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Editorial

Cardiovascular disease in India: A 360 degree overview



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Introduction

The noncommunicable diseases commonly include cardiovascular disease (CVD), various cancers, chronic respiratory illnesses, diabetes, and so on which are estimated to account for around 60% of all deaths. CVDs such as ischaemic heart disease and cerebrovascular such as stroke account for 17.7 million deaths and are the leading cause.¹ In accordance with the World Health Organization, India accounts for one-fifth of these deaths worldwide especially in younger population. The results of Global Burden of Disease study state age-standardized CVD death rate of 272 per 100000 population in India which is much higher than that of global average of 235. CVDs strike Indians a decade earlier than the western population.² For us Indians, particular causes of concern in CVD are early age of onset, rapid progression and high mortality rate. Indians are known to have the highest coronary artery disease (CAD) rates, and the conventional risk factors fail to explain this increased risk. There are no structured data collection methods regarding the cardiac mortality and morbidity for Indian subcontinent, and also majority of deaths happen at home without knowing the exact cause of death. Hospital-based CV morbidity and mortality data may not be representative of overall CV disease burden. In India in 2016, CVDs contributed to 28.1% of total deaths and 14.1% of total disability-adjusted life years (DALYs) compared with 15.2% and 6.9%, respectively in 1990.³ Within India, the rates of CVD vary markedly with highest in states of Kerala, Punjab and Tamil Nadu. Moreover, these states also have the highest

prevalence of raised cholesterol levels and blood pressure. At present, India has the highest burden of acute coronary syndrome and ST-elevation myocardial infarction (MI). Another significant problem in India, among other CVD's, is that of hypertensive heart disease, with 261,694 deaths in 2013 (an increase of 138% in comparison with 1990). Rheumatic heart disease remains in epidemic proportions in India with an estimated prevalence of 1.5–2 per 1000 individuals. Migrant Asian Indians have a 3-time higher prevalence of CAD than the native population. Indians are liable to get hospitalized 2–4 times more frequently for complications of CAD, in comparison with other ethnic groups, and admission rates are 5–10 times higher for populations younger than 40 years. The prevalence of CAD in Indians living in India is 21.4% for diabetics and 11% for nondiabetics. The prevalence of CAD in rural parts of country is nearly half than that in urban population.

Risk factors

The conventional risk factors such as hypertension, diabetes mellitus dyslipidaemia, smoking, obesity are believed to be associated with increased prevalence of CAD in Indians. In INTERHEART study, nine common risk factors (which also included physical inactivity, low fruits and vegetables intake and psychosocial stress) explained more than 90% of acute myocardial infarctions (AMIs) in South Asians. However, all these risk factors cannot still fully explain the increased prevalence or the younger age of onset of CAD in Indians. The

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overall burden of the conventional risk factors is in a rapid increase phase in the Indian population.

Smoking

Until 2016, after China, India was the second largest consumer of tobacco. However, as per the report of Global Adult Tobacco Survey-2 in June 2017, there was a 6% decline in the prevalence of tobacco use among adults (>15 years) in India.³ The smoking rates among men were constantly on decline since 1995–1996 till 2016–2017 and among women from 2.9% to 2% for the corresponding period.³ The prevalence of current tobacco smoking in males (23.6%) is higher than the global prevalence (22%). Tobacco use is the single largest modifiable and reversible risk factor attributable to CVD.

Diabetes

In Indians, one of every ten persons aged 18 years has an increased blood glucose level. There were more than 73 million cases of diabetes in India in 2017 which is the highest in any country across the globe. Diabetes has become a challenge in India with a prevalence of 8.8% in the age group of 20 and 70 years.⁴ The rising prevalence of diabetes and other noncommunicable diseases has been linked to rapid urbanization, globalization coupled with increasing sedentary lifestyles, unhealthy diets, overweight and obesity, tobacco use and increasing life expectancy. Diabetes burden can be significantly reduced by bringing behavioural changes which favour healthy balanced diet and regular physical activity.

Hypertension

One in every four individuals older than 18 years in India has an increased blood pressure level. Hypertension is attributable to 10.8% of all deaths in India. Its prevalence has been on a steep rise over the past three decades both in urban and rural areas. This burden is expected to rise two times from 118 million in 2000 to 213.5 million by 2025.⁵ It was estimated that 16% of CAD, 21% of PVD, 24% of AMI and 29% of strokes are attributable to hypertension.

Obesity

Prevalence of obesity is increasing alarmingly especially in urban areas. The worldwide prevalence of obesity nearly tripled between 1975 and 2016. Overweight or obesity is seen in 30–65% of the adult urban population. Body mass index (BMI) of urban Indians is higher (approximately 24–25) as compared with that of rural population (BMI of about 20). More than raised BMI, it is the abdominal obesity which is a cause for concern. Waist-to-hip ratio in urban setting in men is 0.99 vs 0.95 in rural males. Abdominal obesity is also more prevalent than generalised obesity.⁶ Asian adult BMIs of >21 kg/m² were associated with the development of type II diabetes, ischaemic heart disease, stroke, hypertension, osteoarthritis

and cancers. Asians are less likely to have regular physical activity and more sedentary habits compared with the Caucasian population.

