

**Pattern of Congenital Heart Disease (CHD) Among Children
Under Five Years Referred to Charitable Heart Foundation
At Hadhramout Governorate, Yemen ; 2010/2011**

**نمط امراض القلب الخلقية بين الاطفال تحت السنة الخامسة
بالاستناد لمؤسسة القلب الخيرية-حزرموت-اليمن ٢٠١١/٢٠١٠**

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Pattern of Congenital Heart Disease (CHD) Among Children Under Five Years Referred to Charitable Heart Foundation At Hadhramout Governorate, Yemen; 2010/2011

Abstract :

Background: Congenital Heart Disease (CHD) is the most common congenital anomaly in newborns and it is a leading cause of death during the first year of life with a prevalence of 1% in live births. **Aim:** To determine the pattern of Congenital Heart Disease (CHD) among Children under Five Years according to the registry of Charitable Heart Foundation in Hadhramout, Yemen; 2010 ~ 2011. **Subject and method:** A descriptive retrospective design was used with purposive sampling. The study sample included 130 live birth children registered in charitable heart foundation in Hadhramout governorate were screened and investigated for CHD from September 2010 ~ Sep 2011. Two types of tools were used for data collection: a questionnaire sheet was designed for data collection from patient records in charitable heart foundation, the second tool that performed by telephone interview with parents of the patients to understand the demographic factors such as age, sex, type of CHD and association with endogamy between parent, **Key Words:** Pattern, CHD, Charitable Heart Foundation, Hadhramout, Yemen.

and relation with presence of CHD in their child. **Result:** The results of the present study revealed that more than half of the studied sample (54.6%) was from the urban area and the prevalence of CHD among females was (50.8%) compared to (49.2%) among the males and VSD was the commonest lesion (30.8%) among the studied sample followed by ASD and PDA (15.4% and 14.6 %) respectively. The majority of children was affected by VSD, in the males (31.3%) compared to (30.1%) in the females. The endogamy between parent and relation with presence of disease were positive with (42.3%) of the study sample and negative with (57.7%) of them. **Recommendations:** Finding of this work highlight the need for increasing awareness of family and community in Hadhramout about CHD through health education programs which to provide them with information about CHD, types, early discover of the disease, and pre-marital counseling should be emphasized among susceptible families.

المخلص :

المصابين من المدينة ومعدل الاصابة بين الاناث كان (٥٠,٨%) مقارنة (٤٩,٢%) بين الذكور وقد وجد ان الفتحة بين البطينيين هو الاكثر انتشارا (٣٠,٨%) بين العينة تحت البحث يليها الفتحة بين الاذنيين ثم القناة الشريانية السالكة (١٥,٤% و ١٤,٦%) على التوالي. الاطفال المصابين بالفتحة بين البطينيين كانوا من الذكور (٣١,٣%) مقارنة (٣٠,١%) بين الاناث . وقد وجدت هذه الدراسة ان الزواج بين الاقارب بين الوالدين وعلاقتة بالحالات المرضية الحالية ايجابية بين (٤٢,٣%) من العينة بينما كانت سلبية بين (٥٧,٧%).

التوصيات: بناء على نتائج الدراسة نوصي بتسليط الضوء ورفع الوعي حول امراض القلب الخلقية بين الاطفال في حضرموت من خلال برامج التثقيف الصحي ورفع الوعي حول انواع ، واهمية اكتشاف امراض القلب الخلقية مبكرا واهمية المشورة قبل الزواج خاصة لدى العائلات الذين لديهم استعدادات للمرض. الكلمات المفتاحية: نمط امراض القلب الخلقية، مؤسسة امراض القلب الخيرية، حضرموت -اليمن.

الخلفية : امراض القلب الخلقية من اكثر التشوهات الخلقية شيوعا بين المواليد وهي من الاسباب الرئيسية للوفيات خلال السنة الاولى من العمر وبمعدل انتشار وصل الى ١% لكل ولادة حية. وقد هدفت هذه الدراسة الى تحديد نمط امراض القلب الخلقية حسب سجلات مؤسسة امراض القلب، حضرموت - اليمن خلال ٢٠١٠ - ٢٠١١م.

