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A Manual of Community Medicine for Paramedical Students

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Forewords
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JAYPEE

Contents

1. Medicine in Ancient Times 1
2. Essentials of Health and Disease 4
3. Nutrition and Health 17
4. Environment and Health 80
5. Medical Entomology 101
6. Social Sciences and Health 123
7. Mother and Child Health 137
8. Demography and Family Welfare 160
9. Basics of Communicable Diseases 172
10. Principles of Epidemiology 178
11. Communicable Diseases 188
12. Non-communicable Diseases 233
13. International Health and Recent Updates 256
14. Health of Special Groups 260
15. Occupation and Health 265
16. Mental Health 276
17. Genetics and Health 280
18. Health Education 284
19. Elementary Medical Statistics 288
20. Immunization 292
21. Healthcare Services in India 299
22. Disaster Management 313
23. Hospital Waste Management 316
24. Health Programs in India 318
25. Recent Advances 323

Index *327*

2 CHAPTER

Essentials of Health and Disease

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HEALTH

Q Define health.

Definition: Health is a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity. It also includes the ability to lead a socially and economically productive life. ***—WHO***

DIMENSIONS OF HEALTH

Q What are the dimensions of health?

Health is multidimensional. These dimensions are:

- **Physical dimension:** Every cell, every tissue and every organ in the body is functioning well in perfect harmony with the rest of the body.
- **Mental dimension:** Mental health is not the absence of mental illness. It is a state of balance between the individual and the surrounding world. Realities of harmony between self, other people and environment.
- **Social dimension:** Harmony and integration with self, family, other members of society and the world in which they live. It is a quantity and quality of individual's interpersonal ties as well as optimal involvement with the community and participation in the social system.
- **Spiritual dimension:** Individual with principles, ethics, and purpose in life.
- **Emotional dimension:** It relates to feeling of humanity.
- **Vocational dimension:** It is a part of human existence; earning a source of satisfaction and self-esteem.
- **Other dimensions:** Cultural, socioeconomical, environmental, educational, nutritional. These dimensions contribute to attain a level of health that will permit the man to lead a socially and economically productive life.

POSITIVE HEALTH

Positive health is the highest standard of physical, mental, social and spiritual health of a person.

SPECTRUM OF HEALTH

Q Write a short note on spectrum of health.

The health of an individual is not static. It is a process of continuous changes. Health spectrum fluctuates from the

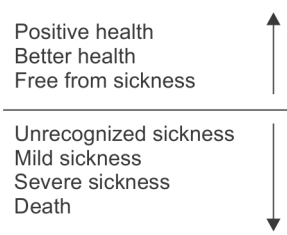

Fig. 2.1: Spectrum of health.

highest point of positive health to lowest point of death **(Fig. 2.1)**. As long as we are alive, there is some degree of health in us.

DETERMINANTS OF HEALTH

Q Enumerate and describe determinants of health.

The health of a person is multifactorial. Some are internal (within the person); some are external (environment and society) where he lives. Interactions of these factors may be health promoting or health deteriorating. Important determinants of health are:

- **Biological:** Genetic constitution. For example, mental retardation, diabetes, sickle cell anemia, hemophilia are genetic.
- **Behavioral (lifestyle):** The cultural, behavioral, social values and personal habits (smoking, tobacco, alcohol, etc.) of an individual may be called as "lifestyle". For example, lung cancer, obesity, drug addiction, coronary heart disease. Some diseases are due to lack of sanitation, poor nutrition, poor personal hygiene.
- **Socioeconomic:** Socioeconomic status determines the standard of living, quality of life, family size, seeking health care, purchasing power, education, nutrition, housing, occupation, political system, etc.
- **Health services:** Healthcare services, such as immunization, family welfare, nutrition, care of pregnant women and children, education all these factors will contribute to the health of people and also improves social and economic development of the country. Services should be preventive, promotive, curative and educative. Services should reach all, acceptable and accessible by them at a cost country and community can afford.
- **Environmental factors:** Environment is classified as:
  - *Internal environment:* Harmonious functioning of body tissues and organs
  - *External environment:* Can be called macro-environment, such as air, water, soil, plants and animals. (All that which is external to us). It can be divided into physical, biological and psychosocial components.

