EPIDEMIOLOGY OF NON-COMMUNICABLE DISEASES

LEARNING OBJECTIVES

1. List risk factors relevant to selected non-communicable diseases
2. Identify general concepts, risk factors, healthy lifestyle, risk modification, primary and secondary prevention of NCD
3. Explain the importance of periodic examinations
4. Define the screening tests pertinent to selected diseases & the at-risk approach in the application of screening tests
5. Define the role of the PHC physician in the prevention and control of non-communicable diseases
6. List the health education messages aiming to achieve a healthy life style, prevention, and control of NCD

NON- COMMUNICABLE DISEASES INCLUDE

- ❑ Cardiovascular (hypertension, coronary disease, stroke)
- ❑ Cancer
- ❑ Diabetes
- ❑ Respiratory (asthma, emphysema, bronchitis)
- ❑ Obesity
- ❑ Renal (nephritis, nephrotic syndrome)
- ❑ Accidents
- ❑ Nervous and mental (mania, depression)
- ❑ Musculoskeletal (arthritis)
- ❑ Degenerative disorders

Burden of NCDs can be assessed through a number of epidemiological parameters such as:

- ❖ Incidence,
- ❖ Prevalence,
- ❖ Disease specific mortality, and
- ❖ Disability caused by the disease as

= YLD (years of life lived with disability)

= DALY (disability-adjusted life year), which combines information on morbidity, mortality and disability to provide a composite index of burden of disease

NON COMMUNICABLE DISEASES DEFINITIONS

- are usually thought of as chronic conditions that do not result from an acute infectious process.
- These conditions cause death, dysfunction, or impairment in the quality of life, and they usually develop over relatively long periods first without causing symptoms; but after disease manifestations develop, there may be a protracted period of impaired health.
- Diseases comprising all impairments or deviations from normal, which have one or more of the following characteristics:
  1. Are permanent
  2. Leave residual disability
  3. Are caused by non reversible pathological alterations
  4. May be expected to require a long period of supervision, observation or care
  5. Require special training of the patient for rehabilitation

MAGNITUDE OF THE PROBLEM

- Non-communicable diseases (NCDs), mainly cardiovascular diseases (CVDs), cancers, chronic respiratory diseases and diabetes represent a leading threat to human health and development.
- These four diseases are the world's biggest killers, causing an estimated 35 million deaths each year - 60% of all deaths globally - with 80% in low- and middle-income countries.
- These diseases are preventable. Up to 80% of heart disease, stroke, and type 2 diabetes and over a third of cancers could be prevented by eliminating shared risk factors, mainly tobacco use, unhealthy diet, physical inactivity and the harmful use of alcohol.
- The increasing prevalence of non-communicable diseases is a serious challenge, where the success in extending life expectancy is translated into a real threat to global health.
- Unless addressed, the mortality and disease burden from these health problems will continue to increase.
- WHO projects that, globally, NCD deaths will increase by 17% over the next ten years.
- The greatest increase will be seen in the African region (27%) and the Eastern Mediterranean region (25%).
- The highest absolute number of deaths will occur in the Western Pacific and South-East Asia regions.

DISEASE BURDEN WORLDWIDE

SOURCE: Adapted from The World Health Report Health Systems: improving performance. Geneva: World Health Organization

	Disability-Adjusted Life Years
Total DALYS	1,438,154
Communicable Diseases	615,105 (42.8%)
Non-Communicable Diseases	621,742 (43.2%)
Injuries	201,307 (13.9%)
Cardiovascular Diseases	157,185 (10.9)
Neuropsychiatric Disorders	158,721 (11.0)
Cancers	84,500 (5.9)
Respiratory Diseases	70,017 (4.9)
Congenital Abnormalities	36,557 (2.5)

WORLDWIDE DEATHS

Causes of Death Worldwide:	
Total Deaths	55,965
Communicable Diseases	17,380 (31%)
Non-Communicable Diseases	33,484 (59.8%)
Injuries	5,101 (9.1%)
Cardiovascular Diseases	16,970 (30.3%)
Cancers	7,065 (12.6%)
Respiratory Diseases	3,575 (6.4%)
Digestive Diseases	2,409 (3.7%)
Neuropsychiatric Disorders	911 (1.6%)
Genitourinary Diseases	900 (1.6%)

WORLDWIDE DEATHS

CORONARY HEART DISEASE (CHD)

- 17.1 million people died - 2010, (representing 30%of all global deaths.)
- 7.2 million were due to CHD & 5.7 million were due to stroke.
- By 2030, almost 23.6 million people will die from CVDs, mainly from heart disease and stroke.
- The largest percentage increase will occur in the Eastern Mediterranean Region.

HYPERTENSION

- The silent killer
- Elevated blood pressure increases risk of cardiovascular events (especially heart attack, heart failure, and stroke), with resultant chronic illness, disability and premature death.
- At least 1/3 of coronary patients have HT as major contributing cause.
- Management of HT reduces mortality, stroke, CHD and heart failure.
- The national estimate of the prevalence of hypertension in Egypt was 26% (Egyptian National Hypertension Society).

