

VIEWPOINT

Call for Multinational Studies of the Epidemiology of Congenital Heart Disease in the Arab World

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Published: 01 January 2013

Ibnosina J Med BS 2013,5(1):1-3

Received: 26 December 2012

Accepted: 27 December 2012

This article is available from: <http://www.ijmbs.org>

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Abstract

Congenital Heart Disease (CHD) is the commonest congenital anomaly worldwide representing nearly one third of all congenital malformations presenting in the neonatal period. Arabs have a high fertility rates and they are liable to have more children with congenital defects including CHD. High rates of consanguineous marriages may increase rates of congenital and genetic anomalies. No reliable statistics exist and assumption that the incidence of congenital defects in the Arab world being greater than the rest of the world is only anecdotal. It is therefore crucial and timely to have a multinational and multicenter study of the incidence of CHD in the Arab world. Creation of cross the Arab world multinational congenital cardiac defects registry program and stratification is essential prerequisite to develop good pediatric cardiac services. Over the last two decades, some Arab countries have already started their pediatric cardiac programs. The author call upon other countries to follow suit and learn from their experiences.

Key Words: Congenital Heart Disease, Genetics, Arab Health, Epidemiology.

Introduction

Congenital Heart Disease (CHD) is defined as a gross structural abnormality of the heart or intra-thoracic great vessels that is actually or potentially of functional significance. Congenital heart disease is the commonest congenital anomaly worldwide. It accounts for about 30% of all congenital malformations presenting in the neonatal period (1). The incidence of CHD worldwide has been reported as 8-13/1000 live newborn. Given the causes of variation, probably there is no evidence for difference in incidence between different countries or times (2).

Size of the Problem

The incidence of CHD in developing countries is not known, but it has been reported that the distribution of different lesions is fairly similar to those in developed

countries except perhaps for lower incidences of aortic stenosis and coarctation of the aorta (3). Environmental factors such as drugs, infections, maternal illnesses and chromosomal aberrations account for about 15% of CHD. The incidence of CHD in trisomy 13 is as high as 90% and in trisomy 18, 80% although the prevalence is low. Down's and velocardiofacial syndromes has been reported as the most commonly associated syndromes with CHD (5). The multifactorial hypothesis is the most acceptable theory for the genetic basis of CHD which accounts for about 85% of cases. The presence of environmental factors in various combinations with genetic contributors could potentiate the genetic predisposition to the occurrence of cardiac defects. Recent developments in molecular biology and genetics indicate that there is a high evidence of affected genes in CHD, which could explain in part the causes of cardiac defects. More than 30 genes have been linked to the non-syndromal forms of CHD. Genetic risk factors could be attributed to chromosomal aberrations, gene mutations, single nucleotide polymorphism of genes involved in cardiac structure and development. Cardiac defects can result from discrete mutations in specific nuclear transcription. These risk factors could be affected by mode of inheritance, penetrance, and expression, which could be heritable or sporadic. It has been reported that single genetic defects can occur in different types of CHD and this could enlighten that similar developmental pathways can be shared in unrelated cardiac defects (6). In patients with ventricular septal defect the gene affected loci are TBX5, TBX1, NKX2-5, in atrial septal defect; TBX5, NKX2-5 and in tetralogy of Fallot; JAG1, TBX1, NKX2-5 (7).

The Arab World in a Medical Context

Increasing articles have recently appeared in the international medical literature on various medical issues in the "Arab World". It is noteworthy defining who are Arabs? and what is "Arab World" entails. Arab populations encompass a vast geographical region that extends from Arabian Gulf in the east to the Atlantic Ocean in the west, including parts in the southeast of Asia Minor, East Africa, and West Africa. It spans more than 14,000,000 square kilometers. This geo-cultural unit is the largest in the world after Russia and Anglo-America, with a population that is currently exceeding 360 million. Politically; Arab population is defined as those who are living in 23 Arab States and members in the Arab league. The Arabs are those people of different ethnic and ancestral origins, and religious backgrounds, and historic identities. Arabs have a high fertility rates, birth rates and annual population growth

rates. As they have a high child bearing at either very early or old maternal ages, they are liable to have more children with congenital defects including CHD. They have high rates of inbreeding and consanguineous marriages and high rates of congenital and genetic anomalies (8). Other evidence that Arabs population could have a high incidence of CHD is the high rates of consanguinity and its associated socio-demographic factors (9, 10). Maternal obesity and diabetes are associated with increased risk of birth defects including cardiac diseases (11). The Arab populations have a high incidence of diabetes and obesity. There is an increase in the frequency of CHD in the offspring of diabetes-complicated pregnancies. Furthermore; pregnancies with poor glycemic control in the 1st trimester are more prone to the presence of fetal heart defects (12).

Call for Action

The lack of public health measures directed toward control and prevention of congenital and genetically determined disorders may increase the number of congenital defects. There are no such direct preventive measures in most of the Arab countries against CHD. Folic acid supplementation in the pre- and peri-conception period and ensuring rubella vaccination has been completed before pregnancy are examples of the prevention controls. The presence of small isolates communities in different parts of the Arab world with their high consanguinity is another evidence of high incidence of CHD (e.g., Armenians, Bedouins, Druzes, Jews, Kurds, Nubians, Berbers, Tebo and Twareq). Accordingly; the present situation with no statistics available is unacceptable. We presume that there is a higher incidence of congenital defects than the rest of the world. It is of a real need and importance to have a multinational and multicenter studies of the incidence of CHD in the Arab world. Creation of cross the Arab world multinational congenital cardiac defects registry program and stratification is essential to be able to develop a good paediatric cardiac service. In fact some of the Arab countries e.g. Kingdom of Saudi Arabia, Kingdom of Jordan, United Arab Emirates, Qatar and Lebanon have already started the pediatric cardiac service strategic planning over the last 2 decades or so. They had their pediatric cardiac program on the way and they have gone further steps forward compared with most of the other Arab countries. The Pan Arab Congenital Heart Disease Association (PACHDA), founded 2002 could take the lead and the initiatives to run this project in pursuance of its goals stated in its constitution (13).

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