disease among hospital live births in India." *Indian pediatrics* 31.5 (1994): 519-528.