Prevalence and Types of Congenital Heart Diseases among Children in Gadarif state, Eastern Sudan

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Abstract

Congenital heart diseases (CHD) are the most common congenital anomalies and they represent a leading cause of morbidity and mortality among children globally. A cross-sectional prospective hospital based study was conducted at Gadarif state, eastern Sudan to determine the prevalence and types of congenital heart diseases among children ≤16 years old. A total of 2300 children admitted to Gadarif pediatrics teaching hospital in the period of 6 months (1st June 2017–December 31st 2017). Thirty nine patients had congenital heart diseases confirmed by echocardiography were selected, giving a prevalence of 1.7%. The commonest type was ventricular septal defect (VSD) 27 (69.2%) with higher frequency among male, followed by atrial septal defect (ASD) present in 7 (17.9%) patients, tetralogy of Fallot (ToF) 2 (5.1%), truncus arteriosus was detected in one case (2.6%), hypoplastic left heart in one case (2.6%), and transposition of great arteries (TGA) in one case (2.6%). In conclusion the present study reported that the prevalence
and the frequency of congenital heart diseases is nearly similar to previous study in other parts of Sudan and Africa but lower than that in other part of the world. Knowledge about cardiac problems is still limited in rural area therefore we recommend to establish cardiac centers for early detection and management of congenital heart diseases, also we recommend to provide advance health education to improve the health awareness of people.

Keywords:
Congenital. heart diseases, Gadarif, Sudan

Introduction

Congenital heart disease (CHD) is structural or functional cardiac abnormality present at birth, although the disease is often discovered later in life (Mitchell et al., 1971). CHD is considered as a major health problem impacts public worldwide (Bernier et al., 2010). Congenital heart disease classified into cyanotic with right to left shunt and a cyanotic with left to right shunt. The highest prevalence rate of CHD was found in Asia (9.3 per 1,000 live births, followed by Europe (8.2 per 1,000), the lowest prevalence rate in Africa (1.9 per 1,000). This difference might be due to socioeconomical, ethnic and environmental factors (Van der Linde et al; 2011). In Sudan the prevalence rate for congenital heart disease reaching 2% of
school children (Siddiq et al; 1997). Despite the improvement in the management and follow up of CHD that allows for the survival of the patients, some of them are still associated with morbidity and mortality. 45% of infant deaths of congenital anomalies were caused by CHD in Western Europe. In Latin America, North America, Eastern Europe and the South Pacific region (including Japan) this proportion has been reported to be 35%, 37%, 42% and 48%, respectively (Botto, 2003). CHD affects the quality of life of children and adults (Majnener et al., 2008); it also has social impacts and affects the quality of life for parents of children with CHD. In Sudan CHD is prevalent, with rate 2.0% of the School children affected (Khalil et al., 1997), CHD is commonest causes of heart disease (El Hag 1994), and it is one of the major causes of hospital death. There has been no study on CHD in this State; we therefore aimed to determine the prevalence and types of CHD among children in Gadarif State, the eastern Sudan.
Main objectives:
The main objective of this study was to assess the prevalence and types of CHD among children in Gadarif pediatrics teaching hospital, Gadarif State, eastern Sudan.

Subjects and Methods:
This was a Cross-sectional prospective hospital based study among children with congenital heart defects in the Gadarif State, eastern Sudan from (1st June 2017–December 31st 2017). 2300 patients who admitted to Gadarif pediatrics teaching hospital during this period were collected, 39 of them had CHD diagnosis clinically and confirmed by echocardiography with children aged ≤ 16 years old were selected. An informed consent was obtained from parents before data collection.

Inclusion criteria:
Study will include both males and females patients with the age ≤ 16 years, and whose parents gave consent for the study. Patients with acquired heart disease and non–cardiac cases were excluded from this study. Data of the study was analyzed using Statistical Package for Social Sciences (SPSS) Software version 20.0. P < 0.05 was considered as statistically significant.
Ethical considerations:
Ethical clearance for the study was obtained from the Research and Ethics Committee of the Faculty of Medicine, University of Gadarif.

