INTRODUCTION

The third global burdened disease ranked by WHO and leading fatal disease till 2020 coronary artery disease (CAD) has killed millions of patients worldwide. Numerous researches have been done to evaluate the epidemiology of CAD. Several risk factors have been identified. Nevertheless, the frequency and hazards of CAD have not declined significantly especially in low and middle income countries. Developed countries, on the other hand, showed dramatic decrease in mortality trend than developing countries (Fig. 1). A study showed that CAD was responsible for each 3 out of 4 deaths in low and middle income countries. Changing life style factors and moving towards urbanization are the major risk factors in this regard. This article presented global snapshot on epidemiology of chest pain, coronary artery disease and related risk factors reported in the literature so far.

Fig. 1: CAD Mortality trend among developed and developing regions

Risk Prevalence:

A study from United States (US) indicted CAD for 33.3% of all deaths. However, in last decade of 2000 century, 13.3% decline in CAD incidence has been reported in the same region. Center of Diseases Control and Prevention reckoned 20% decrease in incidence
of CAD mortality by 2020. Luepker et al. stated that increase in literacy level in US may be one of the factor for the decline in CAD. Statistics from Canada revealed 35% decrease in CAD mortality in the region while in Brazil the same decline was observed up to 3.6%. Despite the delighting statistics of decline of deaths in America, there are still different regions where hazards of CAD have not been reduced yet. Mexico, Costa Rica and Venezuela were the regions where considerable (90%) rise of prevalence of CAD was reported in both gender.

The decline in CAD mortality and prevalence has also reported for some regions in Europe too. Unal et al. performed a meta-analysis on decline of deaths due to coronary artery disease from 1981 to 2000 in England. A 54% decline in CAD mortality was estimated in the region. In Poland, 20% of all deaths accounted due to CAD. While, after modeling for socioeconomic transformation, the CAD mortality declined up to 50%. Despite the decline, CAD had significant contribution among the causes of deaths in Europe. In Turkey, 20% of deaths reported were due to CAD (Fig. 2). The same statistic was 43% in Georgia and 45% in Ukraine.

Statistics about prevalence and mortality rates of coronary artery disease have not been reported for Australian general populations so far. However, the prevalence and complications rates of coronary heart failure and other cardiovascular diseases were reported to be higher in older adults who are more than 55 years of age. The same statistics were remarkably drowning among young adults male and females. There is paucity of literature related to epidemiology of CAD in Africa. Among the few researches conducted in this region reported that in earlier era prevalence of CAD was negligible. Though, changes in life style factors and increasing modernization tended this prevalence to grow. In 2001, CAD was responsible for 33% of all cardiac diseases intuitively. In Middle-East and African regions, the prevalence of CAD is significant (Fig. 3). As per WHO report for South Africa, the mortality rate due to CAD was 120 per 100,000 populations.

In Iran, the prevalence of CAD rose up to 2.4% from 1999 to 2009. Prevalence of CAD in Iran is reported to be highest (12.7%) amongst other Middle East countries. In Saudi Arabia, a population based study indicated that 5.5% of Saudi inhabitants suffered with CAD. Jordan had 5.9% of the population encountered with CAD. In Tunisia and in Egypt the mortality rates due to CAD was measured to be 163.8 and 280 per 100,000 population respectively. Each 3 out of 10 individuals in Europe and Central Asia died due to coronary artery diseases. Japan had the lowest rate of CAD than rest of the western countries. The life style and population of China is apparently same to Japan. However, the prevalence of CAD is reported to be quite high. In urban areas, CAD accounted 22% of all deaths and in rural areas CAD was responsible for 13% of all deaths.

The CAD mortality amongst population of Azerbaijan and Uzbekistan is remarkably high. The proportion of this fatal disease in both regions was 35%. In Tajikistan, 17.5% of all deaths were due to CAD. In Sri Lanka and Nepal, the prevalence of CAD is comparatively low. About 5.4% of Sri Lankan population and 5.7% of Nepalese suffered CAD.
In urban areas of India, CAD is prevalent in 11% of the population. Deaths due to CAD in India was raised from 1.17 million in 1990 to 1.59 million in 2000. Comparative analysis on South and North Indians revealed that former were more prone to suffer with CAD (13.9% vs. 8.6%).

In Pakistan, there is scarcity of research on prevalence of CAD. A single study was found which was conducted by a private sector tertiary care hospital in metropolitan city, Karachi. According to the study 29.6% were affected by CAD among 320 selected adult population. Another study indicated that prevalence of CAD among Pakistani population was 3.6% based on physician’s diagnosis.

Risk Factors:

Causes of decline in prevalence and mortality in developed countries were discussed extensively. Better provision of medical treatment and advancement in surgical methods in Canada had great influence for the same. In Australia, young adults, less smoker, low cholesterol, blood pressure and glucose level assisted in the decline of CAD in their region.

