Noncommunicable Diseases

chapter 9

What is NCD?

NCD

Diseases due to degenerative, genetic, hereditary and environmental conditions as well as life habits as nutrition.

But,

Some incorrectly call it ‚chronic disease‘. But NCD is distinguished by the non-infectious nature and not duration. HIV is chronic but caused by infectious gent .Examples CVD,

What is NCD?

NCD

wide range of diseases- affect mortality and morbidity

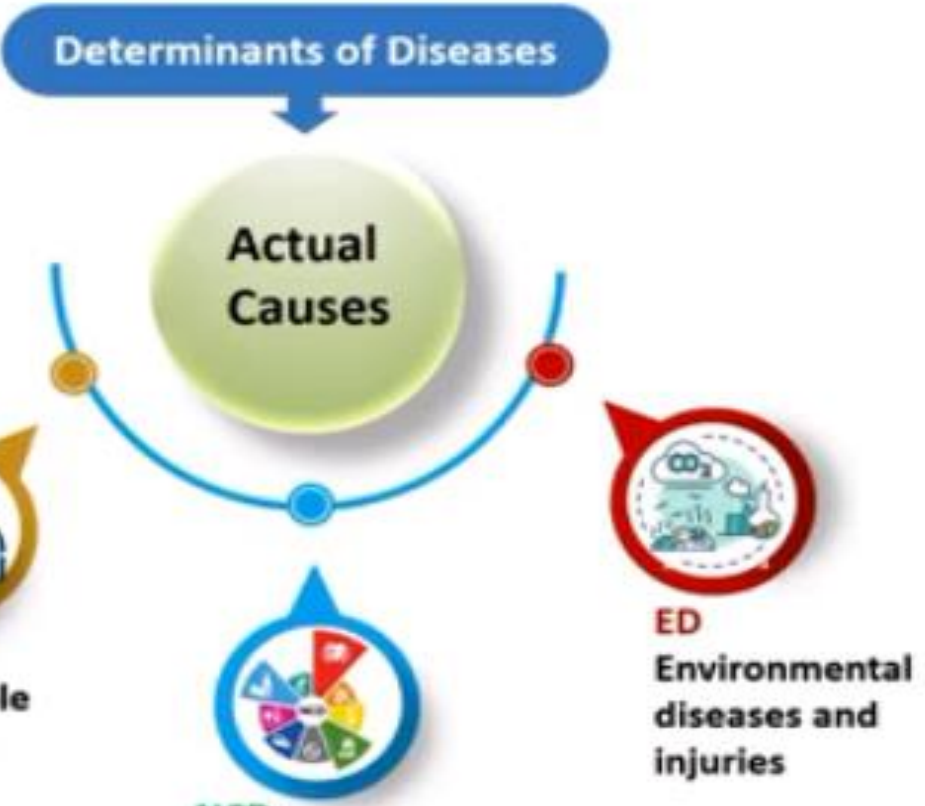
Age

NCDs increase by increase of population age.

