Risk Factors of Cardiovascular Disease in Developing Countries

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ABSTRACT
Cardiovascular diseases (CVDs) have increased the mortality rate both in developing as well as developed countries, however a lower trend in death rates have been seen in developed and high income countries like USA, UK, Australia, Japan and other European countries due to improved life style, better strategic implementation, control of disease both in young and adults and especially reduced smoking habits. In developing countries CVD become an alarming situation due to prevalence of disease in early age that later on become chronic and difficult to control. Various risk factors that can contribute toward CVD in developing countries include smoking, high alcohol and salt intake, dietary factors, diabetes, high blood pressure and psychosocial aspects such as stress, anxiety and depression. Various other factors such as family history and the gender difference also contributing towards the high risk of developing CVD.

Key Words: Mortality rate, epidemiology, prevalence, non-communicable diseases, psychosocial aspects, preventive measures.

INTRODUCTION
CVDs now become one of the major cause of demise among men and women (Anand et al., 2008). Cardiovascular diseases (CVDs) normally include coronary heart disease (CHD), rheumatic heart disease (RHD), strokes, cardiomyopathy, and other heart diseases (Lopez et al., 2006). According to WHO, 16.7 million people globally die of cardiovascular diseases each year in 2002 that represent about 1/3 of all deaths globally (Atun et al., 2009) and it is not being realized that the developing countries become the major contributor in increasing the global burden of CVDs as compared to developed countries (Lopez, 1992).

Epidemiology
Now a days, the domination of chronic diseases as main contributors to total global mortality has emerged (WHO, 2005). More than 80 percent of the deceases occurred in low and middle income countries. The World Health Organization (WHO) approximates that there will be about 20 million CVD deaths in 2015, that will account for 30 percent of all deaths worldwide (Beaglehole and Bonita, 2008). By the end of 2030, researchers estimate that non communicable diseases will account for more than three-quarters of deaths globally; CVD alone will be responsible for more deaths in low income countries than infectious diseases including HIV/AIDS, tuberculosis, and malaria, maternal and perinatal conditions, and nutritional disorders combined (Alwan et al., 2010). So now, CVD is the largest single contributor to global mortality and will continue to control mortality drifts in the future (Fuster, V and Kelly, 2010). CVD was once considered to be the disease of developed countries but now it is affecting not only industrialized nations but also low and middle income countries, where it accounts for nearly 30 percent of all deaths. The adoption of dietary habits from western countries, increased childhood obesity, physical inactivity, and increased smoking due to increased urbanization, globalization and development, and now affects regions which are once at low. On the other hand, control of infectious diseases through proper vaccination and an improved childhood nutrition has increased the average span of life of many people in many low and middle income countries that resulted in emerging of CVD in older people as chronic disease (Gaziano et al., 2010). 82% increase in coronary heart disease mortality will likely to occur in developing countries in near future not only because of the high levels of risk factors, but also due to the relatively earlier onset of disease among largely young and middle-aged people (WHO, 2005).

Prevalence of CVD in Developed and Developing Countries
According to WHO, CVD has no limitation related to gender, geographic, socioeconomic conditions. It can affect people of any age, sex and class (Atun et al., 2009). Even though the strokes death in developing countries was 5 times more than in developed countries (WHO, 2009). The lower socioeconomic groups of developed countries have a higher occurrence of risk factors, prevalence of disease, and mortality rate. Globally CVD not only affecting men but it is also the main cause of death in women too (Mirzaei et al., 2009). Death rates from coronary heart disease has shown decline in North America and many western European countries. Especially a strong study from Latin America, that include countries like Chile, Argentina, Cuba, and Brazil have shown a significant declines in death rates that resulted from CHD between 1970 and 2000. In low income countries, except Argentina, although the rates declined by more than 60 percent between 1970 and 2000 but it was less intense (between 20 and 45 percent) when compared with high income countries and that decline occurred more in the 1980s and 1990s. However in Mexico death rates resulting from CHD is increasing by more than 90 percent between 1970 and 2000 (Deaton et al., 2011). Rise and fall pattern in the CHD mortality rate have been observed in some high income Asian countries like Singapore, while in other countries like the Philippines and urban China death rates seems to be increasing (Lloyd-Jones et al., 2010). Even
though the accurate data for most of Africa is not yet accessible, a report from South Africa has shown a significant rise in mortality rates for CVD and diabetes (Mizraei et al., 2009). According to INTERHEART Study, the average age of patients in South Asia having acute myocardial infarction (AMI) is 52 years, while in European and North American cohorts, it is 60-65 years due to better prevention, diagnosis, and management, reduced cigarette smoking especially in adults, and lower average blood pressure and blood cholesterol levels (Yusuf et al., 2004).

