CONCEPT OF HEALTH AND DISEASE

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LEARNING OBJECTIVES

   From ancient medicine to Health for All.

3. Concepts of Health
   - Definition of Health
   - Dimensions of Health
   - Determinants of Health
   - Causation of disease
   - Natural History of Disease
Stages seen in the history of medicine:

- Stone age
- 5000 BC: Indian medicine
- 2700 BC: Chinese medicine (system of barefoot doctor, System of acupuncture)
- 2000 BC: Egyptian medicine (manuscript of papyrus)
Indian Medicine

Egyptian Medicine

Chinese Medicine

Mesopotamian Medicine
EVOLUTION OF COMMUNITY MEDICINE (HISTORY OF MEDICINE)

Stages seen in the history of medicine:
- 2000 BC: Mesopotamian medicine (Babylonian code of Hammurabi)
- 460 BC: Greek medicine (Hygiea daughter of Aesculapius, Hippocratic oath)
- Arabo-Persian Medicine (in Alexandria)
- 130 AD: Roman medicine (Galen)
- 500 to 1500 AD: Middle ages (Dark ages of medicine)
EVOLUTION OF COMMUNITY MEDICINE (HISTORY OF MEDICINE)

- 1860: Germ theory (anthrax by Robert Koch)
- 1880: Typhoid & pneumonia 1882 TB
- 1883: Birth of preventive medicine
- 1883: Cholera vaccine, 1892 diptheria antitoxin
- 1898: Malaria transmission by Ross
1. Disease control Phase (1880-1920)
2. Health Promotional Phase (1920-1960)
CONCEPT OF HEALTH

- Biomedical Concept.
- Ecological Concept
- Psychosocial Concept
- Holistic Concept
DEFINITION OF HEALTH

WHO Definition

“Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity...... that allows a person to lead a socially and economically productive life.”

Criticism:

Health is not a “state”.
More idealistic than realistic.
DIMENSIONS OF HEALTH

1. Physical Dimension.
2. Mental Dimension.
3. Social Dimension.
4. Spiritual Dimension.
5. Emotional Dimension.
6. Vocational Dimension.
7. Others.
Perfect functioning of the body.

A state in which every cell and every organ is functioning at optimum capacity and in perfect harmony with the rest of the body.

Signs of Physical Health in an individual:

Evaluation of Physical Health

- At Individual Level
- At Community Level.
MENTAL DIMENSION OF HEALTH

“... A state of balance between the individual and the surrounding world, a state of harmony between oneself and others, a coexistence between the realities of the self and that of other people and that of the environment.”

- Psychosocial Vs. Psychosomatic disorders.
- Characteristics of a mentally healthy person:
- Assessment of mental health:
Social well-being has been defined as “the quantity and quality of an individual’s interpersonal ties and the extent of involvement with the community.”
Spiritual health refers to the part of the individual that reaches out and strives for meaning and purpose in life.

It seems to defy a clear definition.

It includes integrity, principles and ethics, purpose in life, commitment to some higher being and belief in concepts that are not subject to “state of the art” explanation.
EMOTIONAL DIMENSION OF HEALTH

- A separate dimension from mental dimension.
- Mental health can be seen as “knowing” or “cognition” and emotional health relates to “feeling”.
When work is fully adapted to human goals, capacities and limitations, work often plays a role in promoting both physical and mental health.

Goal achievement and self-realization in work lead to satisfaction and enhanced self-esteem.
Others/ Non-Medical Dimensions of Health

- Cultural dimension
- Socioeconomic dimension
- Environmental dimension
- Educational dimension
- Nutritional dimension
- Curative dimension
- Preventive dimension
Determinants of Health

- **Biological Determinants**
  - Genetic makeup of an individual.