Economic implications

NCDs: increases health care cost and disability/quality of life

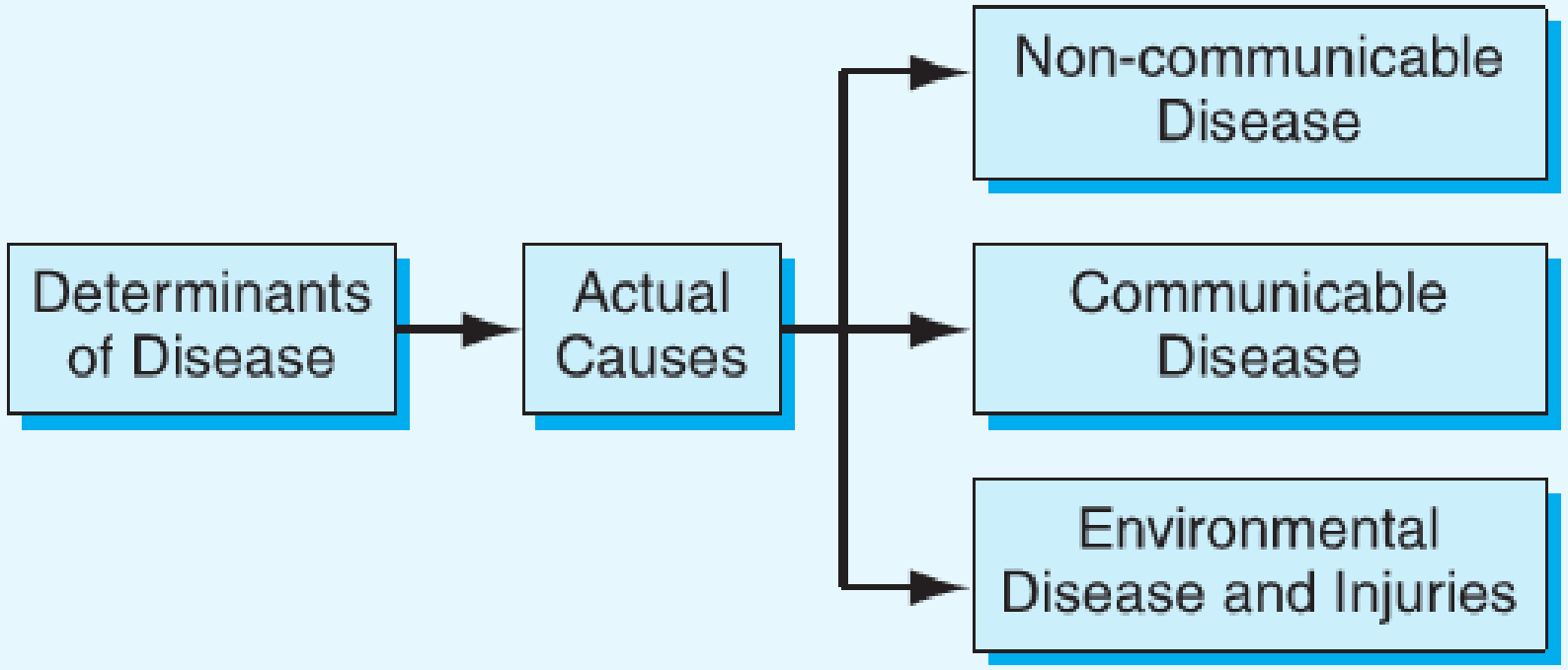
Three Actual Causes DDD



DDD, diseases, disability, death;

Three Actual Causes

FIGURE 3-A Public health framework for diseases and injuries



What is NCD?

NCD:

: a non-infectious long-term conditions/diseases due to degenerative, genetic, hereditary, environmental factors and unhealthy life style

- No definite etiology, but risk factors
- Lead to Impairment, disability or death
- No spontaneous healing
- No/rare complete cure

