MANAGEMENT OF HEALTH SYSTEMS

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CONCEPT OF HEALTH AND DISEASE

UNIT – I

INTRODUCTION

In this first unit we will have four lessons.

In the first lesson, you will be learning about the natural history of health, where the concept and meaning of health is discussed. The definition of health along with the various dimensions is discussed. The changing concepts of health viz. biomedical concept, ecological concept, psychological concept, holistic concept etc have been briefed. You will be learning the basic concept of positive health and well being in the same lesson. The health spectrum along with various health determinants is also furnished. Further, the description of natural history of disease will enhance your knowledge in interpreting the health and disease together. In addition to this, you will also be learning the concepts of control, prevention and intervention of disease.

In the second lesson, health environment is discussed. Here thrust is given on various factors like air, water, lighting, housing, ventilation, noise, radiation, wastes and medical entomology. In the same lesson, you would be learning the meaning of healthcare and at how many levels this health care can be provided. Information about primary, secondary and tertiary levels of health care is provided.

In the third lesson, you will be exposed to the concept of indicators. The importance and significance of indicators is added with recent statistics of important indicators like mortality, morbidity and disability. The recent trends in socio-economic factors is provided to increase your awareness.

This lesson is dedicated for the concept of Health For All. The existing problems in India were discussed under the title overall health situation in India. Establishment of Primary Health Care units, work force were shown as possible measures to answer the problems. You are also provided with Alma Ata declaration and the targets HFA in 21st century.

LESSON - 1

CONCEPT OF HEALTH AND DISEASE

STRUCTURE

1.0 OBJECTIVES

After reading this lesson, you should be able to

- Describe the natural history of health, the concept and meaning
- Definition of health along with the various dimensions
- Understand the concept of positive health and well being and health spectrum
- Describe the natural history of disease
- Interpret the concepts of control, prevention and intervention of disease

1.1 INTRODUCTION

The understanding of basic concepts of health and disease is very important for health personnel. The information provided here would be of an important help to the hospital administrator in interpreting the problem area and can find out suitable solution. The various concepts discussed here about the health, disease will facilitate in better understanding the patient's problems.

1.2 CONCEPT OF HEALTH

Health is a common theme in most cultures. In fact, all communities have their concepts of health, as part of their culture. Among definitions still used, probably the oldest is that health is the "absence of disease". In some cultures, health and harmony are considered equivalent, harmony

being defined as “being at peace with the self, the community, god and cosmos”. The ancient Indians and Greeks shared this concept and attributed disease to disturbances in bodily equilibrium of what they called “humors”.

Modern medicine is often accused for its preoccupation with the study of disease, and neglect of the study of health. Consequently, our ignorance about health continues to be profound, as for example, the determinants of health are not yet clear; the current definitions of health are elusive; and there is no single yardstick for measuring health. There is thus a great scope for the study of the “epidemiology” of health.

Health continues to be a neglected entity despite lip service. At the individual level, it cannot be said that health occupies an important place; it is usually subjugated to other needs defined as more important, e.g., wealth, power, prestige, knowledge, security.

Health is often taken for granted, and its value is not fully understood until it is lost. At the international level, health was “forgotten” when the covenant of the League of Nations was drafted after the First World War. Only at the last moment, was world health brought in. health was again “forgotten” when the charter of the United Nations was drafted at the end of the Second World War. The matter of health had to be introduced ad hoc at the United Nations Conference at San Francisco in 1945.

However, during the past few decades, there has been a reawakening that health is a fundamental human right and a world-wide social goal; that it is essential to the satisfaction of basic human needs and to an improved quality of life; and, that t is to be attained by all people. In 1977, the 30th world Health Assembly decided that the main social target of governments and WHO in the coming decades should be “the attainment by all citizens of the world by the year 2000 of a level of health that will permit them to lead a socially and economically productive life”, for brevity, called “Health for All”. With the adoption of health as an integral part of socio-economic development by the United Nations in 1979, health, while being an end in itself, has also become a major instrument of overall socio-economic development and the creation of a new social order.

1.2.1 CHANGING CONCEPTS

An understanding of health is the basis of all health care. Health is not perceived the same way by all members of a community including various professional groups (e.g., biomedical scientist, social science specialists, health administrators, ecologists, etc) giving rise to confusion about the concept of heath. In a world of continuous change, new concepts are bound to emerge based on new patterns of though. Health has evolved over the centuries as a concept from an individual concern to a world-wide social goal and encompasses the whole quality of life. A brief account of the changing concepts of health is given below:

1. Biomedical concept

Traditionally, health has been viewed as an “absence of disease”, and if one was free from disease, then the person was considered healthy. This concept, know as the “biomedical concept” has the basis in the “germ theory of disease” which dominated medical thought at the turn of the 20th century. The medical profession viewed the human body as a machine, disease as a consequence of the breakdown of the machine and one of the doctor’s tasks as repair of the machine. Thus health, in this narrow view, became the ultimate goal of medicine.

The criticism that is leveled against the biomedical concept is that it has minimized the role of the environmental, social, psychological and cultural determinants of health. The biomedical model, for all its spectacular success in treating disease, was found inadequate to solve some of the major health problems of mankind (e.g., malnutrition, chronic diseases, accidents, dug abuse, mental illness, environmental pollution, population explosion) by elaborating the medical technologies. Developments in medical and social sciences led to the conclusion that the biomedical concept of health was inadequate.

2. Ecological concept

Deficiencies in the biomedical concept gave rise to other concepts. The ecologists put forward and attractive hypothesis which viewed health as a dynamic equilibrium between man and his environment, and disease a maladjustment of the human organism to environment. Dubos defined health saying: “Health implies the relative absence of pain and discomfort and a continuous adaptation and adjustment to the environment to ensure optimal function”.

Human ecological and cultural adaptations do determine not only the occurrence of disease but also the availability of food and the population explosion. The ecological concept raises two issues, viz. imperfect man and imperfect environment. History argues strongly that improvement in human adaptation to natural environments can lead to longer life expectancies and a better quality of life – even in the absence of modern health delivery services.

3. Psychosocial concept

Contemporary developments in social sciences revealed that health is not only a biomedical phenomenon, but one which is influenced by social, psychological, cultural, economic and political factors of the people concerned. These factors must be taken into consideration in defining and measuring health, thus health is both a biological and social phenomenon.

4. Holistic concept

The holistic model is a synthesis of all the above concepts. It recognizes the strength of social, economic, political and environmental influences on health. It has been variously described as a unified or multi dimensional process involving the well-being of the whole person in the context of his environment. This view corresponds to the view held by the ancients that health implies a sound mind, in a sound body, in a sound family, in sound environment. The holistic approach implies that all sectors of society have an effect on health, in particular, agriculture, animal husbandry, food, industry, education, housing, public works, communications and other sectors. The emphasis is on the promotion and protection of health.

1.2.2 DEFINITIONS OF HEALTH

“Health” is one of those terms which most people find it difficult to define although they are confident of its meaning. Therefore, many definitions of health have been offered from time to time, including the following:

I. “The condition of being sound in body, mind or spirit, especially freedom from physical disease or pain” (Webster).

II. "Soundness of body or mind; that condition in which its functions are duly and efficiently discharged" (Oxford English Dictionary).
III. "A condition or quality of the human organism expressing the adequate functioning of the organism in given conditions, genetic and environmental".
IV. "A *modus vivendi* enabling imperfect men to achieve a rewarding and not too painful existence while they cope with an imperfect world".
V. "A state of relative equilibrium of body forms and function which results from its successful dynamic adjustment to forces tending to disturb it. It is not passive interplay between body substance and forces impinging upon it but an active response of body forces working toward readjustment".

1.2.3 WHO DEFINITION

The widely accepted definition of health is that given by the World Health Organization (1948) in the preamble to its constitution, which is as follows.

"Health is a state of complete physical, mental and social wellbeing and not merely an absence of disease or infirmity".

In recent years, this statement has been amplified to include the ability to lead a "socially and economically productive life".

The WHO definition of health has been criticized as being too broad. Some argue that health cannot be defined as a "state" at all, but must be seen as a process of continuous adjustment to the changing demands of living and of the changing meanings we give to life. It is a dynamic concept. It helps people live well, work well and enjoy themselves. The WHO definition of health is therefore considered by many as an idealistic goal than a realistic proposition. It refers to a situation that may exist in some individuals by not in everyone all the time; it is not usually observed in groups of human beings and in communities. Some consider it irrelevant to everyday demands, as nobody qualifies as healthy, i.e., perfect biological, psychological and social functioning. That is, if we accept the WHO definition, we are all sick.

In spite of the above limitations, the concept of health as defined by WHO is broad and positive in its implication; it sets out the standard, the standard of "positive" health. It symbolizes the aspirations of people and represents an overall objective or goal towards which nations should strive.

1.2.4 OPERATIONAL DEFINITION OF HEALTH

The WHO definition of health is not an "operational" definition, i.e., it does not lend itself to direct measurement. Studies of epidemiology of health have been hampered because of our inability to measure health and well-being directly. In this connection as "operational definition" has been devised by a WHO study group. In this definition, the concept of health is viewed as being of two orders. In a broad sense, health can be seen as "a condition or quality of the human organism expressing the adequate functioning of the organism in given conditions, genetic or environmental". In a narrow sense – one more useful for measuring purposes – health means:

1. There is no obvious evidence of disease, and that a person is functioning normally, i.e., conforming within normal limits of variation to the standards of health criteria generally accepted for one's age, sex, community, and geographic region, and

2. The several organs of the body are functioning adequately in themselves and in relation to one another, which implies a kind of equilibrium or homeostasis - a condition relatively stable but which may vary as human beings adapt to internal and external stimuli.

NEW PHILOSOPHY OF HEALTH

In recent years, we have acquired a new philosophy of health, which may be stated as below:

- health is a fundamental human right
- health is the essence of productive life, and not the result of ever increasing expenditure on medical care
- health is intersectoral
- health is an integral part of development
- health is central to the concept of quality of life
- health involves individuals, state and international responsibility
- health and its maintenance is a major social investment
- health is world-wide social goal

DIMENSIONS OF HEALTH

Health is multidimensional. The WHO definition envisages three specific dimensions. As the knowledge base grows, the list is more. Although these dimensions function and interact with one another, each has its own nature, and for descriptive purposes will be treated separately. The various important dimensions are as under.

1. Physical Dimension

   The physical dimension of health is probably the easiest to understand. The state of physical health implies the notion of “perfect functioning” of the body. It conceptualizes health biologically as a state in which every cell and every organ is functioning at optimum capacity and in perfect harmony with the rest of the body. The signs of physical health in an individual are should be normal. This state of normality has fairly wide limits. These limits are set by observation of a large number of normal people, who are free from evident disease.

2. Mental Dimension

   Good mental health is the ability to respond to the many varied experiences of life with flexibility and a sense of purpose. It can be defined as “a state of balance between the individual and the surrounding world, a state of harmony between oneself and others, coexistence between the realities of the self and that of other people and that of the environment”. Till a few decades ago, the mind and body were considered independent entities. It is recent times, researchers have discovered that psychological factors can induce all kinds of illness not simply mental ones, such as Hypertension, Ulcer, Bronchial Asthma etc.,. One of the keys to good health is appositive mental health is a positive mental health. Unfortunately, our knowledge about mental health is far from complete.

3. Social Dimension

   Harmony and integration within the individual, between each individual and other member of society and between individual and the world in which

they live can be considered as social wellbeing. Further, it can be defined as "quantity and quality of an individual's interpersonal ties and the extent of involvement with the community". Social dimension of health is rooted in positive material environment and positive human environment which is concerned with the social network of the individual.

4. Spiritual Dimension

   Spiritual dimension of health refers to the part of the individual which reaches out and strives for meaning and purpose in life. It is the intangible something that transcends physiology and psychology.

5. Emotional Dimension

   This dimension and mental dimension could be closely related elements at the broad view. The research revealed the differences between the both. Mental health can be seen as "knowing" or "cognition" while emotional health relates to "feeling".

6. Vocational Dimension

   This is a new dimension related to the vocational aspect of life. When work is fully adapted to human goals, capacities an limitations, work often plays a role in promoting both physical and mental health. The importance of this dimension is exposed when individuals suddenly lose their jobs or faces with mandatory retirement.

Some other important dimensions are as listed under.

7. Philosophical Dimension
8. Cultural Dimension
9. Socioeconomic Dimension
10. Environmental Dimension
11. Educational Dimension
12. Nutritional Dimension
13. Curative Dimension
14. Preventive Dimension

CONCEPT OF POSITIVE HEALTH & WELLBEING

Health in the broad sense of the world does not merely mean the absence of disease or provision of diagnostic, curative and preventive services. It also includes as embodied in the WHO definition, a state pf physical, mental and social wellbeing. WHO definition also states that the harmonious balance of this state of the human individual integrated into this environment constitutes health.

Compared to the earlier notion about positive health as combination of biological, psychological and social elements, a broader, recent concept of health mentions that of improving the quality of life, of which health is an essential component. This puts forth that positive health

depends not only on medical action, but on all the other economic, cultural and social factors operating in the community.

Psychologists have pointed that the wellbeing of an individual has objective component and subjective component.

Objective component comprises

1. Standard of Living

   It refers to the degree of expenditure, consumption of goods and service that an individual enjoys. It also includes education, employment, food, house, dressing, entertainment, luxuries and comforts of modern living. There are wide inequalities in the standards of living of the people of various countries around the world. General comparison is made with different scales like GNP etc,

2. Level of Living

   Discussion of various components like health, education, food, conditions of occupation and working, housing, clothing, social security, recreation, leisure and human rights involves level of living

Subjective component comprises

1. Quality of Life

   The condition of life resulting from the combination of the effects of the complete range of factors such as those determining health, happiness (including comfort in the physical environment and a satisfying occupation), education, social and intellectual attainments, freedom of action, justice and freedom of expression is Quality of Life as defined by WHO. Researchers, in recent times defined this element as “a composite measure of physical, mental and social wellbeing as perceived by each individual or by group of individuals – that is to say, happiness, satisfaction and gratification as it is experienced in such life concerns as health, marriage, family work, financial situation, educational opportunities, self-esteem, creativity, belongingness, and trust in others”. Hence quality of life can be evaluated by assessing a person’s subjective feelings of happiness about various life concerns.

Physical Quality of Life Index is used to measure the results of social, economic and political policies to complement GNP. It consolidates infant mortality indicator, life expectancy at age one indicator and literacy indicator to facilitate comparison between countries with reference to inter and intra.

1.2.5 HEALTH SPECTRUM

When measured along a continuum of health – disease spectrum (also called as health – sickness spectrum), death indicates the lowest and positive health indicates the highest point as appeared in the Figure-1. It should be understood the health fluctuates within a range of optimum wellbeing to various levels of dysfunction, including the state of total dysfunction, called as death.

The spectrum reveals that the health of an individual is a dynamic phenomenon ad a process of continuous change, subject to frequent subtle variations. A person may function at maximum levels of health today and diminished levels of health tomorrow. That means, health is a state not to

be attained once and for all, but ever to be renewed. There are degrees or levels of health as there are degrees or severity of illness.

1.3 HEALTH DETERMINANTS

Genetic and environmental factors together will influence the state of disease of a man. Various factors interact and the health of an individual or a community would be affected out of their interactions. The following are some of the determinants which may contribute to the list.

1. Heredity

   The unique genetic combination determines every human being's physical and psychological traits. There are good number of researches proved that some diseases have genetic origin such as chromosomal anomalies, errors of metabolism, mental retardation, some types of diabetes etc.,. The state of health therefore, at least partly depends on the genetic constitution of man. The positive health would be possible when a man lives in an environment which transforms genetic potentialities into phenotypic realities.

2. Environment

   This is further can be divided into External and Internal. The External environment (or macro environment) consists of those thing s to which man is exposed after conception, such as physical, biological and psychosocial components. The Internal environment (or micro environment) consists each and every component part, every tissue, organ and organ-system and their harmonious functioning within the system. Environment can have a direct impact on the physical, mental and social well being of those living in it.

