

**A study on Cardiac interventions performed at District Early Intervention Centre at a peripheral Medical College in Tamil Nadu under RBSK screening**

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**Abstract**

**Background and aims:** The poor health seeking attitude of families from rural background results in delayed diagnosis of silent ailments in their children, especially heart diseases. RBSK program in India aims to screen children, detect diseases and ensure better treatment. This study aims to know the clinical spectrum of cardiac diseases and interventions undertaken at district early intervention centre in Villupuram district, Tamilnadu, India.

**Materials and methods:** This cross-sectional study was carried out between January to December 2019. RBSK beneficiaries with cardiac diseases were evaluated with ECG/Echo cardiogram and management was planned with cardiologist on surgical/medical intervention. Data was retrieved from registers and analyzed.

**Results:** 150 children were diagnosed with heart disease. Congenital heart disease was seen more in 1-5 years while rheumatic heart disease was more in 13-18 years. 55.3% were girls; 78.6% had congenital heart disease; 41.5% had ventricular septal defect. Multi-valvular regurgitation was common among rheumatic heart disease. 40% were treated with device closure and 34.6% were managed medically.

**Conclusion:** Early detection and prompt management can help the child lead a comprehensive life without need for complex surgeries, drugs or shortened life span. District early intervention centre acts as a bridge between RBSK and cardiac interventions.

**Keywords:** Congenital heart disease, Rheumatic heart disease, Ventricular septal defect.

## Introduction

Congenital heart disease (CHD) is one of the common congenital malformations among children in developing countries, with high morbidity and mortality.[1] Nature of the heart defect and availability of optimum intervention at the right time are key determining factors on the outcome of disease. The incidence of congenital heart disease is 9/1000 globally. With an estimated prevalence of 240,000 children born with CHD per year in India, of which about one-fifth are serious defects requiring intervention in the first year of life. [2] In 2015, India was the country with highest estimated cases of Rheumatic heart disease (RHD) (13.17 million cases and 119,100 deaths), the most common cause of acquired heart disease in India. [3] The overall prevalence was estimated to be 1.5-2/1000 in all age groups and 0.5/1000 between 5-15 years. [4] RHD affects young population in their productive phase of life, hence non-detection of RHD places heavy economic burden on health care system. [5] Cost of heart valve replacement surgery is unaffordable to many patients.

To overcome the impact of early risk and limited number of expert paediatricians in isolated regions, Rashtriya Bal Swasthya Karyakram (RBSK) was launched by Government of India in 2013. The Medical officers and staff nurses in the RBSK team take part in outreach programs to improve the quality of life in all children from birth to 18 years of life, screening them for 4 Ds – Defects at birth, Diseases, Deficiencies and Development delays. They screen children at delivery, in Anganwadi centres and in all government schools (including primary, secondary and higher secondary schools). After arriving at a provisional diagnosis, children with suspected heart disease are referred to District Early Intervention Centre (DEIC) for management. RBSK is a big boon with

cashless interventions, for management of congenital heart disease. Along with Government facilities, private centres were also roped in for diagnosis and interventions. [6]

The present study was undertaken to know the clinical spectrum of cardiac diseases identified from RBSK centres and interventions performed at DEIC in a peripheral medical college.

## Materials and Methods

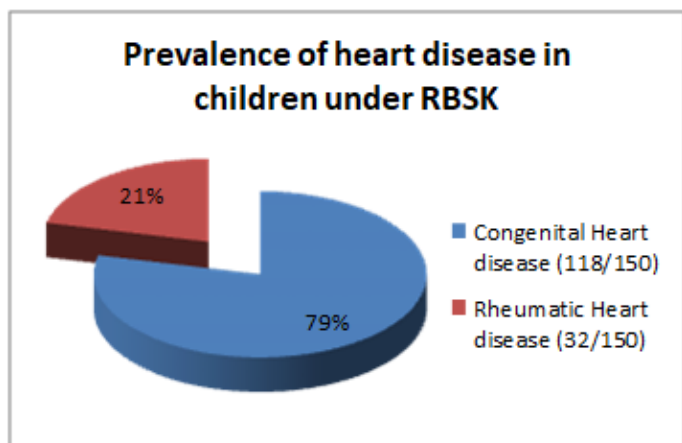
The present study was a cross sectional survey to find out clinical spectrum of cardiac diseases, conducted at RBSK centres and DEIC at Government Villupuram Medical College Hospital, Villupuram, Tamilnadu, India between January and December 2019. The study was undertaken in 22 blocks of Villupuram district in Tamilnadu, India covering 2941 Anganwadi and 2428 schools (1584 primary schools, 456 middle schools, 193 high schools and 195 higher secondary schools). These Anganwadis and schools were visited by a RBSK Medical officer's team after informing District educational officer and headmasters of the schools. Informed consent was taken from all the students and their parents. A record of absentees was maintained and the students were examined subsequently. Those children who were suspected of heart disease on clinical examination and auscultation were referred to DEIC at Government Villupuram Medical College and Hospital. The paediatrician at DEIC made the provisional diagnosis and an expert cardiologist performed echocardiography using Mindray DC-N6 colour Doppler device (National Ultrasound Inc., USA) to confirm the diagnosis. Children with confirmed heart disease (congenital or rheumatic) were further evaluated for management plan which could be medical management and follow up or surgical intervention. Data entry and analysis were done using