المنهجية: استخدم التصميم الوصفي الاستعدادي في هذه الدراسة. وقد تم اختيار ١٣٠ طفل حي مسجلين لدى مؤسسة القلب الخيرية بحضرموت بطريقة عمدية وقد تم الاستقصاء والفحص لنمط امراض القلب الخلقية خلال الفترة من سبتمبر ٢٠١٠ الى سبتمبر ٢٠١١. استخدمت وسيلتان لجمع المعلومات: الاستبانة لجمع المعلومات من السجلات الطبية لمؤسسة القلب الخيرية ، والوسيلة الثانية المقابلة بواسطة الاتصال بالتلفون لوالدي المرضى وذلك لفهم العوامل الديموغرافية كالعمر والجنس وطبيعة مرض القلب الخلقي وعلاقة ذلك بالقرابة بين الوالدين.

النتائج : اظهرت نتائج هذه الدراسة ان اكثر من نصف العينة (٥٤,٦%) من

Introduction :

Congenital Heart Disease (CHD) is the most common congenital anomaly in newborns and it is a leading cause of death during the first year of life with a prevalence of 1% in live births.^[1]

Congenital Heart Diseases (CHDs) are the conformation abnormalities of the heart or the blood vessels, formed during fetal life (3 to 6 weeks of pregnancy), i.e. when the heart or the major blood vessels of the heart cannot develop properly before birth. The abnormalities involving the arteries, the valves, the coronary and the major vessels of the heart can be either simple or complex.^[2]

Congenital heart diseases (CHDs) are relatively common with a prevalence ranging from 3.7 to 17.5 per 1000 live births^[1, 3]. In the United States about 40,000 infants are born with heart defects each year.^[4]

Etiology of congenital heart disease (CHD) is multi factorial & a large collection of environmental and genetic causes have a role in its pathogenesis.^[3]

Several previous reports suggest a changing pattern and incidence of congenital heart disease in various geographic locations^[5, 6] according to racial and ethnic factors.^[7, 8] Knowledge of the epidemiology of congenital heart disease is the basis on which investigative efforts will emerge to identify the causes of cardiac dimorph genesis and afford opportunities to prevent them.^[9]

Malformations of the cardiovascular system are also associated with significant medical morbidity, which requires use of costly medical facilities.^[7] Thus, determining the prevalence and pattern of CHD is necessary to recommend valuable changes in health policies.^[10] There is no information about the prevalence rate of Congenital Heart Disease (CHD) at Hadhramout governorate in Yemen therefore the objective of this study was to determine the pattern of Congenital Heart Disease (CHD) among Children under Five Years according to the registry of Charitable Heart Foundation in Hadhramout.

Subjects And Methods :

Research design: A descriptive retrospective design was used with purposive sampling

Setting: This study was conducted at Charitable Heart Foundation in Hadhramout Governorate, Yemen.

Sampling: The study sample included 130 live birth children under five years registered in Charitable Heart Foundation in Hadhramout were screened and investigated for Congenital Heart Disease (CHD) from September 2010 ~ Sep 2011.

Tools Of Data Collection :

Two types of tools were used for data collection: A questionnaire sheet was designed for data collection from patient records in Charitable Heart Foundation, the second tool that performed by telephone interview with parents of the patients to understand the demographic factors such as age, sex, type of Congenital Heart Disease (CHD) and association with endogamy between parent, and relation with presence of the disease in their child.

Administrative design :

The director of Charitable Heart Foundation was previously informed and authors get written permission to do research, because of an ethical board to institution.

Statistical Analysis :

For statistical analysis the SPSS 14.0 statistical package is used. From statistical parameters the following is used; frequency table with percentage.

Results :

The socio-demographic characteristics of the studied sample are summarized in **table 1**. It shows that the most affected age group (43.8%) was from birth to less than one year and the prevalence of Congenital Heart Disease (CHD) among females was (50.8%)

compared to (49.2%) among the males and more than half (54.6%) of the study sample coming from urban areas.

