

*In the name of
God*





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Review Article

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Cardiovascular Disease in Iran in the Last 40 Years: Prevalence, Mortality, Morbidity, Challenges and Strategies for Cardiovascular Prevention

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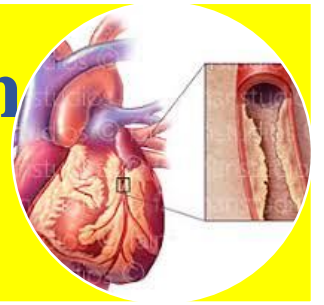
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Abstract

Four decades ago, Iran encountered rapid sociodemographic and economic transitions. This review was carried out to investigate the trend of cardiovascular disease (CVD) prevalence, mortality and morbidity, relevant challenges and suggestions for prevention of CVD. In Iran, the most prevalent causes of death have transited from infectious and diarrheal diseases in 1960 to CVD few decades ago. CVD was the first leading cause of mortality and a million disability adjusted life years (DALYs) led to 46% of all deaths and 20%-23% of the burden of disease in Iran. Ischemic heart disease and stroke are considered the first and second cause of death and DALYs in Iran, respectively. CVD rising epidemic might be related to socioeconomic and cultural changes, nutrition transition, inadequate physical activity, industrialization and urbanization and increasing life expectancy, increasing metabolic and physical risk factors, low accessibility and affordability to primary care and treatment, and low compliance because of economic and psychological problems. Thus, planning and implementing strategies for prevention and control of the disease and its risk factors are on top of the ministry of health agenda in the recent years. Health promotion strategies to prevent and control CVD risk factors, early detection of the disease and treatment of acute and chronic CVD events are essential elements for reducing the burden of CVD in Iran.

Progress of non-communicable diseases in Iran

last four decades



- ✓ growing urbanization, significant reduction in fertility and communicable disease prevention and control by improved access to primary health care (PHC).
- ✓ The developing health system in rural areas, establishing more medical universities and improving health care services by increasing hospitals and physicians per capita around the country.

Important points about of cardiovascular disease

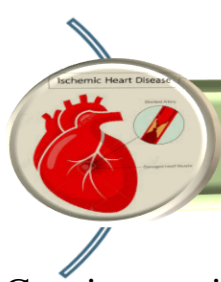
Cardiovascular disease (CVD) are the global leading cause of premature death. CVD led to about 17.9 million deaths in 2012 and 347.5 million disability adjusted life years (DALYs) were due to CVD in 2015 worldwide. The majority of CVD deaths are due to ischemic heart disease (IHD) and stroke and one third occur in those aged less than 70 years. IHD induced 8.1 million deaths in 2013 which was the most frequent in developing countries with nearly 164 million DALYs in 2015. It was predicted that CVD would be the cause of more than 23 million (about 30.5%) deaths by 2030 worldwide. Although in the last decades, CVD mortality rates decreased in high income regions, 50% of CVD mortality and 80% of the CVD global burden have occurred in low- and middle-income countries (LMIC) mostly in the Eastern Mediterranean Region (EMR). In which it is a growing epidemic problem in recent years. Iran may have the highest burden of CVD in the EMR. According to the global burden of diseases (GBD), the prevalence of hypertension was more than 25% in the adult population globally in 2000. It has been estimated to grow by 60% to a total of 1.56 billion in 2025. It is a main health challenge especially in the LMIC.

