Coronary Artery Disease In Sudan(CAD), The Scale Of The Problem

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Abstract:

Coronary artery disease is long considered a disease of the industrialized world. Great emphasis was focused on the prevention of this serious disease in the developed world. Only recently we started to realize that CAD poses a serious health challenge to the developing world than in the developed world. This is associated with the recently observed Epidemic Shift.

Since Sudan is a tropical and developing country, It was not a surprise that CAD is understudied and underestimated. For this reason very little,if any, is known about the epidemiology of CAD in Sudan

In This review, we aim to analyze this issue from the available literature and from our data base in Sudan Heart Institute

Key Words:

Coronary artery disease, epidemiology, risk factors, Sudan.

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Introduction:

Sudan is a tropical country and hence for a very long time communicable diseases were considered the major health challenges. All resources, research and efforts were directed towards their eradication. On the other hand, non communicable diseases, of which coronary artery disease is one of the major components, were largely ignored by the local health authorities. This under estimation of CAD was also a feature of the health related activities of the United Nations and the World Health Organization. This was quite evident by the United Nations Millennium Development Goals (MDG) 1 (Fig 1) launched by the United Nations (UN) in the year 2000, in which all the emphasis with regard to health issues was directed to non-communicable disease.

Fig(1): The United Nation's MDGs:

1. Eradicate extreme poverty and hunger
2. Achieve universal primary education
3. Promote gender equality and empower women
4. Reduce child mortality
5. Improve maternal health
6. Combat HIV/AIDS, malaria, and other diseases
7. Ensure environmental sustainability
8. Develop a global partnership for development

It was only recently that communicable diseases were recognized by the global community as a serious health issue more so than communicable disease in the developing countries. It seems that using old crude epidemiological measures such as prevalence and incidence- which do not really reflect the impact of the disease and the disability associated with it- is one of the reasons why we underestimated the challenge of communicable diseases. Recently introduced epidemiological scales, such as Years of Life Lost (YLL), Years Lived with Disability (YLD), Disability Adjusted Years (DALY) and the use of formulas to estimate the Projected Burden of Disease, were substantial in directing our attention to communicable disease. Moreover, it seems that the behavior of non-communicable diseases has changed and is rapidly creeping towards poorer communities of the world. This has emerged as a result of the change in risk factor distribution due to the un-regulated globalization, unplanned urbanization and the ageing population. This led to the introduction of the term Epidemic shift which in reality describes the status of Communicable diseases in the developing world, of which Sudan is not an exception.

Unfortunately the literature is scarce when it comes to the epidemiology of CAD in Sudan.

Method:

We did a comprehensive search in the internet for any topic related to the epidemiology of CAD in Sudan. We used terms such as prevalence, incidence, mortality, morbidity, risk factors, ischemic heart disease, coronary artery disease, myocardial infarction, acute coronary syndrome and angina with no joy. We also logged into the web site of the Sudanese Ministry of Health looking for any statistics related to CAD in Sudan. As

far as our literature review and internet search are concerned there are no studies or trials addressing the epidemiology of CAD in Sudan.

The epidemiology of CAD in Sudan is derived exclusively from the United Nations projected global burden of CAD2, (fig 2). This was not derived from real data, but rather from models and extrapolation from data available of other countries of the region. This projected estimate depicts that Sudan is amongst the countries with the worst impact of CAD. This is consistent with our observation of the severe and diffuse disease affecting relatively young patients in our daily practice. We have also observed that the rate of referral for surgery is almost twice the rate of referral for percutanous intervention3.

