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4th Edition

An Ultimate Guide to COMMUNITY MEDICINE

As per the Competency- based Medical Education Curriculum (NMC)

Prithwiraj Maiti
Bismoy Mondal

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Chapter
4

Short Notes

Authors' Note

In this chapter, we have given all the short notes important for university examinations. For the less commonly asked short notes, we have given a separate heading "Try Yourself" in the content, which you may read from any of the standard textbook of community medicine.

MAN AND DISEASE

Family Physician

Family physician is the specialist who provides comprehensive and continuous primary health care to all members of the family.

Roles and Main Functions of a Family Physician

A. *Patient care role*:
   - Comprehensive health care
   - Primary health care
   - Continuous care (womb to tomb)
   - Referral services
   - First aid
   - Medicolegal services.

B. *Coordinating role*: Between patient and their families, with hospital specialists to whom the patient is referred for specific care, as well as with all community agencies, welfare agencies, national health program, developmental program, etc.

C. *Community care role*: Identify problems and felt needs of the community and take necessary actions, in order to equip the community so that they can demand and utilize appropriate health and allied interventions like water supply, sanitation, nutrition, reproductive and child health services.

Social Medicine

Definition

Social medicine is the study of man as a social being in his total environment comprising physical, biological and social environment.

Its focus is on the health of the community as a whole.

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Meaning of Social Medicine (According to McKeown)

Social medicine is an expression of humanitarian tradition in medicine and people read into it any interpretation consistent with their own aspirations and interests.

In broad sense	*In restricted sense*
• Care of patients • Prevention of disease • Administration of medical services • Any subject in the extensive field of health and welfare	• A body of knowledge embodied in epidemiology • The study of medical needs or medical care of society

- *Nomenclature*: The term coined by Jules Guerin.
- Concept first developed by Neumann and Virchow.
- *Social medicine deals with*:
  - Understanding how social and economic conditions impact health, disease and the practice of medicine and
  - Fostering conditions in which this understanding can lead to a healthier society.

Components

Social anatomy, physiology, pathology and therapy.

Application

- Development of epidemiological methods
- Their application to the investigations of disease.

Limitation

Social medicine was criticized because it was mostly virtually isolated from the service world and confined mostly to academic study of health services and chronic disease.

Significance

The field of social medicine is most commonly addressed today by public health efforts to understand what are known as social determinants of health.

Community Diagnosis

Definition

Community diagnosis generally refers to the identification and quantification of health problems in a community as a whole in terms of mortality and morbidity rates and ratios, and identification of their correlates for the purpose of defining those at risk or those in need of health care.

Aim: To provide preventive and promotive interventions to the community.

Method of collection of data from the community:

- Discussion with local community decision maker, community member, health and health-related personnel
- Observational visit to the community: To observe environmental situation
- Sample surveys and scrutiny of health service records
- Transect walk.

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(*Transect walk* is defined as an exploratory walk undertaken by the team along with local community member to observe, discuss and understand local matters with them, e.g. sanitary measures system, water source, exposure to social life and the culture, customs of the community members).

Type of Information to be Collected

- Demographic characteristics
- Mortality and morbidity
- Socioeconomic factors
- Physical environmental factors
- Health problems felt by the community.

Tools of Data Collection

- Interview schedule
- Questionnaire
- Observational checklists.

Methods of Data Collection

- Survey
- Discussion
- Observation
- Record analysis
- Interview
- Clinical examination.

Significance

Community diagnosis helps to prioritize the health problems and implement control measures.

CONCEPT OF HEALTH AND DISEASE

Quality of Life

Definition

WHO (1997) defines Quality of Life as individuals' perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns.

Difference between Quality of Life and Level of Living

Quality of life comprises one individual's subjective evaluation about "well-being" and level of living comprises some objective criteria of the concept of well-being.

Measurement of "Quality of Life"

Quality of life is measured by means of some indices. The most important of those are:

- Physical quality of life index (PQLI) and
- Human development index (HDI).

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Physical Quality of Life Index (PQLI)

(Mnemonic: ILL-1)

Components of PQLI	*Upper limit*	*Lower limit*
Infant mortality	100	0
Life expectancy at age 1	100	0
Literacy	100	0

So, PQLI also has an upper limit of 100 and a lower limit of 0.
India: PQLI-65

Note:

- PQLI is a subjective component.
- PQLI does not calculate economic growth of a country (PQLI does not consider income) but it measures the results of social/economic/political policies undertaken by a country.