Cardiovascular Disease in Iran

- ❖ The GBD 2010 revealed that CVD mortality and DALY rates were higher in Iranian men than women.
- ❖ According to GBD's previous reports in 2010 and 2015, CVD was the first leading cause of mortality and DALYs that led to 46% of all deaths and 20-23% of the burden of diseases in Iran.
- ❖ Among all CVD, IHD with about 26% of total deaths and 11% of Total burden of disease in 2015 was the first while ischemic
- ❖ Stroke was the second cause of death and DALY in Iran

Cardiovascular Disease in Iran

- ❖ According to GBD 2015, Iran with more than 9000 cases of CVD per 100 000 persons was one of the countries with the highest CVD rate in the world.
- ❖ Isfahan Cohort Study (ICS) reported that age adjusted incidence rates of total CVD was 1307 in 100 000 person-years and various types of CVD events including CVD mortality, total coronary heart disease (CHD) and stroke were 328, 1027 and 280 in 100 000 person-years (T: 1635), respectively.
- ❖ In comparison to previous studies, CVD risk was higher in young participants, particularly in women, and there was less difference between the occurrence of IHD among men and women and urban and rural areas compared to previous reports.

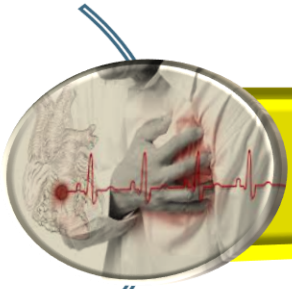


Ischemic Heart Disease

- ✓ Consistent with the global decrease in age-standardized IHD mortality, years of life lost, years lived with disability and DALY were decreased from **1990 to 2010** in Iran.
- ✓ coronary heart disease (CHD) prevalence was **19.4%** in Isfahan city which was more prevalent in women than men in **1999**.
- ✓ The GBD 2014 study indicated that the prevalence of IHD and relevant DALYs rate were higher in men than women and increased by age in Iran which was consistent with GBD results at global level.
- ✓ MI is one of the most important health problems increasing in Iran and worldwide. In-hospital MI mortality rate was 8.36 and 6.12 in 100 person-years in Iranian women and men in 2012, respectively.
- ✓ increasing death rate in MI patients was associated with being women, aged **over 65** years, illiterate and having low socioeconomic status. Even after 30 days, MI mortality rate was higher in Iran than some European countries. However, the contributing factors were similar in Iran, USA and many European countries. In addition, factors like chest pain before hospital admission, no thrombolytic therapy, smoking, right bundle branch block, ST elevation MI (STEMI), lateral MI, and ventricular tachycardia were other contributors for MI mortality in Iran.
- ✓ The time between start of chest pain and arrival to the hospital had some delay, reperfusion in-hospital was well-timed in Iranian STEMI patients. One of the most important in-hospital death in MI patients was STEMI.

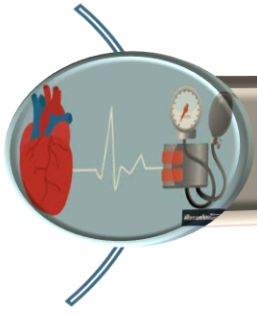


- ✓ The atrial fibrillation (AF) prevalence was 2.8% in adults aged over 50 in Primary Health Care (PHC) setting in Iran which was in agreement with its prevalence of about 2% in the general population in the world.
- ✓ The prevalence of AF, as the most common persistent cardiac arrhythmia was about 2%.
- ✓ Owing to improving/increasing life expectancy and improving health care, the prevalence of stroke and AF have increased, subsequently.
- ✓ AF risk factors included oxidative stress, inflammation, prothrombotic state, and sympathetic/parasympathetic activation.
- Polyunsaturated fatty acid of fish oil and antioxidant such as vitamin could improve AF by reducing the risk of AF and shortening ICU and hospitalization period in Iranian it is necessary to plan for diagnosis, monitoring, prevention and treatment of AF.