Table 2 displays the patterns of Congenital Heart Disease (CHD) among study sample according to the data registry in Charitable Heart Foundation. The table reveals that VSD was the commonest lesion (30.8%) among the study sample followed by ASD and PDA (15.4% and 14.6 %) respectively while, Complex CHD and TOF were found (13% and 8.5%) among the study sample.

Table 3 illustrated the pattern of Congenital Heart Disease (CHD) with endogamy between parents among the study sample. The table, shows that the endogamy between parent and relation with presence of CHD were positive with (42.3%) of the study sample and negative with (57.7%) of them. Also, the table reveals that VSD was positive endogamy between parents with (29.1%) of study sample compared to (32%) was negative endogamy, while ASD was positive endogamy with (12.7%) compared to (17.3%) was negative endogamy and PDA was present at the same percentage (14.5%) with positive and negative endogamy among the study sample. While, Complex CHD was positive endogamy with (14.5%) compared to (12%) was negative endogamy and TOF was positive endogamy with (7.3%) compared to (9.3%) was negative endogamy among the study sample.

Table 4 illustrated the pattern of Congenital Heart Disease (CHD) with sex (male & female) among the study sample. The table reveals that VSD was found (31.3%) among males compared to (30.3%) among female, while ASD was found (18.2%) among female compared to (12.5%) among male and PDA was found (18.2%) among female compared to (10.9%) among male but, the Complex CHD was found (14.1%) among male compared to (12.1%) female and TOF was found (9.4%) in male compared to (7.6%) female of the study sample.

Table 5 shows the pattern of Congenital Heart Disease (CHD) with residence (urban & rural) among the study sample. The table reveals that VSD was found (35.2%) in urban area compared to (25.4%) in rural area among study sample, while ASD was found

(15.5%) in urban area compared to (15.3%) in rural area and PDA was found (23.7%) in rural area compared to (7%) in urban area but, the Complex CHD was found (12.7%) in urban area compared to (13.6%) in rural area and TOF was found (11.3%) in urban area compared to (5.1%) in rural area among the study sample.

Table (1) Distribution of the study sample by their Socio - demographic characteristics according the data referred to Charitable Heart Foundation during 2010-2011

| Socio- demographic characteristics | Frequency | % |
|------------------------------------|-----------|------|
| Age: | | |
| Birth -< 1 Year | 57 | 43.8 |
| 1 - < 2 Y | 31 | 23.8 |
| 2 - < 3 Y | 12 | 9.2 |
| 3 - < 4 Y | 5 | 3.8 |
| 4 - 5 Y | 25 | 19.2 |
| Sex: | | |
| Male | 64 | 49.2 |
| Female | 66 | 50.8 |
| Residence: | | |
| Urban | 71 | 54.6 |
| Rural | 59 | 45.4 |
| Family history to CHD: | | |
| Positive | 9 | 6.9 |
| Negative | 121 | 93.1 |
| Endogamy between parents: | | |
| Positive | 55 | 42.3 |
| Negative | 75 | 57.7 |

CHD: Congenital Heart Disease

Table (2) Patterns of Congenital heart disease (CHD) among the study sample according to the data registry in Charitable Heart Foundation during 2010~2011

| Pattern of CHD according the diagnosis | Frequency | % |
|--|-----------|------|
| PDA | 19 | 14.6 |
| ASD | 20 | 15.4 |
| VSD | 40 | 30.8 |
| TOF | 11 | 8.5 |

| | | |
|---------------------------|-----|-----|
| PS | 6 | 4.6 |
| Complex CHD (CCHD) | 17 | 13 |
| PDA- ASD-VSD | 2 | 1.5 |
| PDA- VSD | 5 | 3.8 |
| PDA- PS | 2 | 1.5 |
| ASD-VSD | 5 | 3.8 |
| VSD- PS | 2 | 1.5 |
| VSD- Complex CHD | 1 | 0.8 |
| Total | 130 | 100 |

PDA:Patent Ducts Arteriosis, ASD:Atrial Septal Defect, VSD:Ventricular Septal Defect, TOF:Tetralogy Of Fallot, PS:Pulmonary Stenosis, , CCHD:Complex Congenital Heart Disease, CHD:Congenital Heart Disease.