3. Life Style

   It refers to the way people leads their life. It may comprise social values, attitudes, activities, cultural and behavioral patterns and lifelong personal habits that have developed through processes of socialization. The interaction with parents, friends, siblings and peer groups etc., also frame one's life style. Many current health problems have roots from so called latest life style changes which are lack of nutrition, personal hygiene etc.,. Good life style leads good health.

4. Socio Economic Conditions

   For majority of people, lot of socioeconomic development factors influence, their health. Some of important factors are,

   a. Economic Status
   b. Education
   c. Occupation
   d. Political System

5. Health and Family Welfare Services

   Variety of personal and community services for treatment of disease, prevention of illness and promotion of health are covered under health and family welfare services. Such activities like, children immunization, safe drinking water, caring of pregnant women will contribute not only that individual, but that family thus, that society and leads to well being of whole community.

6. Other Factors

   Some systems like education, social welfare, food and agriculture, rural development, industry etc., are widely recognized for their effect on the health system.

CONCEPT OF DISEASE

The disease can be defined, in simplest form as opposite to the health. Any deviation from normal functioning or state of complete physical or mental wellbeing can be considered as the clear meaning of disease. We do not find any definition to disease by WHO. This could be because disease has a good range from unapparent cases to severe manifest illness. Some diseases commence acutely and few insidiously. Some other, we can find a carrier state in which the individual founds to be healthy, but could act as a passage to infect others.

In some other cases, the same organism may cause more than one clinical manifestation. Some run for short time, whereas some other would be taking a considerable long time. It could be easy to find the illness when the symptoms and signs are manifest, but in many other diseases the border line between normal and abnormal is inseparable as in case of hypertension, diabetes and mental imbalance. The ultimate result could be leading to complete recovery, partial recovery, disability or death.

The words like illness, sickness are some times used in synonym to disease. But, truly speaking, disease means “without ease”, which says something is wrong with bodily function. Illness refers not only to the presence of a specific disease, but also to the individual’s perceptions and behavior in response to the disease, as well as the impact of that disease on the psychosocial environment. Further to this, Sickness refers to a state of social dysfunction, a roe that the individual assumes when ill.

CONCEPT OF DISEASE CAUSATION

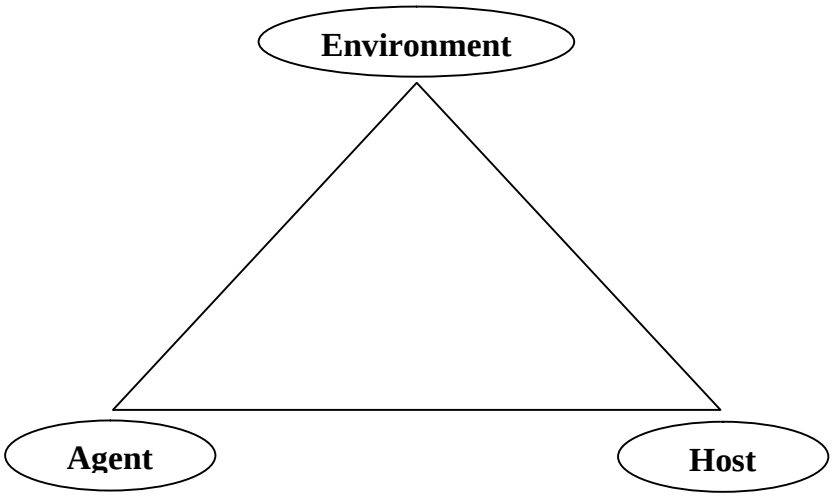
Researchers could attribute a quite some theories in this context. Some of the important theories are as discussed under.

1. Germ Theory of Disease

This theory supports the shifts the cause of disease from empirical causes to microbes. The concept of cause embodied in the germ theory of disease is generally referred to as a one-to-one relationship between causal agent and disease. The model of disease according to this is as below.

2. **Disease Agent** → **Human** → **Disease**

Not every human who is exposed tuberculosis is reported with the affected tuberculosis case. However, an undernourished person many result in clinical disease when exposed with. This is proving a limitation to the Germ Theory. There are other factors relating to the host and environment which are equally important to determine whether or not disease will occur in the exposed host. This demanded a broader concept of disease causation that synthesized the basic factors of agent, host and environment as shown in Fig..



3. Multi Factorial Causation

The Germ Theory of disease and Single Cause Idea propounded in 19th century overshadowed the Multiple Factor Theory propounded by Petternkofer of Munich (1819-1901). Some diseases like lung cancer, coronary heat disease, chronic bronchitis, mental illness etc., could not be explained on the basis of the Germ Theory of Disease or can be prevented by the methods like isolation, immunization or improvements in sanitation etc.,.

All these diseases provided a basis to discuss about the scope of multiple factors for the causation of disease. Some factors like excess of fat intake, smoking, lack of physical exercise and obesity etc, are all involved the pathogenesis of coronary heat disease. Many of these factors are because of undisciplined life style of human. Our present understanding is also because of the significant contribution by

Epidemiology. Many epidemiologists prefer to regard the agent as an integral part of the total environment. The purpose of identifying the multiple factors of disease is to quantify and arrange them in priority sequence of modification or amelioration to prevent or control disease.

4. Web of Causation

MacMahon and Pugh published this concept in their book: "Epidemiologic Principles and Methods", which is very much suitable to study the chronic diseases, where the disease agent is often no known, but is the outcome of interaction of multiple factors. This concept of Web of Causation considers all the predisposing factors of any type and their complex interrelationship with each other. The Figure – 3 describes the complexities of a causal web of myocardial infarction (which is by no means complete). The basic tenet of epidemiology is to study the clusters of causes and combinations of effects and how they relate to each other. The figure also permits to understand a variety of possible interventions that could be taken which might reduce the occurrence of myocardial infarction.

1.4. NATURAL HISTORY OF DISEASE

This concept has a good significance in epidemiology. It describes the way in which a disease evolves over time from the earliest stage of its Prepathogenesis phase to tits termination as recovery, disability or death, in the absence of treatment or prevention. General formation of the natural history of disease is not feasible as each disease has its own unique natural history and need not be the same with other diseases.

Cohort studies best help the analysis of natural history of disease. Costliness and laborious nature of these studies attracted other epidemiological studies like cross sectional and retrospective studies, to understand the natural history of disease. These studies are conducted nationally and internationally in reference to different population setting.

A descriptive diagram of natural history of disease is shown in Figure – 4. This facilitates in understanding the pathogenesis chain of events of a particular disease, and for the application of preventive measures. The natural history of disease generally consists the following two phases.

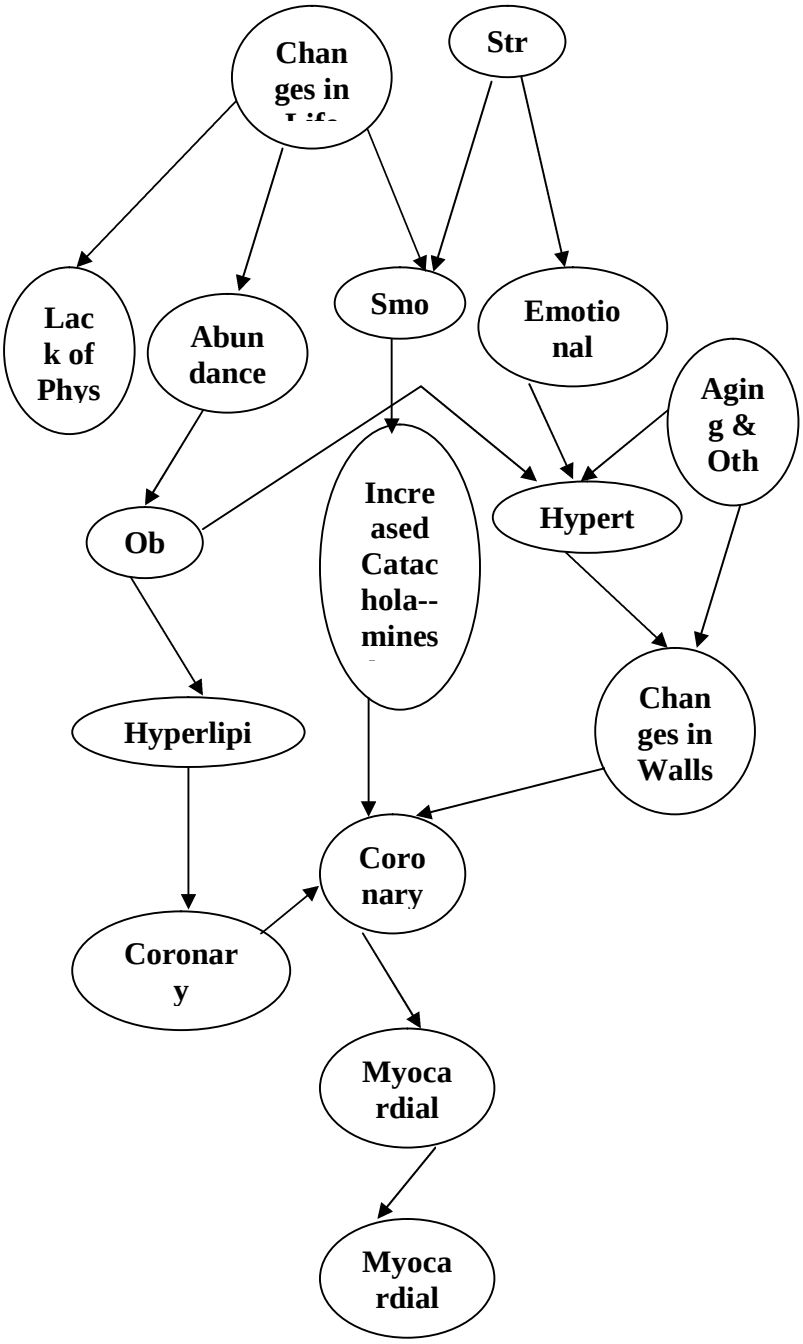


Figure – Myocardial Infarction Casuation Web

1. Prepathogenesis Phase

   It refers to the period preliminary to the onset of disease in human. The disease agent has not yet entered the man, but the factors favouring their interaction with the human host already exist in the environment.

2. Pathogenesis Phase

   It begins with the entry of the disease agent in the susceptible human host. Subsequent events are infectious disease; means disease agent multiplies and induces tissue and physiologic changes, the disease progresses through a period of incubation and later through early and late pathogenesis, leading to recovery, disability or death. Particularly, in some of chronic diseases, the agent-host-environmental interactions (Figure – 5) are yet to be understood during early pathogenesis phases, some times referred as Presymptomatic Phase.

AGENT FACTORS

Disease agent plays a vital role in transmission of disease. It could be a substance, living or non-living, or a force, tangible or intangible, the excessive presence or relative lack of which may initiate or perpetuate a disease process. A disease may comprise one or many agents or factors, as classified under, which would, contribute in developing a disease.

1. Biological Agents
2. Nutrient Agents
3. Physical Agents
4. Chemical Agents
5. Mechanical Agents
6. Social Agents etc,.

HOST FACTORS

1. Demographic Characteristics
2. Biological Characteristics
3. Social and Economic Characteristics
4. Life Style Factors

ENVIRONMENTAL FACTORS

1. Physical Environment
2. Biological Environment
3. Psychosocial Environment

CONCEPT OF DISEASE CONTROL

In this concept, the disease agent is permitted to persist in the community at a level where it ceases to be a public health problem according to the tolerance of the local population. The three components i.e., disease agent, host and environments would be maintained in a state of equilibrium leading to disease control. Disease eradication can be achieved after the process of disease elimination, where transmission of disease is being interrupted. For example, elimination of measles, polio, and diphtheria are under process of elimination from large geographic regions.

Disease eradication means extermination of infectious agent thus resulting into termination of infection transmission. For example, smallpox can now be considered as a disease which has been eradicated. Disease monitoring and surveillance can be helpful in the process of disease control.

CONCEPT OF DISEASE PREVENTION

Clear knowledge of causation, transmission dynamics, identification of risk factors and risk groups, availability of prophylactic are all different factors do influence in the process of successful disease prevention. The perfect organization of application of these measures to appropriate groups or persons, and continuous evaluation of and development of procedures applied is also takes an important role. Disease prevention can be possible in the following four levels.

1. Primordial Prevention

   Means the prevention of the emergence or development of risk factors in countries or population groups in which they have not yet appeared. Here the whole efforts are concentrated towards discouraging children form adopting harmful life styles probably through better awareness and education programs.

2. Primary Prevention

   This can be better defined as “action taken prior to the onset of disease, which removes the possibility that a disease will lever occur”. The intervention in Prepathogenesis phase of a disease or health problem is the measurement taken up at this stage.

3. Secondary Prevention

   This can be defined as “action which halts the progress of a disease at its incipient stage and prevents complications”. Early diagnosis, adequate treatment could be the required specific intervention programs at this stage. It also protects others in the community from acquiring the infection and thus, provides at once secondary prevention for the infected individuals and primary prevention for their potential contacts.

4. Tertiary Prevention

   Intervention in the late pathogenesis phase can be considered as Tertiary prevention. This can be defined as “all measures available to reduce or limit impairments and disabilities, minimize suffering caused by existing departures from good health and to promote the patient’s adjustment to irremediable conditions”. Tertiary prevention extends the concept of prevention into fields of rehabilitation.

CONCEPT OF DISEASE INTERVENTION

Any attempt to intervene or interrupt the usual sequence in the development of disease in man can be defined as intervention. The following are the five modes of intervention in relation to the environment, host and disease agent.

1. Health Promotion
2. Specific Protection
3. Early Diagnosis and Treatment
4. Disability Limitation
5. Rehabilitation

1.5 CONCLUSION

In this lesson, you have learnt the basic concepts of health, definition, meaning, various dimensions, the concept of positive health & well being, and spectrum of it. Further, it is also discussed about the natural history of disease along with concepts of disease control, prevention and interpretation.

1.6 KEY TERMS

1. Health: Health is a state of complete physical, mental and social wellbeing and not merely an absence of disease or infirmity.
2. Disease: The disease can be defined, in simplest form as opposite to the health. Any deviation from normal functioning or state of complete physical or mental wellbeing can be considered as the clear meaning of disease.

1.7 SELF CHECK

1. What is the concept of health? Discuss some definitions?
2. What do you mean by the concept of positive heatlth and well being?
3. Explain various heatlth determinants?
4. What is the significance of disease control and prevention?

LESSON - 2

HEALTH ENVIRONMENT

STRUCTURE

2.0 OBJECTIVES

After studying this lesson, you must understand

- What exactly the health environment is.
- Understand the various important factors of health environment
- Describe the various levels of health care

2.1 INTRODUCTION

Understanding the factors of health environment is very important for both hospital administrator and the doctor. Functional impact of these factors like air, water, ventilation, lighting etc, will enhance the quality of treatment. More over, the various levels of health care provide the increased degree of level of care at different stages will allow the administrator to understand and interpret the requirement of facilities.

2.2 CONCEPT OF ENVIRONEMENT

The combination of various external factors coming under the categories of living and non-living, material and non-material surrounding the man, can be treated as the environment. It includes, in broader perspective, even various social and economic conditions in which a man lives.

To have better discussion and understanding, environment can be classified under three components, as under.

1. Physical
    a. Water
    b. Air
    c. Soil
    d. Housing
    e. Wastes
    f. Radiation etc.

2. Biological
    a. Plant & Animal life (inclusive of Bacteria)
    b. Viruses
    c. Insects
    d. Rodents
    e. Animals etc.
3. Social
    a. Customs
    b. Culture
    c. Habits
    d. Income
    e. Occupation
    f. Religion etc.

Various negative environmental factors like water pollution, soil pollution, air pollution, poor housing conditions, presence of insects etc, leads to man's ill health. Urbanization, industrialization etc, by man himself, are polluting the environment in which he living. A conference in UN on the Human Environment in 1972 identified to the entire world, about various environmental hazards that threaten the human beings.