Examples

DM

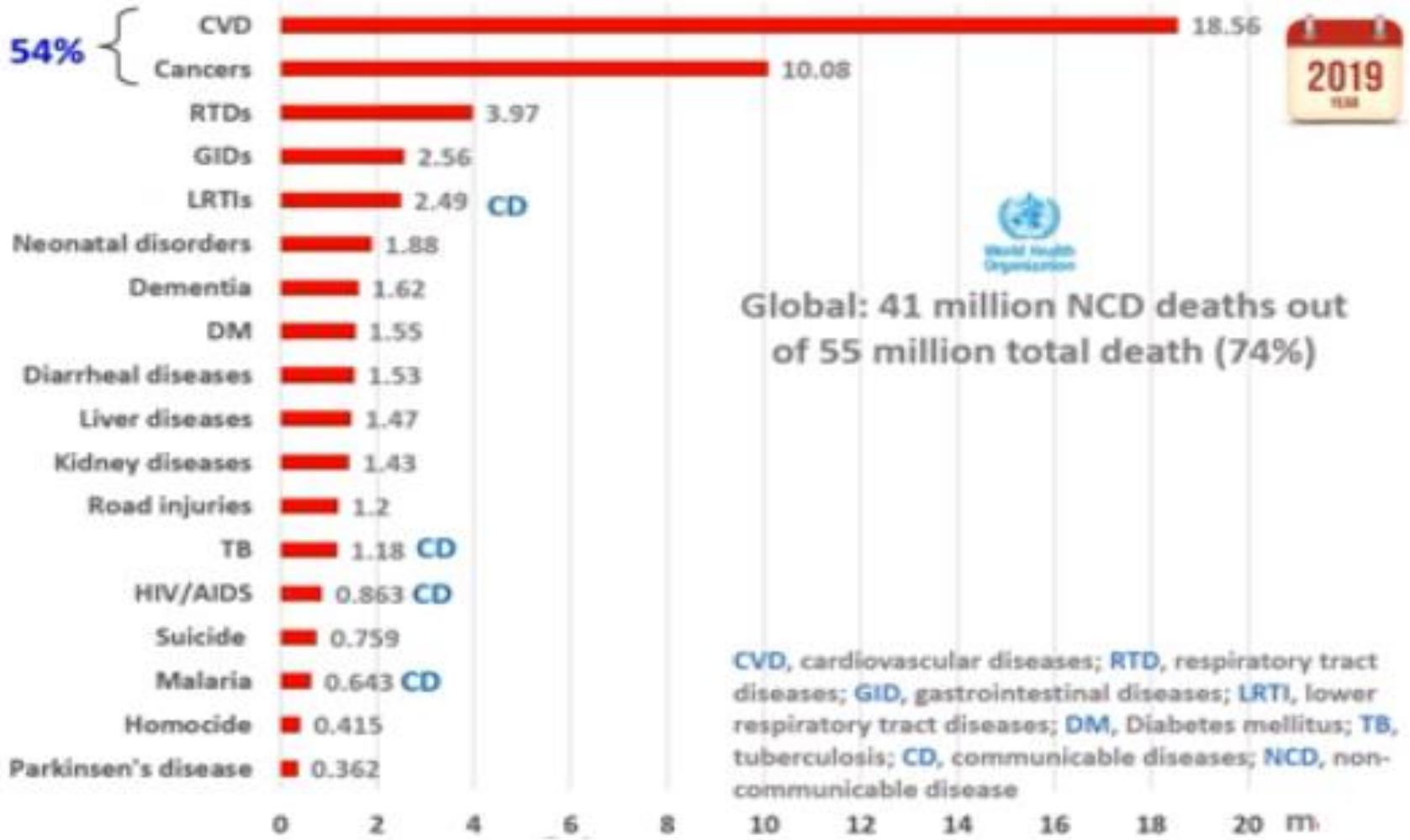
CVD

Cancer

Chronic respiratory diseases

CVD, cardiovascular diseases; DM, Diabetes mellitus

Global Burden of NCDs



Impact and Burden of NCDs

NCD, non-communicable disease

What is the burden of noncommunicable disease?

- Majority of causes of death and disability in most developed countries.
- Cardiovascular disease
- Cancers
- Depression
- Alzheimer's
- Chronic arthritis

Example NCDs

- 1. CANCER:

- - Cancer: is the uncontrolled growth of abnormal cells
- anywhere in a body.
- There are over 200 types of cancer.
- Anything that may cause a normal body cell to develop abnormally potentially can cause cancer;
- general categories of cancer-related or causative agents are as follows:
- chemical or toxic compound exposures,
- ionizing radiation,
- some pathogens, and
- human genetics

Causes of Cancer:

1. **<u>Carcinogens:</u>** chemical, biological, or physical agents that cause the cellular damage that leads to cancer.

- The carcinogens include:

a. Tobacco smoking: smoking is associated with cancer in the lungs, esophagus, respiratory tract.

- The risk of cancer increases depending on:

- the number of cigarettes smoked per day,
- the cigarette's tar content, and
- how many years a person smokes.
- Starting to smoke while young significantly increases the risk of developing cancer.

b. Diet:

- High salt intake increases the risk of stomach cancer.
- Adult obesity increases the risk for breast cancer in women
- Alcohol consumption increases the risk of cancer of the esophagus and stomach, especially when combined with smoking.

