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EC CARDIOLOGY
Mini Review

A Review of Prevalence of Congenital Heart Disease in the Middle-East Region

Neerod Kumar Jha[1]*, Mohammad Daud Khan[2] and Ahmed Daud Khan[3]

[1]*Division of Paediatric Cardiac Surgery, Sheikh Khalifa Medical City, Abu Dhabi, UAE*

[2]*Division of Paediatric Cardiology, Sheikh Khalifa Medical City, Abu Dhabi, UAE*

[3]*Division of Medicine, University Hospital, Leicester, UK*

***Corresponding Author:** Neerod Kumar Jha, Division of Paediatric Cardiac Surgery, Sheikh Khalifa Medical City, Abu Dhabi, UAE.

Received: April 12, 2021; **Published:** May 17, 2021

Abstract

Congenital heart disease (CHD) is the malformation of the heart or associated large blood vessels that affects cardiac function and it is one of the leading causes of mortality in the first year of life. The prevalence of CHD have been reported several times earlier world-wide and this is an effort to summarise the available studies published so far through the literature review and compare it in order to update the recent disease trends and patterns. This review and information may be utilized by the medical professionals and health authorities for understanding the extent of CHD, better utilization and allocation of resources.

The prevalence of congenital heart disease seems to be higher in the middle-east region as compared to other countries. However, amongst the individual type of defects the ventricular septal defect is common in most of the populations followed by atrial septal defect, patent ductus arteriosus and coarctation of the aorta. Approximately 30 percent of the defects were complex in nature in most of the published studies. One of the most important causes of variation in the prevalence of CHD in the middle-east and the developed countries could be access or availability of tertiary level care, consanguineous marriage or lack of national data service.

Keyword: *Heart; Congenital; Disease; Middle-East*

Abbreviations

CHD: Congenital Heart Disease; PDA: Patent Ductus Arteriosus; ASD: Atrial Septal Defect; VSD: Ventricular Septal Defect; TOF: Tetralogy of Fallot; COA: Coarctation of Aorta; PS: Pulmonary Stenosis; Others: Combined or Complex Cardiac Defects

Introduction

Congenital heart disease (CHD) is the malformation of the heart or associated large blood vessels that affects cardiac function and it is one of the leading causes of mortality in the first year of life [1-6]. Approximately 30 - 33% cardiac defects are associated with other system abnormalities [6].

The burden and consequences of congenital heart disease include psychological, economical, provision of health care and logistic factors to deal with it. It requires a long-term but highly specialised management pathway. The prevalence of CHD have been reported several times earlier world-wide and this is an effort to summarise the available studies published so far through the literature review with special emphasis on so called "Middle-East" region and compare it in order to update the recent trends and pattern that might be used for better utilization and allocation of resources by the health authorities [1-15]. The 'Wikipedia' has described the 'Middle-East', a transcon-

tinental region in Afro-Eurasia which generally includes Western Asia (except for Transcaucasia), all of Egypt (mostly in North Africa), and Turkey. Most Middle-Eastern countries are part of the Arab world. The most populous countries in the region are Egypt, Iran, and Turkey, while Saudi Arabia is the largest Middle Eastern country by area. In addition, the findings might be helpful in understanding epidemiology and local demography. The life style, culture, traditions and way of life in various regions of the world is different and it is interesting to observe pattern and difference in various congenital heart diseases that might help in finding the reasons and corrective measures.

Materials and Methods

The present study comprised of review of available reports published in the English literature on prevalence and pattern of congenital heart disease in the middle-east region and an attempt has been made to compare the findings in terms of national or regional figures from various countries and it includes type and incidence of cardiac defects in the neonatal period. The literature search included "PubMed", "google scholar" and review of the reports in the English language journals (Table 1-4).

Results

Country	Year	Total live births	CHD/1000 live births	Diagnostic tool
Oman [1]	2000	139,707	7.10	Non-Invasive
Yemen [2]	2014	12987	5.3	Non-Invasive
Iran [3]	2008	11739	8.6	Invasive/Non-Invasive
Saudi Arabia [4]	2001	50772	10.7	Non-Invasive
Qatar [5]	1997	49887	12.23	Non-Invasive
Iran [6]	2008	217259	12.30	Non-Invasive
Egypt [7]	2000	869434	1.01	Non-Invasive

Table 1: *Prevalence of congenital heart disease in the middle-east region as cited in the literature.*
Non-Invasive= Clinical examination or echocardiography or radiography.
Invasive= Cardiac catheterization or angiocardiography.

