Nutrition in Health course

Course instructor: Dr. Sherzad Ali Ismael

Professor of Community Medicine & Public Health, MBChB, FIBMS/ CM

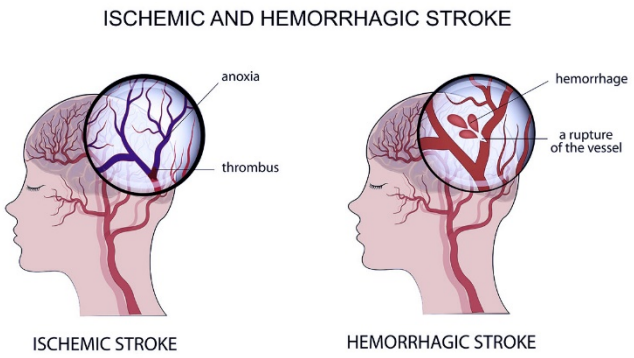
Email: sherzad.aismael@gmail.com

Module 8: Nutrition and Chronic Diseases - Focus on Cardiovascular Diseases (CVDs)

I. Learning Objectives:
   a. Understand the relationship between diet and cardiovascular health.
   b. Identify dietary risk factors contributing to CVDs.
   c. Recognize evidence-based dietary strategies for prevention and control of CVDs.
   d. Discuss public health interventions targeting nutrition and heart disease.

II. **CVD Definition:** A general term for conditions affecting the heart or blood vessels. Usually, CVD is associated with a build-up of fatty deposits inside the arteries (atherosclerosis) and an increased risk of blood clots. Introduction to CVDs.

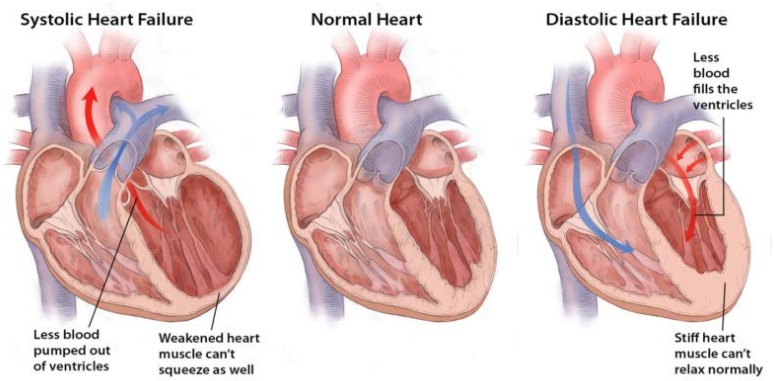
III. **Definition and Types:** CAD, stroke, hypertension, HF
   a. Coronary Artery Disease (CAD): A condition caused by the buildup of plaque in the coronary arteries, leading to reduced blood flow to the heart muscle. CAD can result in angina or myocardial infarction (heart attack).
   b. Stroke: Occurs when the blood supply to part of the brain is interrupted or reduced.
      i. Types of strokes
         1. Ischemic stroke (due to blocked artery):
         2. Hemorrhagic stroke (due to a leaking or ruptured blood vessel).



   c. Hypertension (High Blood Pressure): Persistent elevation of arterial blood

pressure. Often asymptomatic, but it increases the risk of heart disease, stroke, and kidney damage.

d. Heart Failure (HF): A chronic condition in which the heart is unable to pump blood effectively to meet the body's needs. Types: Systolic vs. diastolic heart failure.



IV. Global and Regional Burden of CVDs:

Leading Cause of Death Globally: CVDs are the number one cause of death globally, responsible for an estimated 17.9 million deaths annually (WHO, 2023), accounting for 32% of all global deaths. Major Conditions Contributing to Deaths: Coronary artery disease (ischemic heart disease) – ~9 million deaths. Stroke constitutes ~6.5 million deaths.

Premature Deaths: Over 75% of CVD deaths occur in low- and middle-income countries, with many being preventable through lifestyle interventions.

Regional Burden (Eastern Mediterranean Region / Iraq).