Human Development Index (HDI)

How to calculate HDI:

Dimension	*A long and healthy life*	*Knowledge*	*A decent standard of living*
Indicator	Life expectancy at birth	Mean years of schooling and expected years of schooling	GNI per capita in purchasing power parity [PPP] in US $
Dimension index	Life expectancy index	Education index	GNI index

HDI = (Life expectancy index × Education index × GNI index)⅓

How to calculate dimension indices:

$$\text{Dimension index} = \frac{(\text{Actual value} - \text{Minimum value})}{(\text{Maximum value} - \text{Minimum value})}$$

The "Maximum value" refers to the highest values observed in between the years 1980–2011 in one of the countries. The lowest values are set as follows:

Dimension	*Minimum values*
Life expectancy	20
Mean years of schooling	0
Expected years of schooling	0
Combined education index	0
Per capita income [PPP US $]	100

Interpretation

- The HDI ranges from 0 to 1; 1 being the maximum and 0 the minimum
- HDI comparison may be done among various countries; a country with a high HDI indicates a high quality of life.

Physical Quality of Life Index (PQLI)

Write from the previous question.

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Human Development Index (HDI)

Definition

HDI is defined as a composite index combining indicators representing 3 dimensions:

1. Longevity (Life expectancy at birth)
2. Knowledge (Mean years of schooling and expected years of schooling, it does not consider adult literacy rate) and
3. Income [Gross national income (GNI) per capita in purchasing power parity in US $].

How to calculate HDI:

Dimension	*A long and healthy life*	*Knowledge*	*A decent standard of living*
Indicator	Life expectancy at birth	Mean years of schooling and expected years of schooling	GNI per capita in purchasing power parity [PPP] in US $
Dimension index	Life expectancy index	Education index	GNI index
Calculation	HDI = [Life expectancy index × Education index × GNI index] ⅓		

How to calculate dimension indices:

$$\text{Dimension index} = \frac{(\text{Actual value} - \text{Minimum value})}{(\text{Maximum value} - \text{Minimum value})}$$

The "Maximum value" refers to the highest values observed in between the years 1980–2011 in one of the countries. The lowest values are set as follows:

Dimension	*Minimum values*
Life expectancy	20
Mean years of schooling	0
Expected years of schooling	0
Combined education index	0
Per capita income (PPP US $)	100

Interpretation

- ❖ The HDI ranges from 0 to 1; 1 being the maximum and 0 the minimum
- ❖ HDI comparison may be done among various countries; a country with a high HDI indicates a high quality of life.
- ❖ According to the value of HDI, countries may be grouped into 4 categories:

HDI value of countries	*Interpretation*
>0.8	Very high HDI
0.7– 0.8	High HDI
0.5– 0.7	Medium HDI
<0.5	Low HDI

- ❖ The ultimate goal of a country should be to achieve a HDI of 1.0
- ❖ India has a medium HDI value (0.645), rank 131th out of 189 countries (UNDP report, 2020).

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Disability-Adjusted Life Year

Definition

The disability-adjusted life year (DALY) is a measure of overall disease burden, expressed as the number of years lost due to ill-health, disability or early death.

Development

Originally developed by Harvard University for the World Bank in 1990, the WHO subsequently adopted the method in 1996.

According to WHO: It "extends the concept of potential years of life lost due to premature death...to include equivalent years of 'healthy' life lost by virtue of being in states of poor health or disability".

In doing so, mortality and morbidity are combined into a single, common metric.

Calculation/Measurement

1 DALY = 1 year of healthy life lost

Formula: DALY = YLL + YLD

YLL = 'Years of Life Lost' measured by →

No. of deaths at each age × *The expected remaining years of life* (according to the global standard life expectancy)

YLD = 'Years Lived with Disability' measured by →

No. of incident cases due to injury and illness × Average duration of the disease and a weighing factor reflecting the severity of the disease on a scale from 0 (perfect health) → 1 (dead)

The value of weighing factor depends on age.

Commonly years lived as a young adult is valued more highly than years spent as a young child or older adults.

Importance

1. DALY is the best indicator of burden of disease.
2. DALY will be increased by both mortality and disability
3. If a disease is affecting younger age group we will lose more DALY.
4. DALY can be used to compare effectiveness between 2 interventions.

Example: Suppose in case of road traffic accident if use of helmets can prevent 40 DALY and if use of seatbelt can prevent 20 DALY, then use of helmets will be regarded as better intervention than seatbelts.

Note: Japanese life expectancy statistics are used as the standard for measuring premature death, as the Japanese have the longest life expectancies.