- **Behavioural and socio-cultural conditions**
  - Lifestyle (attitudes, social values and activities, cultural and behavioural patterns and lifelong personal habits, etc)
  - Developed countries (coronary heart disease, obesity, lung cancer, drug addiction)
  - Developing Countries (lack of sanitation, poor nutrition, personal hygienic habits, cultural customs)
Determinants of Health (Contd)

- Environment
- Internal
- External (macro- or micro- environment) Biological, physical and psychosocial environment.
- Socio-economic conditions
- Health Services
- Aging of the population
- Gender
- Other Factors
Concept of Health and Disease

CAUSATION OF DISEASE
4. Concepts of disease
   - Spectrum of disease
   - Iceberg Phenomenon
   - Natural history of Disease
5. Causation of disease
   All Theories
   - Epidemiological Triad
   - Wheel model
   - Diamond model
   - Multifactorial Causation
   - Web of Causation
6. Levels of Prevention
SPECTRUM OF DISEASE

- A graphic representation of variations in the manifestations of disease.
- At one end are subclinical infections and at the other end are fatal illnesses. In the middle lie illnesses ranging from mild to severe.
- For almost all diseases, there exists a spectrum of severity with few exceptions such as Rabies.
- In infectious diseases, the spectrum of disease is also referred to as the “gradient of infection”.

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Disease:

“a condition in which body health is impaired, a departure from a state of health, an alteration of the human body interrupting the performance of vital functions.” (Webster’s Dictionary).

“a condition of the body or some part or organ of the body in which its functions are disrupted or deranged.” (Oxford Dictionary).
From ecological point of view, disease is defined as:
“a maladjustment of the human organism to the environment.”

From a sociological point of view:
“a social phenomenon, occurring in all societies and defined and fought in terms of the particular cultural forces prevalent in the society.”

Literally disease is “without ease”—Dis-ease—when something is wrong with bodily function.
One-to-one relationship between causal agent and disease.

Disease Agent → Man → Disease

Objections: single agent is not responsible in most cases.
Focus on different classes of factors especially with regard to infectious diseases.
THE WHEEL MODEL

MAN

Genetic core

Social Environment

Physical Environment

Biological Environment
The Wheel model presents the interaction b/w host & environment. Agent is not mentioned as it is considered part of biological environment.

The size varies with disease

Eg, in Down’s Syndrome (hereditary condition) the genetic core would be large & in chicken pox genetic core would be small as it is less important as compared to immune status of host & role of biological environment.
DIAMOND MODEL

- Diamond-shaped
- 5 corners
  1. Genetic constitution
  2. Socio-economic Environment
  3. Personal Behaviour
  4. Life Style
  5. Health Care Resources
Diamond Model
Multiple factors
Linked to lifestyle and human behaviour.
Purpose of knowing multiple factors of disease: to quantify and arrange them in sequence of priority (prioritization) for modification or amelioration to prevent or control disease.
Model of disease causation suggested by MacMahon and Pugh. (Epidemiologic Principles and Methods).

This model considers all the predisposing factors of any type and their complex interrelationships with each other. Eg, Myocardial Infarction.

To study the clusters of causes and combinations of effects and how they relate to each other.
FIG. 9
Web of casuation for myocardial infarction
WEB OF CAUSATION (CONT'D)

- Advantage: a model which shows a variety of possible interventions that could be taken which might reduce the occurrence of MI.
- Sometimes removal or elimination of just only one link or chain may be sufficient to control disease provided that link is sufficiently important in the pathogenic process.
- Relative importance of these factors maybe expressed in terms of ‘relative risk’.
Concept of Health and Disease

NATURAL HISTORY OF DISEASE
The way in which a disease evolves over time from the earliest stage of its pathogenesis phase to its termination as recovery, disability or death, in the absence of treatment or prevention.

Best established by cohort studies.

Consists of two phases: Pre-pathogenesis phase and Pathogenesis phase.
1. PRE-PATHOGENESIS PHASE

- The period preliminary to the onset of disease in man.
- Disease agent has not yet entered man/ has not been able to initiate disease.
- The factors which favour the interaction of disease agent with human host are already existing in the environment.
- Presence / Interaction
2. PATHOGENESIS PHASE

- Characterized by entry of the disease agent in the susceptible human host.
- Incubation Period → Early and late pathogenesis phases → Outcome (recovery, disability or death).
- Pathogenesis modified by intervention measures such as immunization or chemotherapy.
2. PATHOGENESIS PHASE

- Infection may be clinical or subclinical/ typical or atypical or may become a carrier with or without having developed clinical disease.
- In Chronic Diseases (eg coronary heart disease, hypertension, cancer) early pathogenesis phase is less dramatic.
- In late pathogenesis phase, the symptoms become manifest.
FIG. 10
Natural history of disease
(From Preventive Medicine for the Doctor in His Community, by Leavell & Clark with permission of McGraw-Hill Book Co.)
Agent : A substance, living or non-living, or a force, tangible or intangible, the excessive presence or the relative lack of which may initiate or perpetuate a disease process.

