



Al-Mustaqbal University / Nursing College
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Epidemiology

Lecture 2

Natural History of a Diseases

By

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Natural history of disease

The WHO defines health as follows: "Health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity" (WHO, 1974).

Health refers to the total well-being of the whole person. (Telstar Innovations, Inc., 2000).

The —natural history of disease

refers to the progression of disease process in an individual over time, in the absence of intervention.

There are four stages:

1. Stage of susceptibility
2. Stage of pre-symptomatic (sub-clinical) disease
3. Stage of clinical disease
4. Stage of recovery , disability or death

1. Stage of susceptibility

- In this stage, disease has not yet developed, but the groundwork has been laid by the presence of factors that service its occurrence.
- Example: unvaccinated child is susceptible to measles.

2 Stage of pre-symptomatic (sub-clinical) disease

- In this stage there are no manifestations of the disease but pathologic changes (damages) have started to occur in the body. The disease can only be detected through special tests since the signs and symptoms of the disease are not present.
- Examples: Detection of antibodies against HIV (**human immunodeficiency virus**) in an apparently healthy person.
- Oval of intestinal parasite in the stool of apparently healthy children.

3. The Clinical stage

At this stage the person has developed signs and symptoms of the disease. The clinical stage of different diseases differs in duration, severity and outcome. The outcomes of this stage may be recovery, disability or death.

Examples:

- Common cold has a short and mild clinical stage and almost everyone recovers quickly.
- Polio has a severe clinical stage and many patients develop paralysis becoming disabled for the rest of their lives.
- Rabies has a relatively short but severe clinical stage and almost always results in death.
- Diabetes Mellitus has a relatively longer clinical stage and eventually results in death if the patient is not properly treated.

4. Stage of recovery, disability or death

Some diseases run their course and then resolve completely either naturally or by treatment. In others the disease may result in a remaining defect, leaving the person disabled for a short or longer duration. Still, other diseases will end in death. Disability is limitation of a person's activities including his role as a parent . etc

Examples:

- Meningitis may result in deafness. Meningitis may also result in death.

Prevention

Prevention is to make the occurrence of some thing like disease, accident, which is expected, impossible.

This can be achieved at three levels (levels of prevention)

- 1- Primary prevention
2. Secondary prevention
3. Tertiary prevention

Primary prevention

Measures are aimed at individuals in the Susceptibility stage

All measures that are applicable before the onset of disease through:

- Health promotion.
- Specific protection.

a. Health promotion

Health promotion.: The process of enabling people to increase control over their health and its determinants, and thereby improve their health.

❖ Health promotion consists of all the activities which are not aimed at any specific diseases but serve to improve the host factor in epidemiologic triangle.

1. Health education.
2. Environmental modification (reducing air pollution, safe water, sanitary latrines, control of insects and rodents, improving housing).
3. Engineering lifestyle (antismoking campaign.).
4. Genetic and marriage counseling (to prevent congenital diseases, i.e. Thalassaemia).

b. Specific protection.

The measures which aim specific diseases. The idea of specific protection, especially that killer diseases could be stopped by simple interventions such as

- Immunization.**
- Nutrient supplementation (vitamin A, iodine).**
- prophylaxis (prior medication to at risk population).**
- Protection against occupational hazards (masks for workers).**
- Avoiding allergens (for asthmatics).**

Secondary prevention

Measures focus on the Sub-clinical stage and the early clinical stage. This is applied after the onset of disease through

- early detection:
- prompt treatment of disease.

Secondary prevention

- **Early detection**

1. Screening tests are done in healthy population of a community.
2. Case finding means diagnosing something else in patient other than his chief complaint.
3. Special medical examination of risk groups.

- **Prompt treatment:**

A quick cure, helps the patient as well as stops further spread of disease.

Tertiary prevention

- Measures are directed mainly at the recovery, disability or death stage.
- Their purpose is to reduce or eliminate long-term impairments and disabilities, minimize suffering, optimize function.

Tertiary prevention

Tertiary prevention through limitation of disability and rehabilitation.

There are four dimensions of rehabilitation

1. **Medical:** If possible restoration of function (i.e physiotherapy)
2. **Vocational:** Restoration of capacity to earn a livelihood (training and creating jobs)
3. **Social:** Reintroduction into family, and society as a whole and involving everyone to maintain the same relationship with this person.
4. **Psychic:** Restoration of self-esteem and confidence