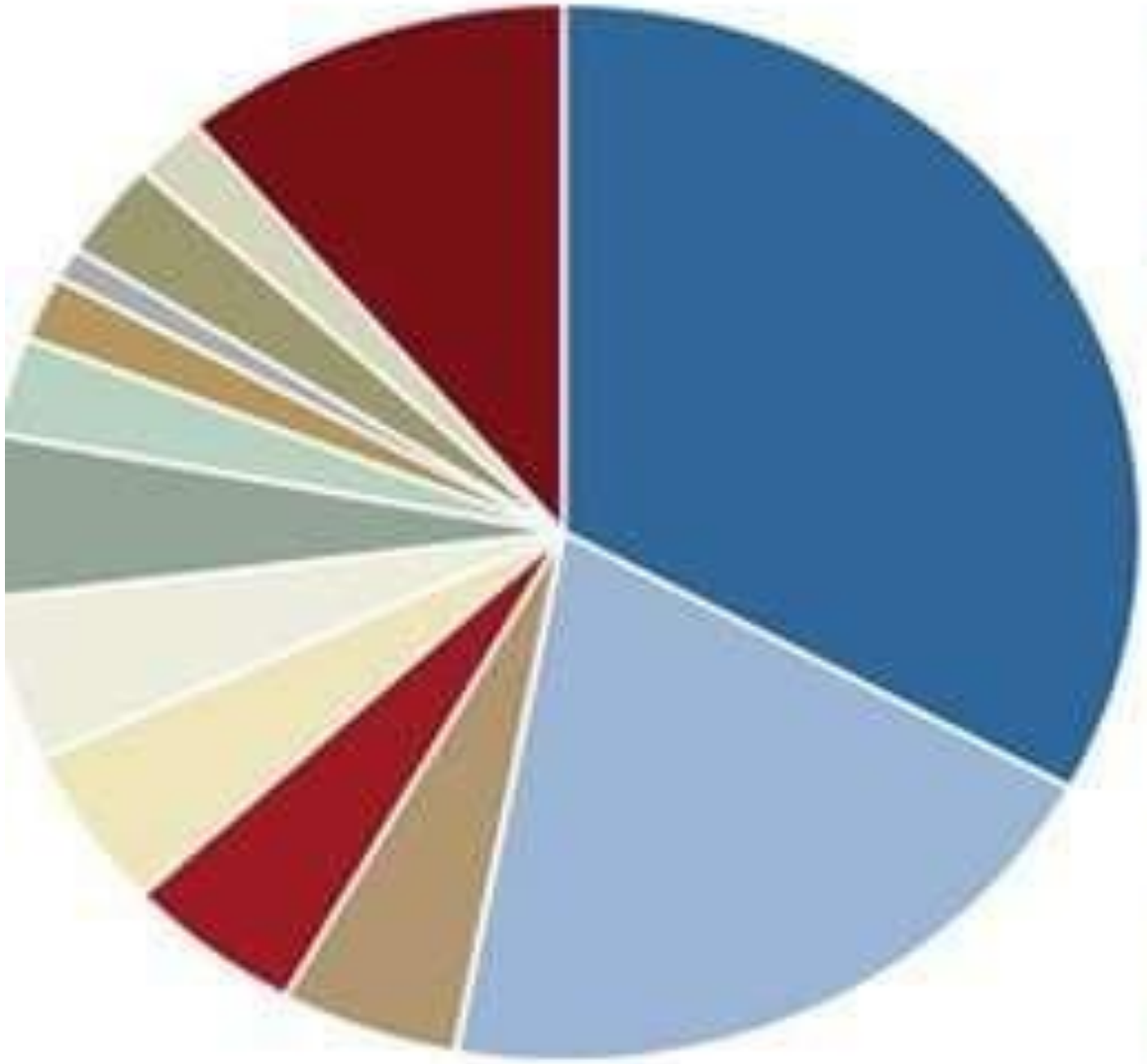
c. Pathogens:

- papilloma virus (HPV), a sexually transmitted virus responsible for cancer of the cervix.
- Hepatitis B & C viruses cause almost 80% of all liver cancer.
- *Helicobacter pylori*, a bacterium associated with stomach ulcers, likely causes cancer of the stomach.

d. Environmental & Occupational chemicals:

- air pollution, water pollution, and pollutants in the soil can cause lung and bladder cancer.
- Lung cancer rates are generally higher in cities, where increased industry and automobile traffic produce air pollution.
- Occupational carcinogens can cause cancer deaths include benzene, asbestos & petroleum products

Estimated Percentage of Cancer Cases Caused by Identifiable and/or Potentially Preventable Factors



- Tobacco 33%
- Excess weight and obesity . 20%
- Diet 5%
- Lack of exercise 5%
- Occupation 5%
- Viruses 5%
- Family history 5%
- Alcohol 3%
- UV and ionizing radiation 2%
- Prescription drugs 1%
- Reproductive factors 3%
- Pollution 2%
- Unknown 11%

merican Association for Cancer Research (AACR) Cancer Progress Report 2012

2. Hereditary Factors:

- Heredity plays a role in developing cancer.
- Some gene mutations associated with cancer are inherited.