  Any disturbance in the internal or external environment disturbs the health of an individual.
- **Aging population:** In an aging population, there is an increased prevalence of chronic diseases and disabilities.
- **Gender:** Women's health covering nutrition, reproductive health, violence, lifestyle, occupational environment, status of women in the society. Women's health issues are given importance in the development plans of society.
- **Other factors:** Health-related systems, such as food and agriculture, education, industry, social welfare, rural development, urban development, intersectoral coordination, services, such as water, road, light, raising the standard of living, etc.

RESPONSIBILITY FOR HEALTH

Q Discuss the responsibility for health at various levels to protect and promote health.

Individual Responsibility

Responsibility for health involves individual responsibility. Health must begin with the individual. Individual must undertake in:

- Promoting their own health

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- Preventing their own disease
- Limiting their own illness
- Restoring their own health

Simple Rules Relating to Self-care

- Diet, sleep, exercise, weight maintaining
- Personal hygiene, healthy habits and lifestyle
- Submitting oneself for medical examinations and screening, taking self-care
- Accepting immunization and specific disease prevention measures
- Early health seeking during sick and taking proper treatment
- Undertaking measures for prevention, relapse or spread of disease to others
- Adopting family planning measures

Community Responsibility

There are many things an individual cannot take care of himself/herself; thus, community effort is needed. Health care is "for the people, to the people, by the people". With this concept **"primary health care"** exists. Community can participate in planning, management and evaluation of health services. Health cannot be fought by physicians alone; it is people's war.

State Responsibility

Responsibility of health will not end with individual and community efforts. The constitution of India says that health is a state responsibility.

International Responsibility

Health of mankind requires the cooperation of people, government, national and international organization. WHO acts as a directing and coordinating authority on international health activities.

HEALTH TEAM

Q Write a short note on the "health team" concept.

The physicians' functions can be performed by trained auxiliary workers. Practice of modern medicine has become a joint effort of many workers, such as nurses, health assistants, trained *dais*, village health guides, social workers and many more. This is called 'HEALTH TEAM". Each team will have a leader who motivates each member. The health team concept has taken firm roots in delivery of health services both in developing and developed countries. A health team is a group of people, each one contributes to accordance with his skills and competence.

Health Team

- Administrator
- Doctors
- Nurses
- ANM *Dai*, ASHA

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- Paramedical staff
- Medico-social workers
- Record keepers
- Laboratory technician
- Field health assistants

INDICATORS OF HEALTH

Q Enumerate health indicators.

Indicators are reflection of the health situation. Indicators are useful:

- To measure the health status of community
- Compare the health status of one state with other state or other nation
- To measure the extent of targets are being attained

An indicator also helps us to give priority allocation of man, material and money. Indicators must be valid, relevant, reliable, sensitive, specific, feasible.

Indicators of Health

Mortality indicator	• Crude death rate • Infant mortality • Maternal mortality • Disease specific mortality
Morbidity indicator	• Prevalence, incidence • OPD attendance • Admission • Discharge, etc.
Disability indicator	• Bed disability days • Work loss days
Nutritional indicator	• Weight and height of preschool child • Low birth weight in children

Other indicators used are—healthcare delivery, utilization of social and mental health, environmental, socioeconomic, health policy, quality of life.

HEALTHCARE DELIVERY SYSTEM

Q How health care is delivered in India?

Health services in India is organized at three levels—(three—tier system) of health care.

Primary Health Care

This level of health care is very close to the people. This is the first level of contact between the individual and health system. Here essential health care is given through:

- Primary health centers
- Subcenters
- Anganwadis

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Secondary Health Care

These deal with more complex problems of patients referred to by primary healthcare system. They are treated in specific centers. For example, district hospitals, community health centers.

Tertiary Health Care

This provides super specialist and highly specialized care. This is the highest referral center for primary and secondary health care. For example, teaching hospitals, specific institutions.

RIGHTS TO HEALTH

Q What are the individual rights and responsibility towards health?