Criticism

DALYs are essentially an economic measure of human productive capacity for the affected individual, and consequently do not capture other aspects of diseases, such as emotional effects on the individual, friends and families.

For instance mentally-ill people are sometimes able to continue working normally whilst suffering great distress.

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Millennium Development Goals (MDGs)

Introduction

The Millennium Development Goals (MDGs) are 8 international development goals that were established following the Millennium Summit of the United Nations in 2000, following the adoption of the United Nations Millennium Declaration.

Countries Involved

All 189 United Nations member states at the time (there are 193 currently) and at least 23 international organizations committed to help achieve the Millennium Development Goals by 2015.

Global Challenge

- ❖ Nearly half the MDGs relate to health and nutrition
- ❖ The targets cover a large share of the burden of disease and deaths among poor people
- ❖ Illness, death, malnutrition impede economic growth and contribute to income poverty.
- ❖ Baseline year for MDG: 1990
- ❖ Deadline year for MDG: 2015.

Goals

The goals follow:

1. To eradicate extreme poverty and hunger
2. To achieve universal primary education
3. To promote gender equality and empowering women
4. To reduce child mortality rates
5. To improve maternal health
6. To combat HIV/AIDS, malaria, and other diseases
7. To ensure environmental sustainability
8. To develop a global partnership for development
   - Goal 4, 5, and 6 are "directly health related".
   - Goal 2 and 3 "do not pertain to health".
   - 3 out of 8 goals, 8 out of 18 targets required to achieve them and 18 out of 48 indicators of progress are directly health related.

Reasons for Short Fall

- ❖ Availability
  - Adequacy of supply: Not satisfactory
  - Periodicity: A bottleneck
  - Quality of equipment/drugs: Need improvement.
- ❖ Accessibility
  - Remote areas: Neglected
  - Gender and socioeconomic discrimination
  - Round the clock services: Questionable
  - Accessibility of government services in urban areas.

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- Utilization
  - Lack of awareness about services
  - Irregularity of services
  - Quality not always maintained.
- Adequate coverage
  - Dropouts: A common factor.
- Effective coverage
  - Skills of workers always not up to the desired level.

Costs and Benefits

- Existing system takes into account supplies, staff and minimal on infrastructures
- Five country assessments and estimates indicate that annual public investments or MDGs will be 80 US $ per person in 2005–2006 scaling up to 124 US $ in 2015.

Epidemiological Triad

Introduction

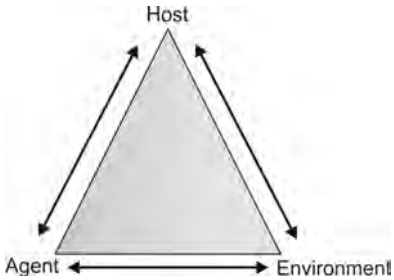
Epidemiological triad is a model developed to explain the mode of causation of disease insufficiently explained by 'germ theory model'.

Definition

Epidemiological triad consists of an external agent; a host and an environment in which host and agent are brought together, causing the disease to occur in the host in equilibrium.

Explanation of the Model

- A state of equilibrium occurs between the agent, host and environment
- When a disease agent reaches a susceptible host in favorable environment it results in the disease state
- When a disease agent reaches a semi-resistant host and when the agent is not much virulent, then it results in carrier state
- It also explains that some persons do not suffer from the disease even though they harbor the pathogens because an equilibrium is established between host and agent in fully resistant host.



Epidemiological triad

According to this model agent, host and environmental factors are as follows:

Agent factors	
1. Biological	Microorganisms
2. Physical	Temperature, radiation, trauma and others
3. Chemical	Acids, alkalis, poisons, tobacco and others

Contd...

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Contd...

Agent factors	
4. Nutrient	Protein, fat, carbohydrate deficiency or excess
5. Physiological	Hormone, enzymes, etc.
6. Mechanical	Friction, pressure, etc.
7. Social	Poverty, etc.
Host factors	
1. Demographic characteristics	Age, sex, ethnicity
2. Biological characteristics	Genetic factor, blood level of important constituent, blood enzyme, immunological factors
3. Lifestyle factor	Smoking, alcoholism, drug abuse
4. Literacy level	↑ Literacy level →↓ Disease
5. Marital status	Ca cervix more common in married woman
6. Income	Low socioeconomic status →↑ Infectious disease High socioeconomic status →↑ Noncommunicable disease
7. Occupation	Pneumoconiosis
Environmental factors	
1. Physical environment	Air, water, soil, etc.
2. Biological environment	Plant, animal, insect, etc.
3. Psychological environment	Depression, anxiety, etc.