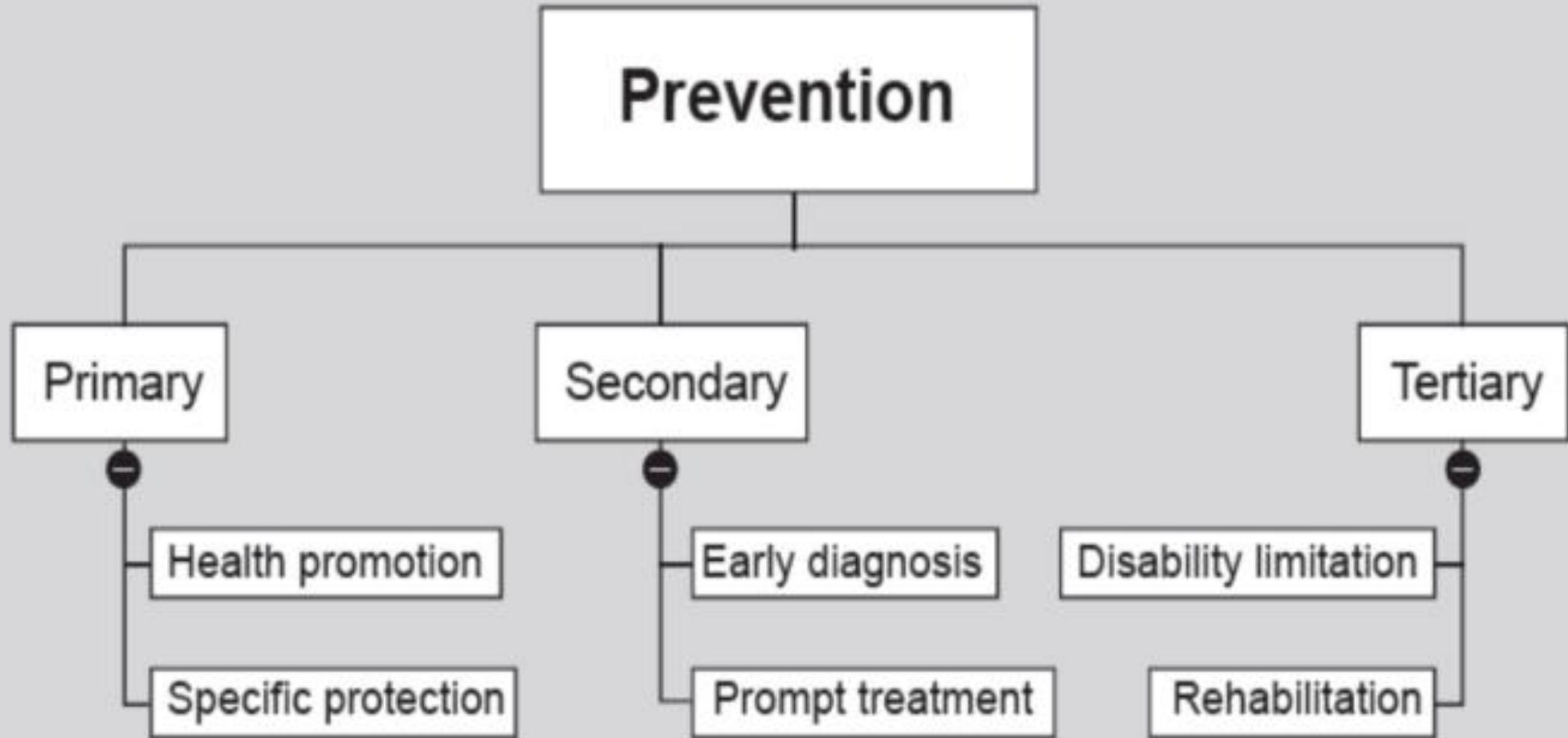


Figure 1.6. Three levels of prevention

Importance of Understanding the Natural History:

- **Public Health Interventions:** Helps identify stages where prevention is possible (e.g., vaccination during the susceptibility stage or screening in the presymptomatic stage).
- **Clinical Decisions:** Guides diagnosis, treatment, and prediction.
- **Research:** Provides a framework for studying disease mechanisms and potential therapies.

Natural History of Type 2 Diabetes Mellitus (T2DM):

1. Susceptibility Stage

.Predisposing Factors: Genetic predisposition, family history, and environmental factors like sedentary lifestyle and poor diet.

.No Symptoms: Individuals are generally asymptomatic, but underlying factors like insulin resistance may begin to develop.

2 .Subclinical (Preclinical) Stage

- **Pathophysiology:** Insulin resistance starts in muscle, liver, and adipose tissues, leading to compensatory hyperinsulinemia. Over time, beta-cell function in the pancreas declines.
- **Prediabetes:** Blood glucose levels are elevated but do not meet the diagnostic criteria for diabetes (e.g., impaired fasting glucose or impaired glucose tolerance).
- **Symptoms:** Usually asymptomatic, though some may experience mild fatigue or increased hunger.