Everyone has the right to health and wellbeing for himself and his family. Some rights are:
- Right to medical care
- Right to responsibility for health
- Right to healthy environment

PRIMARY HEALTH CARE

Q Define primary health care. What are the principles and components of primary health care?

Definition: Primary health care is a new revolutionary approach to health care. Primary health care is the key to achieving health for all. This is the closest and first level of contact between the individual and the health system. Care is provided by primary health centers, subcenters and Anganwadi, with community participation. India has pledged itself to provide primary health care in India. Primary health care starts with the people themselves placing people's health in people's hands.

The Alma-Ata Declaration of 1978 defined primary health care (PHC) as essential, universally accessible health care, based on practical, scientifically sound, and socially acceptable methods, delivered through full community participation and at a cost the community and country can afford.

Principles of Primary Health Care

There are four principles of primary health care:

1. **Equitable distribution:** Health services are shared equally to all the people irrespective of their ability to pay, rich, poor, urban, rural slum must have equal access to health services.
2. **Community participation:** Involvement of individuals, families and community in promotion of their own health. Primary health care cannot be achieved without the involvement of the local community in planning, implementation and maintenance of health services. Village health guide, trained *dais*, ASHA, Anganwadi teacher are selected from local community. Villagers providing places, furniture, food to doctors to conduct health camp is best example of community participation.
3. **Intersectoral approach:** Primary health care cannot be provided by health sector alone. Agriculture, animal husbandry, food industry, education, housing, communications coordination is essential for providing health care. For example, electric department has to provide current to keep vaccine in proper temperature.

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4. **Appropriate technology:** Technology used in primary health care is scientifically sound, adaptable to local needs and acceptable to them. For example, ORS, vaccines, iodized salt.

Components of Primary Health Care

There are eight essential components of primary health care:
- Health education
- Food supply and nutrition
- Safe water and sanitation
- Mother and child health care including family welfare
- Immunization
- Control of locally endemic diseases
- Appropriate treatment to injuries and common diseases
- Provision of essential drugs

EPIDEMIOLOGICAL TRIAD

Q Explain epidemiological triad with example.

Epidemiological theory hypothesizes that there are three important determinants of health or disease, namely **(Fig. 2.2)**:
- Agent factors
- Host factors
- Environmental factors

As long as the state of fine balance is maintained between these factors, the person stays in a state of health. The moment when this balance is disturbed, disease occurs.

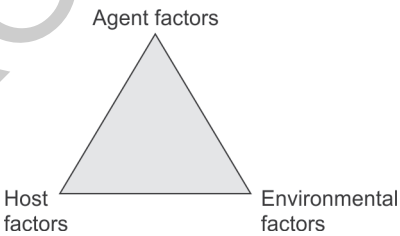

Fig. 2.2: Epidemiological Triad.

Example: A person may have infection with tuberculosis bacteria. He may be perfectly healthy because the agent host and environmental factors are well-balanced with each other. If he is malnourished or immune-compromised; or if environmental conditions change, e.g., poverty, these changes will disturb the equilibrium, leading to development of tuberculosis (TB) disease.

MULTIFACTORIAL CAUSATION OF DISEASE

Q Describe the characteristics of agent, host and environment factors in causation of disease.

In primitive and middle ages, "supernatural causes", 'bad air' and "germ" were related to the causes of human disease. Now agent, host and environment factors are related to the causation of disease.

Multifactorial Etiology of Disease

Agent Factors

- **Physical agents:** Heat, cold, electricity, noise, radiation, vibration, forces, accidents, injury, etc.
- **Chemical agents:** Acids, alkalis, heavy metals, dust, fumes, allergens, etc.

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- **Biological factors:** Bacteria, virus, protozoa, parasite, arthropod, fungus, rodents, etc.
- **Nutritional factors:** Carbohydrate, protein, fat, vitamins, minerals, deficiency or excess

Host Factors

Sociodemographic: Age, sex, occupation, education, income, marital status, nutrition status, lifestyle, knowledge attitude practice (KAP), genetic factors.

