

# Role of *Rashtriya Bal Swasthya Karyakram* in the Reduction of Mortality and Morbidity in Children with Congenital Heart Disease

Akshay Ashok Bafna<sup>1</sup>, Shishir Mirgunde<sup>2</sup>

<sup>1</sup>Department of Cardiology, Rajarshee Chhatrapati Shahu Maharaj Government Medical College and CPR Hospital, Kolhapur, Maharashtra - 416013, India

<sup>2</sup>Department of Pediatrics, Government Medical College, Miraj, Sangli, Maharashtra- 416410, India

Corresponding Author: Akshay Ashok Bafna

## ABSTRACT

**Background:** Children from rural and underprivileged classes are likely to get deprived of healthcare facilities, delayed diagnosis and delayed treatment may worsen the morbidity pattern and mortality in these children. So the purpose of this study is to evaluate the impact of screening programs implemented by RBSK with a view of detecting previously undiagnosed heart disease and offering prompt treatment for congenital heart disease (CHD) in children.

**Methods:** A cross-sectional study was conducted for one day in February 2018 in Kolhapur district. The list of 179 children suspected with CHD who were beneficiaries of *Rashtriya Bal Swasthya Karyakram* (RBSK) was included in the study.

**Results:** The Majority of the children with CHD were observed higher in the age group of 3–6 years (26.2%). The most common type of CHD was found to be a ventricular septal defect in 65 (36.3%) children. Of the 179 children, 77 (43.0%) children were called for the follow-up, 29 (16.2%) children were treated with medications, 9 (5.0%) children were advised for device closure, and 64 (35.8%) children were advised for the surgical treatment and referred to the higher tertiary-care center.

**Conclusion:** RBSK is playing an important role in screening children for early detection of CHD and encouraging early treatment in the form of intervention services or surgical treatment. These services are most beneficial for improvement in the overall health status of children by reducing morbidity and mortality in children.

**Keywords:** Children; Congenital heart disease; *Rashtriya Bal Swasthya Karyakram*

## INTRODUCTION

Heart diseases are one of the most common congenital defects of children in developed as well as in developing countries such as India. [1,2] Among all congenital anomalies, congenital heart disease (CHD) has the highest effect on the children's mortality and morbidity. The incidence of CHD ranges from 4-8 per 1000 births. [3,4] The CHD requires medical and sometimes surgical intervention in early life. Due to the lack of information about the risk factors and non-detection of CHD places a heavy economic responsibility on the health care system in the developing countries because the cost of heart valve surgery is uneconomical for many. Hence, early detection and quality care can improve the health of the children. [2]

To negate the impact of early risk and due to the limited expert pediatricians in the isolated areas, *Rashtriya Bal Swasthya Karyakram* (RBSK) was launched by the government of India in 2013. [5] The RBSK medical officers take part in outreach programs involved to improve the quality of life of all children from birth to 18 years of age. These programs should be effectively incorporated into the school health services for the early detection of the diseases. Such that it can prevent the negative impact of

CHD by early detection and management of health conditions. [5] We, therefore, set out to clinically evaluate the impact of screening programs implemented by RBSK with a view of detecting previously undiagnosed heart disease and offering prompt treatment for CHD in children.

## METHODS

A cross-sectional study was conducted for one day in February 2018 in Kolhapur district. Screening of 255 children below the age of 18 years was done under the RBSK program conducted by Asha workers, Anganwadi workers, and school health medical officers. All patients underwent electrocardiography (ECG) evaluation, the list of 179 children suspected with CHD who were beneficiaries of RBSK was included in the study. The pre-planned set of questions was used for data collection. Based on the convenience of the parents, all the queries were asked orally in the local language Marathi or Hindi for about 10–20 minutes. Queries regarding demographic characteristics such as the age of the children were asked and noted. After obtaining the available information and clinical examination of the children with CHD, they were called for further evaluation at the cardiology department in the tertiary-care center.

### Statistical analysis:

Continuous variables were expressed as mean  $\pm$  standard deviation. Categorical variables were expressed as frequencies and percentages. Data collected and recorded was entered in the Microsoft office excel database and the analysis was performed accordingly.

## RESULTS

### Baseline characteristics

A total of 255 children were selected from the whole district after a large scale screening program conducted at school health organization, Anganwadi activities and RBSK evaluation camp held in the hospital. There was a male (51.4%)

predominance in the selected population. Among 255 patients, 76 (29.8%) patients were normal and 179 (70.2%) patients had congenital heart disease. A total of 179 patients diagnosed with CHD were included in the study. The majority of the children with CHD were observed higher in the age group of 3–6 years (26.2%). Of the study population, most common type of CHD was found to be VSD in 65 (36.3%) children followed by ASD in 35 (19.5%) children, TOF in 15 (8.4%) children, RHD and other type of CHD in each 13 (7.3%) children, pulmonary valve lesions in 12 (6.7%) children, bicuspid aortic valve, combination of both ASD and VSD in each 6 (3.4%) children, PDA and complex CHD in each 5 (2.8%) children, and dextrocardia in 3 (1.6%) children, respectively. The baseline characteristics of the study population are shown in **Table 1**.