Table (3) Pattern distribution of Congenital Heart Disease (CHD) with endogamy between parents among the study sample referred to Charitable Heart Foundation

| Pattern of CHD according the diagnosis | Endogamy between parents | | | |
|--|--------------------------|------|-----------|------|
| | Positive | | Negative | |
| | Frequency | % | Frequency | % |
| PDA | 8 | 14.5 | 11 | 14.7 |
| ASD | 7 | 12.7 | 13 | 17.3 |
| VSD | 16 | 29.1 | 24 | 32 |
| TOF | 4 | 7.3 | 7 | 9.3 |
| PS | 2 | 3.6 | 4 | 5.3 |
| Complex CHD | 8 | 14.5 | 9 | 12 |
| PDA- ASD-VSD | 0 | 0 | 2 | 2.7 |
| PDA- VSD | 3 | 5.5 | 2 | 2.7 |
| PDA- PS | 1 | 1.8 | 1 | 1.3 |
| ASD-VSD | 3 | 5.5 | 2 | 2.7 |
| VSD- PS | 2 | 3.6 | 0 | 0 |
| VSD- Complex CHD | 1 | 1.8 | 0 | 0 |
| Total | 55 | 100 | 75 | 100 |

PDA:Patent Ducts Arteriosis, ASD:Atrial Septal Defect, VSD:Ventricular Septal Defect, TOF:Tetralogy Of Fallot, PS:Pulmonary Stenosis , CCHD:Complex Congenital Heart Disease, CHD:Congenital Heart Disease.

Table (4) Pattern distribution of Congenital Heart Disease (CHD) with the sex of studied sample referred to Charitable Heart Foundation

| Pattern of CHD according the diagnosis | Sex | | | |
|--|-----------|------------|-----------|------------|
| | Male | | Female | |
| | Frequency | % | Frequency | % |
| PDA | 7 | 10.9 | 12 | 18.2 |
| ASD | 8 | 12.5 | 12 | 18.2 |
| VSD | 20 | 31.3 | 20 | 30.3 |
| TOF | 6 | 9.4 | 5 | 7.6 |
| PS | 3 | 4.7 | 3 | 4.5 |
| Complex CHD | 9 | 14.1 | 8 | 12.1 |
| PDA- ASD-VSD | 1 | 1.6 | 1 | 1.5 |
| PDA- VSD | 3 | 4.7 | 2 | 3 |
| PDA- PS | 1 | 1.6 | 1 | 1.5 |
| ASD-VSD | 3 | 4.7 | 2 | 3 |
| VSD- PS | 2 | 3.1 | 0 | 0 |
| VSD- Complex CHD | 1 | 1.6 | 0 | 0 |
| Total | 64 | 100 | 66 | 100 |

PDA:Patent Ducts Arteriosis, ASD:Atrial Septal Defect, VSD:Ventricular Septal Defect, TOF:Tetralogy Of Fallot, PS: Pulmonary Stenosis, CCHD:Complex Congenital Heart Disease, CHD:Congenital Heart Disease.

Table (5) Pattern distribution of Congenital Heart Disease (CHD) with the residence of studied sample referred to Charitable Heart Foundation

| Pattern of CHD According The Diagnosis | Residence | | | |
|--|-----------|------|-----------|------|
| | Urban | | Rural | |
| | Frequency | % | Frequency | % |
| PDA | 5 | 7 | 14 | 23.7 |
| ASD | 11 | 15.5 | 9 | 15.3 |
| VSD | 25 | 35.2 | 15 | 25.4 |
| TOF | 8 | 11.3 | 3 | 5.1 |
| PS | 5 | 7 | 1 | 1.7 |
| Complex CHD | 9 | 12.7 | 8 | 13.6 |
| PDA- ASD-VSD | 1 | 1.4 | 1 | 1.7 |

| | | | | |
|-------------------------|----|-----|----|-----|
| PDA- VSD | 4 | 5.6 | 1 | 1.7 |
| PDA- PS | 1 | 1.4 | 1 | 1.7 |
| ASD-VSD | 2 | 2.8 | 3 | 5.1 |
| VSD- PS | 0 | 0 | 2 | 3.4 |
| VSD- Complex CHD | 0 | 0 | 1 | 1.7 |
| Total | 71 | 100 | 59 | 100 |

PDA:Patent Ducts Arteriosis, ASD:Atrial Septal Defect, VSD:Ventricular Septal Defect, TOF:Tetralogy Of Fallot, PS:Pulmonary Stenosis, CCHD:Complex Congenital Heart Disease, CHD:Congenital Heart Disease.