Environmental Factors

- **Physical environment:** Air, water, soil, food, seasons, climate, rainfall, altitude, etc.
- **Biological environment:** Plant, animals, insects, rodents, microbes, etc.
- **Social environment:** Community beliefs, practices, culture, availability of health services
- **Psychological environment:** Stressful situation, death, or divorce, loss of employment, chronic disease, such as TB, cancer, birth of handicapped child, etc.

ICEBERG PHENOMENON

Q What is the iceberg phenomenon?

When an ice piece is put into the water, a small portion of ice is visible above the water level, large portion is submerged in the water. The floating tip of iceberg represents small portion of clinical cases which physician sees the submerged portion of the iceberg represents a hidden mass of disease in the community.

Examples: Hypertension, diabetes, anemia, malnutrition, mental illness, etc., iceberg concept explains the magnitude of human diseases.

- Only a very small portion of disease comes to notice of health professionals.
- Large number of cases are hidden in the community.
- The real hidden load of the undiagnosed disease should be detected and managed early to prevent further havoc.

WEB OF CAUSATION

Q What is web of causation? Explain with an example.

Noncommunicable diseases, such as accidents and MI, cannot be satisfactorily explained by epidemiological triad. The "Web of Causation" theory is postulated. Wherein the various factors interacting like web of a spider.

THEORY OF NECESSARY AND SUFFICIENT

According to this theory, a disease may/may not occur in its presence but will not occur in its absence. For example, infection with HIV is a necessary as well as sufficient cause for AIDS.

NATURAL HISTORY OF DISEASE

Q Describe the natural history of disease.

It is very important for all of us to understand the natural history of each disease. Such knowledge is essential to develop suitable modalities of disease prevention and control. It is

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a key concept in epidemiology. Natural history of the disease is observed from earliest stage of disease to termination of disease either by recovery, Deformity, disability or death, in the absence of treatment or prevention.

PHASES OF PATHOGENESIS

Q What are the subphases of pathogenesis?

Pathogenesis has four subphases:
1. Early pathogenesis phase (asymptomatic)
2. Stage of early describable lesions
3. Phase of full-blown disease
4. Phase of termination:
   - Full recovery
   - Residual disability
   - Chronicity
   - Death

LEVELS OF PREVENTION

Prevention of disease occurs at three levels, depending on the phase of the natural history of the disease.

1. **Primary prevention (before the disease starts—prepathogenic phase):** Primary prevention aims to prevent the onset of disease in healthy individuals. It consists of two sub-steps:
   a. *Health promotion:* Measures to improve overall health and well-being.
   b. *Specific protection:* Actions taken to prevent specific diseases.
2. **Secondary prevention (after disease starts—early pathogenic phase):** This involves early detection and prompt treatment to halt disease progression.
   Early diagnosis and treatment: Identifying disease at an early stage to improve prognosis.
3. **Tertiary prevention (after disease has manifested—late pathogenic phase):** Tertiary prevention focuses on reducing the impact of an already established disease by minimizing complications and disabilities.
   Disability limitation: Preventing further complications of the disease.
   Rehabilitation: Restoring function and improving the quality of life for those affected by the disease.

Q Describe the application of interventions at various levels of prevention.

Application of interventions at various levels of prevention

Levels of prevention	*Interventions*
Health promotion	Health education, good environment, good nutrition, lifestyle changes, safe water, sanitation, pre-marital counseling
Specific protection	Immunization, specific nutrient, iron, folic acid tablets, chemoprophylaxis, protection from carcinogens and accidents
Early diagnosis and treatment	Health camps, screening, mass treatment, periodic checking pap-smear

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Levels of prevention	***Interventions***
Disability limitation	• Impairment • Disability • Handicap • By social, medical, surgical environmental. For example, rest, foot care, etc.
Rehabilitation	• Medical rehabilitation • Vocational rehabilitation • Social rehabilitation • Psychological rehabilitation • Occupational rehabilitation

