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***Original Research Article***

# Clinical Profile, Echo, and Outcome of Congenital Heart Disease in First Two Years of Life

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**Abstract:** *Due to the lack of high-quality echocardiography in developing countries mostly neonates with CHD die each year.* ***Objective:*** *The aim of the study was to find out the Clinical profile, echo, and outcome of congenital heart disease in first two years of life.* ***Method:*** *The current study was carried out in neonatal intensive care unit Bacha Khan Medical Complex/Gajju khan Medical college Swabi from July 2023 to December 2023 after taking permission from the ethical board of the institute. A total of 54 children of day zero to two years presented to the NICU with congenital heart diseases were enrolled in this study. Echo-machine was used to perform transthoracic echocardiography (TTE).Throughout the research period, the study population was evaluated in order to determine the outcome of congenital cardiac disease. A pre-tested, semi-structured questionnaire was used to record all pertinent data in a prepared datasheet Microsoft Excel was used to analyze the data, which were then shown as tables and figures.* ***Results:*** *A total of 54 children with congenital heart defect were included in this study. Of these, 38.1% of cases were identified between the ages of 13 - 24 months, while 61% of cases were diagnosed between the ages of 0-12 months. Out of 54 individuals, 15 (27%) had cyanotic heart lesions and 36 (66.6%) had a cyanotic heart lesions. VSD was the most common structural defect, Complaints of children with CHD showed cough in most cases (82%), dyspnea in 80%, poor weight gain in 70%, breathing difficulty in 68% and fever in 58% cases. Among children with congenital heart disease, murmur was the most prevalent presenting symptom (85%). In both age groups, 57.4% of the participants had a history of over two respiratory symptom episodes. Out of the total participants 66% Advice for Surgery or conservative treatment and 9 % of individuals died.* ***Conclusion:*** *This study concluded that echocardiography play a major role in the diagnosis and management of congenital heart disease in first two years of life .the death rate was recorded 9% in this study which further revealed that early management of CHD is crucial.*

**Keywords:** Clinical profile; Echo; Congenital heart disease; life

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## Introduction

The term "congenital heart diseases" (CHD) describes structural cardiac abnormalities present from birth. These are mainly found in newborns, infants, or children. (1) It affects 0.8% of live births. Congenital cardiac abnormalities in neonates can range widely in severity approximately 2-3 / 1000 neonates will show heart disease symptoms within the first year of life. (2) The diagnosis of congenital cardiac disease is possible during the first week after birth in 40–50% of cases or the first month in 50–60%. (2) It incidence was once four to five per 1,000 live births, according to a research on the subject, but it is now twelve to fourteen per 1,000 live births. (3) Due to the lack of high-quality echocardiography, the incidence was low, and if cardiac catheterization was needed and the diagnosis was not clinically evident it was not made. Abortion following a prenatal diagnosis results in reports of a low prevalence of CHDs. (4) But according to a recent study, the frequency ranged from 8.5 to 13.6 per 1000 live births. (5) According to a different recent Chinese study, the incidence of congenital heart disease is 8/1000 live births worldwide. (6) The most prevalent CHD is ventricular septal defect (VSD), which is followed by patent ductus arteriosus (PDA). Aortic coarctation (COA), pulmonary stenosis (PS), and atrial septal defect (ASD) are further Congenital heart defects. It has been noted that, in comparison to later years of life, the greatest number of CHDs were found in the first year of life. A research conducted in Kashmir, reported an incidence of 5.3% per individual. The most frequent lesion was VSD (thirty percent), which was followed by PDA (twenty one percent) and ASD (twenty percent). Tetralogy of Fallot (TOF) was the most prevalent CHD among cyanotic heart disease (8.0%). (7) The two most important elements in the prenatal diagnosis of congenital heart disease are the kind of heart disease and the skill and experience of doctors who are doing the ultrasound screening. (8) After birth, infants with severe congenital heart disease sometimes show life-threatening symptoms that need urgent medical attention. (9) On regular evaluation, certain individuals, however, can seem normal, and symptoms of serious CHD might not become visible until after discharge. The time of CHD diagnosis varies according on the existence of patent ductus arteriosus. If the PDA is closed in the first few days, there may be potentially fatal side effects include metabolic acidosis, convulsions, shock, and end-organ damage. If serious congenital heart disease is not identified after birth, the chance of death rises to thirty percent. (10) Thirty percent of babies born with serious congenital heart disease were not identified at discharge prior to the widespread use of pulse oximetry for screening. (11) Separate treatment criteria are in place in our country for two reasons. First, the outcomes of surgery differ from those in the West because our children have more infections, underweight, anemia, and several co-morbidities. Second, late presentation happens most of the time; thus, treatment standards need to be modified to maximize the result. The objective of the study was to find out the Clinical profile, echo, and outcome of congenital heart disease in first two years of life.