Results:

Characteristics of the subjects:

Cross-sectional prospective hospital based study was conducted at Gadarif state between 1st June 2017 – December 31st 2017. A total of 39 subjects age ≤ 16 years old participated in the study of which 13 (33.3%) were females while males were 26 (66.7%). The male-to-female ratio was 2:1. The patients came from different ethnic groups. Among the subjects, 36 Children were born to mother’s age ≥ 35 (92.3%), and 3 (7.7%) to younger mothers. A total of 6 patients (15.4%) were first-born children. 23 patients (58.9%) were from Urban, while 16 patients (41%) were from rural background. Among 39 cases studied, 35 (87.2%) were a cyanotic while 5 (12.8) were cyanotic. Ventricular septal defect was the most common cardiac defect followed by atrial septal defect, tetralogy of Fallot, truncus arteriosus hypoplastic left heart and transposition of great arteries (Table 1). All the patients of ventricular septal defect were within the age groups 3–9 years and atrial septal
defect within the age 0–2 years. The majority of male had VSD type, while the female had ASD type.

(\textbf{Table 1}): Type of congenital heart disease in Gadarif state

<table>
<thead>
<tr>
<th>Type</th>
<th>Number</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ventricular septal defect</td>
<td>27</td>
<td>69.2%</td>
</tr>
<tr>
<td>Atrial septal defect</td>
<td>7</td>
<td>17.9%</td>
</tr>
<tr>
<td>Tetralogy of Fallot</td>
<td>2</td>
<td>5.1%</td>
</tr>
<tr>
<td>Truncusareterious</td>
<td>1</td>
<td>2.6%</td>
</tr>
<tr>
<td>Hypoplastic left heart</td>
<td>1</td>
<td>2.6%</td>
</tr>
<tr>
<td>Transposition of great arteries</td>
<td>1</td>
<td>2.6%</td>
</tr>
</tbody>
</table>

\textbf{Discussion}

A total of 39/2300 subjects with confirmed congenital heart disease were studied. In the present study the prevalence was found to be 1.7%, was different from a studies done in China and India, that reported higher prevalence (Jiang et al., 2005, Chadha et al., 2005). Various factors may contribute to the differences in prevalence and relative frequencies of CHD subtype, in Gadarif state many of deliveries occur at home and also people of rural area who are having CHD didn’t attend to hospital and may had early neonatal death. The most common CHD type was
VSD (68.2%) % which was consistent with other studies (Rose et al., 1964; Hoffman et al., 2004; Koshnood et al., 2010). The second type of CHD was ASD; this was in line with other studies (Rose et al., 1964; Mitchell et al., 1971; Mészáros et al., 1975; Samánek et al., 1989; Sípek et al., 2010). In Sweden ASD represents the fifth most common type (Sípek et al., 2010). This difference might be attributed to ethnic, socioeconomic, and environmental differences (Correa-Villaseñor, 1991). No cases of patent ductus arteriosus or Coarctation of the aorta, and this may be due to limitation of sample size.

92.3% of Children were born to mother’s age≥35; Baird reported that increased in maternal age causing a higher prevalence of congenital abnormalities (Bairdet al., 1991). In this study most cases of CHD (%) were seen in the age group 3–9 years; and occurrence of CHD was decrease with increasing age. This was in line with previous studies, Bassili et al (2000) reported that majority of cases of CHD were found in children aged 5–10 years with a decline of CHD in children older than 10 years. 58.9% were from Urban, while 41% of patients were from rural background. This might be that children from rural area with the congenital heart disease may die before reaching the doctor or detection of the disease.
On the other hand there is decrease awareness of CHD among the parents of children with CHD.

**Conclusion:**
The present study report that the prevalence and the frequency of congenital heart diseases was nearly similar to previous study in other part of Sudan and Africa but lower than that in other part of the world. Knowledge about cardiac problems is still limited in rural areas therefore we recommended establishment of cardiac centers to provide advance health education to improve public health awareness. Further studies on large numbers of cases may give more accurate estimation of prevalence.

**References**