Dyslipidaemia

Asian Indians have a unique pattern of atherogenic dyslipidaemia with low high density lipoproteins (HDL), high triglycerides and high small dense low-density lipoprotein (LDL) particles. An Indian Council of Medical Research (ICMR) study in 2014 brought out that more than three-fourth (79%) of the general population had abnormalities in at least one of the lipid parameters, and there was no urban rural variation. Various studies show prevalence of hypercholesterolaemia, hypertriglyceridemia, low HDL-C and high LDL-C is 13.9%, 29.5%, 72.3% and 11.8%, respectively with representative samples from all regions and at all ages. Nearly 25% of Indians and other South Asians have raised levels of Lp(a) (≥ 50 mg/dl), making it as a important risk factor. Factors strongly associated with dyslipidaemia are female gender, obesity, sedentary lifestyle, diabetes, dysglycaemia and hypertension.⁷

Dietary habits and exercise

About half of the Indian population is vegetarian and yet diabetes and CVD risks are comparable with or higher than nonvegetarians as seen in the western population. Indians consume high carbohydrate diets with uneven dietary patterns. Average Indian diets contain more amounts of carbohydrates, high fat dairy, butter, ghee and cheese in their everyday meals. In Kerala, the culture and practice of using coconut oil in cooking has predisposed them to the highest rates of CAD in India.⁸ Reusing oil for cooking in Indian culture is common, and it increases trans fatty acids. Indians consume less amounts of fresh fruits and vegetables compared with that of rest of the world. The prevalence of malnutrition in Indian subcontinent is unique with high prevalence of malnutrition and low birth weights on one side and rapid increase in obesity with associated morbidities on the other side. Poor living conditions along with low education levels were also associated with higher CAD mortality. Poor people in rich countries and rich people in poor countries suffer more CAD due to various metabolic, social, and cultural maladjustments. Other causes may include rapid lifestyle changes due to urbanization and nutritional transitions that accompany such economic developments. As per Indian Council of Medical Research–India Diabetes (ICMR–INDIAB) study, every second individual is physically inactive, and less than 10% of the studied population was involved in doing regular physical activity.

Genetic risk factors

Coronary artery disease has high familial incidence indicating possible genetic association. Numerous studies suggest the presence of specific ‘candidate genes’ which are

associated with pathways leading to coronary heart disease. Studies have revealed large numbers of genes which have predilection for CAD. However, these findings are inconsistent. Coronary Artery Disease Genome-wide Replication and Meta-analysis⁹ study and other genome-wide association studies found that 109 loci are associated with CAD and can explain the role of hereditary factors. It has been postulated that the interaction of genes with environmental factors such as smoking increases the risk, and the combined effect may be greater than the sum of either factors alone. There are multiple genes which regulate CAD which is multifactorial, and it will be difficult to pin point one culprit genetic loci.

Emerging risk factors

Other risk factors that are thought to be correlated with high prevalence of CAD are high homocysteine levels, ambient air pollution, variations in outdoor temperatures, psychosocial factors, and mental health and higher high sensitivity C-reactive protein (hsCRP) levels indicating chronic infection and inflammation.

Treatment gaps

Data from Prospective Urban Rural Epidemiology (PURE) study suggests that up to three-fourth of patients with CAD are not on guideline-recommended basic therapy drugs, and this perhaps is one of the major reasons for higher morbidity and mortality.

Strategies for prevention

Promoting health education and awareness about the pathogenesis of CAD, discouraging smoking and tobacco use and adapting a healthy diet and exercise routine will promote better cardiovascular health. Reducing high fat dairy, carbohydrates, saturated fats and increasing daily intake of fruit and vegetables will also improve overall health. Aggressive screening tests beginning at an early age will be beneficial for early detection and treatment. Promoting healthy group exercise activities such as walking, yoga and meditation to be practised regularly will certainly aid in preventing the rising epidemic of CAD.

Conclusions

The deaths due to CVDs have reduced in several developed countries, whereas the same has increased greatly in low- and middle-income countries. These countries bear about 80% of the global burden. Mortality associated with CAD in Asian Indians is 20–50% higher than any other population. Hence, all efforts are required to be proactively taken to clearly understand the role of risk factors in the emerging epidemic and for their effective control. General screening for conventional risk factors right from younger age may increase awareness; help in promoting lifestyle changes which can prevent or slow atherogenesis. Finally, a healthy lifestyle, balanced diet and regular physical exercise should be instilled right from the beginning in childhood to check this epidemic.

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