Microsoft Excel spreadsheet (Microsoft Corporation, Washington, USA). Descriptive data were given in summary statistics while statistical analysis was done using Microsoft excel.

### Results

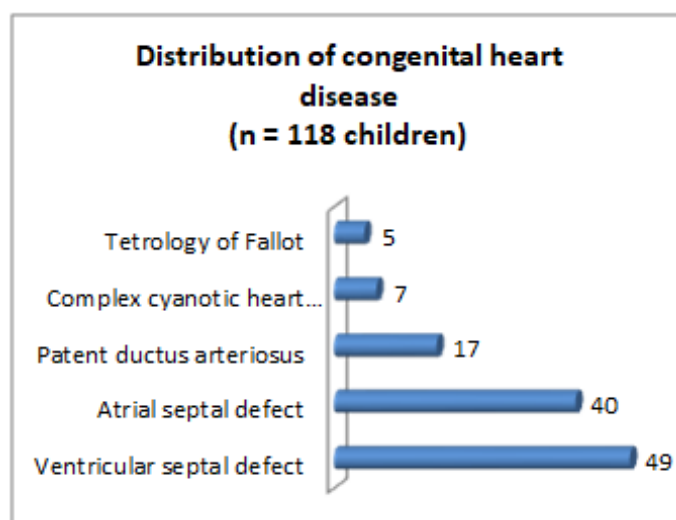
In the present study to find out clinical spectrum of cardiac diseases among school going children, a total of 5,56,890 students from Anganwadis and schools were screened under RBSK camps, across the entire district. A total of 942 children (n = 942/5,56,890) (0.17%) with suspected cardiac ailments were referred to the DEIC centre at Government Villupuram Medical College hospital, Villupuram. Of the 942 children suspected of heart disease, 792 were normal and 15.92 % (n = 150/942) were diagnosed with actual heart disease. These 150 children were evaluated at Cardiology centre for diagnosis and (n = 118/150) (78.67%) were diagnosed with congenital heart disease while the remaining (n = 32/150) (21.33%) children were diagnosed with rheumatic heart disease. More than half of the children diagnosed with heart disease were girls (n = 83/150) (55.33%) (Fig 1).

Fig 1: Prevalence of heart disease in children under RBSK screening program at Villupuram district



While congenital heart disease was common in age group of 1-5 years, rheumatic heart disease was commoner in the age group of 13-18 years. Ventricular septal defect was the most common congenital heart disorder (n = 49/118) (41.52%) followed by atrial septal defect (n = 40/118) (33.89%) (Fig 2). Among children with rheumatic heart disease, mitral regurgitation with aortic regurgitation was the most common observed lesion (n = 28/32) (87.50%).

Fig 2: Distribution of congenital heart disease in children under RBSK screening program at Villupuram district



The treatment options offered to the children diagnosed with congenital heart disease (n = 118) included surgical treatment in the form of device closure in more than half of the patients (n = 60/118), open heart surgery (n = 37/118) and medical management with follow up (Fig 3). Similarly the treatment options offered to children diagnosed with RHD included Valve repair in more than 60% (n = 20/32) and medical management with follow up (Fig 4).

Fig 3: Treatment offered to children diagnosed with CHD under RBSK screening program at Villupuram district