The quality of living is express din the clean home, the clean farm, the clean business, the clean neighborhood and the clean community, nothing but "Sanitation". Sanitation is the science of safeguarding the health. WHO defined environmental sanitation as "the control of all those factors in man's physical environment which exercise or may exercise a deleterious effect on his physical development, health and survival".

In narrow sense, sanitation means the construction of latrines. In fact, the term sanitation covers the whole field of controlling the environment with a view to prevent disease and promote health. Various controllable factors like water, food, clothing, housing, sanitation etc, have been controlled by the man to raise the standard of living. During the past century, in many countries, citizens could increase their life period, because of the control they could exercise on the above controllable environmental factors. But, some problems like air pollution, radiating pollution etc, are increasingly becoming good threats to human community. The term environmental sanitation now replaced as environmental health, which now demands the contributions of a qualified public health doctor, the epidemiologist, the public health engineer, the town planner, the sociologist, the economist, and the health inspector, which is nothing but combined, integrated, multi-disciplinary approach to achieve a healthy environment.

The various environmental factors which are basic and fundamental to individual and community health are listed above and few of them are discussed below.

2.3.1. WATER

The lack of safe and wholesome drinking water is major source and reason for ill health of man kind in many developing countries. Water should be easily accessible, adequate, contamination free, safe and readily available throughout the year. Without safe water, positive health can not be achieved. Water is a vital environmental factor to all forms of life including socio-economic development of any country's population. In 1981, the 34th World Health Assembly has passed a resolution with an emphasis on safe drinking water as a basic element of Primary Health Care.

A Safe and Wholesome Water can be defined as "free from pathogenic agents, free from harmful chemical substances, pleasant to the taste, i.e., free from color & odor and usable for domestic purposes". A daily supply of 150-200 liters per capita is considered an adequate supply to meet the needs for all domestic purposes. Water has many uses like,

- Domestic use
- Public use
- Industrial use
- Agricultural use
- Power use etc,.

Rain, surface water (Impounding reservoirs, Rivers & Streams, Tanks, Ponds and Lakes) and ground water (Shallow wells, Deep wells and springs) are the three major sources of water.

2.3.2 WATER POLLLUTION

Water with purity and with no contamination will not be available and contains lot of impurities both naturally added and some times by man kind. The earlier category includes,

- firstly, dissolved gases like hydrogen sulfide, nitrogen, carbon dioxide etc, added during rain fall,
- secondly, dissolved minerals like magnesium, salts of calcium, sodium etc, which are natural constituents of water following its contact with soil,
- thirdly, suspended impurities like silt, sand, mud and clay,
- and fourthly, microscopic organisms. These impurities are derived from catchments area, soil, and from the atmosphere.

The second category of contamination which is made by the man kind resulting in hazardous pollution consists,

- sewage, containing decomposable organic matter and pathogenic agents
- industrial and trade wastes, containing toxic agents ranging form metal salts to complex synthetic organic chemicals
- agricultural pollutants, comprising fertilizers and pesticides,
- and, physical pollutants, like thermal pollution, radioactive substances.

Pollution Indicators provide the amount of total suspended solids, biochemical oxygen demanded at 20^0 C, concentration of chlorides, nitrogen and phosphorus and absence of dissolved oxygen. Corrosion of water pipes, sewage drainage pipes, and many such, also may cause water contamination.

A variety of water related diseases may affect the man kind, which may be summarized as under.

1) Biological (Water-borne Diseases)
   a) Caused by presence of an infective agent
      i) Viral agents result in Viral Hepatitis A, Hepatitis E, Poliomyelitis, Rotavirus Diarrhoea in infants etc.,
      ii) Bacterial agents result in Typhoid and Paratyphoid fever, Bacillary dysentery, Esch, Coli Diarrhoea, Cholera etc.,
      iii) Protozoal agents result in Amoebiasis, Giardiasis etc.,
      iv) Helminthic agents resulting in Roundworm, Threadworm, Hydatid disease etc.,
      v) Leptospiral agents result in Weil's disease
   b) Caused by the presence of an aquatic host
      i) Snail leading to Schistosomiasis
      ii) Cyclops leads to Guineaworm, Fist tape worm
2) Chemical diseases

Because of different pollutants like detergent solvents, cyanides, heaby metals, minerals and organic acids, nitrogenous substances, bleaching agents, dyes, pigments, sulfides, ammonia, toxic and biocidal organic compounds etc., may lead to various chemical based problems in human.

3) Dental diseases

More than 1mg/litre of fluoride in drinking water lead to various dental diseases including mottling of dental enamel.

4) Cyanosis in infant

Methaemoglobinaemia is associated with water having high content of nitrate.

5) Cardiovascular diseases
6) Some other diseases also

2.3.2. AIR

Air is another element which is dominant by virtue of its existence. It surrounds man and has taken part in all ways of life of human. With different components of it, like oxygen, air is playing vital role in the day to day life of man kind. It is also acting as transferring platform in effective functioning of human senses. On the other hand, it is also facilitating the passage of disease elements, thus becoming a pollutant. Dust, toxic gases, smoke and some typical chemical vapors, using air to transform diseases, resulting sickness and in some cases, death also.

Air contains various gases, like Nitrogen (78.1%), Oxygen (20.93%), Carbon Dioxide (0.03%), Argon, Neon, Krypton, Xenon and Helium. The other elements like Water vapor, Ammonia traces and suspended matter such as Bacteria, Spores, Dust and Vegetable debris. Different reasons are attributed for this impurity presence. They are,

- Organic matter decomposition,
- Human and animals' respiration,
- Elements like Gas, Oil, Coal burning
- Manufacturing processes which induce undesirable gases, fumes, vapors, dust etc.

AIR POLLUTION

When the substances like gases, dust, smoke, toxic gases, etc, generated by the various operations of man, reached certain levels, which have negative effect on the health, safety, comfort of human kind, can be treated as a situation called as "air pollution". Not only the man kind, but the pollution is also affecting the other living in the surrounding environment. As a direct effect of this pollution, the basic structure,

functioning of ecosystems is being disturbed. Air pollution is one of the important factors, leading severe health problems in the entire world.

The following can be attributed with the sources of the air pollution.

1. Automobiles

   Automobiles emit various gases including Carbon Monoxide, Lead, Hydrocarbons, and Nitrogen Oxides etc, which after interacting with sun light, converted into Photochemical Pollutants of oxidizing nature, thus damaging the human health.
2. Industries

   Smoke, Sulphur Dioxide, Nitrogen Oxides, Fly ash, Hydrogen Fluoride, Hydrochloric Acid, Organic Halides, Carbon Monoxide, Carbon Dioxide, Hydrogen Sulfide and Sulphur Dioxide etc, are emitted in large quantum by the operations in industries.
3. Domestic

   Domestic Coal burning, Wood burning, Oil usage, etc, are also affecting the human life in becoming very much pollutant. Passive smoking is one of the prime factors affecting the health of majority of people in the entire world.
4. Miscellaneous

   Various other factors like incinerators, pesticide spraying, wind borne dust, fungi, molds, bacteria, burning refuse and nuclear energy programs etc, are also contribution in the air pollution.

Some of the popular air pollutants are listed below.

i. Carbon Monoxide
ii. Sulfur Dioxide
iii. Lead
iv. Carbon Dioxide
v. Hydrocarbons
vi. Cadmium
vii. Hydrogen Sulfide
viii. Ozone
ix. Poly-nuclear Aromatic Hydrocarbons
x. Particulate Matter

INDOOR AIR POLLTION

Apart from this, indoor air pollution is also, one of the critical aspects, attracting environmentalists to work upon. Air in some cities as Delhi in India, Xian in China, contains a daily average of 500 microns /m^3 of total suspended particulates, Smokey houses in Nepal have peak level of about 10000 microns / $m^{3.}$ This indoor air pollution is leading to acute respiratory infections in children, chronic lung disease & cancer in adults, and adverse pregnancy outcomes in women during pregnancy. About 10% of the young children are being killed because of these acute respiratory infections in the developing countries. Childhood pneumonia could be substantially reduced about 50%, if the indoor air pollution levels are reduced to low levels.

The following table identifies various sources of indoor air pollution. Researchers in these developing countries identified that at least about 15% of chronic respiratory diseases, acute

respiratory infection and about 10% of respiratory tract cancer could be reduced, if steps are initiated in improving the indoor air quality.

SOURCES	POLLUTANT
Combustion, Respiration	Carbon Dioxide
Stove, Gas heater, Combustion Equipment	Carbon Monoxide
Coal Combustion	Sulfur Dioxide
Carpet Adhesives, Insulation, Particle Board	Formaldehyde
Cigarettes, Gas Cookers	Nitrogen Dioxide
Stove, Aerosol Sprays, Tobacco Smoke	Respirable Particles
Building Material	Radon & Daughters
Appliances	Mineral Fibers
Fireproofing, Insulation	Asbestos
UV Light Sources, Electric Arcing	Ozone
Adhesives, Solvents, Resin Products, Aerosol Sprays	Other Organic Vapors (Toluene, Benzene etc,.)

EFFECTS OF AIR POLLUTION

Air quality in the developing countries have affected about 1.3 billion urban residents world wide due to which a lot of problems, are arising, as listed in the following table.

SOURCES	NOXIOUS AGENT	NEGATIVE EFFECTS
High altitude aircraft cabins, Automobile exhaust	Ozone	Substernal discomfort, Cough, Bronchoconstriction, Decreased exercise performance, Respiratory tract irritation
Leaded gasoline based automobile exhaust	Lead	Development of neuropsychological impairment in children
Gas stoves, Heaters, Wood burning, Kerosene stoves, Automobile exhaust	Nitrogen Oxides	Bronchial hyperactivity, Respiratory tract irritation, Bronchialitis obliterans, Impaired lung defenses
Kerosene space heaters, Smelters, Power plants, Oil refineries	Sulfur Dioxide	Respiratory tract irritation, Exacerbation of asthma and COPD, in severe exposure cases, may lead to death
Cigarette/Tobacco smoke, Automobile exhaust	Hydrocarbons	Lung cancer

3. VENTILATION

Supply of fresh outdoor air will replace the vitiated air along with effective control of incoming air is the prime responsibility of ventilation. Ventilation will also be helpful in maintaining the room temperature, comfortable environment free from infection. There are two major varieties of ventilation. They are as under.

- Natural Ventilation
  - Wind
  - Diffusion
  - Temperature inequality
- Mechanical Ventilation
  - Exhaust Ventilation
  - Plenum Ventilation
  - Balanced Ventilation
  - Air Conditioning

4. LIGHTING

To have good and health vision, proper lighting is must. Absence of adequate lighting conditions, eye ball is put to strain which may lead to eye and sight related health problems. Following are few factors, which influence the effectiveness and efficiency of human vision.

- Sufficient lighting
- Uniform distribution of light intensity
- Lighting glare must not be present
- Sharp and contrasting shadows must be absent
- Absence of flicker in the light source
- Colour of light would be matched to day light
- Reflections from the surroundings must be co-operative

5. NOISE

Noise can be understood in simple terms as an unwanted sound. In a broader perspective, it can be defined as “wrong sound, in the wrong place, at the wrong time”. Day by day, noise is becoming a big irritating factor in human life. Various unwanted sounds in the dynamic society, is resulting into Noise Pollution, leading to different health hazards.

A variety of sources like automobiles, industries, factories, railway junctions, traffic islands, bus terminals, usage of horns, loudspeakers, radios, televisions, etc, are contributing a lot to this noise pollution. A different auditory effect like deafness is one of major health disorder because of noise pollution. A number of non-auditory effects like

- speech interference among individuals,
- people’ annoyance,
- reduction of human working efficiency,
- physiological unwanted changes (raise in blood pressure, increase in heart rate, giddiness, nausea, fatigue etc,), are resulting because of this noise pollution.

6. RADIATION

The external environment includes various types of radiation. Different particles and rays comprise in the environment leads to different types as under.

- Alpha particles
- Beta particles
- Cosmic rays
- X-Rays
- Gamma rays

Ionizing radiation is having ability to penetrate tissues and deposit its energy within them. These radiations can be of following two types.

- Electromagnetic radiations: The above listed X-Rays and Gamma Rays come under this category.

  X-Rays and Gamma rays have short wave lengths. They are deep penetrating radiations. X-Rays are man-made, while Gamma rays are emitted spontaneously by some elements of radioactive nature during their disintegration process.

- Corpuscular radiations: Alpha particles and Beta particles belong to this type.

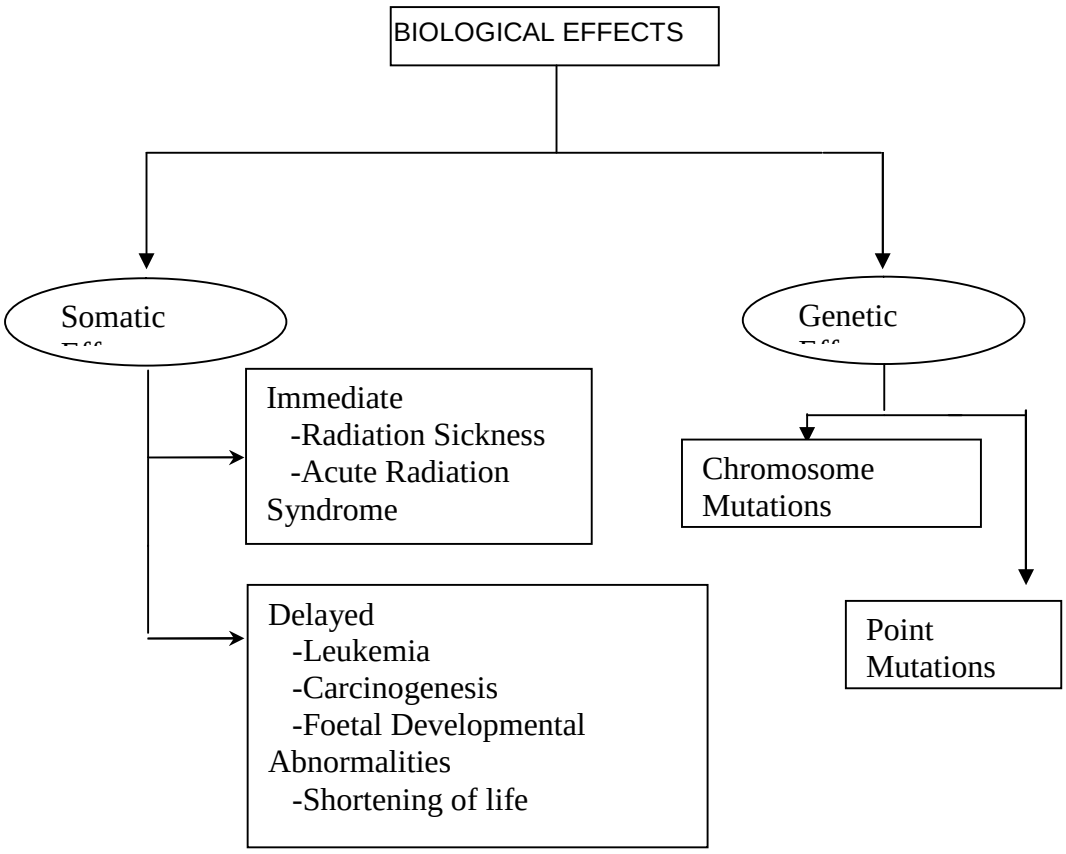
  Alpha particles are more harmful compared to X-Rays, Gamma rays and Beta particles up to ten times. But Alpha particles are less penetrating depth compared to the other types of rays but can do high damage if any radioactive substance entered into human body.

Non-ionizing radiation, on the other hand, includes UV (Ultra Violet) radiation, visible light, infrared radiation, microwave radiation and radio frequency radiation. Various sources of the radiation can be divided into two groups as listed under.