3. Steroid Hormones:

- Medical research suggests that cancers of the reproductive organs may be affected by naturally occurring steroid hormones produced by the endocrine system.
- These hormones stimulate reproductive organ cells to divide and grow.
- In women, relatively high or long exposure to the female sex hormone estrogen seems to increase the risk of breast and uterine cancers.

Types of Cancers:

1. **Carcinomas** occur in epithelial tissues—the skin and inner membrane surfaces of the body, such as those of the lungs, stomach, intestines, and blood vessels.

Carcinomas account for approximately 90% of human cancers.

2. **Sarcomas** originate in connective tissues—such as muscle, bone, cartilage, and fat—that support and connect other parts of the body. Sarcomas account for less than 2% of all cancers.

3. **Leukemias** develop in blood cells, and lymphomas originate in the lymphatic system. Combined, these cancers account for about 8% of all human cancers.

Examples of Cancers:

A. Breast Cancer:

Breast cancer is the most common cancer in women. The rate of incidence increases with age, and women 75 years and older are at highest risk.

Breast cancer can affect males, but the disease strikes women about 100 times as often as it does men.

Risk Factors of Breast Cancer:

1.Women with a long menstrual history (menstrual periods that started before age 12 and ended after age 50);

2.Women who never gave birth or who waited until after age 30 to have children;

3.Women who have used birth control pills or hormone replacement therapy.

4. Women with a history of breast cancer in the family are also at greater risk.

B. Colorectal Cancer:

Colorectal Cancer, malignancy of the large intestine, the lower portion of the intestinal tract, which consists of the colon and rectum.

Risk Factors of Colorectal Cancer:

1.The risk increases with age. About 90 % of all colorectal cancers are diagnosed in people over the age of 50.

2. A family history of colorectal cancer,

3.The presence of polyps (abnormal but usually benign growths) in the large intestine,

4. Inflammatory bowel disease.

C. Skin Cancer:

Skin Cancer is the most common of all cancers. There are three main types of skin cancer:

1.Basal cell carcinoma: the most common type, develops in the basal layer of the epidermis.

2.Squamous cell carcinoma: the second most common type, develops in the upper layers of the epidermis.

3.Melanoma: It develops in the melanocytes. Melanoma is the most dangerous type of skin cancer and is responsible for about 3/4 of all skin cancer deaths.

Risk Factors of Skin Cancer:

1. Exposure to direct sunlight, especially during childhood.
2. People with pale skin.
3. A family history of skin cancer.

Prevention of Cancer:

A. Life Style Changes: more than 60% of cancer deaths are preventable through lifestyle changes, so reducing individual risk factors decreases the contracting of this disease.

1. Avoid smoking.

2. Healthy Diet: eating a healthy diet (fruits & vegetables).

3. Avoid Alcohol.

4. Physical Activity: Moderate activity for 30 minutes a day enhances the immune system, shortens the time food takes to move through the intestines.

B. Screening and Early Detection:

Detecting a tumor while it is still in an early stage is the best predictor of long-term survival.

A cancer-related checkup is recommended every three years for people aged 20-40 and every year for people over age 40.

2. **Coronary Heart Diseases**:

- chronic illness in which the coronary arteries, the vessels that supply oxygen-carrying blood to the heart, become narrowed and unable to carry a normal amount of blood.

- Most often, the coronary arteries become narrowed because of atherosclerosis, a process in which fatty deposits called plaque build up on the inside wall of an artery.
- Gradually, the growing plaque thickens the wall of the artery, reducing the space for blood to flow through.
- When its blood supply is reduced, the heart does not receive sufficient oxygen..
- Coronary heart disease is the leading cause of death in the most developed & developing countries.

Risk Factors of Coronary Heart Disease:

1. A person’s risk increases with age.
2. Hereditary factors. .
3. Males were once thought to be at greater risk of coronary heart disease.
4. A person’s lifestyle include

- cigarette smoking,
- a sedentary lifestyle,
- obesity,
- diabetes mellitus, and
- hypertension (high blood pressure).
- high blood cholesterol. When excess cholesterol circulates in the blood, it deposits in the wall of the arteries, hastening the progression of atherosclerosis.

Treatment and Prevention:

- There is no cure for coronary heart disease.
- However, proper treatment can slow the progression of atherosclerosis so that the coronary arteries do not become further narrowed.
- **Prevention:** Lifestyle changes to reduce risk factors:

1. Heart patients eat a low-fat diet and keep their blood cholesterol low.
2. Quit smoking.
3. Exercise regularly.
4. Control high blood pressure and diabetes mellitus through diet or medication.
5. Aspirin is recommended to help prevent a heart attack.