Heart Failure

- ❖ HF is an advanced heart problem and one of the main causes of death and burden in many countries, particularly in LIMCs. HF prevalence is between 0.4% and 4.3% in the general population and between 2% and 20% in the elderly population over 75 years. It has been estimated to increase by two times in two decades.
- ❖ The 1-year mortality rate of HF was 32% in Iran which fell in the range of this rate in other countries
- ❖ In the follow-up period: HF mortality predictors are hypotension during hospitalization, anemia, hyponatremia, heart valve disease and renal disease, pulmonary hypertension, tachycardia and less use of medications including ACE inhibitor/angiotensin receptor blocker and beta blocker.
- ❖ Age, diabetes mellitus, hypertension, stroke, atrial fibrillation (AF), ventricular tachycardia (VT), left or right bundle branch block (LBBB, RBBB), percutaneous coronary intervention (PCI), CABG and chest pain were associated with increase in HF.
- ❖ decrease in use of medications including thrombolytic, ACE inhibitor and diuretics with decreasing the recurrence of myocardial ischemia in Iran. Self-care of HF patients in Iran were not suitable and need to be improved.

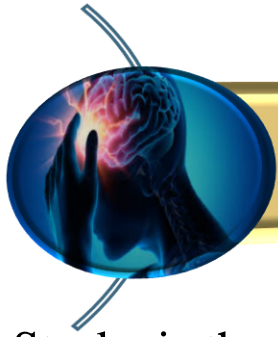


Hypertension

- The highest risk of CVD events is attributed to hypertension in the Iranian population.
- It's because hypertension has the highest prevalence among CVD which range between 17.3% to more than 20% in Iranian adults aged over 18 years old and 26.9% in population aged 40-75 years.
- About 6.6 million of Iranians aged 25-64 years were hypertensive in 2005.
- According to a national study among 722 Iranian adults aged 25-65 years, the prevalence of hypertension was 19.8% in men and 26.9% in women and pre-hypertension was prevalent in 59.6% and 44.5% men and women, respectively. In addition the hypertension prevalence was a bit higher in urban vs.

Tips important:

- **socioeconomic and lifestyles changes, urbanization and rising life expectancy.**
- **More important is the challenge of lack of awareness and uncontrolled high blood pressure in Iran and other LMIC**
- **One of two Iranian hypertensive patients are aware of their hypertension.**
- Consider hypertension awareness, treatment and control as priorities on the health agenda.



Stroke

- ❖ Stroke is the second most prevalent type of CVD in Iran, more prevalent than western countries. The incidence rate of stroke was between 23 and 103 per 100 000 persons in different age groups of the Iranian population.
- ❖ Particularly, its morbidity and mortality are higher in young Iranian adults compared to the Western population. Prevalence of Stroke is higher in Iranian women than men which might be due to the higher life expectancy in women.
- ❖ The total mortality rate was 24.6% in central part of Iran and in-hospital death rate was 20% and but higher than Western countries.
- ❖ lack of specialized stroke units and under diagnosis of stroke, late referral, Also lack of social insurance, social and family support are among main challenges in stroke patients that lead to low quality of life and make distress for patients and their families.
- ❖ Ischemic stroke is increasing in Iran and worldwide due to the increase of same risk factors of IHD. Owing to the young population of Iran now, all types of stroke may increase in the future.