- Natural Sources
  - Cosmic Rays
  - Terrestrial Environment
  - Atmospheric Environment
  - Internal Radiation (radioactive matter stored in body tissues)

- Man-made Sources
  - Medical and Dental Radiation (X-Rays & Radioisotopes)
  - Occupational Exposure (Patients, Medical Technicians)
  - Nuclear Exposure (Radioactive Fallout)
  - Miscellaneous
    - Television Sets
    - Luminous Markers
    - Radioactive Dial Watches
    - Isotope Tagged Products

The following biological effects may be identified due the ionizing radiation.



7. METEOROLOGICAL ENVIRONMENT

The various elements listed below will comprise the meteorological environment.

a) Atmospheric Pressure

High altitudes of atmospheric pressure particularly above 25000 feet will stop man without breathing equipment. The increase in respiration, increase in the concentration of hemoglobin and increase in cardiac output etc, may occur because of low pressures and would lead to

- Acute Mountain Sickness
- High Altitude Pulmonary Oedema

Low altitudes where atmospheric pressure would increase, particularly 33 feet deep below seas level, where general gas elements like Oxygen, Carbon Dioxide and Nitrogen are dissolved in the blood and tissues proportionately to the partial pressure.

b) Air Temperature
c) Rainfall
d) Humidity
e) Movement of Clouds and
f) Wind Speed & Direction are the other factors do take part in meteorological environment.

8. HOUSING

A shelter to facilitate protection from environmental unwanted forces is known as Housing. Over a period of time, it included the immediate surroundings, other basic facilities and community services in related also, in its meaning. According to WHO Expert Group (1961), “residential environment” is the word coined in this regard and defined as the physical structure that man uses and the environs of the structure including all necessary services, facilities, equipment and devices needed or desired for the physical and mental health and the social well being of the family and the individual. Hence, the aims of housing include, the following.

- Providing shelter
- Facilitates family life
- Accessibility to community facilities
- Helps economic stability etc.

Housing must be proper in order to enhance the healthy family life. In absence of good standards, it may lead to various diseases such as respiratory infections (tuberculosis, common cold, diphtheria, influenza, measles, bronchitis, whooping cough etc,), rat infestation like plague, high morbidity and mortality rates, skin infections (ringworm, leprosy, impetigo, scabies etc,), arthropods (mosquitoes, bugs, houseflies, fleas etc,), some times accidents, and few psychosocial effects also.

9. WASTES DISPOSAL

Improper disposal of wastes lead to ill health. Solid wastes including garbage, rubbish, sewage treatment residue, manure, discarded material and demolition products etc, must be treated properly. They can be disposed through various methods like incineration, burial, dumping, composting, controlled tipping (or sanity land – fill), or manure pits. If any of the above methods could not be executed successfully, it may favor fly breeding, allow water and soil pollution, pathogen ate, attract rodents & vermin, and bad odors etc,. In some extreme cases of improper solid wastes disposal, vector-born diseases may also results out.

10. MEDICAL ENTOMOLOGY

Variety of Arthropods can be counted in the surrounding environment. Majority of them are posing threats to man kind. But some of them are helping them particularly in flowers’ fertilization. Some other types of them are acting as disease carriers called as vectors.

Medical entomology is the study of arthropods of medical importance. The following information about various classes helps in understanding some arthropods of medical importance.

Class I : INSECTA

1. Mosquitoes
   - Anophelines
   - Culicines
2. Flies
   - Houseflies
   - Snadflies
   - Tsetse flies
   - Black flies

3. Human Lice
   - Head and body lice
   - Crab lice
4. Fleas
   - Rat fleas
   - Sand fleas
5. Reduviid bugs

Class II : ARCHNIDA

1. Ticks
   - Hard ticks
   - Soft ticks
2. Mites (Chiggers)
   - Leptotrombidium & Trombiculid mites
   - Itch mites

Class III : CURSTACEA

1. Cyclops

The following table describes various Arthropod-borne diseases.

SL. No.	DISEASES	ARTHROPOD
1	Cholera, Gastro-enteritis, Amoebiasis, Conjunctivitis, Anthrax, Typhoid, Paratyphoid fever, Trachoma, Diarrhoea, Dysentery, Yaws, etc.	Housefly
2	Endemic typhus, Plague, Hymenolepis diminuta, Bubonic plague, Chiggerosis	Rat flea
3	Viral fevers (Dengue), West Nile, Viral hemorrhagic fevers (Dengue, Yellow fever), Malaria, Viral encephalitis, Filaria	Mosquito
4	Sleeping sickness	Tsetse fly
5	Onchocerciasis	Black fly
6	Chagas disease	Reduviid bug
7	Relapsing fever, Epidemic typhus, Pediculosis, Trench fever	Louse
8	Rickettsial pox, Scrub typhus	Trombiculid mite
9	Relapsing fever, Q fever	Soft tick
10	Viral encephalitis, Viral fevers, Viral hemorrhagic fever, Tick paralysis, Tick typhus, Human babesiosis, Tularemia	Hard tick
11	Fish tapeworm, Guinea worm disease	Cyclops
12	Scabies	Itch mite

13	Enteric pathogens	Cockroaches
14	Oriental sore, Sand fly fever, Kalaazar, Oraya fever	Sand fly

2.4 LEVELS OF HEALTH CARE

A basic and clear understanding of health care is discussed in the Lesson 5. Now, we shall discuss levels of health care. Three levels of health care can be identified as under.

1. Primary health care level
2. Secondary health care level
3. Tertiary health care level

A brief understanding of these three health care levels can be as follows.

PRIMARY HEALTH CARE LEVEL

This is the first level where the individuals will come in contact with the national health system. This system facilitates a close view of people, which allows the system to identify their most happening and common health problems. Subsequently, the system can take up necessary steps in resolving the health problems. In India, “Primary Health Centers” are established to provide this primary health solution. PHCs along with their sub centers are actively taking part in disseminating the necessary health services to the needy.

The system comprising Multipurpose health workers, Village health guides and Trained dais, Village health teams, effectively and efficiently managing the health services transfer from design stage to implementation stage to the root levels of society, i.e., villages.

The Alma-Ata declaration has pointed out the following essential components in primary health care system.

- Prevailing health problems education, the controlling & preventing methods,
- Food supply and proper nutrition
- Adequate supply of safe drinking water and basic sanitation
- Maternal and child health care and family planning
- Immunization against major infectious diseases
- Prevention and control of locally endemic diseases
- Appropriate treatment of common diseases and injuries and
- Provision of essential drugs.

SECONDARY HEALTH CARE LEVEL

This is intermediate level which is in between Primary health care level and Tertiary health care level. Here, the problems which could not be answered at Primary level will be dealt. The system of District Hospitals, Community Health Centers will serve at this level.

TERTIARY HEALTH CARE LEVEL

This is the advanced level where more sophisticated facilities, with latest technological medical systems, highly trained specialized doctors; health staff will attend the problems which could not be resolved at both of the previous levels. Regional level institutions like Medical College Hospitals, AII Hospitals, Specialized Hospitals etc, will take care of these problems.

Meanwhile, the patients must be continuously informed, about their health status. The staff (qualified doctors, any other nursing staff), who referred the patients must also be informed about the patient health status.

CHANGING APPROACHES

The suggestions and recommendations of various committees instituted by the government of India are being considered in modernizing the health care system in order to enhance its effectiveness and to meet the basic purpose of having such a system.

2.5 CONCLUSION

At the end of this lesson, you must have understood the importance of studying the various factors of health environment. In middle, medical entomology is also discussed to enhance the knowledge of environment. At the last stage of this lesson, a thrust is given to understand the various levels of health care to increase your awareness and knowledge about the requirement of facilities provided at the three stages of health care.

2.6 KEY TERMS

1. Environment: The combination of various external factors coming under the categories of living and non-living, material and non-material surrounding the man, can be treated as the environment.

2.7 SELF CHECK

1. Explain the concept of heatlth environment?
2. What is the importance of factors of environment? Explain them.
3. Why the health care is discussed in three levels? Discuss their significance.

LESSON - 3

HEALTH INDICATORS

STRUCTURE

3.0 OBJECTIVES

After studying this lesson, you must able to

- Understand what exactly an indicator is and its significance
- Interpret the various type of indicators
- Know the recent trends in socio-economic factors and the health status

3.1 INTRODUCTION

Indicators are required to measure the communities' health status which would help in comparing the health status of various states and different countries in the world. This comparison would benefit in assessing the health needs of that society accordingly the various scarce resources can be allocated. The careful monitoring and evaluation of health services, activities and programmes would also be possible with proper health assessment. Indicators help to measure the extent to which the objectives and targets of a programme are being attained.

3.2.CONCEPT OF INDICATORS

Indicators are to indicate a specific situation or will reflect a particular situation. The definition provided by WHO's guidelines for health programme evaluation is "variables which help to measure changes". Often they are used particularly when these changes cannot be measured directly, as for example health or nutritional status. A systematic and chronological measurement of any particular situation over a period of time will reveal the direction and speed of that situation's change and serve to compare different groups of people at the same moment in time.

Indicators to prove its scientific viability should possess the following characteristics.

- Objectivity
- Reliability
- Specificity
- Sensitivity
- Validity

Since health is expressed in terms of happiness, cannot be exactly measured. Measurement of health may be possible in terms of illness, consequences of illness and few more measurable characteristics. Also, health is multi-dimensional and each dimension is

influenced by large number of factors, of which, only few are known. So, multi-dimensional measurement only will help in measuring the health. That means no one indicator will suffice the study and understanding requirements but many as follows.

3.3 TYPES OF INDICATORS

1. Mortality Indicators
2. Morbidity Indicators
3. Population and Vital Statistics Indicators
4. Socioeconomic Indicators
5. Environmental Indicators
6. Health Resources Indicators
7. Facilities Indicators
8. Human resources Indicators
9. Budgetary resources Indicators
10. Health Services Indicators
11. Health Status Indicators
12. Nutritional Status Indicators
13. Health Care Delivery Indicators
14. Health Policy Indicators
15. Indicators of Quality of Life
16. Other Indicators

3.4 RECENT TRENDS IN HEALTH STATUS

Life expectancy

For the period 1996-2001, the life expectancy at birth is estimated to be 62.36 years for males and 63.39 years for females. In 1991 the sex ratio was 927 females per 1000 males which increased to 933 in 2001. To ensure the continued improvement in life expectancy, the health care delivery infrastructure is being expanded, MCH care is being improved, specific programmes such as the expanded programme on immunization (EPI), introduction of Oral Re-hydration Therapy (ORT), etc. are being strengthened, and efforts are continuing to contain locally endemic diseases. There is also an increased thrust in other development and poverty alleviation programmes. The main constraints are the diverse population groups, low literacy and income levels, and socio-cultural beliefs and practices which adversely affect health.

Mortality

The infant mortality rate (IMR) was reported to be 68 per 1000 live births in 1994-98 and the maternal mortality ratio (MMR) for 1998 was estimated at 407 per 100,000 live births. An estimate for 1996 of the number of deaths per year in children under five years from diarrhoeal diseases was 840,000, from acute respiratory infections 600,000 and from measles 330,000. Deaths from malaria were reported to be 1061 (1995) and 1057 (1999), cardiovascular diseases 2,386,000 (1990), traffic accidents 45,670 (1993), and work accidents 543 (1993). Between 1986 and 1999 the crude death rate (CDR) declined from 11.1 to 8.7 per 1000 population. Between 1980 and 1998 the IMR declined from 114 to 68, the leading causes of death being diseases of circulatory system, infections and parasitic diseases, injury, poisoning, perinatal conditions, and diseases of respiratory system. The number of reported accidental deaths in 1993 was 11,125 and 80,000 in 1998. The main constraints are low literacy and income levels, socio-cultural beliefs and practices, and suboptimal utilization of health facilities.

Morbidity

The numbers of reported cases of the following diseases were: leprosy 560,000 (2000), malaria 2,276,788 (1999), measles 26,986 (1991), neonatal tetanus 1896 (1995), polio 14215 (2000/2001), and tuberculosis 1,223,127 (1999). The vaccine-preventable diseases (referred to in Section 6) have declined significantly since implementation of the EPI. In India about 14 million people are estimated to be suffering from active tuberculosis and about 0.5 million die of the disease each year. Currently, short term chemotherapy using DOTS has been introduced and accessibility to tuberculosis treatment centers improved. The prevalence of leprosy has declined from about 39 per 10,000 populations in 1985 to about 7 per 10,000 in 1995 and further down to 3.7 in 2000. The spectacular reduction in this disease has been due to the new regimen of multi-drug therapy. The number of new cases detected annually has, however, remained more or less the same, at about 0.5 million.

Disability

Disability prevalence rates per 100,000 population estimated in 1994 is as follows: physical disability 3574, visual disability 827, hearing 806, speech 510, and locomotor disability 2041. The incidence rates per 100,000 population of these disabilities are: physical 173, visual 45, hearing 27, speech 10 and locomotor disability 105 (national sample survey). The main cause of blindness is cataract (80.1%), with about 6.5 million (2000) persons blind due to cataract. The national blindness control programme is centrally sponsored with a four-pronged strategy to strengthen service delivery, develop human resources, promote outreach activities and develop institutional capacity. Due to changing lifestyles, mental disorders are likely to increase in the future. The total number of mental disorders treated in specialized mental hospitals was 48,396 in 1991 and 38,323 in 1992. The majority of cases have been diagnosed as suffering from psychosis (85.7%).

3.5 RECENT TRENDS IN SOCIOECONOMIC FACTORS

Economic trends

Gross national product (GNP) per capita increased from Indian Rs. 6340 in 1991/92 to Rs. 13,193 in 1997/98. The annual growth rate of the GNP increased from 0.5% in 1991/92 to 7.0% in 1995/96, but declined to 4% in 2000/2001. The percentage of poor in rural areas increased from 20.5 in 1991/92 to 22.9 in 1992/93 and to 37.3% in 1993/94. Since the early 1990s, overall economic growth has been faster. The situation regarding balance of payments has strengthened considerably, and the central government's fiscal deficit as a proportion of the gross domestic product (GDP) has declined significantly.

Demographic trends

The crude birth rate (CBR) declined from 29.5 in 1991 to 26.1 in 1999, while the crude death rate (CDR) declined from 9.8 to 8.7 per 1000 population over the same period. The total fertility rate (TFR decreased from 3.6 in 1991 to 2.85 in 1996-98. The annual population growth rate declined from 1.97 in 1991 to 1.74 in 1999. The population, however, continues to grow, as the decline in the birth rate is not as rapid as the decline in the death rate.

Due to the increase in life expectancy at birth (58.7 in 1990 to over 62 in 2001), the number of elderly persons in the population is now increasing, for which specific health facilities will need to be provided. Urban migration over the last decade has resulted in the rapid growth of urban slums, with ad hoc provisions for health care if any. Within the 9th plan steps are proposed to improve urban PHC.

Social trends

From the 2001 population census, the literacy rate for males is 75.85% and for females is 54.16%. The changing economic situation created by urbanization, industrialization and new economic liberalization has transformed the Indian social structure and values from a traditionally agrarian economy to a modern industrial order. The emerging nuclear family is exposed to severe economic and social constraints and changes. The traditional mechanisms for social security and adjustment in times of crisis and conflict are fast disappearing. This transformation has resulted in the creation of several social problems for individuals and groups such as older persons, the disabled, drug addicts, street children, child labor, HIV-infected populations, etc. There has also been increased violence - individually as well as collectively - especially towards women and young girls, which has assumed a national dimension.

The problem of drug abuse is no more confined to a particular section of society but has infiltrated all strata. The large uncontrolled influx of rural migrants to urban areas in search of better earnings and job opportunities leaves them totally vulnerable, particularly the children of these migrant families. The negative influence of the electronic media appears to have resulted in an increase in juvenile delinquency, vagrancy, robberies, murders and kidnappings.

There is a plethora of social legislation to safeguard the interest of persons in distress and to deal with the various social problems. Many of the acts have been amended in recent years to give them more teeth in terms of their effectiveness. However, there are wide gaps in the implementation of these acts with regard to coverage, quality and content, which affect social development and the well being of the people. The 9th FYP envisages a more holistic approach to these social problems, with strategies aimed at specific target groups and/or problems.

