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Introductory Chapter: Recent Trends in Cardiovascular Risk Factors

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We are happy to bring out this new book entitled 'Recent trends in Cardiovascular Risks' which is written by scientifically accredited authors across the globe. The primary and secondary preventions are the effective measures for reducing premature mortality. In context to developed countries, there are five existing modifiable risk factors, namely high blood pressure, high cholesterol, tobacco use-smoking, diabetes mellitus and obesity which constitutes approximately one-third of all CVD cases [1]. Of which highly preventable risk factors such as high blood pressure, obesity and smoking are related to premature mortality and morbidity from cardiovascular disease (CVD) [2]. The modifiable risk factors, namely smoking, obesity and lack of physical activity, account to 36%, 20% and 7–12% of coronary artery disease, respectively [3].

1. Scenario of Cardiovascular Disease

The incidence of AMI is drastically increasing in major developing countries, and it is noticed even in rural population, which has become a potential threat [4]. Other modifiable risk factors include low socioeconomic status, alcohol use, mental ill-health, psychosocial stress and left ventricular hypertrophy. Among the nonmodifiable risk factors are advancing age, heredity or family history, gender, ethnicity or race (**Figure 1**) [5]. To reduce the global burden of mortality from CVD, we need to refine our strategic goals and intervention programs. While we find the global population is expected to rise by almost 20% from 6.7 billion to 8.1 billion by 2030, the crude death rate still remains stable around 8.4 deaths/thousand [1]. Cardiovascular diseases were once thought to be the disease of the rich and affluent class of people, but now it is more visible among the poor as well. Conventional cardiovascular risk is attributed to lifestyle changes and altered metabolic activity.

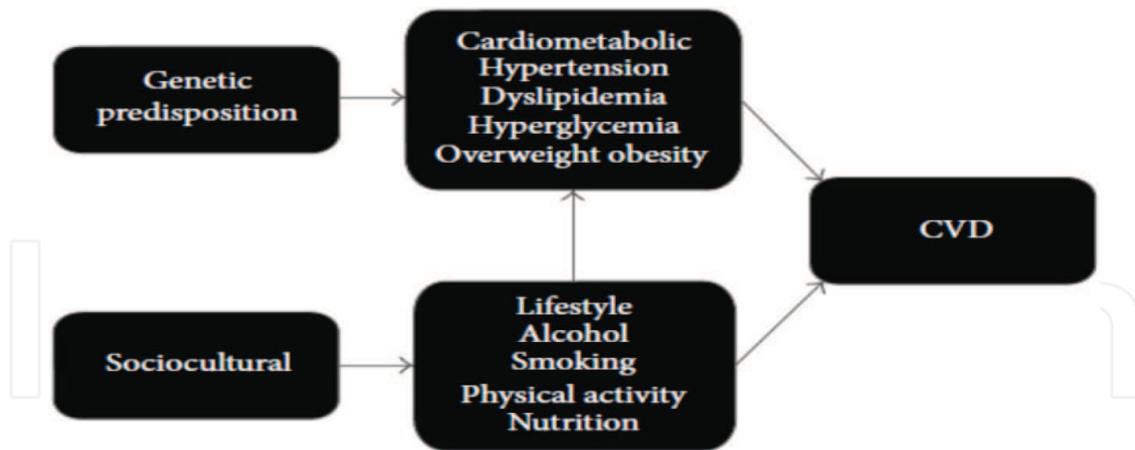


Figure 1. Causative pathways for CVD.

2. Changing Trends of Cardiovascular Risks

The most common emerging trends in cardiovascular risk factors include altered lipid profile, coronary artery calcium score, lipoprotein (a), apolipoproteins, homocysteine, thrombosis markers like fibrinogen, plasminogen activator inhibitor-1, carotid intima-media thickness, genotypic variations, nonalcoholic fatty liver disease, C-reactive protein, platelets and birth weight levels [6].

These diseases not only affect the well being, but can also dampen the economic growth of the country due to enormous healthcare expenditure associated with decreased productivity. Even though abundance curative cares are available in urban areas, this alone cannot suffice the problem of CVDs. The need of the hour is to focus on its prevention and palliative care along with its early diagnosis, and management as it is not the sole responsibility of the health care providers alone can tackle this problem.

3. Awareness is a must among mass

There is an urgent need for all of us to change our lifestyle through positive and negative reinforcements. In rural areas, we need to adopt start-ups, to create awareness among common people so that the disease can be cured at the grassroots level. Through coordination and collaboration with health care sectors including the government and pharmaceutical companies, the awareness can be generated and the risk can be identified.

4. Contents of the book in brief

In this book, we delineate the various risk factors and the current trends of cardiovascular risk factors. This book emphasizes on various issues which are alarming and are potential threats for cardiovascular risk. The overall risk assessment of cardiovascular disease using multivariate scores in developing countries is one of the approaches. This approach is likely

to assure that limited resource in developing countries be allocated to those who need it most. The clear justification for cardiovascular risk assessment is crucial for policy decision on the implementation of such a strategy. While many developing countries solely described estimated cardiovascular risk by applying existing CVD risk scores to their population's cross-sectional risk factor data, a number of countries have validated and recalibrated existing risk scores and only a few have developed a new risk score specific to their populations [7]. To enhance the adoption of such a policy in developing countries, an additional strategy by the WHO and International Society of Hypertension was developed by deriving both laboratory- and nonlaboratory-based CVD risk prediction charts for low- and medium-resource settings in countries in different WHO subregions. Significant researches have suggested that a vascular segment gives us a clue of atherosclerotic lesions, namely endothelial dysfunctions, macrophage activation, cellular proliferation and thrombosis, and they respond differently on medication [8]. Therapeutic approach of the atherogenic dyslipidemia imposes the correlation with proatherogenic individual tendencies in order to correct the further risks [9]. Cardiovascular disease appears in coronary arteries when the atherosclerotic lesions evolve from an initial accumulation of isolated foam cells in the arterial intima to fatty streaks, followed by the accumulation of cholesterol deposits and atheroma formation [10]. Cardiovascular disease may have their origin in the intrauterine life, but also a low birth weight and an extremely rich diet increase the risk of obesity and a specific metabolic syndrome in adults [11]. Its incidence and mortality is very low in reproductive age women, but it increases with age [12]. Estradiol (E2) reduces the development of the early atherosclerotic lesions, in some measure, by its effects on the lipid metabolism, with a reduction of the lipid deposits from the intima [13].