Cardiovascular Risk Factors

prevalence of CVD risk factors
among Iranian population
aged more than 40 years

Hypercholesterolemia

65.4
%

High LDL-C

58.9
%

Hypertriglyceridemia

52.7
%

low HDL-C

52.3
%

Hypertension

42.2
%

Obesity

26.4
%

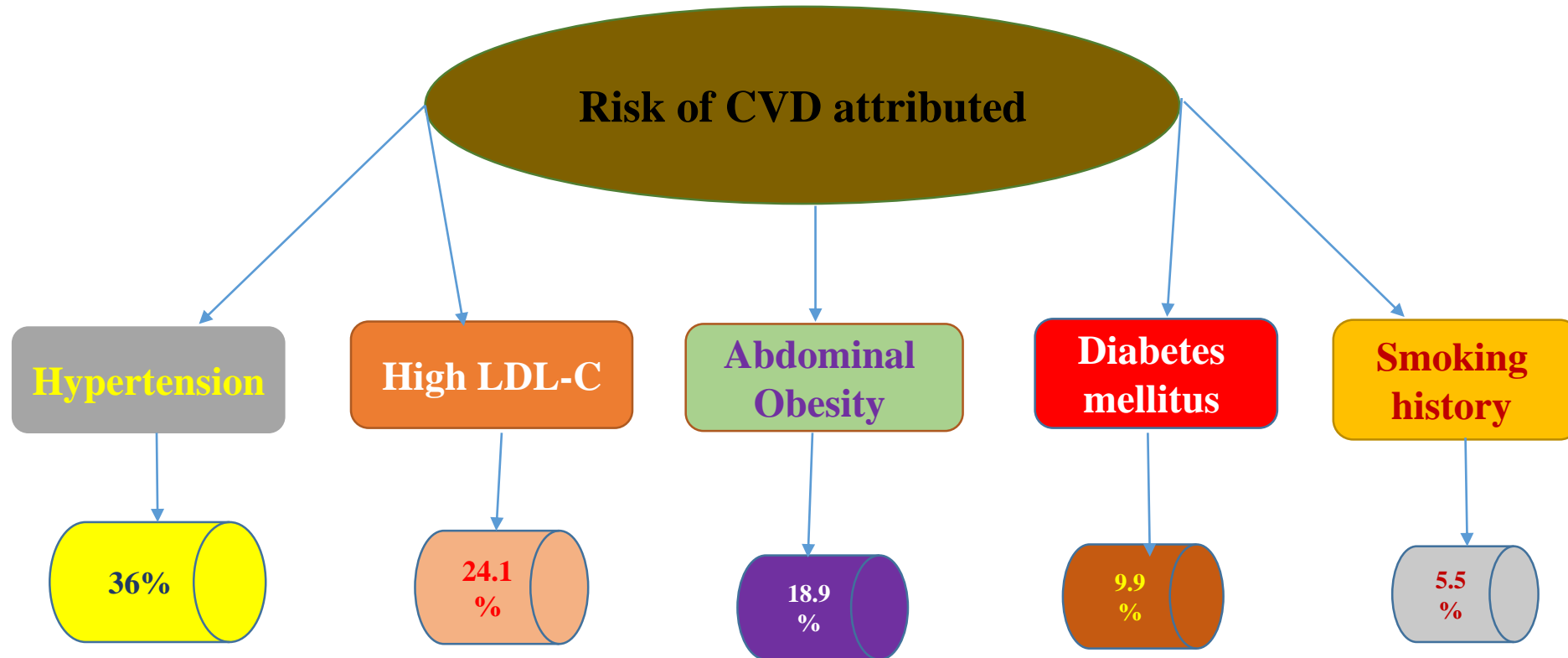
Diabetes mellitus

18.7
%

Current smoking

13
%

Cardiovascular Risk Factors



❖ According to the prevalence of CVD risk factors and the risk of CVD, it has been concluded that prevention and control of these modifiable risk factors can prevent the incidence of CVD by 80%.

Strategies for CVD Prevention

- Health promotion strategies to prevent and control of CVD risk factors
- Early detection of the disease and treatment of acute and chronic CVD events are essential elements for reducing the burden of CVD. Modification of CVD risk factors could prevent more than 90% of MI risk.
- Good primary health care (PHC) infrastructure in Iran to integrate CVD and risk factor prevention programs
- Existence of new diagnostic and treatment technology at nationwide scale

Strategies for CVD Prevention

- progress in providing secondary prevention and rehabilitation services to cardiac patients in public and private sectors to reduce revascularization, rehospitalization and improvement of quality of life
- knowledge improvement of health care providers and policy makers in CVD prevention and control arena.
- The presence of health networks and recent family physicians in urban areas.

Isfahan Healthy Heart Program (IHHP)

- Implementing educational, environmental, legislation and intersectoral collaboration strategies could improve lifestyle behaviors, physical and metabolic risk factors and ultimately decrease the incidence of CVD.
- Implementation research on Iranian programs for CVD prevention can be helpful to recognize what facilitators and barriers exist in order to build new strategies for prevention and control.