3. Hypertension: (High Blood Pressure):

- Medical condition in which constricted arterial blood vessels increase the resistance to blood flow, causing an increase in blood pressure against vessel walls.
- It is called the "silent killer," because it usually causes no symptoms until it reaches a life-threatening stage.

Physicians use two measurements to describe blood pressure.

1. Systolic pressure measures blood pressure as the heart contracts to pump out blood.

2. Diastolic pressure measures blood pressure as the heart relaxes to allow blood to flow into the heart.

An instrument called **a sphygmomanometer** measures systolic & diastolic pressure using units of millimeters of mercury (mm Hg).

Complications of Hypertension:

1. Increased the risk of atherosclerosis.

2. Internal hemorrhaging (bleeding).

Both atherosclerosis and internal hemorrhaging in the brain can lead to a stroke

Hypertension forces the heart to work harder to pump adequate blood throughout the body, this may lead to heart failure.

3.It may damage the small blood vessels within the kidney. The kidney then becomes unable to filter blood efficiently, and waste products may build up in the blood in a condition known as uremia.

Treatment of Hypertension:

1. People with pre-hypertension (blood pressure 120-139) undergo diet and lifestyle changes:

- Losing weight
- Quitting smoking.
- limiting salt in their diet.
- Increasing physical activity.

2. For those with stage 1 and stage 2 hypertension, a physician may prescribe diet and lifestyle changes, as well as one or more drugs known as antihypertensives.

Diuretics are antihypertensives that promote excess salt and water excretion, reducing the amount of fluid in the bloodstream and relieving pressure on blood vessel walls.

4. Stroke:

Stroke: brain damage caused by a lack of blood flow to part of the brain..

- A stroke results in permanent damage to the brain tissue & cause permanent disability for the patient.
- For example, a patient who has had a stroke may develop:

➢ paralysis on one or both sides of the body;

➢ have difficulty with walking, eating; or

➢ lose the ability to speak or understand speech.

Types of Stroke:

1.Ischemic strokes: which account for about 80 percent of all strokes, are caused by an obstruction in an artery that carry oxygen-rich blood from the heart to the brain.

2.Hemorrhagic strokes: account for the remaining 20 percent of all strokes. They occur when weakened blood vessels within the brain rupture and bleed into the surrounding tissue.

Symptoms of a hemorrhagic stroke may be more sudden and more severe, and these strokes carry a greater risk of death than ischemic strokes.

➢

Risk Factors of Stroke:

1. Increases as people get older > age 65 at greatest risk.

2.The incidence of stroke in males and females is about equal, although females are more likely to die than males.

3. People with a family history of stroke.

4.A person who has already had a stroke is at greater risk of having another stroke in the future.

Prevention of Stroke:

1. Quitting smoking,

2. Controlling high blood pressure through diet or medication,

3. Eating a low-fat, healthy diet,

4.Becoming physically active can greatly decrease a person’s risk of having a stroke.

5. Diabetes Mellitus:

Diabetes Mellitus: disease in which the pancreas produces little or no insulin, a hormone that helps the body's tissues absorb glucose (sugar) so it can be used as a source of energy.

Risk Factors of Diabetes:

1. Adults over 45 years of age;
2. In people who are overweight or physically inactive;
3. In individuals who have an immediate family member with diabetes;

Symptoms of Diabetes:

1. Frequent urination to get rid of the additional water drawn into the urine;
2. Excessive thirst to trigger replacement of lost water;
3. Hunger to replace the glucose lost in urination.
4. Blurred vision.
5. Dramatic weight loss.
6. Irritability, weakness and fatigue.

Types of Diabetes:

1. Type 1 diabetes: called insulin-dependent diabetes mellitus (IDDM) and juvenile-onset diabetes, the body does not produce insulin or produces it only in very small quantities.
2. Symptoms usually appear suddenly, typically in individuals under 20 years of age. Most cases occur around puberty—around age 10 to 12 in girls and age 12 to 14 in boys.

Untreated Type 1 diabetes affects the metabolism of fat. Because the body cannot convert glucose into energy, it begins to break down stored fat for fuel. This produces increasing amounts of acidic compounds in the blood called ketone bodies, which interfere with cellular respiration, the energy-producing process in cells.