Single agent/ independent alternative agents or factors.
Disease Agents are classified broadly into the following groups:

1. Biological agents:
   Infectivity, pathogenicity, virulence.

2. Nutrient agents:

3. Physical agents: heat, cold, humidity, etc.

4. Chemical agents:
   i) Endogenous: eg urea, bilirubin, ketones, uric acid, etc.
   ii) Exogenous: allergens, metals, fumes, dust, insecticides.
5. Mechanical agents: crushing, tearing, sprains, dislocations, even death.
6. Absence or insufficiency or excess of a factor necessary to health.
i. Chemical factors:
ii. Nutrients:
iii. Lack of structure:
iv. Lack of part of structure
v. Chromosomal factors:
vi. Immunological factors:
7. Social agents: poverty, smoking, abuse of drugs and alcohol, unhealthy lifestyles, social isolation.
HOST FACTORS (INTRINSIC)

“Soil” and “Seed”.

Host Factors:

i. Demographic characteristics:

ii. Biological characteristics:

iii. Social and economic characteristics:

iv. Lifestyle factors:
ENVIRONMENTAL FACTORS (EXTRINSIC)

- **Macro-environment**: “All that which is external to the individual human host, living or non-living, and with which he is in constant interaction”.
- Includes air, water, food and housing, etc.
- **Micro-environment**?
**Components of Environment**

- *Physical Environment*: Includes non-living things and physical factors (eg, air, water, soil, housing, climate, geography, heat, light, noise, debris, radiation, etc.)

  New health problems due to air pollution, water pollution, noise pollution, urbanization, radiation hazards, etc. exposure to electromagnetic energy.
**COMPONENTS OF ENVIRONMENT**

- *Biological environment.*
  
  Living things around man including man himself. Viruses and other microbial agents, insects, rodents, animals and plants.
  
  These act as disease-producing agents, reservoirs of infection, intermediate hosts and vectors of disease.
Psychosocial environment:

The complex of psychosocial factors which are defined as “those factors affecting personal health, healthcare and community well-being that stem from the psychosocial make-up of individuals and the structure and functions of social groups.”

Cultural values, customs, habits, beliefs, attitudes, morals, religion, education, lifestyles, community life, health services, social and political organization.
RISK FACTORS

- Risk factors Vs Causative agent.
  i. An attribute or exposure that is significantly associated with the development of a disease.
  ii. A determinant that can be modified by intervention thereby reducing the possibility of occurrence of disease or other specified outcomes.
- Risk factors maybe additive or synergistic.
- May be truly causative/ contributory/ predictive only in a statistical sense.
- Modifiable/ Non-modifiable or immutable.
ICEBERG OF DISEASE

- Disease in a community may be compared with an iceberg.
- Floating tip --------- clinical cases.
- Submerged portion -------- hidden mass of disease, i.e., latent, inapparent, presymptomatic and undiagnosed cases and carriers in the community.
- Waterline -------- demarcation between apparent and inapparent disease.
Iceberg
Phenomenon of disease

- Iceberg phenomenon of disease
- Tip of the iceberg: CLINICAL DISEASE
- Submerged portion: HIDDEN BURDEN OF DISEASE
CONCEPTS OF PREVENTION

The objective of preventive medicine is to intercept or oppose the “cause” and thereby the disease process.
Prevention is defined in terms of four levels:

1. Primordial prevention.
2. Primary prevention.
Prevention of emergence or development of risk factors in countries or population groups in which they have not yet appeared.

Eg. Efforts directed towards discouraging children from adopting harmful lifestyles.

Intervention: individual and mass education.
PRIMARY PREVENTION

- Action taken prior to the onset of disease which removes the possibility that disease will ever occur.
- Measures designed to promote general health and well-being and quality of life of people or by specific protective measures.
- It aims at elimination or modification of “risk factors” of disease.
The WHO recommends the following approaches for the primary prevention of chronic diseases where the risk factors are established:

- Population (mass) strategy.
- High Risk Strategy.
SECONDARY PREVENTION

- Action which halts the progress at its incipient stage and prevents complications.
- Specific interventions are:
  - Early diagnosis (by screening tests, case finding methods)
  - Adequate prompt treatment.