## Methodology

The current study was carried out in neonatal intensive care unit Bacha Khan Medical Complex/Gajju khan Medical college Swabi from July 2023 to December 2023 after taking permission from the ethical board of the institute. A total of 54 children of day zero to two years presented to

the NICU with congenital heart diseases were enrolled in this study. Individuals older than two years, who had undergone definitive surgery at the time of initial presentation, and those who died away before an echocardiogram could confirm a diagnosis were all excluded from the research. Individuals older than two years, who had undergone definitive surgery at the time of initial presentation, and those who died away before an echocardiogram could confirm a diagnosis were all excluded from the research. A thorough medical examination was performed on each patient, which included cardiovascular evaluation, anthropometric index and arterial oxygen saturation tests. Individuals who had a clinical suspicion of CHD had a 12-lead electrocardiogram (ECG) after a chest X-ray. The Sonoscape SSI 5000 echo-machine was used to perform transthoracic echocardiography (TTE).. Throughout the research period, the study population was evaluated in order to determine the the outcome of congenital cardiac disease. The following were an assessment of the outcomes: 1) Pediatric patients who underwent medical care and their results. 2) Infants who had surgery and the subsequent care they received. 3) The result at the conclusion of the three-month observation period.4) Infants who died away while the study was going on. A pre-tested, semi-structured questionnaire was used to record all pertinent data in a prepared datasheet Microsoft Excel was used to analyze the data, which were then shown as tables and figures.

**Results**

A total of 54 children with congenital heart defect were included in this study. Of these, 38.1% of cases were identified between the ages of 13 - 24 months, while 61% of cases were diagnosed between the ages of 0-12 months. The ratio of male to female participants was 1.17:1, with thirty-nine participant (53.7%) being male (table 1). Out of 54 individuals, 15 (27%) had cyanotic heart lesions and 36 (66.6%) had a cyanotic heart lesions. VSD was the most common structural defect, occurring in 18 cases (33.3%), followed by PDA (16.6%), TOF (7.9%), and TGA (6.1%) (Table 2). Complaints of children with CHD showed cough in most cases (82%), dyspnea in 80%, poor weight gain in 70%, breathing difficulty in 68% and fever in 58% cases(table 3). Table 4 shows that among children with congenital heart disease, murmur was the most prevalent presenting symptom (85%) followed by tachycardia (75%) while cyanosis was recorded in 28% of cases. Common respiratory symptoms were rapid breathing in 90% of patients, crepitation in 86%, and cyanosis in 29% of cases, and chest indrawing with 28% of cases (figure 1). In both age groups, 57.4% of the participants had a history of over two respiratory symptom episodes.(table 5) Various congenital heart defects and their outcomes are displayed in table 7. Out of the total participants 66% Advice for Surgery or conservative treatment and 9 % of individuals died.