Disability-adjusted life years (DALYs) lost means loss of healthy years of life. They specify the total burden of a disease, as compared to simply the resulting deaths. Cardiovascular disease accounts for 10% of DALYs lost in low- and middle-income countries and 18% in high income countries. Coronary heart disease burden rise from around 47 million DALYs globally in 1990 to about 82 million DALYs in 2020. In China the DALY’s lost per 1000 population, age-standardized estimates for 2002 is 0-9 while in Pakistan, Saudi Arabia and Iran is 10-19 while in India it is 20-29 and in Afghanistan it is 30 and above (Jha and Chaloupka, 1999).

CVD is becoming a worldwide health problem that requires a global effort for its prevention and management. Its influence is highest in developing countries because they lack expertise both in professional and financial department to prevent and manage CVD (Mathers and Loncar, 2006).

**PRIMARY RISK FACTORS OF CVD**

Risk factors that can lead to CVD in both men and women includes excessive intake of tobacco, oil, salt and alcohol. Also diabetes, high blood pressure and low physical activity also contributes towards heart stroke. In addition to that, emotional factors such as stress and anxiety and also the environmental issues playing significant part to increase the rates of CVD in developing countries.

**Use of Tobacco:** More than 1 billion smokers are observed around a world. Even though Tobacco products utilization has shown a decreasing trend in high income countries but increasing globally, as in low and middle income countries, more than 80 percent of the world’s smokers reported (King et al., 2012). Annually around 5.4 million people are dying due to smoking, this figure is more than the deaths occurring due to infectious diseases like tuberculosis (TB), malaria and HIV and responsible for mortality in 1 out of 10 adult globally(Mathers and Loncar, 2006). Secondhand smoke contact increases cardiovascular risk by 25 to 30 percent and also cause AMI, because with the ban of smoking a significant reduction in the rate of AMIs from 6 to 47 percent is reported (King et al., 2012).

**Impact of High Risk Diet:** The relationship between CVD and diet has been largely studied in epidemiology. Although nutritional research has usually focused on the effect of individual food groups on CVD, however in recent years different types of dietary patterns and their effect on CVD risk were also studied. Like reducing saturated fat intake, maintaining low to moderate intake of alcohol, and increasing the consumption of lino-leic acid, fish and fish oils, vegetables and fruits, and potassium along with intake of whole grains, seeds, nuts and beans decline the risk of developing CVD. While the use of myristic and palmitic acids, trans fatty acids, high sodium, and heavy alcohol and obesity have increased the risk of CVD both in developed and developing countries (Who and Consultation, 2005).

**Oil Intake:** Developing countries that usually have high levels of oil intake should ensure affordable supplies of healthy oils at economical prices. Countries like Argentina, Brazil, Chile, and Turkey slightly improved the accessibility of healthful oils at low price through oilseed plantation and production developments (Fuster and Kelly, 2010).

**Excessive Use of Salt:** Excessive sodium intake increases CVD risk significantly while through reduced sodium levels, a significant decrease in CVD burden is reported. High sodium intake increases our blood pressure that is confirmed through various epidemiological, animal, studies, and genetic studies. In addition to that reductions in sodium intake lead to declines in systolic and diastolic blood pressure that reduces heart attacks and strokes (He and MacGregor, 2009).