Prepathogenic phase			***Pathogenic phase***		
Primary prevention			***Secondary prevention***		
Levels of prevention	***Health promotion***	***Specific protection***	***Early diagnosis and treatment***	***Disability limitation***	***Rehabilitation***
Measures	***Promotive***	***Preventive***	***Curative***	***Restorative***	***Rehabilitative***
Examples	• Health education • Sex education • Proper nutrition • Good sanitation • Potable water • Waste disposal • Breast feeding • Family planning • Genetic counseling • Premarital counseling • Recreation • Exercise • Yoga • Slum clearance • Schooling • Increase standard of living	• Immunization • Vitamin 'A' • Iron, folic acid prophylaxis • Use of helmet • Seat belt • Lead apron in radiation area • Avoid allergen • Pasteurization of milk • Use of contraception • Ear plug • Iodized salt	• Screening for disease • Antenatal care • Contact tracing" • Fasting blood sugar • Pap-smear, blood smear examination • RT-PCR test • Self examination breast	• Rest in bed • Intensive, treatment • ORS treatment • Physiotherapy • Surgical therapy • Care of teeth • Movement of joints	• Physical • Mental • Social • Psychological • Vocational, e.g., blind school • Artificial limb • Wheel chair • Cataract surgery • Reconstructive surgery • Pace maker • Use of dentures • Kidney transplantation

RISK FACTORS

Q What do you understand by risk factors of disease?

A factor that increases the likelihood of disease development or adversely affect on the development of the disease is called a risk factor.

❖ Risk factors are not necessarily the cause of a disease; presence of the factor does not imply that the disease will occur, and, in its absence, the disease will not occur.

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- Person exposed to the risk factor, may get the disease.
- Intervention reduces the chance of getting the disease.

Some risk factors	
Disease	***Risk factor***
Heart disease	Smoking, obesity, cholesterol, diabetes, hypertension
Cancer	Smoking, radiation, environment pollution, infections
Accident	Alcohol, over speed, bad roads, no seat belt, no helmet
Cirrhosis of liver	Alcohol
Diabetes	Obesity

Risk Factors may be Modifiable or Nonmodifiable

Nonmodifiable and modifiable risk factors

Nonmodifiable risk factors (cannot be changed)	***Modifiable risk factors (can be changed)***
Age	Smoking and alcohol
Sex	Hypertension/diabetes
Race	Elevated cholesterol
Genetic factors	Inactivity
Family history	Obesity

DIFFRENCES BETWEEN DISEASE CONTROL, ELIMINATION, ERADICATION

Q What are the differences between disease control, elimination and eradication?

- **Control:** When a disease is reduced to a level where it is no longer a major public health concern. *Example:* Malaria is under control in several regions.
- **Elimination:** The interruption of disease transmission in a specific geographic area, such as a taluk, district, state, or country. *Example:* Amoebiasis elimination in certain areas.
- **Eradication:** The complete and permanent removal of a disease worldwide, meaning no further cases occur anywhere. *Examples:* Smallpox has been eradicated, and polio is close to eradication.

REHABILITATION

Q What is rehabilitation? Give examples.

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 is called rehabilitation.

Through rehabilitation, a person becomes useful to himself and his family and to the community.

Classification of Rehabilitation

Rehabilitation has been classified as:

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Types of rehabilitation:

Rehabilitation types	*Restoration*
Medical rehabilitation	Functions of the body
Vocational rehabilitation	Earning capacity
Social rehabilitation	Family and social relation
Psychological rehabilitation	Personal dignity and confidence
Educational rehabilitation	Healthy life

Examples:

- Establishing schools for blind
- Aids for crippled—hearing aid, wheelchair, artificial limbs, dentures
- Reconstructive surgery in leprosy
- Physiotherapy for paralysis
- Cataract surgery and lens implantation

Rehabilitation is intended to:

- Prevent the development of complications
- Helps the person to regain functions and earning
- Develop new function ability in the place of lost functions
- Encourage and motivation to involve in social activities

CONCEPT OF HEALTH

Q Describe the changing concepts of health.

Health is not perceived in the same way by all professionals. In a world of continuous changes new concepts emerged based on new patterns of thought. A brief account of the changing concepts of health is given below.