- Eastern Mediterranean Region (EMR): CVDs are the leading cause of mortality, responsible for about 1.4 million deaths per year in EMR. Hypertension prevalence: Up to 30–40% in adults. Contributing factors: High salt intake, rising obesity, and low physical activity contribute significantly.
- Iraq-specific Trends: Non-communicable diseases (mainly CVDs and diabetes) account for over 50% of deaths. Studies from Erbil and Baghdad show rising rates of ischemic heart disease in adults aged 40+.
- Contributing factors: Urbanization, conflict-related stress, poor diet, and sedentary lifestyles exacerbate the burden.

V. Importance of Modifiable Risk Factors

a. Definition: Modifiable risk factors are behaviors and conditions that individuals and communities can change to reduce the risk of developing cardiovascular diseases.

Distinction from Non-Modifiable Risk Factors: Differ from non-modifiable risk factors such as age, sex, and genetics.

b. Key Modifiable Risk Factors: Unhealthy diet (e.g., high saturated fat, trans fat, salt, and sugar intake), Physical inactivity, Tobacco use, Excessive alcohol consumption, Obesity and overweight, High blood pressure (hypertension), High blood cholesterol, Diabetes mellitus (particularly uncontrolled type 2 diabetes), Chronic stress and poor mental health.
c. Impact on Global Health: According to WHO, 80% of premature heart disease and stroke can be prevented by controlling these modifiable risk factors.
d. Effectiveness of Interventions: Community-based interventions, health promotion programs, and individual behavior change have shown significant reductions in CVD morbidity and mortality.

VI. Nutrition and Heart Health:

a. Role of Dietary Patterns: Dietary patterns refer to the overall combination of foods and beverages consumed habitually.
    i. Healthy dietary patterns are consistently associated with: Reduced blood pressure, Improved lipid profiles (lower LDL, higher HDL), Better glycaemic control, and decreased systemic inflammation, and weight management.

b. Evidence-Based Cardioprotective Dietary Patterns:
    i. Mediterranean Diet: Rich in fruits, vegetables, whole grains, legumes, nuts, olive oil, and fish. Associated with a lower incidence of coronary artery disease and stroke.
    ii. DASH Diet (Dietary Approaches to Stop Hypertension): Emphasizes fruits, vegetables, low-fat dairy, lean proteins, and whole grains. Proven to lower blood pressure and improve heart health.
    iii. Plant-Based Diets: Prioritize plant-derived foods; minimize animal products. Linked to lower cardiovascular risk and mortality.
    iv. Nordic Diet: Based on traditional eating in Nordic countries: berries, whole grains, fish, root vegetables. Shown to improve lipid profiles and blood pressure.
c. Unhealthy Dietary Patterns and CVD:

    Patterns high in: Saturated and trans fats, added sugars and refined carbohydrates, Sodium (salt), and Ultra-processed foods are associated with increased risk of hypertension, atherosclerosis, obesity, and cardiovascular events.

VII. Impact on Inflammation, Oxidative Stress, Lipids.

a. Inflammation: Chronic low-grade inflammation contributes significantly to atherosclerosis and plaque instability.

b. Anti-inflammatory Dietary Patterns: Mediterranean Diet and plant-based diets are rich in: Omega-3 fatty acids (from fish, flaxseeds), Polyphenols and antioxidants (from fruits, vegetables, and olive oil), and Fiber (from legumes and whole grains). These reduce circulating inflammatory markers such as CRP, IL-6, and TNF-α.

Pro-inflammatory Dietary Patterns: A high intake of Refined carbohydrates, trans fats, and processed meats increases inflammatory markers and promotes vascular damage.

Oxidative Stress: Results from an imbalance between free radicals and antioxidants, leading to endothelial dysfunction and lipid oxidation.

Protective Nutrients: Antioxidants (Vitamin C, E, selenium, flavonoids) from fruits, vegetables, nuts, and seeds. They neutralize free radicals and inhibit oxidation of LDL cholesterol (a key event in atherogenesis).

Exacerbating Factors: Diets high in processed foods, alcohol, and low in antioxidants promote oxidative stress and vascular injury.

VIII. Role of Public Health in Prevention of CVD:

a. Raising awareness about modifiable risk factors.

b. Designing population-level interventions.

c. Advocating for healthy policies (e.g., food labeling, tobacco taxes).

d. Promoting screening and early detection in primary care.

IX. Conclusions:

a. Diet plays a key role in CVD prevention.

b. Reduce harmful, increase protective dietary components.

c. Support public health efforts for sustainable change.

End of Module 8.