Being female makes higher chances for the risk of CAD worldwide. On the contrary, Chinese males had higher prevalence of CAD than females. Similarly, Russian male encountered more deaths due to CAD than females. In Pakistan the prevalence of CAD for both gender was equal. Conflicts in gender-based risk of CAD have also been reported in other studies.

Increased BMI and high waist circumstances are the leading risk factors for the development of CAD. Torpy et al., reckoned that decreasing 10% weight of body would significantly reduce heart rate. The reports of Framingham heart study revealed that high blood pressure, smoking, dyslipidemia, diabetes and obesity were positively associated with the risk of CAD. A study on Polish female also classified these five risk factors as highly prevalent among CAD patients. American College of Cardiology reported that other than these five factors aging is the leading risk for the mortality of CAD. In Australia, native and elderly more than 55 years were in higher risk.

Smoking, saturated fat intake, cholesterol level, diabetes, hypertension, glucose intolerance and other risk factors were found more in South Indians as compare to North Indian which led to high prevalence of CAD among the former ones.

Gender and Diabetes play a significantly higher role in the development of CAD worldwide. Men from South Asia had higher death ratio due to CAD than European men. Diabetes was found leading risk factors for the same. Diabetic female had 2 times higher chances to die due to CAD as compare to diabetic men.

Dietary habits and patterns also vary the hazards of CAD. Intake of trans-fatty acids and food with high glycemic index are hazardous risk factors for the same. Seafoods, folate, whole grains, vitamin intake lessen the risk of CAD. The cause for low mortality and CAD prevalence in Japan was reported that they take low cholesterol in their diet.

Excessive dietary habits enhanced risk of CAD among Middle East natives. In Iran, low literacy rate, unstable socio-economic condition and residents of flats amplify the chances for the development of CAD. Urban population was also classified as more prone to have CAD in India and Africa. Changes in life style factor while moving towards urbanization has also reported to be riskiest factor in Mexico, Costa Rica, Venezuela, Africa and in Arab Middle East.

Psychosocial factors have also indicated to increase risk of CAD. According to Framingham Heart study depression, conflicts, disagreements etc. are the most common factors in this regard. A study from Sweden diagnosed depression as major co-morbid for CAD. Conflicts management by married partner has profound effect on reduction of CAD. Females who fight back with husband had four fold higher chances of development of CAD as compare to those females who kept silence during fight with their male partner (Fig. 3). For men, conflict in office work caused 2.7 fold higher chances of developing CAD.

Fig. 4: Quantified Risk Factors Elevating Chances of CAD
Chest Pain:

Among many other symptoms indicated coronary artery disease, chest pain is one of the discernible symptoms. The examination of patients with chest pain is critical. This examination declared whether the chest pain is cardiac or non-cardiac. If the chest pain is diagnosed to be non-cardiac, the patient can be referred to general physician. Nevertheless, in case of cardiac chest pain, also called as angina, physicians first strive to eradicate CAD and other hazardous conditions for patient’s life. Intuitively, it can be confessed that not all patients with chest pain necessarily encounter coronary artery disease. A follow up study from Verdon et al confirmed the statement while reporting 2.7% prevalence of chest pain among the cohort of 24,620 Swiss populations. Among them, only 12% of patients diagnosed with coronary artery disease.

Predicting mortality for CAD patients have been studied widely in literature. One study from Philippines measured length of hospital stay for CAD patients. Though, as far as author’s knowledge is concerned, literature on modeling chest pain to CAD is limited. Ledwich and Mondragon reported that longer duration of acute chest pain led larger infarct size. Another study from US by Squist et al shared an interesting outcome reporting risk of CAD found low in those patient who suffered chest pain. A study from Canada showed that many risk factors of CAD were also correlated with onset of chest pain (Fig. 5). Gencer et al derived risk scores for ruling out CAD in primary care patients of Switzerland based on their history and physical examination. The score was consisted of eight predictors ascribed to reduction of CAD. Duration of acute chest pain is among one of the eight predictors. Bosner et al, on the other hand, reckoned age/sex with exercise is the prominent risk factors for CAD with patients having acute chest pain in Germany. Hussain et al attempted to estimate duration from chronic chest pain to past among Saudi adults. Female had significantly longer duration then male. The average duration from chest pain to coronary artery disease was found to be 5 years. Young age, increased high density lipoprotein, low body mass index, exercise and triglyceride nitrate were the significant predictors increasing duration from chest pain to CAD.

CONCLUSION

This narrative review revealed that despite drastic decrease among developed regions, prevalence and mortality ratio of coronary artery disease are still cause of concern for developing regions. Urbanization, unhealthy diets and sedentary life style are the leading factors in this regard. Strategies should be made worldwide to ameliorate treatment of CAD from first onset of its symptom.

REFERENCES


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