Biomedical Concept

Biomedical concept was based on "Germ Theory" of disease. The human body was viewed as a machine. Disease is due to the breakdown of machines. The doctor's task is to repair the machine. This is a very narrow view. This concept did not include the role of the environment, social, cultural, psychological determinants of health. Thus, biomedical concept was inadequate to solve major health problems, such as malnutrition, mental illness, chronic diseases, accidents, drug addiction.

Ecological Concept

Ecological concept views health as dynamic equilibrium between the man and environment. Diseases are due to the maladjustment of the man to his environment. Human adaptation to the environment can give longer life and better quality of life.

Psychological Concept

Health is not only a biomedical phenomenon. It is influenced by social, cultural, economic, and political factors of the people concerned.

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Holistic Concept

Holistic model developed by synthesis of all other concepts it recognizes the strength of social, economic, political, environmental influences on health. The holistic approach implies all sectors of society (agriculture, housing, public works, communication, animal husbandry, food industries, education, etc.) holistic concept influences on promotion and protection of health.

Q What is the physical quality of life index?

The **physical quality of life index (PQLI)** consists of three indicators:

1. Infant mortality
2. Life expectancy at age of one year
3. Literacy

For each indicator is given on a score of 0 (worst) to 100 (best).

Index is calculated by averaging the three indicators giving equal weight to each of them. The resulting PQLI is thus scaled 1 to 100. PQLI has not taken per capita income, showing that money is not everything. The ultimate objective is to attain a PQLI of 100.

GERM THEORY OF DISEASE

Q Write a short note on germ theory of disease.

Historically, diseases were believed to have supernatural causes. However, the germ theory of disease emerged after Louis Pasteur (1822–1895) discovered bacteria. During this period, several pathogenic microorganisms, including *Mycobacterium tuberculosis* (tubercle bacillus), *Vibrio cholerae* (cholera), *Bacillus anthracis* (anthrax), and *Neisseria gonorrhoeae* (gonococcus), were identified.

During the Golden Age of Bacteriology, the germ theory gained prominence. At that time, people largely attributed all diseases to germs.

However, the germ theory could not explain why some infected individuals did not develop disease. Additionally, certain diseases such as hypertension (high blood pressure) and diabetes have no direct microbial cause. These limitations led to the development of a broader concept of disease causation, considering the interplay between the agent, host, and environment.

INVESTIGATION OF EPIDEMIC

Q Mention the steps involved in investigation of epidemic.

Steps in investigation of epidemic are:

- Confirmation of diagnosis—by visiting the spot and quickly examining few causes
- Confirmation of an epidemic—cases are clearly excess than previous experiences
- Defining population—use spot maps
- Identify population at risk
- Rapid search of all cases:
  - Age, sex, occupation, travel history, food taken
  - Day and time of onset of disease, symptoms

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- Data analysis by time, place, person
- Formulation of hypotheses
- Testing the hypotheses
- Study the ecological factors
- Investigation of population at risk
- Writing the report
- Suggesting control measures

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A Manual of
Community Medicine
for Paramedical Students

Salient Features

- A unique book on Community Medicine, highly recommended as a best buy for paramedical and allied health science students.
- The author has successfully addressed the specific learning needs of paramedical students.
- Presented in a simple language and an attractive style, the content is easy to understand and follows a "known to unknown" format, ensuring comprehensive syllabus coverage.
- This book is not just a textbook—it is a living tutor. Students can read independently, learn effectively, recapitulate, and perform confidently in their examinations.
- An ideal resource for learning, understanding, and achieving the best results in paramedical and allied health science examinations.
- Although primarily intended for paramedical students, this book also serves as a valuable guide for medical and nursing students, and teaching professionals.

DK Mahabalaraju holds an MBBS and MD (Community Medicine) from the prestigious JJM Medical College, Davangere, Karnataka, India. He has served as a faculty member in the Department of Community Medicine at the same institution in various capacities since 1980. Recognized as a hardworking, dedicated, and highly competent teacher, Dr Mahabalaraju has earned numerous accolades, including international, national, and Karnataka state-level awards for his academic contributions. His medical books and literature are widely appreciated and circulated across the globe. Dr Mahabalaraju has poured his lifetime of experience and expertise into the meticulous creation of his masterpiece, *A Manual of Community Medicine for Paramedical Students*.

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