Since it provides protection for the uninfected, so it is secondary prevention for the infected individuals and primary prevention for their potential contacts.
TERTIARY PREVENTION

- All means available to reduce or limit impairments or disabilities, minimise suffering caused by existing departures from good health and to promote the patient’s adjustment to irremediable conditions.
- Intervention in the late pathogenesis phase.
FIG. 10
Natural history of disease
(From Preventive Medicine for the Doctor in His Community, by Leavell & Clark with permission of McGraw-Hill Book Co.)
Concept of Health and Disease

MODES OF INTERVENTION
MODES OF INTERVENTION

- Intervention:

- Defined as any attempt to intervene or interrupt the usual sequence in the development of disease in man.

- “Aim is to oppose or intercept a cause to prevent or dissipate its effect.”

- Five modes of intervention have been described:
1. Health Promotion

- The process of allowing people to increase control over and to improve health.
- Strengthens the host.
- Approaches:
  - i) Health education
  - ii) Environmental modifications
  - iii) Nutritional interventions
  - iv) Lifestyle and behavioural changes.
Health Education:
- The most cost-effective intervention.
- Little or no medical intervention.
- Providing medical, psychological and related knowledge.
- Target groups: general public, patients, priority groups, health providers, community leaders and decision-makers.
Environmental modifications

- Non-clinical and do not involve the physician.
- Eg, provision of safe water, installation of sanitary latrines, control of insects and rodents, improvement of latrines.

Nutritional interventions

Food distribution and nutrition improvement of vulnerable group, child feeding programmes, food fortification, nutrition education.
1. HEALTH PROMOTION (CONT'D)

- **Lifestyle and Behavioral changes**
- To identify individuals at high-risk and to direct appropriate messages to them.
- Goals must be identified and means or alternative means of accomplishing them should be explored.
- It involves organizational, political, social or economic interventions designed to facilitate environmental and behavioral adaptations that will improve or promote health.
2. SPECIFIC PROTECTION

i) immunization

ii) use of specific nutrients.

iii) chemoprophylaxis.

iv) protection against occupational hazards.

v) protection against accidents

vi) protection against carcinogens

vii) avoidance of allergans

viii) control of specific hazards in the general environment eg, noise pollution or air pollution.

viii) control of consumer product quality and safety of food, drugs and cosmetics, etc.
3. EARLY DIAGNOSIS AND TREATMENT

- The detection of disturbances of homeostatic and compensatory mechanism while biochemical, morphological and functional changes are still reversible.
- For Tuberculosis, leprosy and STD, early diagnosis and treatment are the only effective modes of transmission.
- It shortens considerably the period of communicability and reduces the mortality from acute communicable diseases.
- Rationale behind Mass Treatment.
Its objective is to prevent or halt the transition of the disease process from impairment to handicap.

It is applicable only late in the pathogenesis phase.

The sequence of events leading to disability and handicap have been stated as follows:

Disease  Impairment  Disability  Handicap
Impairment

- Any loss or abnormality of psychological, physiological, or anatomical structure or function.
- eg. Loss of foot, defective vision, mental retardation.
- May be visible or invisible, temporary or permanent, progressive or regressive.
- Primary impairment may lead to secondary impairment, eg, Damage to peripheral nerves may lead to cutaneous ulcers.
- Medical treatment has greater implication in treating impairments than social and environmental components.
4. Disability Limitation

- Disability
  - “Any restriction or lack of ability to perform an activity in the manner or within the range considered normal for a human being.”

- Intervention in disability will be often social or environmental as well as medical.

- Issues to be considered: dependence and cost.
4. Disability Limitation

- **Handicap**
  A disadvantage for a given individual, resulting from an impairment or a disability that limits or prevents the fulfillment of a role that is normal (depending on age, sex, and social and cultural factors) for that individual.

- Social and environmental components in terms of dependence and social cost.

- “Difference between disability limitation and disability prevention”
4. REHABILITATION

“The combined and coordinated use of medical, social, educational and vocational measures for training and retraining the individual to the highest possible level of functional ability.”

Aim: reduce the impact of disabilities and handicaps to achieve social integration.