5. Facts based on Epidemiological studies

World Health Organization (WHO) conducted numerous studies regarding the mortality due to myocardial infarction, stroke and venous thromboembolism in many countries across the world. Epidemiological studies revealed an increased incidence of myocardial infarction approximately five times higher in individuals between the ages of 40 and 60 years old [14]. Hormonal contraceptives, pregnancy and polycystic ovary syndrome in young women and menopause in older women are directly linked with cardiovascular diseases [15]. Polycystic ovary syndrome should be seen as a metabolic disease, with a high risk in developing diabetes mellitus type 2 and different cardiovascular disease, and is less frequent in women in reproductive age. Another extremely important risk factor involved in women atherosclerosis is heredity. Diabetes mellitus induces hypercholesterolemia and in consequence an increase in predisposition for atherosclerosis in both male and female. The incidence of the myocardial infarction is two times higher at patients with diabetes mellitus compared to patients without diabetes.

6. Metabolic Syndrome an emerging threat

In the last few years, the criteria for metabolic syndrome have been reviewed: abdominal obesity, increased serum cholesterol, high blood pressure, insulin resistance with or without impaired glucose tolerance, pro-inflammatory status, a high level of C-reactive protein and

a pro-thrombotic status with a high plasmatic fibrinogen and coagulation factors level [16]. Morphological and experimental studies have demonstrated connections between hyperlipidemia, especially hypercholesterolemia, and atherosclerosis, in both women and men. The content of the atheroma plaque, which is made of cholesterol and cholesterol esters, the structure of the foam cells and the experimental production of atherosclerosis by a high-fat diet have been initial arguments for the implication of lipids in atherosclerosis genesis. Cholesterol and triglycerides are the lipids with the highest impact for atherosclerosis and ischemic cardiomyopathy.

HDL-cholesterol has anti-inflammatory, antioxidant and antithrombotic properties that contribute to the improvement of the endothelial function and atherosclerosis inhibition [17]. Therefore, as the HDL-cholesterol level is higher, the risk of developing atherosclerosis lowers. The physical exercises and moderate consume of ethanol increase the HDL-cholesterol level, while the obesity and smoking are decreasing it [18]. High cholesterol diets or saturated fats, like the ones from the butter, animal fats and yolk, increase the level of the plasmatic cholesterol, while the diets poor in cholesterol and in polyunsaturated fats decrease it.

7. Hypertension as a risk

High blood pressure is a condition characterized by an increase of the systolic value over 140 mmHg and of the diastolic value over 90 mmHg, being a major risk factor for atherosclerosis at all ages, females being less affected. Decreased arterial compliance has a high predictive value for cardiovascular events, so its evaluation becomes an important objective in investigating the arterial function.

Recent studies have shown that smoking is the most important adjustable risk factor in women and men under 40 years old with acute coronary syndrome, being observed in mostly equal parts on those with normal coronary arteries and on those with lesions on one or more coronary arteries.

8. Homocystinuria a silent killer

Patients with homocystinuria, which is a congenital metabolic disorder, characterized by elevated levels of circulating homocysteine ($>100 \mu\text{mol/L}$) and urinary homocysteine, present an early vascular injury [19]. Clinical and epidemiological studies revealed a connection between the serum levels of homocysteine and peripheral vascular disease, coronary artery disease, stroke and venous thrombosis, meaning that a high concentration of homocysteine is associated with the progression of the atherosclerosis [20].

9. Diabetes and Cardiovascular Disease

Diabetes is now considered as a major and growing health problem worldwide. It causes a considerable amount of disability, premature mortality, loss of productivity and increased

demands on health care facilities [21]. According to the World Health Organization, 1 in 20 death is attributable to diabetes, 8700 deaths every day and 6 deaths every minute [22]. Cardiovascular disease is the major cause of morbidity and mortality in people with diabetes, and coronary heart disease is the most common cause of death among people with type 2 diabetes. People with diabetes are two to four times more likely to develop CVD compared with people without the condition [23].

10. Ferritin as an additional risk

Serum ferritin is the main marker of iron status, and hepcidin is the key regulator of iron metabolism, but both are increased in inflammation states; thus, their relationship with pathological processes should be studied with caution. Iron deficiency with severe anemia has been also related to oxidative stress as iron is involved in several enzymatic antioxidant systems. Most studies deal with the association between iron deposition in tissues and cardiovascular risk, while decreased iron status is predominantly related to protection against atherosclerosis and coronary heart disease [24].

So concluding the contents of the book, it focuses on the overall emerging risks in developing and developed countries. We hope that this book would create awareness among mass and also in scientific community across the globe. We tried to bring out and cover most of the recent trends of cardiovascular risks which is prevalent among the society which we tend to condone. It is now high time we look upon ourselves and make resolutions to decrease the existing risks factors which we are on. It is never too late to implement than to overlook. We wish to get the notes and feedback from our readers and rejoice the success of launching this book.

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