3. Clinical Stage

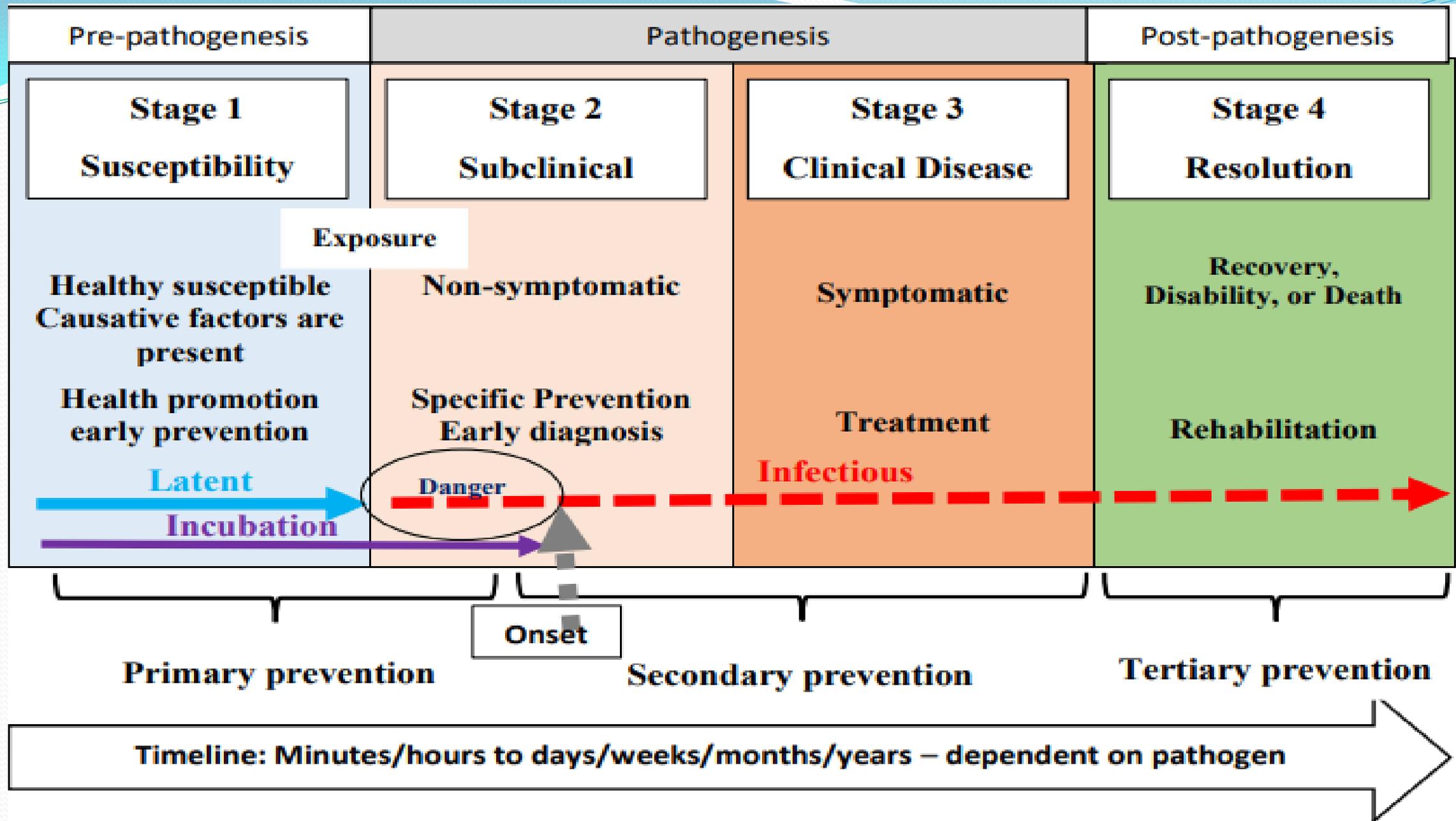
- **Diagnosis:** Blood glucose levels meet diagnostic thresholds for diabetes (e.g., fasting glucose ≥ 126 mg/dL or HbA_{1c} $\geq 6.5\%$).
- **Symptoms:** Polyuria (frequent urination), polydipsia (excessive thirst), polyphagia (increased hunger), fatigue, and blurred vision.
- **Complications:** If untreated, acute complications like hyperosmolar hyperglycemic state (HHS) may develop.

4. Chronic Complications Stage

- **Microvascular Complications:** Retinopathy, nephropathy, and neuropathy due to prolonged hyperglycemia and small blood vessel damage.
- **Macrovascular Complications:** Increased risk of cardiovascular disease, stroke, and peripheral artery disease due to larger blood vessel damage.
- **Quality of Life:** Reduced due to complications and associated morbidity.

5. Terminal Stage

- **End-Stage Complications:** End-stage renal disease (ESRD), blindness, amputations due to diabetic foot ulcers, or death from cardiovascular events.
- This progression outlines how T2DM evolves without medical intervention. Early detection and lifestyle modifications, alongside pharmacological treatments, can alter its natural history and prevent or delay complications.





THANK YOU