Discussion :

Congenital heart diseases are an important group of disease that cause great morbidity and mortality in children.^[9] Early recognition of such lesions has great implications on prognosis.

The present study revealed the most affected age group (43.8%) was from birth to less than one year and the prevalence of Congenital Heart Disease (CHD) among females was (50.8%) compared to (49.2%) among the males and more than half (54.6%) of the study sample coming from urban areas. This finding disagree with the study in **Iran**^[11] who found that CHD was more common in male births and also, this finding is not similar to that reported in Saudi Arabia^[12], and Iceland^[13] where the frequency was the same for males and females while this finding in line with study in Nigeria^[14] CHD was found to be more common in female births.

The current study revealed that VSD was the commonest lesion (30.8%) among the study sample followed by ASD and PDA (15.4% and 14.6 %) respectively while, Complex CHD and TOF were found (13% and 8.5%) among the study sample , these results agrees with the findings of the study formed by **Sheikh et al., 2012**^[15] who found that the most frequent type of congenital heart disease was found to be ventricular septal defect (VSD) (33.45%), followed by atrial septal defect (ASD) (13.6%), and patent ductus arteriosus (PDA) (10.6%). And also in line with **Aburawi, 2006**^[16] who mentioned that Worldwide ventricular septal defect (VSD) is the most common acyanotic CHD accounting 25-30% of all CHD

[16]. This may be explained by the difference in genetic makeup & ethnicity. Atrial septal defect (ASD) ranked second in frequency accounting for 13.6% . Patent ductus arteriosus (PDA) was seen in 10% of cases.

The most frequent type of CHD was found to be ASD which is in accordance with another study in **Iran** [17] while in other studies [9, 18, 19, 20-13] the most frequent type of CHD was VSD. This could be due to the severity of defects which might have led to the death of patients before accessing the medical facilities. This might also be due to racial and genetic factors in different populations.

The finding of the present study showed that VSD was found among males (31.3%) compared to (30.3%) among female, while ASD was found (18.2%) among female compared to (12.5%) among male and PDA was found (18.2%) among female compared to (10.9%) among male. These results in line with **Sheikh et al., 2012** [15] in the finding of the rate of VSD in males & females were 1.27:1. The rate of ASD in males was 1.17:1. And disagree of the result PDA was found to be more common in male than female. Parents of (6.25%) babies were related. None of the affected children had a positive family history of birth defects, hypertension, diabetes, thyroid disorder. History of still birth were found in 1% of mother – was Down syndrome. This finding agree with study by [21] (**Khan et al., 2011**) who reported that eight cases of the studied sample had a family history of CHD. The finding of this study revealed VSD was found (25.4%) in rural area among study sample, and PDA was found (23.7%) in rural area, these results disagree with study performed in rural area by [21] (**Khan et al., 2011**) who reported that Atrial septal defect was the commonest lesion with a prevalence of 9.6 per 1000 followed by ventricular septal defect with a prevalence of 5.8 per 1000 children

Conclusion :

In the light with the main study findings, it might be concluded that the pattern of Congenital Heart Disease (CHD) among females was (50.8%) compared to (49.2%) among the males and the most affected age group (43.8%) was from birth to less than one year and 54.6% of the sample coming from urban areas. VSD was the commonest lesion (30.8%) among the study sample followed by ASD and PDA (15.4% and 14.6 %) respectively. The majority of children was affected by VSD, in the males (31.3%) compared to (30.3%) in the females. The endogamy between parent and relation with presence of disease were positive with (42.3%) of the study sample and negative with (57.7%) of them

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