Country	CHD/1000 live births
Austria [8]	6.90
Australia [9]	7.65
Hong Kong [10]	6.35
USA [11]	6.60
UK [13]	5.51
Canada [12]	5.54
Denmark [14]	6.14
Sweden [15]	7.72

Table 2: *Prevalence of congenital heart disease in other countries.*

Country	PDA (%)	ASD	VSD	TOF	COA	PS	Others
Qatar [5]	5.10	7.20	40.60	5.10	4.10	8.70	0.3 - 3.1
Oman [1]	10.30	14.40	24.90	9.60	3.7	8.80	3.6 - 8.5
Saudi Arabia [4]	8.60	11.50	39.50	4.20	2.7	8.90	1.9 - 15.7
Iran [6]	17.97	19.54	11.07	16.99	1.7	3.59	29.14
Egypt [7]	6.1	13.6	35.3	5.0	3.9	18.4	-
Yemen [2]	5.8	24.1	39.1	-	-	-	30

Table 3: *Distribution of congenital heart diseases according to type of defects in the Middle-East.*
PDA: Patent Ductus Arteriosus; ASD: Atrial Septal Defect; VSD: Ventricular Septal Defect; TOF: Tetralogy of Fallot; COA: Coarctation of Aorta; PS: Pulmonary Stenosis.

Country	PDA (%)	ASD	VSD	TOF	COA	PS	Others
USA [11]	8.3	7.4	32.1	3.8	6.7	8.6	14.2
UK [13]	11.9	5.9	32.5	5.9	6.3	7.6	8.5
India [1]	11	12	29	17	2	7	15
Japan [1]	3.6	5.3	60	5.8	2.7	9.6	9.5
Denmark [14]	12.6	9.4	24	5.8	7	5.9	14.1
Nigeria [1]	20.9	7.5	35	10	2	9	10.3

Table 4: *Distribution of type of congenital cardiac defects in other countries (%).*

Discussion

The literature search indicates that most of the published reports are old and there is no fresh data update(1-15). The diagnostic tools used were clinical examinations, invasive or non-invasive investigations. With the advent of echocardiography and antenatal screening the number of newly diagnosed cases are expected to be more in future. The prevalence of congenital heart disease seems to be higher in the middle-east region as compared to other countries. However, the individual type of defects was VSD in most of the populations followed by ASD, PDA and Coarctation of the aorta. Approximately 30 percent of the defects were complex in nature in most of the studies. The causes of variation in the prevalence of CHD in the Middle-East and the developed countries could be access or availability of tertiary level care, consanguineous marriage or lack of national data service (1-5). The "Tetralogy of Fallot" was the commonest cyanotic heart disease and probably it is due to the fact that it is associated with better survival even without intervention. The prevalence of coarctation of aorta although considered to be higher in non-Asian population than Asian patients looked similar in the Middle-East.

The variations in the frequency of cardiac defects in infants could be due to many factors such regional variations, race and gender predisposition or genetic influence [1-5]. In general, the disease with no symptoms or delayed presentations have more prevalence in a population due to accumulation of patients, or lack of registrations.

The present brief review of the prevalence of CHD may help in providing a source of information while assessing impact of CHD on planning and delivery of effective health-care and its effect on health and economy. The CHD is associated with significant morbidity and required expensive medical care and facility in long-term. The data may be informative for setting regional or national cardiology or paediatric cardiac surgical units in future. To overcome missing or inaccuracy in recording the actual incidence of CHD, maintenance of regional or national registry is of paramount importance for a better long-term planning and research. Unfortunately, the information on this problem is lacking in most of the countries in the Middle-East and need to establish soon.

Conclusion

On a literature review and comparison between various regions, it seems that the prevalence of congenital heart disease is higher in the middle-east region as compared to other countries. However, the individual type of defects was VSD in most of the populations in all countries followed by ASD, PDA and Coarctation of the aorta. Approximately 30 percent of the defects were complex in nature. Amongst the cyanotic heart diseases, the TOF is most common. The present brief review of the prevalence of CHD may help in providing a source of information while assessing impact of CHD on planning and delivery of effective health-care and its effect on health and economy.

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Volume 8 Issue 6 June 2021