**Table 1: Baseline characteristics of the study population**

Characteristics	Total (N = 179)
<b>Age of children</b>	
0–3 years, n (%)	28 (15.7%)
3–6 years, n (%)	47 (26.2%)
6–9 years, n (%)	37 (20.7%)
9–12 years, n (%)	46 (25.7%)
12–15 years, n (%)	19 (10.6%)
15–18 years, n (%)	2 (1.1%)
<b>Type of CHD</b>	
VSD, n (%)	65 (36.3%)
ASD, n (%)	35 (19.5%)
VSD + ASD, n (%)	6 (3.4%)
PDA, n (%)	5 (2.8%)
TOF, n (%)	15 (8.4%)
RHD, n (%)	13 (7.3%)
Dextrocardia, n (%)	3 (1.6%)
Bicuspid aortic valve, n (%)	7 (3.9%)
Pulmonary valve lesions, n (%)	12 (6.7%)
Complex CHD, n (%)	5 (2.8%)
Others, n (%)	13 (7.3%)

CHD – Congenital heart disease; VSD – Ventricular septal defect; ASD – Arterial septal defect; PDA – Patent ductus arteriosus; TOF – Tetralogy of fallot; RHD – Rheumatic heart disease

**Table 2: Management of the study population**

Management	Total (N = 179)
Follow up, n (%)	77 (43.0%)
Medical treatment, n (%)	29 (16.2%)
Device closure, n (%)	9 (5.0%)
Surgical treatment, n (%)	64 (35.8%)

### Management of the screened children

Out of 179 patients diagnosed with CHD, 77 (43.0%) children were called for the follow-up, 29 (16.2%) children were

treated with medications, 9 (5.0%) children were advised for device closure, and 64 (35.8%) children were advised for the surgical treatment and referred to the higher tertiary-care center. These management details are illustrated in **Table 2**.

## DISCUSSION

In India, children with developmental disabilities are frequently missed due to either failure of identification of the symptoms or non-visiting or delayed in visiting the physician often ending up with the false reassurance to the family members. [6] Since most of the heart defects remain asymptomatic until early adulthood, early screening plays a major role in this class of disease. For this purpose, the RBSK program has been initiated by the government and its uniqueness lies in the fact that children are screened comprehensively from head to toe by a dedicating screener mainly focusing only on screening. [5] After screening the study population, it was observed that the majority of the children belong to the age group of 3–6 years which is in contrast to a study conducted by Balat MS et al. [7] showing that the majority of children belong to the age group 0–3 years.

ECG is the standard method for examining patients in pediatric cardiology. After examining the patients with ECG, it was observed that VSD was the most common type of CHD in Kolhapur. Similarly, a study conducted by Bharadwaj et al. [8] in north India, Begum et al. [9] in Assam, Smitha et al. [10] in Mysore, and as well as by Khalil et al. [11] in New Delhi showed VSD as the most common lesion. Furtherly we found that ASD was the second most common type of CHD in Kolhapur which is similar to a study conducted by Khalil et al. [11] A study by Suryakant et al. [12] concluded that ASD and VSD were observed in each 25.2% of the population. This explains that the incidence of septal defects such as VSD and ASD varies from one region to another. Since ASD remains asymptomatic until early

childhood it tends to be missed in children. In this study, TOF was the third most common type of CHD, but a study done by Bharadwaj et al. [8] showed a higher prevalence of TOF in the study population. Moreover, these results can be compared with a study done by Smitha et al. [10] showed that TOF affected 13% of cases in the study at Mysore. The remaining type of CHDs was observed in fewer children and the least common type of CHD was found to be PDA, complex CHDs and dextrocardia. Similarly, a study by Gupta et al. [13] concluded that PDA was the least common type of CHD.

While the RBSK program mainly focuses on screening, the management is undertaken by other specialized professionals such as pediatricians, surgeons, and therapists who focus more on management rather than on screening. In this study, 35.8% of children were referred for surgical treatment which is comparable to a study by B Rupa et al. [14] showing that 34% of children required surgery. The rest of the children were managed by medical treatment and device closure and most of the patients were called for follow-up. Thus, this study suggests that effective health intervention such as child health screening and promotion of early intervention services are more important for improvement in the health status of children. These RBSK services are very helpful in reducing the extent of disability and also help in improving the quality of life of children.

## CONCLUSION

The findings of this study suggest that many children who are undiagnosed and deprived of treatment for curable heart diseases; this hidden part of children with heart diseases constitutes a major part in child mortality. RBSK is playing an important role in the screening of children for early detection of CHD and encouraging early treatment in the form of intervention services or surgical treatment. These services are most beneficial for improvement in the overall health status of

children by reducing morbidity and mortality in children.

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