**Table 1. Age and sex-specific pattern of congenital heart disease cases N=154**

| Age group | Male N (%) | Female N (%) | Total N (%) |
|---|---|---|---|
| 0 to 12 months | 17 (51.5% | 16(48.4%) | 33(61.1%) |
| 13 to 24 months | 12(57%) | 9(42.8%) | 21(38.8%) |
| Total | 29(53.7%) | 25(46.26%) | 54(100%) |

**Table 2. Case distribution according to congenital heart disease structural defects**

| Structural defects | Frequency /Percentage |
|---|---|
| PS with VSD | 1(1.8%) |
| TA with ASD | 1(1.8%) |
| TGA | 6(11.1%) |
| TOF | 7(12.9%) |
| Cyanotic | 15(27%) |
| ASD | 4(7.40%) |
| PDA | 16(29.6%) |
| VSD | 18(33.3%) |
| Acyanotic | 36(66.6%) |

**Table3. Distribution of CHD cases based on complaints made during admission**

| Complaint | Frequency /percentage |
|---|---|
| Bluish coloration of lips,!ngers | 15(27.7%) |
| Fever | 29(47%) |
| Difficulty in breathing | 35 (66%) |
| Poor weight gain | 36(66.6%) |
| Dyspnea | 41(75%) |
| Cough | 42(76%) |

**Table 4.CHD case distribution based on presenting symptoms**

| Symptoms | |
|---|---|
| Clubbing | 3(5.5%) |
| Edema | 7(12.9%) |
| Hepatomegaly | 15(27%) |
| Cyanosis | 16(28%) |
| Tachycardia | 42(75%) |
| Murmur | 46(85.1%) |

**Table 5.Distribution of individuals with CHD by number of respiratory problems attacks by age group n =54**

| Age group in months | Total cases | N0 episodes | Episode <2 | Episode >2 |
|---|---|---|---|---|
| 0 to 12 | 33 | 4 | 12 | 17 |
| 13 to 24 | 21 | 0 | 7 | 14 |
| Total n (%) | 54(100%) | 4(7.4%) | 19(35.1%) | 31(57.4%) |

**Table6 .Complication-wise distribution of CHD cases**

| Complications | Frequency/percentage |
|---|---|
| Heart failure | 15(27.7%) |
| Pulmonary hypertension | 18(33.3%) |
| Failure to thrive | 39(72.2%) |

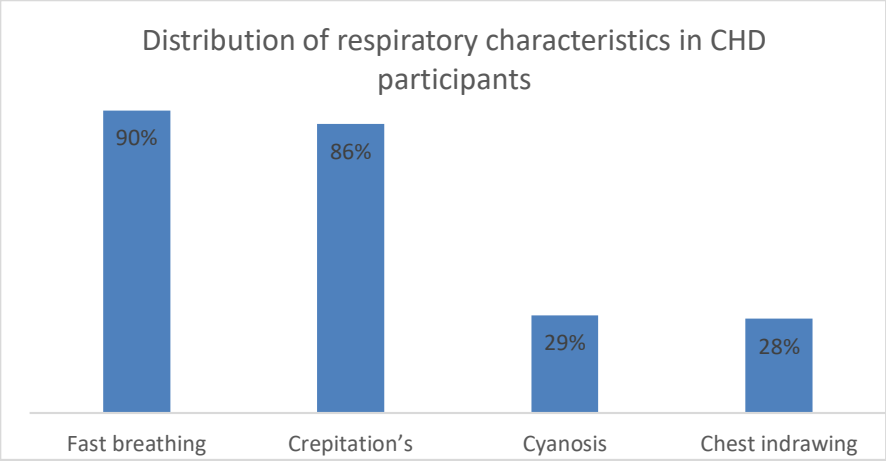


**Figure 1. Distribution of respiratory characteristics in CHD participants**

**Table 7. Outcome of congenital heart disease in the study population**

| | Advice for Surgery or conservative treatment n(%) | Closed spontaneous n (%) | Device N (%) | Death N(%) |
|---|---|---|---|---|
| VSD 18 | 15(27%) | 3(5.5%) | 0 | 0(0) |
| PDA 16 | 8(14.8%) | 2(3.7%) | 6(11.1%) | 0(0) |
| TOF 8 | 6(11%) | 0(0) | 0(0) | 2(3.7%) |
| TGA 7 | 5(9.2%) | 0 | 1(1.8%) | 1(1.8%) |
| ASD 3 | 2(3.7%) | 0 | 0(0) | 1(0) |
| ASD with TA 1 | 0 | 0 | 0(0) | 0 |
| VSD with PS 1 | 0 | 0 | 0 | 1(1.8%) |
| Total n(%) | 36(66.6%) | 5(9.2%) | 8(14.8%) | 5(9.2%) |