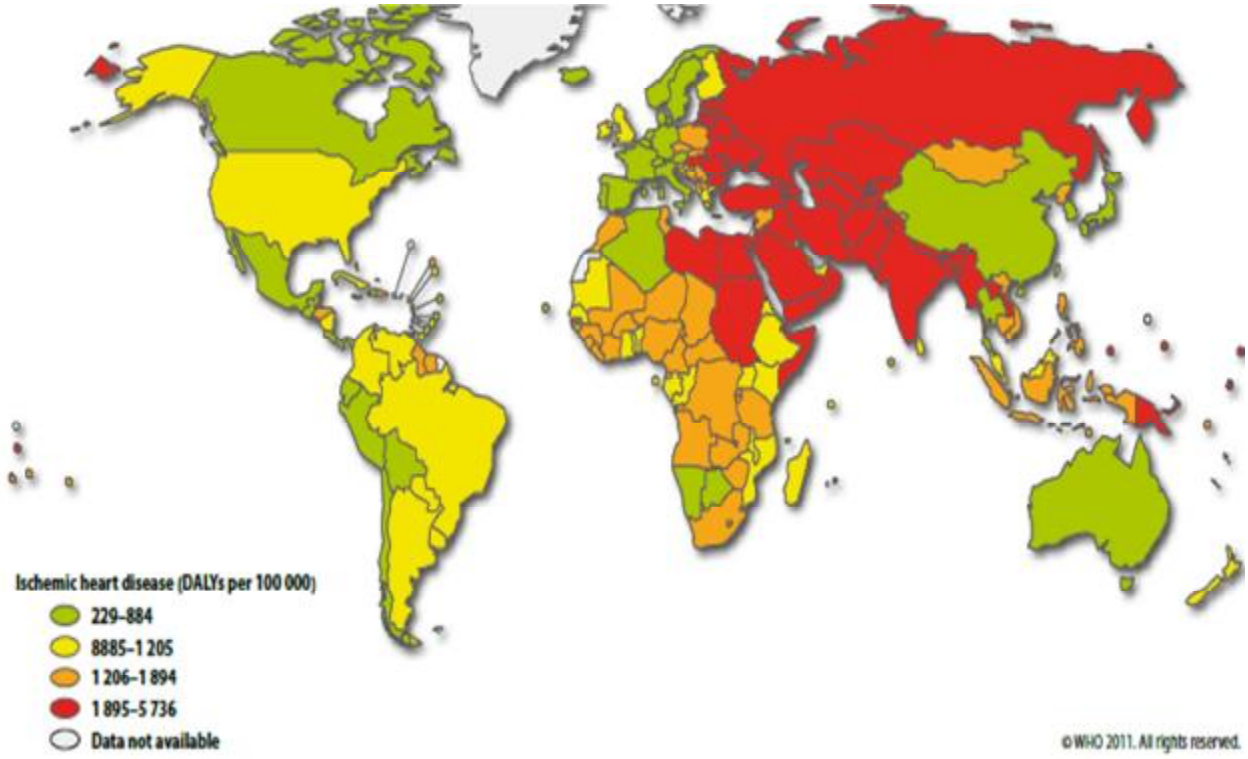

Fig2: Projected Global Burden of CAD

We have observed that the Coronary arteries of Sudanese patients are smaller in diameter with a diffuse type of disease; this is awaiting confirmation by clinical trials. We are not sure if this is related to the distribution of conventional risk factors, ethnically related or some other common environmental factors that are shared by all patients.

Data from Sudan Heart Institute:

We looked into 3 different groups of patients that we studied in Sudan Heart Institute:

One group is the cohort of patients admitted with Acute MI in the study (reperfusion therapy in AMI patients in Sudan)4 (The MI trial). 2nd group are those patients referred for coronary artery by-pass surgery (local data sheet) (CABG group) and the 3rd group are those patients with CAD studied for their lipid status *5* (LIPID study). We retrospectively analyzed and inspected patient's files, outpatients notes, cath lab data and surgical notes of the studied patients.

Findings:

CAD is a predominantly male disease in Sudanese patients as is the case of the rest of the world, the sex ratio was 28% females and 72% males in the MI trial and 32% females and 68% males in the CABG group.

The mean age of patients in the MI group was 57 years. Fig 3 compares this to the mean age of patients with acute Mi as was shown by the Inter-heart Study 6. We have to note that in the interheart study, unlike in our study, those patients with previous history of IHD were excluded. This makes Sudanese patients much younger than European patients and possibly than the rest of the world. The mean age of patients referred for CABG was 61 years same as age of South Asian patients 7 , and younger than European patients 8. (Fig 4).