CANCER

- a leading cause of death worldwide.
- Cancer was the sixth cause of death in developed countries.
- Today, it is the second leading cause of death next to CVD in developed countries. In developing world, it ranks 4th as a cause of death.
- 7.9million deaths (or around 13% of all deaths worldwide) in 2014.
- Deaths from cancer worldwide are projected to continue rising, with an estimated 12 million deaths in 2030.

DIABETES MELLITUS

- 1/5 leading causes of death in many countries
- associated with premature mortality, predominantly thru atherosclerotic vascular disease.
- Microvascular complications, which affect the small blood vessels in the eye, kidney and nerves, are associated with considerable morbidity.
- The economic and social costs of diabetes are enormous, both for health care services and through loss of productivity.
- In developed countries,10% or more of the total health budget is spent on the management of diabetes and its complications.
- The prevalence of diabetes in Egypt is estimated at 5-8% and this level is increasing overtime.
- Egypt is expected by WHO to be one of the top 10 countries with high prevalence of diabetes mellitus by the year 2030.

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PREDISPOSING FACTORS FOR THE INCREASING PREVALENCE & CHALLENGES FOR PREVENTION OF NCD

1. **The demographic transition**:

The ↓ in fertility & mortality result in ↑ in the life expectancy with subsequent increase in the proportion of the elderly populations. Non-communicable diseases are usually associated with aging.

2. The epidemiologic transition:

There is shift from mortality from communicable diseases (due to the use immunizations and antibiotics etc.,) to non-communicable diseases which have specific genetic, environmental and behavioral risk factors.

3. **Nutrition Transition**:

- There has been shift from famines to increased production and consumption of food.
- Large shift in the pattern of nutrition to a diet high in total fat, sugar and other refined carbohydrates and low in polyunsaturated fatty acids and fibers, and often accompanied by increasing sedentary life.
- Such pattern resulted in increasing the prevalence of obesity and contributing to degenerative non-communicable diseases .

4. The multi-factorial nature of the risk factors for NCDs.

- ❖ Compared to communicable disease, non-communicable diseases are difficult to identifying the specific cause-effect relationship.
- ❖ The multiplicity of the risk factors associated with specific disease limits the opportunities to have specific intervention for prevention and control.
- ❖ The types of the risk factors are difficult to be controlled by technology (in communicable diseases immunizations and antibiotics are of the technologies that are used to prevent the diseases).
- ❖ The risk factors are related to genetic, environment, culture and behavior which represent a challenging issue to public health programs.

5. **Migration of population across different cultures**:

- The individuals who migrate from low-risk culture (e.g. rural areas) to high-risk culture (e.g. urban areas) will follow the life-style of the new culture and demonstrate increased risk for the non-communicable diseases.
- Due to the progressive increase in urbanization, non-communicable diseases have shown increase in prevalence.

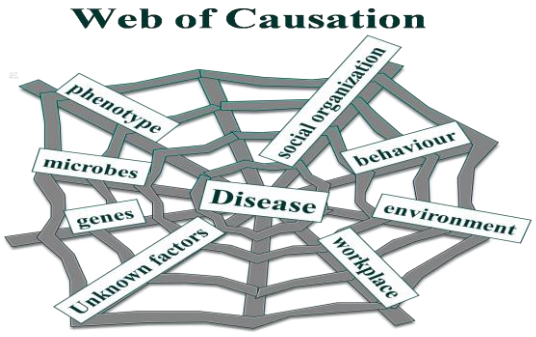
6. International communication:

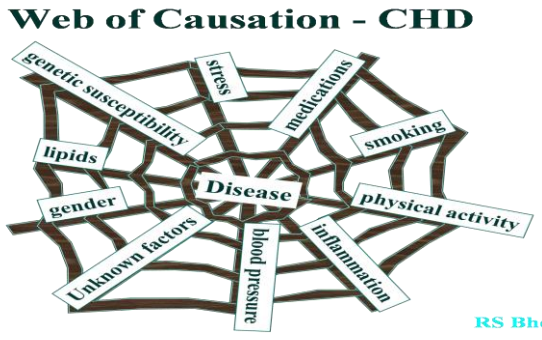
- ❖ International communication, multinational business and new food technologies have resulted in introduction of new life-styles and new food products in the communities and predispose to the risks of non-communicable diseases:
- ❖ Communication through the mass media/satellites/internet, overseas travel, and international food business and marketing facilitate the introduction of different concepts and dietary pattern which predispose to exposure to the risk factors to the non communicable diseases.
- ❖ Adolescents and youth are population segments who are exposed to such modernization in concepts and behavior.

Web of Causation model

- ❑ Web of Causation is devised to address chronic disease
- ❑ can also be applied to disease due to mulifactorial nature of causation in many diseases.

1. There is no single cause
2. Causes of disease are interacting
3. Illustrates the interconnectedness of possible causes





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PREVENTION AND CONTROL OF NCD

PRIMARY PREVENTION

Action taken prior to the onset of disease which removes the possibility that the disease will ever occur.