Food supply and nutritional status

The proportion of newborns weighing less than 2500 grams at birth was reported as 23% in 1995/96. The proportion of children under 3 years whose weight-for-age was less than minus 2 SD below the median was 47% (1998/99). It is estimated that 200 million people are exposed to the risk of iodine deficiency disorders (IDDs) and that 63 million suffer from goiter. Surveys conducted in 275 districts have revealed that 235 districts are endemic for IDDs. In 1991, 87.5% of pregnant women were found to be anaemic (haemoglobin < 11g/dl). The National Institute of Nutrition in Hyderabad reported that 56% of children fewer than five years of age had iron deficiency anaemia. The contribution of vitamin A deficiency to blindness was estimated to be 2% in 1975 and 0.04% in 1990.

A national IDD control programme was launched in 1992, which covers all states and union territories. The strategy is the use of iodated salt and all aspects of programme implementation are being addressed. Anaemia contributed to 20% of maternal deaths in 1991. An intervention programme that commenced in 1992 prioritized pregnant women for iron and folic acid administration. During 1994/95, 85.8% of pregnant women were covered with the recommended daily dose of iron folate tablets.

The most susceptible group for vitamin A deficiency blindness is preschool children. The child survival programme seeks to administer five doses of vitamin A to all children under three years. During 1994/95, 72.6% of infants and 54.8% of 1-2 year old children were administered vitamin A. Other actions include the Integrated Child Development Service (ICDS) programme that provides a package of services to 54 million beneficiaries comprising preschool children, pregnant women and lactating mothers, and the mid-day meal programme for primary school children. The following goals have been set to be achieved by the year 2000: reduction by 50% of moderate and severe protein-energy malnutrition (PEM) in preschool children, reduction of low birth weight to less than 10%, elimination of blindness due to vitamin A, reduction of iron

deficiency anaemia among pregnant women to 25%, and reduction of IDDs to less than 10% in endemic districts.

Lifestyle

The proportion of males 15 years and over who were regular smokers in the 1980s has been estimated at 32-74% (rural) and 46-63% (urban), and females 20-50% (rural) and 2-16% (urban). Currently there is an increasing trend in smoking among youth. Other significant changes in lifestyles relate to lack of physical activity among the affluent, increased use of fast foods, substance abuse, and violence, particularly against young women and children. The government has taken action to promote healthy lifestyles through sports, health education, setting up of no smoking zones, legislation banning smoking in public places, and establishing drug detoxification centers. A major constraint is the government revenue derived from tobacco, sponsorship of activities, especially sports events by tobacco companies, and high-pressure advertising.

3.6 LATEST AVAILABLE DATA

For few indicators the available latest data is presented in the below table.

Indicator	Latest available data	Year	Remarks
Population and Vital Statistics			
Total population (in millions)	1,027	2001	Census results
Population density (persons per sq km)	324	2001	Census results
Sex ratio (females per 1000 males)	933	2001	Census results
Population under 15 years (%)	35.6	1998	
Population 65 years and above (%)	4.1	1998	
Crude birth rate (per 1000 population)	26.1	1999	
Crude death rate (per 1000 population)	8.7	1999	
Annual population growth rate (%)	1.74	1999	Natural growth
Total fertility rate (per woman)	2.85	1996-98	
Urban population (%)	26.13	1991	Census results
Socioeconomic Situation			
Net national product per capita: At current prices At 1993-94 prices	 Rs 13,193 Rs 9,660	 1997/98 1997/98	
Literacy rate (%): Total Male Female	65.38 75.85 54.16	2001 2001 2001	For population of age 7 years and above
Prevalence of low birth weight (weight <2500 grams at birth) (%): Total Urban Rural	23 21 24	1995-96 1995-96 1995-96	

Prevalence of underweight (weight-for-age) in children <3 years of age (%)	47.0	1998-99	
Prevalence of stunting (height-for-age) in children <3 years of age (%)	45.5	1998-99	
Prevalence of wasting (weight-for-height) in children <3 years of age (%)	15.5	1998-99	
Environment			
Population with safe drinking water available in the home or with reasonable access (%) *(piped or hand pump)* — Total	77.9	1998-99	
Urban	92.6	1998-99	
Rural	72.3	1998-99	
Population with adequate excreta disposal facilities available (%) *(population with toilet/latrine facility)* — Total	36.0	1998-99	
Urban	80.7	1998-99	
Rural	18.9	1998-99	
Health Resources			
Facilities			
Number of hospital beds	665,639	1998	As of 1/1/1998
Population per hospital bed	1,451	1998	For hospitals only
Hospital beds per 10,000 population	6.9	1998	
Number of health centres:			
(a) Sub-centres	137,006	1998	
(b) Primary health centres	23,179	1998	
(c) Community health centres	2,913	1998	
Man Power			
Number of physicians	503,900	1998	Registered
Population per physician	1,916	1998	Computed value
Physicians per 10,000 population	5.2	1998	
General nurse midwives	607,376	1997	Registered
Auxiliary nurse midwives/health workers	301,691	1997	
Budgetary resources			
Total Expenditure on Health (THE) as % of Gross Domestic Product (GDP)	5.1 %	1998	
Public Expenditure on Health (PHE) as % of Total Expenditure on Health (THE)	18.0 %	1998	
Private Expenditure on Health (PvtHE) as % of Total Expenditure on Health (THE)	82.0 %	1998	
Public Expenditure on Health (PHE) as % of General Government Expenditure (GGE)	5.6 %	1998	
Social Security Expenditure on Health (SSHE) as % of Public Expenditure on Health (PHE)	…	1998	
Tax funded Health Expenditure (TaxFHE) as % of Public Expenditure on Health (PHE)	96.4	1998	
External Resources for Health (Ext Res HE) as % of Public Expenditure on Health (PHE)	3.6	1998	

Private Insurance for Health Risks (Pvt ins HE) as % of Private Expenditure on Health (PvtHE)	…	1998	
Out-of-Pocket Spending on Health (OOPS) as % of Private Expenditure on Health (PvtHE)	97.3 %	1998	
Per capita Total Expenditure on Health (THE) at official Exchange rate (X-Rate per US$)	22	1998	
Per capita Public Expenditure on Health (PHE) at official Exchange rate (X-Rate per US$)	4	1998	
Per capita Total Expenditure on Health (THE) in international dollars (int'l $)	110	1998	
Per capita Public Expenditure on Health (PHE) in international dollars (int'l $)	20	1998	
Health Services			
Pregnant women attended by trained personnel during pregnancy (%) Total Urban Rural	65.1 85.6 59.3	1995-96 1995-96 1995-96	
Deliveries attended by trained personnel (%) Total Urban Rural	42.3 73.5 33.5	1995-96 1995-96 1995-96	
Women of childbearing age using family planning (%)	48.2	1998-99	
Eligible population (i.e. infants reaching their first birthday) that has been fully immunized according to national immunization policies	34.5 49.0	1998-99 2001	As of Oct 2001
Infants reaching their first birthday that have been fully immunized against diphtheria, tetanus, and whooping cough (%)	52.1	1998-99	
Infants reaching their first birthday that have been fully immunized against poliomyelitis (%)	59.2	1998-99	
Infants reaching their first birthday that have been fully immunized against measles (%)	41.7	1998-99	
Infants reaching their first birthday that have been fully immunized against tuberculosis (%)	69.1	1998-99	
Women that have been immunized with tetanus toxoid (TT) during pregnancy (%)	66.8	1995-96	
Health Status			
Life expectancy at birth (years): Male Female	 62.36 63.39	 1996-2001 1996-2001	 Projected values
Infant mortality rate (per 1000 live births)	68	1994-98	
Under-five mortality rate (per 1000 live births)	95	1994-98	
Maternal mortality ratio (per 100,000 live births)	407	1998	

Sources:

1. India, Census of India 2001 : Provisional Population totals, March 2001
2. India, Sample Registration System, Statistical Report 1998, October 2000
3. India, Sample Registration System, SRS Bulletin, April 2001
4. India, National Family Health Survey (NFHS-2), 1998-99, October 2000
5. India, Health Information of India 1997 & 1998, July 2000
6. Adapted from "WHO Geneva, The World Health Report 2001 : Mental Health, New Understanding, New Hope", October 2001
7. India, Press briefing by the Minister of Health, 23 October 2001
8. India, Sample Registration System, SRS Bulletin, April 2000

3.7 CONCLUSION

At the end of going through this lesson, you must have understood the meaning and importance of the health indicator. The various important types like mortality, morbidity and disability indicators would have given brief understanding of respective fields. Further, the recent trends in the health status along with the discussion on the recent socio – economics factors would have provided additional knowledge.

3.8 KEY TERMS

1. Indicators: variables which help to measure changes.

3.9 SELF CHECK

1. What is an indicator? Explain its significance.
2. Explain various types of indicators.
3. Discuss the effect of socio-economic factors on health?

LESSON 4

TOWARDS HEALTH FOR ALL

STRUCTURE

4.0 OBJECTIVES

At the end of this lesson, you must able to

- Understand the concept and history of Health For All
- Know the overall health situation in India
- Describe the Alma Ata Declaration

4.1 INTRODUCTION

Knowing the concept of Health for All will enable an administrator to realize the necessity of framing suitable objectives. The HFA will help in achieving the targets as it allows one to continuously monitor the progress. While providing the information about the prevailing difficulties of health in India, the appropriate measures for solving these problems are also being discussed.

4.2 HISTORY

A combination of variety of characteristics comprise the “our country”, India. Economic factors, socio - cultural factors, traditional factors, illiteracy conditions, poverty limits, unawareness or educational factors etc, have made up the India as a representative of a common man leading to ill health. In fact, the constitution of India framed strategies, action plans, to visualize the new social order comprising equality, justice, freedom and an individual having dignity. Another dimension is to eradicate poverty, remove unawareness, and mitigate the conditions leading to ill health thus building our country with high level of nutrition, citizens with high standard of living, securing the health and strength of workers, women, men and future generation of children. Public health, hospitals, dispensaries and sanitation are the responsibilities of the individual states, whereas controlling of the population, family planning, drugs, prevention of food adulteration are the points under discussion.

National health care system caters the citizens from the roots i.e. from villages. Primary Health Care System is the channel chosen for this purpose. It acts as foundation for the rural heath care system. Primary Health Care is a successful concept as it could help in expediting the process of socio-economic development, increasing the standards of living, and creating the qualified, healthy human power for the county.

On 2nd October, 1952, the concept of Primary Health Care Centers has come into reality. Initially, the intention is that a PHC must cater each Community Development Block comprising 60,000 to 80,000 population in it. Each PHC complex was established with a main center of Six beds located at the Block Head Quarters, and Four sub centers. The staff consist One Medical Officer, One Sanitary Inspector, Four Midwives (ANMs), and Two Ancillary Personnel.

CONCEPT

The Member countries and WHO together have decided during the 30th World Health Assembly meeting in 1977 that all the countries must increase the health levels of their citizens to such a level which would permit them to lead a socially and economically productive life. Subsequently, UNICEF and WHO organized a joint conference on Primary Health Care at Alma Ata, USSR, during 6th to 12th September, 1978. The highlights of decision resolved during the meeting were as under.

- The health is a fundamental human right.
- Achieving the complete health positively must be an important social goal, with the contributions also from the social and economic sectors.
- The International Conference held in Alma Ata during 1978, as mentioned above could witness participation from the representatives from 67 UN organizations and NGOs, and delegates from 134 Governments.
- A multi-pronged strategy must be incorporated to achieve the goal of Health for All (HFA) by the year 2000, involving all the social and economical sector i.e., All for Health Approach (AFH).

Even after the year 2000, this goal still continued as a vision founded on social equity. Achieving the social equity demands the reduction in the gross inequality in the world health status, in all developed, developing and under developed countries. This vision encompasses a new paradigm shift in the change of perception, promotion, projection and delivery of health. This change attracts a fundamental shift in values, as under.

- Change in individuals, to assume the responsibility to protect and promote their health.
- Change in collective participation of people, in organizing various self reliance groups, in order to achieve the change.
- Change in the way of perception of health providers' value system, because they must be able to involve people to take up responsibility of their own health status uplift. The providers must also increase their orientation towards the health education system.
- Change in health system administration, involving the reallocation of responsibilities, power structure, decentralization, and delegation of authority, redefined health care delivery system, and close alliances between all the social, economic and other health related sectors.
- Most importantly the attitudinal change in the strategy makers sitting at the top. They must assume the development of system leading to social equity, resulting

appropriate health care system even to cater the needs of vulnerable, under privileged, socially and economically deprived segments of society.

4.3 OVERALL HEALTH SITUATION IN INDIA

Let us now turn our attention to the overall health situation in India. We will look at some basic statistics impacting health, review health care delivery systems and critique the achievements as well as the unfulfilled targets of health care delivery. Population Profile: The work on the next census (2001) has already started. Even without it, it can be said that India is heading towards a population explosion. It is one of the most populous nations in the world-second only to China. Nature has only finite resources and the consequences of an ever expanding population to mankind as a whole are grave. Let us look at some of these demographics or should we say "demographics".

LARGE POPULATION

Declining mortality, high fertility (both in terms of birth rate and family size), Illiteracy rate of about 40%, and dependency ratio of 0.9; that is, every economically productive member has to support almost one dependent. This table summarizes the most recent demographic information available:

Total Population (estimated1996)	952	million
Population rural% (1995)	73.2	
Adult literacy rate % (1995)	52	
Density of population per sq.km (1995)	283	
Sex ratio female per 1000 male (1991)	929	
Average family size (1988)	34.8	
Age at marriage, female (1991)	19	Years
Annual per capita GNP (at current prices 1994 - 95)	Rs.8984	

When we compare some of the available statistics with respect to selected health and socioeconomic indicators to that prevalent in the west the following is the observation.

	Developing Countries	**Developed Countries**
Life expectancy at birth(years) 1996	66	77
IMR (per 1000 live births)	55	6
Maternal mortality per 100,000 live births 1990	350	13
Doctor population ratio per 10,000 (1993)	8.4	25.2
Nurse population ratio per 10,000	9.6	74.2
GNP per capita (US $)(1994)	1133	24414
Adult Literacy rate	73	99

A LOOK AT SOME MORTALITY INFORMATION

POSITIVE ACHIEVEMENTS

During the last few decades, there has been a notable improvement in the health status of the population. The death rate has steadily declined. The life expectancy at birth has gone up considerably since 1951, recording an estimated 62 years during 1995. Many of the infectious diseases have shown a decline, e.g. plague and malaria.

SOME DRAWBACKS

There is still a lot that needs to be done. India's health standards are still low compared to those in developed countries. The infant mortality rate (IMR) India is still high (about 74) as compared to a low of about 6 in developed countries. It does not compare even favorably to some countries in the African continent. Even among underdeveloped countries the IMR is considerably higher. The life expectancy rate in India is at least 10-15 years behind the western life expectancy.

A LOOK AT SOME MORBIDITY PROFILES

Although some diseases have been brought under control many diseases like tuberculosis, filariasis, leprosy, malaria, diarrhea diseases continues to be a major health problem. Small pox has been eradicated. But measles and polio are still widely prevalent. Bacterial meningococcal meningitis has been on the increase. We still have not controlled viral hepatitis infections. AIDS may become one of the most deadly diseases in the near future. Diarrhoeal diseases still are a major cause of morbidity and mortality in children. Malnutrition occurs very commonly in children, especially in the rural areas.

About 30 per cent of babies are born with a birth weight of less than 2.5. Kg. Vitamin A deficiency is a major cause of preventable blindness. India is home to almost half the cases of tuberculosis in the world. Not so encouraging is the widespread occurrence of leprosy. People continue to be afflicted by malaria. Many deaths occur due to Paramoecium falciparum infections. Kala-azar has made a resurgence. An estimated 20,000 cases occur annually. Lastly sexually transmitted diseases are widely prevalent.