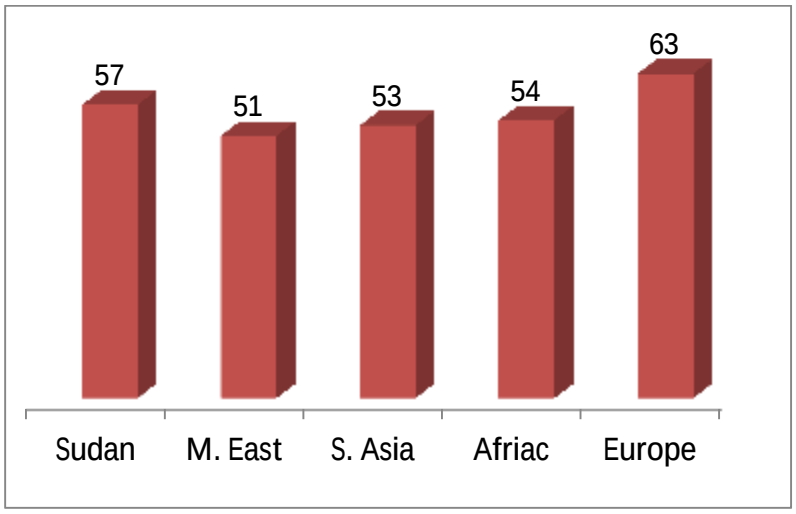

Fig 3: The mean age of patients with AMI in Sudanese patients compared to other countries

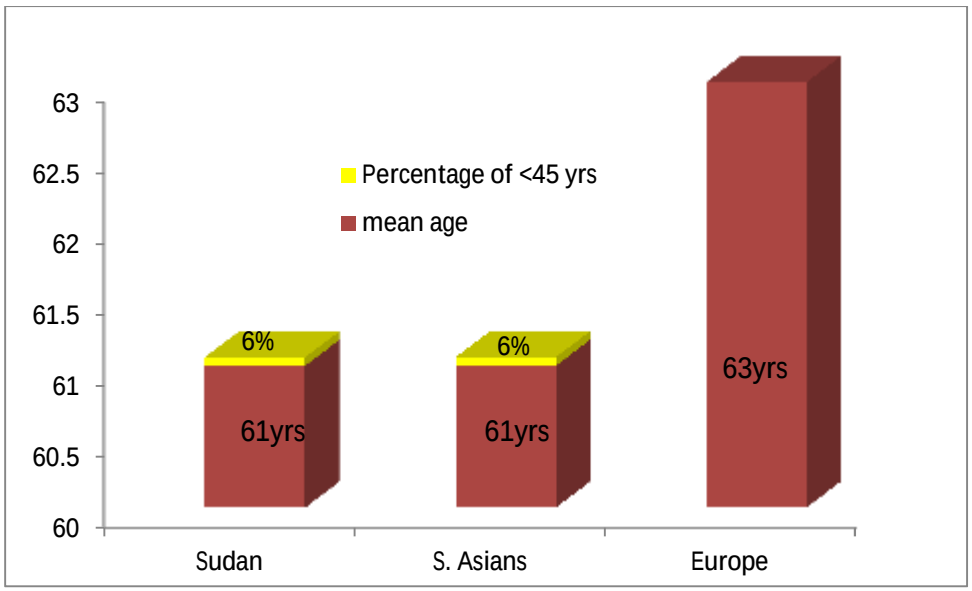

Fig 4: the mean age of patients referred for CABG in Patients from Sudan, South Asia and Europe

Patients with CAD in Sudan are characterized by poor left ventricular function. The mean Ejection Fraction in patients admitted with acute MI was very low at 42%. This is much lower than European patients 9 EF is lower in Sudanese patients compared to Europeans undergoing CABG at 49 and 56% respectively. Obviously Sudanese patients selected for CABG have higher EF than those admitted with acute MI since patients awaiting CABG may include patients with unstable angina and Non ST elevation myocardial infarction which represent a group of patients with more or less preserved LV function.

Risk factor distribution:

Studying risk factor distribution retrospectively proved to be difficult. This is particularly so for lipid status and history of hypertension. One of the major problems is that patients are not quite aware of their previous medical history and since they are all prescribed a statin and ACE/ARB/B-blocker they would assume that they are hypertensive and hyperlipidemic. History of smoking does not differentiate between active and Ex-smoker, and between those who smoke cigarettes or chew the local tobacco. We think that the distribution of these 3 risk factors may not reflect their real distribution in patients with CAD in Sudan. We think that prospective trials or retrospective trial with comprehensive questionnaire are needed to clarify this area.