Significance

The mission of an epidemiologist is to break at least one of the sides of the epidemiological triad, disrupting the connection between the environment, the host, and the agent; thus stopping the continuation of disease.

The Iceberg Concept of Disease

Introduction

According to this concept, disease in a community may be compared with an iceberg. The tip of the iceberg is only visible whereas rest is submerged, only people manifesting clinical signs and symptoms are thought to be diseased.

Explanation

- The floating tip of the iceberg represents what the physician sees in the community, i.e. *clinical cases*
- The vast submerged portion of the iceberg represents the hidden mass of the disease, i.e. *latent*, *inapparent*, *presymptomatic* and *undiagnosed* cases and carriers in the community.
- The "waterline" represents the demarcation between apparent and inapparent disease.

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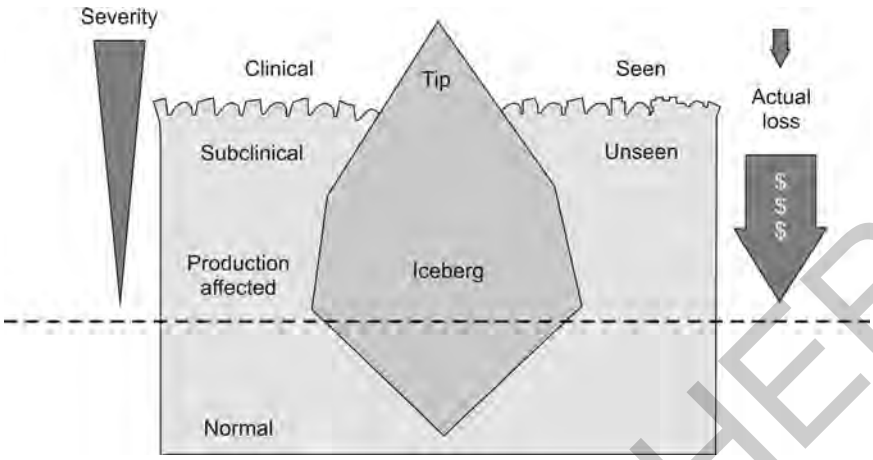

Schematic diagram showing Iceberg phenomenon of diseases

Significance of the Iceberg Phenomenon

- In some diseases (e.g. hypertension, diabetes, anemia, malnutrition, mental illness) the unknown morbidity (i.e. the submerged portion of the iceberg) far exceeds the known morbidity
- The clinician is concerned with the '*tip of the iceberg*' and the epidemiologist with the '*hidden portion of the iceberg*'
- *Screening is done for hidden portion of the iceberg whereas diagnosis is done for tip of the iceberg*
- Iceberg phenomenon is not shown by measles, tetanus, rubella, rabies (mnemonic: MTR2).

Natural History of Disease

Definition

It is the sequence of events in a disease from the earliest stage to its termination as recovery, disability or death in absence of any intervention in form of treatment or prevention.

Methods

Natural history of disease is established by cohort, cross-sectional and retrospective studies.

Components

Prepathogenesis phase:

It is a phase before the onset of disease in man. Man yet not involved but is in the "midst of disease". In this phase:

- Causative factors are present in the environment (Risk factors are before man)
- Person is susceptible to the risk of disease occurrence
- Due to interaction among the components of epidemiological triad host enters into the pathogenesis phase from prepathogenic phase.

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Salient Features

- Updated as per the Competency-based Medical Education Curriculum (NMC)
- A comprehensive guide to community medicine for undergraduates.
- Exhaustive coverage of questions commonly asked in theory examinations.
- Separate chapters assimilating different patterns of theory questions in-depth discussion about all the topics asked in practical and viva voce.
- Written in an easily accessible manner and illustrative way.
- Includes latest guidelines of different diseases and health programs in India.

Some of the important updates

- Revised National TB Control Programme
- Revised Malaria control guidelines (2022)
- Revised guidelines on initiation of antiretroviral therapy (2022)
- COVID-19 updates (2022)
- New vaccines being introduced in Universal Immunization Program (2017)
- Pradhan Mantri Surakshit Matritva Abhiyan (2016)
- National switch from trivalent OPV to bivalent OPV (2016)
- ESI Act updates (2016)
- New biomedical waste management and handling rules (2016)
- New treatment guidelines on kala-azar (2015)
- Revised IMCI guidelines (2014)
- Swachh Bharat Abhiyan (2014)
- RMNCH+A strategy
- Rashtriya Kishor Swasthya Karyakram
- National Iron Plus Initiative
- Most recent health-related statistics

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