# Prevalence of Congenital Heart Disease, Kanpur, India

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## ABSTRACT

*Our aim was to study the prevalence, age-wise distribution, and clinical spectrum of congenital heart disease (CHD) at a multi-speciality corporate hospital in North India. A retrospective analysis of records of 10,641 patients over a five-and-a-half year period was done. Clinical examination, echocardiography and color doppler were used as diagnostic tools. A prevalence of 26.4 per 1000 patients was observed. VSD (ventricular septal defect) was the commonest lesion (21.3%), followed by ASD (atrial septal defect) in 18.9% and PDA (patent ductus arteriosus) in 14. 6%. Tetralogy of Fallot was the commonest cyanotic heart disease (4.6%). Maximum number of children with heart disease (82.9%) were diagnosed between 0-3 years of age.*

**Key words**: *Congenital heart disease, India, Prevalence.*

## INTRODUCTION

Congenital heart diseases (CHD) are relatively common with a prevalence ranging from 3.7 to 17.5 per 1000 live births(1,2). According to a status report on CHD in India, 10% of the present infant mortality may be accounted for by CHD(3). According to a large hospital based study from India, the incidence of congenital heart disease is 3.9/ 1000 live births(4). In community based studies from India(5,6) the prevalence of CHD ranges from 0.8 – 5.2/1000 patients. Thus, the prevalence of CHD is not uniform across the country and setting. We conducted this study to assess the prevalence of CHD among patients attending a tertiary care corporate hospital in North India.

## METHODS

Regency hospital is a multi-speciality corporate hospital at Kanpur, with patients coming from 400 km around the city. Kanpur has a population of around 4 million. We receive patients from lower to upper middle class strata.

We retrospectively analyzed the records of all live births in the hospital from January 2002 to June 2007, and all records of pediatric first visit OPD (out patient department) and IPD (indoor patient department) patients between 0 to 15 years, during the same period. Children diagnosed with CHD were analyzed further. Preterms with PDA were followed up and not included in this study if it closed spontaneously within the period of hospital stay or by managing conservatively.

Clinical examination, 2D echocardiography and color doppler were considered as definitive tools for diagnosis of CHD.

## RESULTS

CHD was detected in 9 out of 860 live births in the hospital during the period January 2002 to June

2007. During this period we saw 10,641 new patients between 0 to 15 yrs (OPD and IPD), of these, 281 children were diagnosed to be having some type of CHD, with a prevalence of 26.4 per 1000 patients. Details of congenital heart diseases are provided in ***Table* I**. Ventricular septal defect was the most common heart lesion (21.3%). Acyanotic heart diseases were present in 222 (79%) children; 59(21%) had cyanotic heart diseases. Maximum number of cases were seen in 0-3 years age group (*n*=233, 82.9%).

## DISCUSSION

As a group, congenital heart disease (CHD) constitute a significant proportion (up to 25% in some studies) of congenital malformations that present in the neonatal period. Recent studies from India and other developing countries have shown a decline in prevalence of rheumatic fever and rheumatic heart disease(7). Congenital malformations and, in particular CHDs are likely to become important contributors to infant mortality in the near future. Hence, it is important to determine the exact prevalence and case burden of congenital heart disease so that appropriate changes in health policies can be recommended(8).

There is just one study available from India which gives the incidence of CHD per 1000 live births, by Khalil, *et al.*(4). They studied 10964 live births and observed the incidence of 3.9/1000 live

**TABLE I** SPECTRUM OF AGE WISE DISTRIBUTION OF CONGENITAL HEART DISEASES

| Age group | 0-3 yr | | 4-6 yr | | 7-9 yr | | 10-12 yr | | 13-15 yr | | Total | % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | M | F | M | F | M | F | M | F | M | F | | |
| VSD (subaortic 85%) | 23 | 20 | 6 | 2 | 4 | 0 | 2 | 0 | 2 | 1 | 60 | 21.3 |
| ASD | 36 | 10 | 5 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 53 | 18.9 |
| PDA | 22 | 15 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 41 | 14.6 |
| Complex anomalies | 28 | 5 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 35 | 12.5 |
| AV septal defects | 16 | 12 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 29 | 10.3 |
| ASD+PDA | 11 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 13 | 4.6 |
| TOF | 9 | 0 | 1 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 13 | 4.6 |
| PS | 2 | 2 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 9 | 3.2 |
| AS | 2 | 3 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 8 | 2.8 |
| Ebsteins anomaly | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1.1 |
| TGA+VSD+PS | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 3 | 1.1 |
| Peripheral PS | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 1.1 |
| Bicuspid aortic valve | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 | 1.1 |
| Truncus arteriosus | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0.71 |
| TAPVC | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.4 |
| Dextroversion | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.4 |
| Sinus venosus | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.4 |
| DORV+PS | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.4 |
| Single ventricle | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.4 |
| VSD+PDA | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0.4 |
| Total | 162 | 71 | 23 | 4 | 12 | 2 | 3 | 0 | 3 | 1 | 281 | |

*AV septal defects:atrio ventricular septal defects, PS: pulmonary stenosis, AS: aortic stenosis, TGA: transposition of great arteries , TAPVC: total anamolous pulmonary venous connection, DORV: double outlet right ventricle.*

**WHAT THIS STUDY ADDS?**

- The prevalence of congenital heart disease in a tertiary care center at Kanpur, UP was 26.4/1000 patients. Ventricular septal defect was the most common lesion.

births. All large studies from India have taken into consideration only one age group *i.e.*, either newborns or school going children. The former may miss out on a large number of small VSD or Tetralogy of Fallot or ductus dependent lesions, which present a little later than at birth. It also fails to focus on the prevalence of CHD. Other studies done on the prevalence of CHD in community include mainly 5-15 year old school going children, which automatically excludes all the severe lesions. Hence, they do not present a true picture. Our observation of prevalence of 26.4/1000 patients cannot be compared to earlier studies, because we included all mild, moderate and severe CHDs in age groups ranging from 0 to 15 years.

Our study had certain limitations. Being a super specialty corporate hospital, children below poverty line do not come here, so a certain sect of the society was excluded from the study. We do not have a facility for autopsy, so, we cannot state the number of stillborns who had CHD as a cause of neonatal demise, and the number of severely ill children who died during initial steps of resuscitation (before the echocardiography could be performed). Drop out rate of children born here and attending the OPD is around 0.5%, hence due to loss of follow up of many patients, we could not assess the fate of very small acyanotic lesions like tiny VSD. We also do not know the outcome of the children referred for surgery to the cardiac centers. We could not assess the true incidence of CHD in our hospital because of the inability to follow each child born in this hospital, for 6 months.

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