The prevalence of diabetes, hypertension, tobacco abuse and family history are 37%, 38%, 32% and 18% respectively in patients with acute MI and 49%, 47%, 41% and 23 % respectively in patients referred for CABG (Fig 5). It is obvious that our patients have a high prevalence of diabetes mellitus and probably this represent the major risk factor associated with CAD. It is interesting to note the low incidence of a positive family history of CAD, this is especially true when we note that a positive family history of CAD used in these two studies include a positive history regardless of age of onset. This would probably suggest a common environmental factor that is shared by all patients in different regions of the country rather than ethnicity as a major risk factor for CAD.

As we have mentioned earlier it is difficult to study the lipid status of patients from the medical records and notes since all patients are started a stating regardless of their baseline levels which is not routinely checked and not previously known by the patents. Hoe ever when we look at the lipid levels in those patients with established cad and those without history of cad we note an interesting finding. The mean cholesterol, LDL cholesterol and HDL cholesterol were 158.8, 63.2 and 45.9 mg/dl respectively. These levels are quite low and though the vast majority of patients studied were already on statin but we think these low levels of lipid profiles are not

explainable only by ongoing treatment. This may suggest that hyperlipdemia may not be a major contributing risk factor for cad in Sudan.

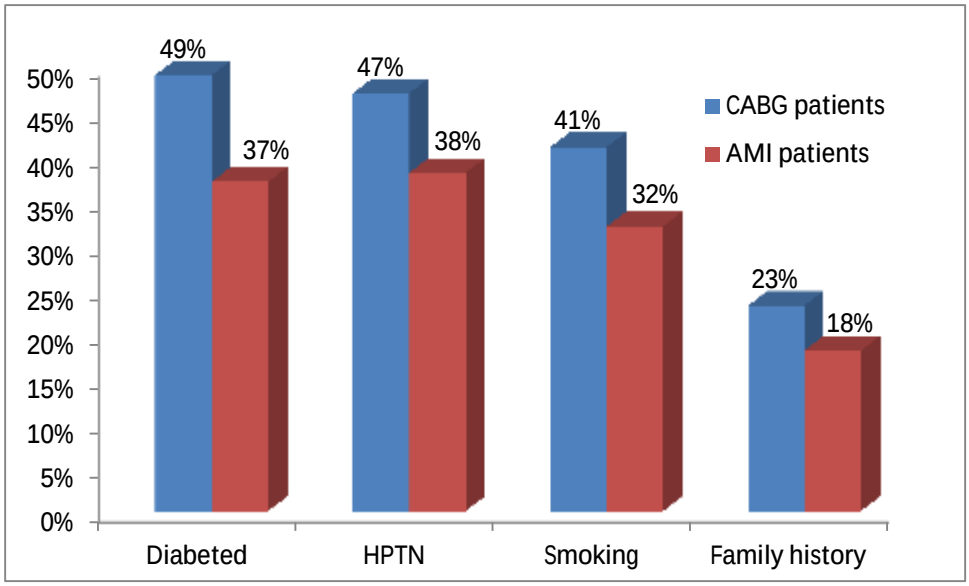

Fig 5: Risk factors distribution in AMI and CABG Patients

Conclusion:

It is likely that cad has a greater impact on the health of Sudanese patients as compared to previous knowledge. Patients with CAD in Sudan are more sick and much younger compared to the rest of the world, this may carry negative implications on the economy of the country and may call for the government to take serious actions to address this problem.

Prevalence of diabetes is high in Sudanese patients while family history of CAD is very low. This may suggest that in addition to diabetes, a common environmental factor/factors such as lack of exercise, or local tobacco abuse and use of saturated animal oils should seriously be studied as among the environmental factors suspected.

All these studies were retrospective trials sourced out mainly from patients notes. the results may not represent the actual status and risk factor distribution in patients with cad in Sudan , but the results are probably close to the true story and above all raise serious questions that may need future research and study, preferably in a controlled prospective setup that involve larger samples of the population

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