Social Integration: “the active participation of disabled and handicapped people in the mainstream of community life.”
The following areas of concern have been identified:

a) *Medical Rehabilitation*: restoration of function.

b) *Vocational Rehabilitation*: restoration of the capacity to earn a livelihood

c) *Social Rehabilitation*: restoration of family and social relationships

d) *Psychological Rehabilitation*: restoration of personal dignity and confidence.
4. REHABILITATION

- **Aim:** “to restore and retrain the individual to live and work within the limits of his disability but to the hilt of his capacity.”
- **Examples:** Establishing schools for the blind, provision of aids for the crippled, reconstructive surgery in leprosy, muscle re-education and graded exercises in neurological disorders like polio, change of profession and modification of life in general in the case of tuberculosis, cardiac patients and others.
### Natural History of Disease

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<tr>
<th>Interrelation of Agent, Host and Environmental Factor</th>
<th>Reaction of the host to the stimulus</th>
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<tr>
<td>Production of stimulus</td>
<td>Early pathogenesis</td>
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<td>Pre-pathogenesis period</td>
<td>Period of Pathogenesis</td>
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<td>Health Promotion</td>
<td>Specific protection</td>
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<td>Health Education</td>
<td>Use of specific immunization</td>
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<tr>
<td>Good standard of nutrition adjusted to developmental phases of life</td>
<td>Attention to personal hygiene</td>
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<td>Attention of personality development</td>
<td>Use of environmental sanitation</td>
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<tr>
<td>Provision of adequate housing recreation &amp; agreeable working cond.</td>
<td>Protection against occupational hazards</td>
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<tr>
<td>Marriage counseling &amp; sex education</td>
<td>Protection from accidents</td>
</tr>
<tr>
<td>Genetics</td>
<td>Use of specific nutrients</td>
</tr>
<tr>
<td>Periodic selective examination</td>
<td>Protection of carcinogens</td>
</tr>
<tr>
<td>Avoidance of allergens</td>
<td>Adequate treatment to arrest the disease process and to prevent further complications</td>
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<tr>
<td>• Primary prevention</td>
<td>• Secondary Prevention</td>
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<tr>
<td>• Secondary Prevention</td>
<td>• Tertiary prevention</td>
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#### Period of Pathogenesis
- Early diagnosis & prompt treatment
- Disability limitation
- Rehabilitation

- Case finding measures individual & mass
- Screening surveys
- Selective examinations objectives
- To cure & prevent disease process
- To prevent the spread of a communicable diseases
- To prevent complications & sequel
- To shorten period of disability
- Provision of facilities to limit disability and to prevent death
- Provision of hospital & community facilities for retaining & education for maximum use of remaining capacities
- Education of public & industry the rehabilitated
- As full employment as possible
- Selective placement
- Work therapy in hospitals
- Use of shelter colony

- Health Education
- Good standard of nutrition adjusted to developmental phases of life
- Attention of personality development
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2. Public Health

Definitions:
Preventive Medicine
Public Health
Comprehensive Health
Integrated Health
Community Medicine
Social Medicine
Community diagnosis
Community Treatment
• Development of Public Health in Pakistan
• Economics & Health
**Important Definitions**

- **Hygiene**: the science of health and embraces all factors which contribute to healthful living.

- **Public Health**: the science and art of preventing disease, prolonging life, and promoting health and efficiency through organized community efforts ... to ensure for every individual a standard of living adequate for the maintenance of health, so organizing these efforts so as to enable every citizen to achieve his birthright of health and longevity. (Winslow, 1920).
Preventive medicine:
“Not only the organized activities of the community to prevent occurrence as well as progression of disease and disability, mental and physical but also the timely application of all means to promote the health of the individuals, and of the community as a whole including prophylaxis, health education and similar work done by a good doctor in looking after individuals and families.”
Social Medicine:

“The study of man as a social being in his total environment.” It includes all the factors affecting the distribution of health and ill-health in population including the use of health services.

Social medicine stands upon two pillars: sociology and medicine. Social medicine, by derivation is concerned with the health of groups of individuals ....with a view to create, promote, preserve and maintain optimum health.
Community Medicine:
- The study of health and disease in the population of a defined community or group. Its goal is to identify the health problems and needs of defined population (community diagnosis) and to plan, implement, and evaluate the extent to which health measures effectively meet these needs.
Definition:
- Health and disease lie along a continuum and there is no single cut-off point. The lowest point on the health-disease spectrum is death and the highest point corresponds to the WHO definition of “Positive Health.”
Spectrum Of Health

- Positive health
  - Better health
    - Freedom from sickness

- Unrecognized sickness
  - Mild sickness
  - Severe sickness
    - Death