**Alcoholism:** Alcohol is one the largest preventable risk factors in low and middle income countries, accountable for most of the diseases worldwide (Rehm et al., 2009). WHO has suggested some alcohol control interventions that are now being considered as a worldwide strategy. These include “pricing policies, restricting the intake of alcohol, drunk-driving rules, restrictions on marketing, awareness and education, and access to effective treatment” (WHO, 2010).

**Reduced Physical Activity:** Few studies reported the reason of declining levels of physical activity in developing countries. However a study conducted in China estimates 32 percent decline in average weekly physical activity among adults due to fast urbanization particularly through better transport and housing set-up and industrialization. Meanwhile, sitting behaviors like prolonged television watching also increased dramatically. Both health professionals and researchers suggested physical activity in order to reduce the global burden of chronic diseases and to increase the energy source of population (Ng et al., 2009). Remaining physically inactive ultimately leads towards obesity which is steadily increasing during the past years both in developed and developing countries. WHO and FAO also came to the point that significant increase in weight could raise the risk of CVD substantially (Ferrandez et al., 2012).

**Biological Factors:** Such as lower levels of high-density lipoprotein (HDL) cholesterol and high levels of low-density lipoprotein (LDL) cholesterol cause an increase trend in CHD risk (Kannel et al., 1969). The high levels of triglycerides also increase CVD risk (Goto, 2005). According to the INTERHEART study the abnormal blood lipids levels are causing myocardial infarction (MI) globally and become the most important risk factor that can cause MI (Yusuf et al., 2004) A reductions in saturated fat intake along with careful cholesterol monitoring and treatment can decrease the CVD risk (Puska et al., 2009). Another biological factor includes the high blood pressure that causes 6 million deaths annually and accounts for 13.5 percent of global deaths annually (Lawes et al., 2008).

**Intolerance to Glucose:** Diabetes is common and significant contributor to CVD risk. International Diabetes Federation’s Diabetes Atlas 2010 estimates that global prevalence of diabetes will be nearly 285 million people aged 20 to 79 years of which some 70 percent belongs to developing countries (Shaw et al., 2010) It was reported that 83 percent of all diabetes deaths happen in low and middle income countries (WHO, 2009).
Gender Specific Occurrence: Despite the fact that CVD affects men more predominantly, it is the leading cause of death among both men and women worldwide (Blauwet and Redberg, 2007). The INTERHEART study reported that on average, women have their first MI 9 years later than men. A recent review of stroke epidemiology estimated that that men experience their first stroke 4.3 years earlier than women (Anand et al., 2008).

Psychological and Social Aspects: Psychosocial dynamics that can increase CVD risk include stress, anxiety, depression, anger, and lack of peer support. Psychosocial factors have also promoted some unhealthy behaviors like smoking, heavy alcohol intake, physical inactivity, poor diet and non-adherence to medicines, that all contribute to indirect increase in CVD risk (Everson-Rose and Lewis, 2005).

Family History: Genetic link with CVD is supported by the fact that the family history of CVD can increase your risk of having heart diseases. Several single-gene disorders that can cause CVD have been reported such as mutations of the Apo lipoprotein B gene is related to certain forms of familial hypercholesterolemia. The pathophysiology of CVD become more understandable after the identification of genetic loci such as 9p21 which is found to be associated with CVDs (Arking and Chakravarti, 2009).

PREVENTIVE MEASURES

Certain preventive measures can decrease your risk of developing CVD such as reduce or stop smoking, maintain your blood cholesterol level, your total should be less than 200 mg/dL, maintain your blood pressure at 120/80 mmHg, control CVD in low income areas although it can be easily controlled through adherence to medicines, that all contribute to indirect increase in CVD risk (Blauwet and Redberg, 2007). The INTERHEART study reported that on average, women have their first MI 9 years later than men. A recent review of stroke epidemiology estimated that that men experience their first stroke 4.3 years earlier than women (Anand et al., 2008).

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