In addition to the above the so called slow epidemics of diseases such as diabetes, cancer, and heart diseases also affect people in third world countries. Smoking is decreasing in many developed countries due to health fears, but it is on the rise in developing countries. It is estimated that in certain developed countries as high as 60% of the men smoke. Heart attacks occur at a younger age in South Asia as compared to the rest of the world. With the adoption of western lifestyle, diabetes is increasingly seen in India.

MEASURES TAKEN TO TACKLE THESE HEALTH PROBLEMS

Establishment Of Primary Health Care Centers

The establishment of primary health care centers started earnestly after independence in 1952. Over the years, a network of primary health centers and sub-centers have been established. The primary health centers are the major health care providers in the rural areas.

At the village level, a band of voluntary health workers (e.g. village health guides and trained dais) has been created. They are selected by the local community and trained to deliver primary health care. Secondary health care is provided by the district hospitals and newly created community health care.

Tertiary health care is provided by the teaching hospitals and institutions and other apex hospitals. Both in the rural and urban areas, the public and private sectors exist side by side. A large number of voluntary organizations are also involved in providing health care to the people.

Establishing A Health Care Work Force

Major requirement in developing an adequate health infrastructure is health manpower which must be adequate both as regards quality and quantity. Many medical colleges (allopathic) and nursing schools were started soon after independence. There are about 400,000 allopathic doctors. In addition the alternative forms of medicine also contribute to the workforce e.g. Ayurvedic system, Homeopaths, Unani system, they number approximately 6 lakhs and are actually more than the existing allopaths. When all doctors are included the ratio of doctor: patient population is roughly 1:2100.

Health Care And Insurance

As compared to the West, health care insurance does not exist in a big way. As part of the public sector health services, there are a number of schemes such as Central Govt. Health scheme (CGHS) and the Employees State Insurance Scheme (ESIS) under which comprehensive health care services are provided to the families of employees. The beneficiaries covered by these schemes work out to a little less than 6 per cent of the Indian population.

Some private sectors provide insurance to their employees. With the government opening up the insurance sector to international competitors the insurance scenario will undergo a dramatic change in the coming years.

PRIMARY HEALTH CARE

Another important declaration was the Alma Ata (erstwhile USSR) joint conference of WHO-UNICEF. It was declared that ”The existing gross inequality in the health status of people particularly between developed and developing as well as within countries is politically, socially and economically unacceptable". The Alma- Ata conference called for acceptance of the WHO goal of Health for all by 2000 A.D. and proclaimed "primary health care as a way to achieving health for all".

This slogan was adopted and incorporated into delivery of health services by many countries including India. India is a signatory to the Alma-Ata Declaration of 1978. The National Health Policy, approved by the parliament in 1983 clearly indicates India's commitment to the goal of health for all by the year 2000 AD.

Declaration Of Alma Ata About Primary Health Care

The Primary Health care includes atleast,

- Education about prevailing health problems and methods of preventing and controlling them.
- Promotion of food supply and proper nutrition;
- An adequate supply of safe water and basic sanitation;
- Immunization against infectious diseases;
- Prevention and control of endemic diseases;
- Appropriate treatment of common diseases and injuries;
- Provision of essential drugs.

There are some statistical measures used to give an idea of the health status of a community or nation as a whole. They are

Crude death rate: It is defined as the number of deaths per 1000 population per year in a given community.

Expectation of life: Life expectancy at birth "the average number of years that will be lived by those born alive into a population if the current age-specific mortality rats persist". Life expectancy is a good indicator of socio-economic development in general.

Infant mortality rate: Infant mortality rate is the ratio of deaths under 1 year of age in a given year to the total number of live births in the same year; usually expressed as a rate per 1000 live births. It is one of the most universally accepted indicators of health status not only of infants, but also of whole populations.

Comparison of Kerala and all India Health Statistics

	Kerala	All-India
Death rate (1993)	6.0	9.2
Infant mortality rate (1993)	13	74
Life expectancy at birth (1993)	66.5	61.5
Literacy rate (%) (1991)	90.59	52.11
Per capita income (1989-90)	Rs.3389	Rs.5670
Doctor Population ratio (1991)	1:7213	1:2148

4.4 TARGETS FOR HFA IN 21ST CENTURY

As the time moved on from 20th century, everybody started understanding that the HFA by the year 2000 can not be achieved and at least in order to realize this in 21st century, WHO framed new set of targets. The new global health policy implementation now will be guided by 10 focused indicators, which are grouped under three broad categories for transparent monitoring and success. They are briefly explained as under.

1. Improving Health Equity By 2005
   Child growth is to be used for equity by confining the percentage of children under five years who are stunted should be less than 20% in all countries and sub groups with in the countries by the year 2020. The current percentage of stunted children is 34% worldwide and 38% in developing countries.
2. Increasing Survival By 2020
   The new targets for maternal mortality rate is to be less than 100 per 1,00,000 live births, for life expectancy at birth is to be greater than 70 years for all countries and the child mortality rate is to be less than 45 per 1000 live births.
3. Reversing Global Trends for Five Major Pandemics by 2020
   The increasing incidence of disability caused by Tuberculosis, HIV/AIDS, Malaria, Tobacco related diseases, and Violence/Traume must be reversed by proper implementation of appropriate disease control programmes.
4. Eradication and Elimination of Certain Diseases
   Chagas's disease transmission must interrupted by the year 2010 through vector control and blood screening. Measles is to be eradicated by the year 2020 through immunization, surveillance and training. Leprosy must be eliminated by the year 2010 through multi drug therapy, surveillance, research and awareness. Vitamin A and Iodine deficiency must be eliminated by the year 2020 through dietary improvement, fortification of fats or sugar or salt, and supplementation program. Trachoma must be eliminated by the year 2020 through SAFE strategy surgery, antibiotics, facial cleanliness and environmental improvement. Lymphatic filariasis must be eliminated by the year 2020 through vector control and community treatment.
5. Access to Water, Sanitation, Food and Shelter Must Be Improved By 2020
   Through community participation towards management of facilities, and increased awareness and participation from policy makers and politicians, all

countries should move in leaps and bounds in providing proper sanitation, food, shelter and adequate safe drinking water to their citizens.

6. Promoting The Health Enhancing Life Styles By 2002

   A suitable combination of community, educational, economical and organizational based programs must be introduced to increase the way of life style and simultaneously to reduce the detrimental way of life. All the citizens must be informed about the target to be achieved and must be sought after their participation through supporting environment, community action, health services. Health enhancing indicators and health damaging indicators can be taken use for effective monitoring of this program.

7. National HFA Policies – Develop, Implement and Monitor By 2005

   In accordance to the national HFA policies framed, all countries must chalk out appropriate programs in developing, implementing and monitoring. The strategies developed based on the developmental needs of such countries must be effectively and efficiently converted into practical success.

8. Improving Access to Comprehend Essential Quality Health Care By 2010

   The public health promoting network must allow all the citizens to comprehend, themselves for a qualitative health care which must promote positive health and prevent unwanted.

9. Enhancing The System of Health Information and Surveillance By 2010

   With the available resources, an appropriate system of health information and surveillance should be established in promoting the health care by all member countries.

10. Support Research for Health By 2010

    Suitable research program containing all necessities of the countries with clearly defined objectives, facilities, mechanisms should be started. The countries also must ensure that successful completion of these programs through suitable proportional financial assistance, management support.

4.5 CONCLUSION

The discussion of the above topics should allow you in learning the basic concept of Health For All. The overall health situation in India must have increased your awareness about various problems to be answered by a health administrator. You should have realized that the establishment of Primary Health Care centers supported with the properly trained staff should be right approach for the problems identified. We have also understood the vision for 21st century towards the HFA.

4.6 KEY TERMS

1. Primary Health Center: The primary health centers are the major health care providers in the rural areas.
2. Secondary Health Care Center: Secondary health care is provided by the district hospitals and newly created community health care.
3. Tertiary Health Care Center: Tertiary health care is provided by the teaching hospitals and institutions and other apex hospitals.

4.7 SELF CHECK

1. Explain why the “Health For All” concept should be discussed?
2. Assess the current situational factors in view of above concept.
3. Do you feel the PHC, SHC and THC are serving the purpose? Comment.

INTRODUCTION

In this 2nd unit we have again 4 lessons.

In the first lesson (lesson – 5), the framework of Health Care Delivery System is discussed to give insights about the various important elements of health care delivery. The studies conducted by different eminent people in this industry, in proposing a suitable system for the benefit of India is discussed in detail. The health care infrastructural components were discussed. While discussing the various health care services, an outlook is provided also on the recent developments in this area.

In the second lesson (lesson – 6), the discussion is on the alternative systems of medicine. In this lesson some of them were discussed. They are Ayurveda system, Yoga system and Unani system. The orientation and approaches of each of these were discussed. Where ever available, the infrastructural facilities also provided for reader's clarity.

In the third lesson (lesson – 7), the remaining three alternative medicine systems viz. Siddha system, Homeopathy system and Naturopathy system were discussed. Here also, individual ideologies were attempted.

In the fourth lesson (lesson – 8), National Health Policy intricacies were discussed. The twenty nine sub components of NHP were described. This provides you about the Government of India's orientation towards the health care.

LESSON - 5

AN OVERVIEW OF HEALTH CARE DELIVERY SYSTEM

STRUCTURE

5.0 OBJECTIVES

Studying this lesson should allow you to

- Understand the concept and basics of health care system
- Know about the studies conducted by various committees
- Describe the recent trends in Health Care Delivery System
- Develop awareness about various components of Health Care Delivery System
- Know about the various Health Services

5.1 INTRODUCTION

The framework of Health Care Delivery System provides clear insight about the functional elements of health care delivery. In developing an appropriate system, we also must understand the various efforts laid by different eminent people in this industry, for the benefit of India in particular. The health care infrastructure is necessary to understand as it is the basic foundation

for any health care center. While discussing the various health care services, an outlook is provided also on the recent developments in this area.

5.2 CONCEPT OF HEALTH CARE

Health care is an expression of concern for fellow human beings. It is defined as a "multitude of services rendered to individuals, families or communities by the agents of the health services or professions, for the purpose of promoting, marinating, monitoring or restoring health". Staffing, organizing, administering, and financing such services might be done in every imaginable way, but they all have focus on the ultimate, i.e., the people are being served, that is: diagnosed, helped, cured, educated and rehabilitated by health personnel. For most of the countries around the world, health care is completely or largely, taken care by government.

Health care includes "medical care". Both are different in their operational aspect and hence, not synonymous. Medical care is one component under the umbrella of a health care system. The term "medical care (which ranges form domiciliary care to resident hospital care), refers chiefly to those personal services that are provided directly by physicians or rendered as a result of physician's instruction".

5.2.1. HEALTH CARE SYSTEM

This can be understood as a facilitator which paves a platform for successful application of health services, a tailor-made set up, intended to focus on a typical society.

Health needs of the person or community are catered by the carefully planned and scheduled health services by a fine blend of the available knowledge and resources. A precise definition about the fixed role for health services may not be possible because of the fact that the socioeconomic pattern of one country differs so much from another.

The health services are delivered by the "health system", that means the health system is intended to deliver health services. In other words, it constitutes the management sector and involves organizational matters, e.g., planning, determining priorities, mobilizing and allocating resources, translating policies into services, evaluation and health education.

CHARACTERISTICS OF HEALTHCARE SYSTEM

The following are few important characteristics of health care system.

- Appropriateness
- Comprehensiveness
- Adequacy
- Availability
- Accessibility
- Affordability
- Feasibility

LEVELS OF HEALTHCARE

Health services are usually organized at three levels, each level supported by a higher level to which the patient is referred. These levels are:

(a) Primary Health Care

This is the first level of contact between the individual and the health system where essential health care is provided. A majority of prevailing health complaints and problems can be satisfactorily dealt with at this level. This level of care is closest to the people. In the Indian context, this care is provided by the primary health centers and their sub centers, with community participation.

(b) Secondary Health Care

At this level, more complex problems are dealt with. This care comprises essentially curative services and is provided by the district hospitals and community health centers. This level serves as the first referral level in the health system.

(c) Tertiary Health Care

This level offers super specialist care. This care is provided by the regional or central level institutions. These institutions provide not only highly specialized care, but also planning and managerial skills and teaching for specialized staff. In addition, the tertiary level supports and complements the actions carried out at the primary level.

5.3 HISTORY OF EVOLUTION

Dates back to the Vedic era, carried on to known civilization like Indus Valley civilization, Mohenjodaro etc., evidences about the application of health system are available. Their emphasis on preventive aspects of health care indicates a fairly mature attitude towards health was given high priority in daily life and this concept of health included physical, mental, social and spiritual well-being.

STATUS BEFORE INDEPENDENCE

The Traditional Indigenous System of Medicine was into much use till the 19th century, after which, slowly, the modern allopathic medicine system could set in to the society. Middle of 18th century witnessed the introduction of Allopathic System, bye the British Government, which was in rule in India, at that time. The prime intention for this brought is to cater the health needs of British Armies, their civil servants and labor employed in colonial enterprises and industries. The general public was given little chance to take use of this system. The strong prevalence of deadly diseases like cholera, plague, malaria, tuberculosis, small-pox etc., lead high rates of mortality in the community as a whole. Every 22.4 out of 1000 inhabitants and 162 infants out of every 1000 were reported to be died because of such devil diseases.

No clear health planning or medical education was drafted, till the growing national movement. The National Planning Committee (NPC) of the Indian National Congress was set up in 1938. This committee set up a sub-committee on National Health chaired by Colonel Santok Singh Sokhey, which made a penetrating assessment of then health situation and health services in the country and recommended measures of their improvement in the interim report submitted in 1940.

STATUS AFTER INDEPENDENCE

Simultaneous programmes on Family Planning, Nutrition, and Control of different Communicable diseases were paid with sufficient attention. The monitoring at the peripheral end was to work within the parameter of Peripheral Health Units system. Various committees observed the system and provided with different recommendations. Health planning in Independent India was made an integral part of the overall planning for socio-economic development.

The establishment of Primary Health Center (PHC) in October, 1952 is found to be a big break through, in the direction of development of health services in India. The PHC, as part of the

Community Development Programme signified the putting into practice of the concept of community participation and intersectoral development for heath care.

5.4 CONTRIBUTIONS BY VARIOUS COMMITTEES

1. Bhore Committee (1943-46)

Sir Joseph Bhore as Chairman, the then British government, appointed a committee to conduct survey of the existing health conditions and health organization s and to provide suggestions in meeting the health problems of the community, particularly in rural areas, with the name "Health Survey and Development Committee". The salient features of the report are as under.

a) In long run, planning for the future time considering 20 to 40 years. The basic service unit would be a Primary Health Unit, serving a population of 10,000 to 20,000
b) For short run time period, which would be covering 2 to 5 years period, the emphasis would be on setting up 30 bedded hospitals, one for every two Primary Health Units.
c) Village Health Committee is to be established to foster active cooperation and support in the development of health Programme.
d) Identifying a "Social Doctor", whose job would involve both curative and preventive measures.
e) District Health Board would be established having representatives from public and district health officials.
f) To provide proper housing, sanitary environment, safe drinking water supply, unemployment reduction etc,.

2. Mudaliar Committee (1959-61)

The Government of India setup a committee on 12th June 1959. Dr. A. Lakshmanswami Mudaliar, as Chairman, this committee focused on assessing the medical relief and public health. Salient features of the recommendations include,

a) Upgrading the Primary Health Units and District Hospitals in view of strengthening
b) Establishing Mobile Service Units in rural areas
c) Users of hospital facilities, may be levied with a small fee. Poor people may be exempted.
d) All citizens may be provided with long term health insurance policies.
e) Having senior members from central and state ministries, a Central Health Cadre may be formed.
f) The functions of UGC education may be continued and extended in the faculties of Medicine, Engineering, Agriculture and Veterinary Sciences.
g) In the area of Malaria eradication, Small Pox, Leprosy, Cholera, Filariasis and Tuberculosis, national programmes may be instituted.
h) Central Council of Health must be made more effective
i) The status of Additional Secretary ship may be granted to the Director General of Health Services.