**Discussion**

It is crucial to diagnose congenital heart disease as soon as possible and to determine its presentation, complications, and outcome because prompt referral and appropriate intervention may save lives and lower the risk of developing more serious issues. In this study, there were more male participants (53.7%) than female and Rahman et al. also revealed that children with CHD had a higher male sex preponderance. (12) The male to female ratio in this research was 1.3:1, which was in particularly accordance with another study conducted in Bangladesh. (13) our study showed that 15 (27%) had cyanotic heart lesions and 36 (66.6%) had a cyanotic heart lesions. VSD was the most common structural defect, occurring in 18 cases (33.3%), followed by PDA (16.6%), TOF (7.9%), and TGA (6.1%). It is consistent with the results of Hussain et al., who found acyanotic heart disease in three out of four individuals, with VSD being the most prevalent acyanotic and TOF being the most prevalent cyanotic heart disease. (11) Begum et al. (14) discovered that ASD was the most prevalent CHD, however Hoque et al. (15) observed that VSD was the most common. Simple and possibly treatable heart abnormalities including VSD, PDA, and ASD are prevalent at all ages, but structural problems of CHD vary by age group. (15) in this study 38.1% of cases were identified between the ages of 13 - 24 months, while 61% of cases were diagnosed between the ages of 0-12 months. It's possible that many cases of CHD go undiagnosed during the fetal stage or at delivery. Approximately thirty percent of people with CHD may die without receiving a diagnosis; similarly, 35% of people with postnatal CHD who were released without a diagnosis either fell ill or passed away by the time they were six weeks old (16) in this study Complaints of children with CHD showed cough in most cases (82%), dyspnea in 80%, poor weight gain in 70%, breathing difficulty in 68% and fever in 58% cases. According to Sharmin et al., 60% of patients had dyspnea, 43.5% coughed, 41.7% had poor weight gain, and 26% had eating issues. (13) in

this study children with congenital heart disease, murmur was the most prevalent presenting symptom (85%) followed by tachycardia (75%) while cyanosis was recorded in 28% of cases Anisworth et al. found a much greater proportion of murmur absence (31.82%) in children with CHD compared to the results of our study (55.36%). (17) In this study common respiratory symptoms were rapid breathing in 90% of patients, crepitation in 86%, and cyanosis in 29% of cases, and chest indrawing with 28% of cases.the current findings are with contrast with the Sharmin et al. (13) VSD was found in 34% of cases of varying sizes in the current investigation. Of these, 17.65% of cases had spontaneous closures throughout the research period, 47.06% had moderate and small VSDs recorded, and 17.65% had big VSDs that were sent for surgical closure. Even at the age of four, VSDs can shut on their own. (18) Regarding the outcome of congenital heart disease in children, echocardiography revealed spontaneous closure in 9% of cases, while nine more children died during the research period. The other children received appropriate advice on surgery, intervention, and medical treatment; of them, 14% had device closure during the research period. Our study findings are similar to the study conducted by Rana et al. in which they reported 8% death rate.

## Conclusion

This study concluded that echocardiography play a major role in the diagnosis and management of congenital heart disease in first two years of life .the death rate was recorded 9% in this study which further revealed that early management of CHD is crucial.

## Declarations

**Data Availability statement**
All data generated or analysed during the study are included in the manuscript.
**Ethics approval and consent to participate**
Approved by the department concerned. (IRBEC-BKM-08-22)
**Consent for publication**
Approved
**Funding**
Not applicable

## Conflict of interest

The authors declared the absence of a conflict of interest.

## Author Contribution

**NUHK (Trainee Medical officer)**
*Manuscript drafting, Study Design,*
**AK (Assistant professor)**
*Review of Literature, Data entry, Data analysis, and drafting articles.*
**NUSK (House officers)**
*Conception of Study, Development of Research Methodology Design,*
**HG (Associate professor)**

*All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.*

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