2. Type 2 diabetes: known as non-insulin-dependent diabetes mellitus (NIDDM) and adult-onset diabetes, the body's unable to balance between insulin production and the ability of cells to use insulin.

Symptoms include those found in Type 1 diabetes, as well as repeated infections or skin sores that heal slowly or not at all, numbness in the hands or feet.

Treatment of Diabetes:

Individuals with Type 1 diabetes require:

1. Insulin injections, often two to four times a day, to provide the body with the insulin it does not produce.

2.Control their diets by distributing meals and snacks throughout the day. They also need to eat foods that contain complex sugars, which break down slowly and cause a slower rise in blood sugar levels.

For persons with Type 2 diabetes,

1. Treatment begins with diet control: a recommended meal is usually low in fat, and contains complex carbohydrates like beans, vegetables & grains.

2. Exercise & weight reduction: exercise helps body cells absorb glucose.

3. Oral medication.

4.If oral medications are ineffective, a person with Type 2 diabetes may need insulin injections or a combination of oral medication and insulin injections.

6. Anemia:

Anemia: a medical condition caused by an abnormally low number of red blood cells.

People with anemia develop symptoms which include pale skin, shortness of breath, dizziness.

Causes of Anemia:

1. Reduced production of red blood cells:

It happened if the body has inadequate amounts of certain nutrients, including iron, vitamin B12, and folic acid, or the hormone erythropoietin.

2. Excessive destruction of red blood cells:

Abnormal destruction of red blood cells may be caused by an enlarged spleen, by a malfunction of the immune system in which antibodies attach to red blood cells, or by some genetic conditions, such as thalassemia.

3. Extensive bleeding:

Large amounts of blood loss may occur suddenly due to injury or surgery. In some cases, excessive bleeding may occur over time, such as from bleeding ulcers or tumors of the intestinal tract.

Types of Anemia:

There are more than 100 types of anemia. The most common types:

1.Iron-deficiency anemia: When the body's need for iron increases—such as during periods of rapid growth in childhood, during pregnancy, or when there is chronic bleeding—an iron deficiency may develop.

2.Pernicious anemia: a chronic ailment that mostly affects people over 40, is a result of vitamin B12 deficiency.

3.Sickle-cell anemia: is an inherited disorder. People with sickle-cell anemia have an abnormal form of hemoglobin that distorts red blood cells.

7. Peptic Ulcer:

Peptic ulcers: are ulcers of the stomach (gastric) or small intestine (duodenal). In addition to the pain caused by the ulcer itself, peptic ulcers give rise to such complications as hemorrhage from the erosion of a major blood vessel; perforation of the wall of the stomach or intestine, or obstruction of the gastrointestinal tract.

Causes and Risk Factors of Ulcers:

The direct cause of peptic ulcers is infection with the bacterium *Helicobacter pylori*.

The risk factors include:

1. Anti-inflammatory drugs.
2. Excess secretion of hydrochloric acid.
3. Genetic factors.
4. Cigarette smoking,
5. Psychological stress.

Treatment:

1. Antacids may be ingested to neutralize the hydrochloric acid secretions.
2. Antibiotics may be used to eradicate *Helicobacter pylori* infection, accelerating healing and reducing the rate of ulcer recurrence.
3. Quitting smoking can also accelerate the healing process.
4. Alcohol and caffeine should be avoided.

8. Osteoporosis:

Osteoporosis: bone condition characterized by a decrease in mass, resulting in bones that are more porous and more easily fractured than normal bones. Fractures of the wrist, spine, and hip are most common.

Risk Factors of Osteoporosis:

1. White females are the most susceptible.
2. Low vitamin D and calcium intake.
3. Inadequate physical activity.
4. Certain drugs, such as corticosteroids.
5. A family history of the disease.

Types of Osteoporosis:

A. **Primary osteoporosis** (the most common form of the disease) due to:

1. Postmenopausal,
2. Age-related affects those over the age of 70;

B. Secondary osteoporosis may be caused by:

1. Bone disuse as a result of paralysis.
2. Endocrine and nutritional disorders, including anorexia nervosa processes;
3. Certain drug therapies.

Prevention and Treatment of Osteoporosis

1. Synthetic estrogen therapy,
2. Intake of calcium and vitamin D.
3. Weight-bearing exercise.
4. Drugs such as calcitonin.