3. Chadda Committee (1963)

Dr. M.S. Chadda, Director General of Health Services, as chairman, in April, 1963, the Government of India, constituted a special committee,

a) To study the requirements related to the Primary Health Centers, their planning, the necessary priority required according to the needs of the maintenance phase of Malaria Eradication Programme and also for other health activities.
b) The plan for effective utilization of the technical and supervisory staff of National Malaria Eradication Programme in achieving the target.
c) General Health Services must take the responsibility of maintaining and strengthening the various services, in particularly, rural health services.
d) Vigilance through governmental and non-governmental medical institutions must be developed.
e) Concentrating on all health programmes like Malaria, Small Pox and other communicable diseases, and on health education, a Multi-Purpose Domiciliary Health Services Programme must be developed.

4. Mukherjee Committee (1966)

On 31st December, 1965, the Central Council of Health constituted a committee under the chairmanship of Dr. Mukherjee, the then Union Health secretary,

a) To review the Family Planning Programme and its implementation strategy.
b) The administrative set up must be strengthened at the different levels from the Primary Health Units to the State Unit.
c) Malaria maintenance activities must be separated from the Family Planning Programme.

5. Jain Committee (1966-67)

The Government of India, in August 1966, constituted a committee under the chairmanship of Sri Ajit Prasad Jain to study the necessary medical care services under the prevailing continuous growth of population and rapid industrialization. The committee worked to,

a) Study the different hospital categories working style in the entire country in order to uplift the standards of medical care and developing sound guidelines for the future expansion of hospital services.
b) Review the Central Government Health Scheme's working in order to evaluate its performance and progress, and subsequently to suggest the necessary improvements and reduce the government's liability.

6. Katar Singh Committee (1972-73)

During October 1972, the Government of India, constituted a committee under the chairmanship of Sri Katar Singh, to study the recommendations made by the Executive Committee, some of which are as under.

a) To suggest a suitable structure for the integrated services.
b) To find out the feasibility of adopting "multi-purpose/bi-purpose workers" in the operational level.
c) To suggest required training parameters for that category of workers.
d) To understand the Mobile Service Units' utilization level for the Family Planning Programme for the integrated medical, public and family planning services operating from taluk levels.

The highlights of the recommendations made were as follows.

a) It is feasible to have the multi-purpose workers for delivering the health, family planning and nutrition services to the rural communities and also desirable.
b) For a population of 6000 to 7000, at least one male health worker in multi-purpose category must be appointed.
c) Similarly, one female health worker (ANM) must be appointed for at least 10000 to 12000 population.
d) A population of at least 50000 must be catered by each Primary Health Center along with 16 sub-centers spread uniformly.
e) Adaptation of integrated training program for all workers engaged in the field of health, family planning and nutrition.

7. Shrivastava Committee (1974-75)

The government of India formed a committee under the chairmanship of Dr. J.B. Shrivastava focusing on Medical Education and Support Manpower, during 1974. The area of study includes,

a) To draft the course content for training the Health Assistants to familiarize with medical first aid, preventive and nutritional services, family welfare, maternity and child welfare activities in order to make them act as a bridge between the multi-purpose workers and qualified medical practitioners, leading to best cater the various health care, family welfare and nutritional services to the citizens.
b) To frame guidelines for successful implementation of suggestions and recommendations provided by the earlier committees in the area of Medical Education like Medical Education Committee in 1968, Medical Education Conference in 1970 and subsequently for the improvement in existing system.

The highlights of the recommendations made by the committee are as under.

a) Basic health services like nutrition, health education and family planning must be organized with the community and accordingly the necessary training may be provided to the concerned staff.
b) The gap between the community and Primary Health Center must be reduced by implementing an efficient and economic Health Services Programme.
c) National Referral Services Complex may be developed to act as mediator between the Primary Health Center and higher level referral and services centers.
d) The necessary administrative and financial infrastructure may be established so as to better organize the entire programme on medical and health education from the point of view of the objectives and needs of the proposed programme of national health services.

ANALYSIS OF CONTRIBUTIONS BY VARIOUS COMMITTEES

The recommendations of Bhore Committee resulted in establishing the primary health care units, which contributed a lot for the health care development in India, even today, followed by the various health development plans substantiating the health care development. In fact, the concept of Primary Health care Unit (PHC) is much successful concept, proved and helped, in subsequent health care plans in India.

The recommendations of Mudaliar Committee resulted in various programmes for controlling the communicable diseases. The concept of Mobile Health care Unit for catering the basic health care could not proved well. Long range health insurance policy for all citizens and collecting small fee in form of levy from the users of hospital facilities could prove to be important recommendations by this committee.

To deal with the Malaria Eradication Programme, the concept of having Multi-Purpose Domiciliary Health Service for all health programmes could be seen as one of the important recommendations made by Chadda Committee. But subsequently, the recommendations made by Mukherjee Committee suggested to de-link the malaria maintenance activities with family planning activities so that both programmes can better concentrated.

5.5 RECENT TRENDS IN HEALTH CARE DELIVERY SYSTEM

Health Systems

Health Systems Unit (HSY) aims at optimizing the potential of a health system to promote health, reduce excess mortality, morbidity and disability, and respond to people's legitimate demands in a way that is equitable and financially fair. Equity in health remains an important goal for health systems and the delivery of health services. This is reflected as the countries started to build their capacity to strengthen the health component of poverty reduction strategies and to better develop and implement pro-poor health policies. The PHC concept developed in Alma- Ata will continue to play a significant role in key aspects of strengthening of health systems.

Main Areas of Work

- National and district health systems based on PHC
- Integrated health care/integrated health systems
- Community health services
- Community empowerment and participation
- Referral systems including telemedicine
- Quality assurance
- Universal accessibility

Overall Assessment

Mortality rates, especially the CDR, IMR and to some extent the MMR, have shown a declining trend. There has been an improvement in the expectation of life at birth for both males and females. The vaccine-preventable diseases have started to decline. Guinea-worm disease has been eradicated and leprosy shows a declining trend. Tuberculosis is still a persistent public health problem, but the new short term chemotherapy and DOTS strategy offer some promise. Together with the persistence of communicable diseases, no communicable diseases are also emerging as public health problems. The population growth rate though declining continues to be alarmingly high, with some very populous states continuing to have high birth rates. Socioeconomic and sociocultural factors, the diversity among states, and low literacy remain major constraints.

With regard to health policy, there are well formulated policy guidelines for health, nutrition, education, children, etc. which provide an overall framework for health and development. Health is a state subject and the decentralization envisaged under the Panchayat Raj Act may provide greater opportunities for community participation in development.

The outlay in the health and health-related sectors has been increasing over the five year plan periods, but as a percentage of the total outlay has remained constant over the years. The

health care delivery system has expanded, but issues such as consolidation of existing infrastructure and quality need to be given more attention.

Though there is an upward trend in economic growth (except for certain period 2000/2001), reducing the gap between the haves and the have-nots is a major challenge. Various international organizations and UN agencies continue to provide significant material and technical assistance for health and family welfare programmes.

Future Vision

The goal is to achieve optimal health for the people, which would allow them to lead socially and economically productive lives and be in keeping with the principles of the HFA strategy. The health care system envisaged would have a public-private mix, with the latter encouraged to take a greater share of secondary and tertiary health care services.

The National Conservation Strategy and Policy Statement on Environment and Development (1992) aim at ensuring that the demands on the environment do not exceed its carrying capacity for the present as well as for future generations.

Proposed Strategies

a) Enhancing equity for health: Making health services and facilities accessible and available to the people, especially the underprivileged, through the regionalization of health services, rational transfer policies, incentives and career development opportunities, and minimizing inter and intrastate differences.
b) Strengthening of health promotion and protection: Development of an integrated education and health promotion programme with locally relevant content, implementation of an integrated no communicable disease control programme (9^{th} FYP), strengthening of intersectoral coordination for implementing preventive and promotive health in an integrated and comprehensive manner, and strict and effective enforcement of available legislation relating to health and the environment.
c) Strengthening the health sector through partnerships in health development: This includes public and private sector involvement, better use of indigenous systems of medicine, etc.
d) Developing and strengthening specific health programmes.
e) Developing and using appropriate health technology.
f) Strengthening international partnerships for health.

5.6 HEALTH CARE INFRASTRUCTURE

The health sector in India is characterized by:

- A government sector that provides publicly financed and managed curative and preventive health services from primary to tertiary level, throughout the country and free of cost to the consumer (these account for about 18% of the overall health spending and 0.9% of the GDP), and
- A fee-levying private sector that plays a dominant role in the provision of individual curative care through ambulatory services and accounts for about 82% of the overall health expenditure and 4.2% of the GDP. Nationwide health care utilization rates show that private health services are directed mainly at providing primary health care and financed from private resources, which could place a disproportionate burden on the poor.

The provision of health care by the public sector is a responsibility shared by state, central and local governments, although it is effectively a state responsibility in terms of service delivery.

State and local governments incur about three-quarters and the center about one-quarter of public spending on health. The responsibility for health is at three levels.

First, health is primarily a state responsibility. Second, the center is responsible for health services in union territories without a legislature and is also responsible for developing and monitoring national standards and regulations, linking the states with funding agencies, and sponsoring numerous schemes for implementation by state governments. Third, both the center and the states have a joint responsibility for programmes listed under the concurrent list. Goals and strategies for the public sector in health care are established through a consultative process involving all levels of government through the Central Council for Health and Family Welfare.

The outcomes from meetings of the Central Council for Health and Family Welfare have provided a thrust to various sub sectors within the health sector. The private and voluntary sectors have emerged as an important arm of the health sector. From 1 April 1996 a change has been effected in the family welfare services with targets for contraceptive methods being replaced by a target-free approach. A huge campaign to eradicate poliomyelitis through pulse polio immunization (PPI) was initiated in 1995. The traditional system of medicine is now playing a more significant role due to escalating costs of health care.

State health systems/projects have been formulated to improve efficiency in the allocation and use of health resources through policy and institutional development. Specific efforts have been made to consolidate and strengthen the PHC infrastructure, under the minimum needs programme, by providing enhanced assistance to regions with severe health problems, supporting voluntary organizations, improving IEC activities, etc. The convergence of services to provide a holistic approach to population control has also been promoted. In March 1995 a separate Department of Indian System of Medicine and Homeopathy (ISM & H) was created within the Ministry of Health and Family Welfare.

Intersectoral Cooperation

In order to meet current needs and emerging challenges, a number of working groups were constituted in 1996 to comprehensively review the existing health situation in its totality. The following areas are included: communicable diseases, health systems and biomedical research development, ISM & H, child development, environmental health, health education and IEC, women's development, and requirements for supportive and diagnostic services in primary, secondary and tertiary care.

Consultations have also been held with NGOs. Two other committees have been constituted, namely an expert committee to comprehensively review the public health system in the country and the National Mission on Environmental Health and Sanitation. The recommendations of these consultations have been discussed by the concerned ministries and were to be submitted as proposals for the 9th FYP.

The active promotion of the Panchayat Raj (local administration) system from the village to the district is a measure directed towards ensuring intersectoral collaboration. Specific health areas that have effectively made use of intersectoral collaboration include malaria control; AIDS control programme, blindness control, nutrition, and water and sanitation to name a few.

Organization of the Health System

The focus of the 8th plan has been to improve access to health care for the underserved and underprivileged segments of society, through consolidation and operationalization of the health infrastructure at all levels with emphasis on primary health care. In view of the high maternal mortality, upgrading of existing maternal health facilities and establishing first referral units (FRUs) have been prioritized. Many states have initiated major projects to upgrade their health services with assistance from funding agencies.

Andhra Pradesh is implementing a Health Systems Project with World Bank assistance, and the states of Karnataka, West Bengal and Punjab are to follow. In support of Safe Motherhood, priority central assistance has been provided to establish FRUs in all 213 districts in six states where the maternal mortality is two to three times more than the national average.

States in India have only recently begun to address issues relating to the organization of their health systems. Their capacity to bring about key policy reforms is still lacking. A substantial proportion of specialist posts in CHCs is vacant, and thus affects the functioning of first referral units. Other constraints relate to shortage of paramedical staff, support staff and inadequate involvement of NGOs.

Managerial Process

The process has been initiated for decentralization of authority to the various levels to enable decision making at the right time. Besides this, the Panchayat Raj bodies are also being revitalized. Training facilities for health management are being augmented with the NIFHW playing a pivotal role. A consortium of institutions dealing with health management has also been formed. As a further step towards managerial process development, the NIFHW is making efforts to strengthen institutions all over the country, including State Institutes of Health and Family Welfare.

A postgraduate certificate course in hospital management through distance learning is in its second year. Through various fellowship programmes, health personnel are being oriented towards newer developments in the field of management and management processes. Networking has also been established between the Nuffield Institute of Health in the UK and NIFHW towards strengthening managerial processes. A recurring constraint has been the appointment of officials to managerial positions who do not have any managerial training or experience.

Health Information System

In pursuance of the national health policy for the establishment of an efficient and effective management information system, a computer-compatible health management information system (HMIS version 2.0) has been designed in collaboration with participating states, the national information center (NIC) and WHO. The system is being implemented in phases.

The first phase, involving 13 States / Union Territories (UTs) commenced in 1992-93 and is at present operational in two states with others in the process of implementation. In addition, each of the disease control programmes has its independent MIS, e.g. the National Programme for Control of Blindness, the National Leprosy Eradication Programme, the AIDS programme, tuberculosis control programme, etc.

Obligations under the International Health Regulations continue to be observed. Morbidity and mortality data in respect of internationally quarantinable diseases (including cholera) are received by CBHI each week. Based on information received, weekly epidemiological reports are prepared and sent to WHO. Surveillance of the principal communicable diseases other than those covered by the international health regulations is also maintained and reported monthly. Health condition reports giving morbidity and mortality data are received annually from states and UTs according to the ICD-9 classification. At present, the states need to be helped to augment their infrastructure facilities for computerization of data.

Community Participation

The concept of community participation is contained in national health policy. The broad areas of community participation at grass roots level are seen in the village health services scheme, the Anganwadi scheme of ICDS, and the formation of village level committees.

Community action has also been successfully used in disease control programmes such as malaria and in areas such as the provision and maintenance of drinking water schemes and sanitation. The main constraint to community action is the low priority given to health by the community in contrast to schemes that provide direct financial benefit.

Preparedness for Emergency

Floods in India affect about 30 million people annually and drought about 50 million. Coastal areas experience two or three tropical cyclones of varying intensity each year. The Himalayan regions are prone to earthquakes. A Health Sector Emergency Preparedness and Response Programme have been in place since 1980. Crisis management groups have been used since 1980 and are constituted at national, state and district levels. In the Ministry of Health and Family Welfare, the Emergency Medical Relief Division is the responsible technical unit.

With WHO collaboration, emergency preparedness and response programmes in the health sector have resulted in:

- Preparation of a comprehensive health sector contingency plan at national level,
- Institutionalization of health sector disaster preparedness in seven national institutes,
- Training activities at institutional and state levels,
- Surveys, case studies and research projects, and
- Publication of books relevant to emergency preparedness.

Limited studies have shown the need to improve competencies of grass root level functionaries in disaster prone areas, as well as to strengthen monitoring of activities. From 1995 the following activities are envisaged: transfer of expertise from national to state level institutions, training of target groups including translation of materials into the local languages, strengthening local infrastructure including stockpiling of essential supplies, disease control monitoring and surveillance, and operational research.

Research and Technology

India has a long history of biomedical research including health systems research. In several instances research results have directly influenced programme policies or led to modifications in programme strategies. Among the many research institutions, the Indian Council of Medical Research (ICMR), established in 1911, is the lead agency.