Can be divided into population & high risk strategy.

Interventions:

- ✓ Health promotion
- ✓ Specific protection
- ✓ Adequate nutrition
- ✓ Safe water and sanitation
- ✓ Life style modifications

Medical Nutrition Therapy: Diet prescription [Main stay of treatment]

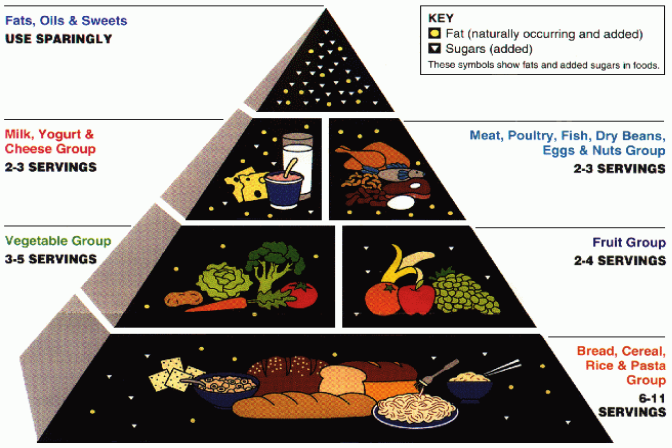
Diet Should be

- individualized,
- realistic
- flexible
- suitable to patients life style
- Patient educated & at regular intervals compliance judged

Diet Control

- ❖ Avoid Starchy food
- ❖ More Vegetables & Fruits
- ❖ Choose From Food Pyramid
- ❖ Benefits of 10% Weight Loss

Identify high risk groups	Nutritional Education	Healthy lifestyle
❑ Cases with positive family history specially 1st degree relatives. ❑ Obese individuals ❑ Premature atherosclerosis.	Diet modification of high risk groups ❑ Minimize carbohydrate over consumption ❑ Avoid high fat diet ❑ Encourage breast feeding ❑ Control of obesity & maintenance of optimal body weight . ❑ Increase intake of high fiber diet	❑ Promotion of physical exercise . ❑ Avoid use of diabetogenic drugs among high risk individuals ❑ Prevention and control measures of viral infections complicated with diabetes or malignancies through : - General preventive measures - Specific prevention by immunization as mass MMR &HBV immunization . **Exercise Advantages** ▪ Benefits glycemic control ▪ Improves insulin sensitivity ▪ Builds physical fitness ▪ Optimizes body weight ▪ Gives psychological well being



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SECONDARY PREVENTION	TERTIARY PREVENTION
❑ Action which halts the progress of the disease at its incipient stage and prevents complications (Mostly curative). Disadvantage: ❑ patient has already suffered mental & physical anguish & community to loss of production. ❑ Often more expensive &less effective. Intervention : EARLY DIAGNOSIS AND TREATMENT Screening For early case finding: ▪ NCD screening is recommended for many people specially for those with any of several risk factors . ▪ The screening test should be highly valid & reliable ▪ NCD Universal screening for adults at age 40 or 50, and often periodically thereafter may be recommended . ▪ Earlier screening is typically recommended for those with risk factors such as obesity , HT , family history of , high-risk ethnicity .	All measures available to reduce impairments & disabilities, minimize suffering due to departure from good health & promote patient's adjustment to irremediable conditions . Intervention : DISABILITY LIMITATION AND REHABILITATION ❑ Prevention of diabetes complications . ❑ Diabetes can affect many parts of the body and can lead to serious complications such as blindness, kidney damage, and lower-limb amputations. ❑ Working together, people with diabetes and their health care providers can reduce the occurrence of these and other diabetes complications by controlling the levels of blood glucose, blood pressure, and blood lipids and by receiving other preventive care practices in a timely manner.

RISK FACTORS OF NCDS

Risk Factors: any attribute, characteristic or exposure of an individual, which increase the likelihood of developing a disease or injury.

Life style: Life style is the way people live. It includes their behavior and beliefs, cultural values, activities and personal habits e.g. smoking.

Non modifiable	Modifiable	
❑ Age	Tobacco use	Raised blood pressure
❑ Sex	Alcohol consumption	Diabetes
❑ Genetic Predisposition	Raised lipid levels	Behavioral
❑ Family history	Overweight	Infections
❑ Some Environmental Characters	Low fruit/vegetable intake	Environmental (Polluted environment)
	Physical inactivity	

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CONTROL OF RISK FACTORS

Control Of DM	Blood Pressure Control	Control Of Blood Lipids
❖ It aims to maintain serum glucose level within normal 1. Lifestyle and diet modification . 2. Oral hypoglycemic 3. Insulin use .	- can reduce CVD (heart disease & stroke) by approximately 33% to 50% - can reduce microvascular disease (eye, kidney, and nerve disease) by approximately 33%. - In general, for every 10 (mm Hg) reduction in systolic blood pressure, the risk for any complication related to diabetes ↓ by 12%.	- Improved control of cholesterol or blood lipids (for example, HDL, LDL, and triglycerides) can reduce cardiovascular complications by 20% to 50%.