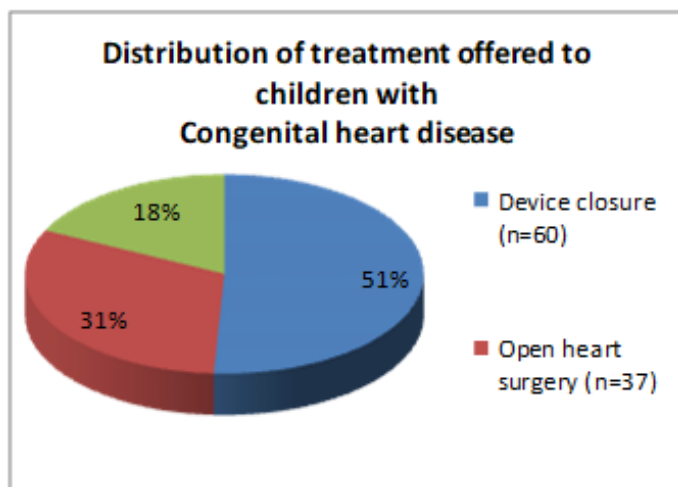
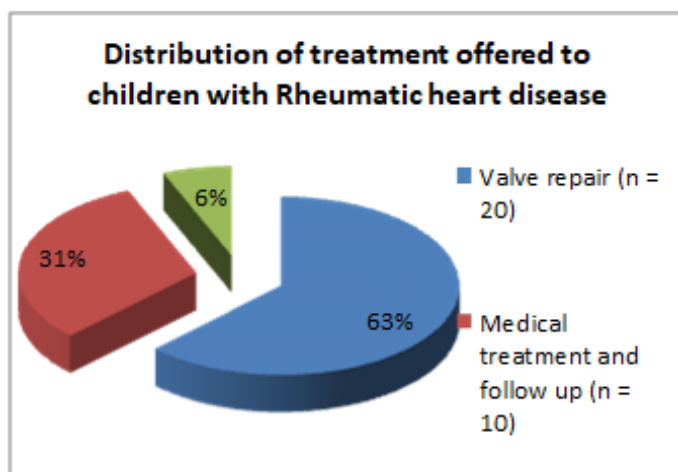


Fig 4: Treatment offered to children diagnosed with RHD under RBSK screening program at Villupuram district



## Discussion

In India, congenital anomalies are missed by parents due to failure of identification of symptoms and delay in visiting the physician, due to false reassurance from family members. Congenital heart diseases are one of the most common severe congenital anomalies seen in the newborn. [7] Most of the heart defects, especially septal defects remain asymptomatic until early adulthood, hence early screening plays a vital role in detection. For this purpose, RBSK program has been initiated whose

uniqueness lies in screening of children from head to foot, focusing only on screening.

CHD were common in the age group of 1-5 years (78.67%) (n = 118/150), which was similar to the results obtained in the study by Bafna et al. (common in the age group of 3-6 years). [8] but Balat et al. in their study found the common age group to be 0-3 years. [9] Female children were almost equally affected as males (55%) in the present study which was similar to the results observed by Rupa et al. (52.5%) at Vellore. [10]

Ventricular septal defect was the commonest CHD observed in the present study followed by atrial septal defect. This was similar to the results obtained in the study by Bafna et al., Dixit et al., and Smitha et al. [8,11,12] But in the study by Nisale et al. VSD and ASD were observed equally (25% in each). [13] This shows that incidence of septal defects vary from place to place. Since ASD remains asymptomatic until adulthood, it is more likely to be missed in children. Hence early screening in childhood is advised. Patent ductus arteriosus was the third common type of congenital heart disease observed in the present study (14.40%) (n = 17/118) while in the study by Bafna et al., Dixit et al. and Smitha et al. Tetralogy of Fallot was more common than PDA. [8,11,12]

In the present study, rheumatic heart disease contributed to 21.3% of total heart diseases (21.33%) (n = 32/150). While the incidence of RHD was low in the study by Bafna et al. (7.3%) (n = 13/179) and in the study by Rupa et al. (10.35 %) (n = 56/541), the incidence was higher in the study by Ba-Saddick et al. (36.5%) (n = 219/6000). [8,10,14] Mitral regurgitation with aortic regurgitation was the most common observed anomaly in RHD (87.5%) (n = 28/32). This was in contrast to the studies by Rupa et al. and Ba-Saddick et al. who found a higher

prevalence of isolated mitral regurgitation and less of multi valvular involvement. [10,14] In the present study, device closure was the most common modality of intervention (40%) (n = 60/150) but surgical intervention was commonly employed in the study by Bafna et al. (35.8%) (n = 65/179) and Rupa et al. (34.19%) (n = 185/541). [8,10]

### Conclusion

The present study highlights the fact that many heart ailments go unnoticed in childhood and this can complicate management of such cases in later life. Early detection and prompt management can help the child lead a comprehensive life without need for complex surgeries, drugs or shortened life span. To conclude, the RBSK program, with DEIC, goes a long way in case identification and early management of children with undetected heart diseases, thus moving from survival to healthy survival.

### Abbreviations

CHD	- congenital heart disease
RHD	- Rheumatic heart disease
RBSK	- Rashtriya Bal Swasthya Karyakram program
DEIC	- District Early Intervention Centre
VSD	- Ventricular septal defect
ASD	- Atrial septal defect

KB conceptualized, designed and approved the study. RP collected and compiled data. KE critically analyzed data and approved manuscript. VS collected data and prepared manuscript.

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