In the 8th FYP (1992-1997), ICMR attempted to consolidate significant leads in priority or "thrust" areas that were identified by various scientific expert groups. These areas included emerging health problems like HIV/AIDS, other important communicable diseases like tuberculosis, leprosy, diarrhoeal diseases, malaria, Filariasis, Japanese encephalitis, etc., non-communicable diseases like cancer, cardiovascular diseases, metabolic disorders, etc., contraception, MCH and nutrition. Efforts have been made to develop a bibliographic database on HSR. With WHO support, nearly 400 HSR studies have been abstracted and a database was developed by the NIHFW in 1996.

It is important that research findings have an application in the community. There is a need to sensitize policy makers and administrators about the importance of research and its managerial and programmatic uses. Financial resources also need to be improved. Dissemination of research findings and their utilization for identifying strategies to solve problems have not been up to the desired level.

5.7 HEALTH SERVICES

Education and Promotion of Health

Health education and promotion has been an integral component of all national health and family welfare programmes. The IEC approach uses a community-based strategy. Interpersonal communication at grass roots level is being strengthened by establishing women's health organizations (Mahila Swasthya Sangh - MSS) in villages. By 1995-96, 74,000 MSSs had been established. Funds were earmarked for setting up IEC bureaus in eight states in 1995-96. Training of frontline workers and field functionaries in various departments is being strengthened. The sensitization of local leaders is implemented through orientation training camps.

National health programmes are supported with health education and promotion strategies and activities specifically designed to suit programme needs. Such national programmes include those for leprosy eradication, tuberculosis control, malaria eradication, and HIV/AIDS control, as well as the national iodine deficiency disorder programme and the environmental health and sanitation programme.

Inter-ministerial committees at central and state levels meet periodically to review the progress of health education activities. NGOs and other professional organizations have joined with government agencies all around the country to improve health education. The media division of the CHEB has been strengthened to support media promotion activities as well as materials production.

Family Planning and Health of Mother-Child

The proportion of pregnant women attended by trained personnel in 1995/96 was reported to be 65.1%. The proportion of deliveries in 1995/96 attended by trained personnel (including trained TBAs) in the urban sector was 73.5% and in the rural sector 33.5%.

The proportion of women of childbearing age using family planning in 1998/99 was 48.2%. The crude birth rate (CBR) was 26.1 per 1000 population (1999) and the infant mortality rate (IMR) for were and 68.0 per 1000 live births (1994-98).

There are wide interstate differences in achievements of health and family planning indicators. Any change in these indicators is dependent on the performance of four states (Bihar, Rajasthan, Madhya Pradesh and Uttar Pradesh). With regard to population growth, unless these states improve their family planning performance, the national growth rate will not change significantly.

High priority has been given to MCH since 1985. The success achieved with EPI is likely to have made a significant contribution to the reduction in the infant mortality rate from 95 in 1987 to 68 per 1000 live births in 1994-98. Perinatal mortality and stillbirth rates remain high, with only a marginal decline in the last decade.

Several socioeconomic variables as well as technical and operational shortcomings constitute the main constraints. Though services are being strengthened and community education promoted, there is a lack of complete involvement by the people. Better coordination with NGOs, professional health organizations, private practitioners and the like is needed if better results are to be achieved.

For future action, a result-oriented action plan has been evolved in consultation between the center, states and UTs. The key features are improving the quality of outreach services, having a differential strategy for poorly performing districts as based on CBR, increasing coverage of younger couples, introducing newer and better quality contraceptives, strengthening family welfare schemes in urban areas, especially slum pockets, revitalizing training for health

staff, IEC to focus on quality of life issues and interpersonal communication, and improving intersectoral coordination at all levels.

After four decades, the importance of a holistic multi-sectoral approach to population stabilization has been realized. A draft revised National Population Policy based on a holistic approach was placed before parliament in 1996. With a view to regulate and prevent the misuse of modern prenatal diagnostic techniques, legislation was passed in parliament in 1994.

To ensure strong political commitment to curbing population growth, the 79th Constitution Amendment Bill seeks to incorporate promotion of population control and a small family norm, with an added clause enjoining all citizens to promote and adopt a small family norm. The bill also proposes to add an additional schedule, under which a person shall be disqualified from being elected to hold office as a member of either house of parliament or in a state legislature if he/she has more than two children - but is not to take place with retrospective effect.

Immunization Coverage

The proportion of infants reaching their first birthday who were fully immunized according to national immunization policies in 2001 was 49.0%. By individual vaccines the coverage in 1998/99 was as follows: DPT3 52.1% OPV3 59.2%, measles vaccine 41.7%, and BCG 69.1%. Percentage of pregnant women who received two doses of TT was 66.8% (1995/96). As a result of the immunization programme, the incidence of polio and neonatal tetanus has declined significantly.

The strategies to maintain and improve coverage include outreach immunization sessions, intensification in high risk areas, national immunization days (NIDs) and mop-up rounds, strengthening surveillance, intensifying IEC and training, maintaining vaccines and essential supplies, and improving supervision and monitoring. WHO recommended strategies are being followed with regard to achieving the goal of polio eradication, neonatal tetanus elimination and measles control.

Locally Endemic Diseases' Prevention and Control

The incidence of malaria remained around 2 million cases per year during 1984-1992. In 1997, 2.7 million and in 1999, 2.3 million cases were reported. The incidence of P. falciparum is increasing and reached to 50% in 1999. For Filariasis, present estimates indicate that about 420 million people live in endemic areas. There are 206 control units, 198 clinics and 27 survey units. Visceral leishmaniasis, which reappeared in Bihar in the 1970s, is now endemic in 30 districts in Bihar and 9 districts in West Bengal. In 1996 there were 20,466 cases and 260 deaths reported.

Japanese encephalitis (JE), though not a major public health problem, has over time been reported from as many as 24 states/UTs during one year, with an estimated 378 million people at risk. Dengue, dengue haemorrhagic fever (DHF) and dengue shock syndrome, all caused by the dengue virus, have been prevalent in India in almost all major urban areas, with periodic outbreaks of dengue fever and DHF. All four serotypes have been detected, and guidelines for prevention and control have been issued to all states.

An expert committee drew up a malaria action programme in 1995. A key strategy is the implementation of short and long term measures in selected high risk areas, high powered boards to expedite intersectoral cooperation, community involvement in antimalarial activities with intensified IEC, and capacity building at the central and grass roots levels through training. The progress of Filariasis control is constantly under review and a strategy of selective treatment, vector control and IEC is being implemented.

A revised strategy of mass drug administration has been initiated in some districts in Tamil Nadu and Maharashtra states. In view of the seriousness of visceral leishmaniasis, the government has accorded high priority for its control. Strategies involve early diagnosis and treatment of patients and interruption of transmission by DDT spraying.

Common Diseases and Injuries Treatment

The national tuberculosis control programme has not achieved the desired results. In 1992 the programme was reviewed and a revised control programme formulated with short term course chemotherapy using the DOTS strategy. The problem of protein-energy malnutrition (PEM) and micronutrient deficiency disorders are quite significant and are being dealt with through a number of national programmes with well defined goals.

Diarrhoeal diseases, which are still a major cause of morbidity and mortality in infants and children, are being addressed through the promotion of exclusive breast-feeding, good child feeding practices, and the timely use of ORT during episodes of Diarrhoea. Acute respiratory infections (ARIs) are a leading cause of death due to pneumonia in children under five years. A strategy aimed at early recognition of the signs of pneumonia and timely referral has been very effective in reducing mortality.

HIV/AIDS is predicted to be a major problem in India. A total of 22,529 seropositive cases were reported up to March 1996, but this number does not convey the actual magnitude of the problem. Almost 4 million HIV cases are estimated as of June 2000. Of the non-communicable diseases, cancer and cardiovascular diseases are emerging as major health concerns that will require considerable financial resources for case management.

5.8 CONCLUSION

This lesson concentrated on the importance of having a system for delivering the health care. It is further noted that how an effective Health Care Delivery System can be developed which is the outcome of various focused studies in the form of committees. We have also understood about the various components of the system and how they must be framed in enhancing the quality of health care delivery. The information about the various services also should have increased the knowledge.

5.9 KEY TERMS

1. Health Care: multitude of services rendered to individuals, families or communities by the agents of the health services or professions, for the purpose of promoting, marinating, monitoring or restoring health.
2. Health Care System: This can be understood as a facilitator which paves a platform for successful application of health services, a tailor-made set up, intended to focus on a typical society.

5.10 SELF CHECK

1. What is a Health Care Delivery System?
2. Discuss the necessity of constitution of various committees.
3. Check out with your experience and exposure about the recent trends in HCDS?
4. Explain the significance of Health care Infrastructure.
5. What are various health services?

LESSON - 6

ALTERNATIVE SYSTEMS OF MEDICINE – PART I

STRUCTURE

6.0 OBJECTIVES

Studying this lesson should enable you to

- Understand the existence of various alternative systems of medicine
- Develop knowledge in the systems of
  - Ayurveda
  - Yoga
  - Unani

6.1 INTRODUCTION

In this lesson, the focus is shifted to the other available systems of alternatives to the existing medicine system. The meaning, interpretation, diagnosis, treatment, infrastructural facilities of Ayurveda, Yoga and Unani were discussed.

6,2 DEVELOPMENT

Human life and knowledge of preserving it as a going concern, in the face of overpowering and brute physical and biological environment, must have come into being almost simultaneously. It has to be so. There cannot be any other plausible explanation, other than this, to account for the continuity of human race and survival of its several highly developed cultures and civilizations. All known cultures of the past - Egyptian, Babylonian, Jewish, Greek, Indus -Valley etc. - had their own equally glorious and useful systems of medicine and health care.

6.2.1AYURVEDA

In India, development and growth of such a body of knowledge known as Ayurveda, meaning science of life, was coeval with the growth and evolution of Indian civilization and culture. Vedas, which are considered to be the repositories of recorded Indian culture, have mention of this knowledge both in theoretical and practical form. There is discussion of theories about the composition of living and non-living matter, the physical, biochemical, biological, psychological and spiritual components of man and the vital motive forces working both inside and outside the body. In other ancient works there is mention of such current medical subject like anatomy, physiology, aetiology, pathology, treatment and environmental factors. This medical knowledge has been the work of ages.

It is the out-come of the great power of observation, generalization and analysis combined with patient labour of hundred of investigators spread over thousand of years. This knowledge has played so important a part in the development of Indian culture that it has been documented in an integrated form in the Vedas-the ancient most documented Indian wisdom and knowledge.. Most of the mythological and medico-religious genesis of Ayurveda is even today shrouded in the mist of antiquity.

Around 5000 years BC, Rigveda & Atharvaveda (the ancient books on Indian knowledge, wisdom, culture & science) contain many hymns on diseases and their treatment by various plants and other materials. It was around 1000 years BC when Ayurvedic fundamentals and its eight clinical specialties were fully documented in Charaka Samhita and Sushruta Samhita – the first compendia on Ayurvedic medicine & surgery respectively. In this sense, Ayurveda is considered to have divine origin representing one of the oldest organized system of medicine for positive health & cure of human sickness. Making use of systematic careful observations and documenting detailed experiences over the past several thousand of years, it has grown into a very comprehensive health care system with two major schools and eight specializations. It has a school of physicians and a school of surgeons referred in literature as ‘Atreya Sampradaya’ and ‘Dhanvantri Sampradaya’ respectively.

The most important and massive ancient compilation of the School of Medicine is known as Charka Samhita. It contains several chapters dealing at length with therapeutic or internal medicine. About 600 drugs of plant, animal and mineral origin are described in it. Besides, this compendium also deals with other branches of Ayurveda like anatomy, physiology, aetiology, prognosis, pathology, treatment and medicine etc.

An equally exhaustive ancient compilation, Sushruta Samhita exists relating to school of surgery. It deals primarily with various fundamental principles and theory of surgery. More than 100 kinds of surgical instruments including scalpels, scissors, forceps, specula etc. are described along with their use in this valuable document. Dissection and operative procedures are explained making use of vegetables and dead animals. Descriptions of how to go about doing incision, excision, extraction and bandaging etc. are detailed in this compendium. In addition, this document also mentions of such other topics as anatomy, embryology, toxicology and therapeutics. It also has a mention of about 650 drugs.

In course of time Ayurveda, which started as a magico-religious practice, matured into a fully developed medical science with eight branches which have parallels in the modern western system of medicine. The growth of these eight specialties gave Ayurveda another name of Astanga Ayurveda. In the last 50 years of development in the teaching and training, it has developed into following sixteen specialties .

1. Ayurveda Siddhanta (Fundamental Principals of Ayurveda).
2. Ayurveda Samhita.
3. Rachna Sharira (Anatomy).
4. Kriya Sharira (Physiology).
5. Dravya Guna Vigian (Materia Medica & Pharmacology).
6. Ras-shastra.
7. Bhaishajya Kalpana (Pharmaceuticals).
8. Kaumar Bharitya (Peduatrics).
9. Prasuti Tantra (Obstetrics & Gynaecology).
10. Swasth-Vritla (Social & Preventive Medicine).
11. Kayachikitsa (Internal Medicine).
12. Rog Nidan (Pathology).
13. Shalya Tantra (Surgery).
14. Shalkya Tantra (Eye & ENT).
15. Mano-Roga (Psychiatry)
16. Panchkarma.

6.2.1.1 AYURVEDA - MEANING

"AYURVEDA" is made up of two words-Ayuh and Veda. Ayuh means life and Veda means knowledge or science. Thus "AYURVEDA' in totality means 'Science of life'. It incorporates all aspects of life whether physical, psychological, spiritual or social. What is beneficial and what is harmful to life, what is happy life and what is sorrowful life; all these four questions and life span allied issues are elaborately and emphatically discussed in Ayurveda. It believes the existence of soul before birth and after death too.

6.2.1.2. THE ORIGIN OF AYURVEDA

Ayurveda, the ancient most health care system originated with the origin of universe. With the inception of human life on earth Ayurveda started being applied. The antique vedic texts have scattered references of Ayurvedic Remedies and allied aspects of medicine and health. Atharva-veda mainly deals with extensive Ayurvedic information. That is why Ayurveda is said to be the off shoot of Atharva Veda.

6.2.1.3. AYURVEDIC VIEWPOINT

Universe as well as human body are made up of five basic elements collectively called 'Panch Mahabhootas'. These are Aakash (Ether), Vayu (Air), Agni(Fire), Aapa (Water) and Prithvi (Earth). The sixth mandatory component of life is Atma (life spirit) without which life ceases. The human body is made up of Doshas (Bio-humours), Dhatus(Body matrix) and Malas (excretable products). Vata, Pitta and kapha, known as Tridoshs are physiological entities of the body which are responsible for carrying out all the functions of the body. Dhatus are the structural entities of the body. These are Rasa (Plasma), Rakta (Blood cells), Mamsa (Muscular tissue), Meda (Fatty tissue), Asthi (Bony tissue), Majja (Bone marrow) and Shukra (Hormonal and other secretions of genital). Agni (Metabolic fire) is in thirteen different forms and carries out the whole metabolism of the body. The waste products of the body which are excretable are produced in the body as bye-products of metabolism. These are known as malas which include pureesh (faeces), Sweda

(sweat) and Mutra (urine). All biotransformation within the body occur through Srotases (body channels) which are the sites for action of agni.

6.2.1.3. THE PHILOSOPHY OF HEALTH, DISEASE AND TREATMENT

As per Ayurveda, 'Health' is a state of equilibrium of normal functions of doshas, Dhatus, malas and Agni with delighted body, mind and soul. It means that when Dosh-Dhatu-Malas and Agni are constantly in a state of functional equilibrium, then the health is maintained. Otherwise distortion of the equilibrium results into diseases. Erratic lifestyle is believed to be one of the basic causes behind the failure of mechanism of maintaining equilibrium.

Treatment either with or without drugs and application of specific rules of diet, activity and mental status as described, disease wise, brings back the state of equilibrium i.e. health.

6.2.1.4. DIAGNOSIS

Diagnostic procedures in Ayurveda are two pronged; one is aimed to establish the state and type of pathology and second to decide the mode of treatment to be applied. The former implies examination of the patient and make different investigations to diagnose the disease entity. Inspection, palpation, percussion and interrogation are the main modes of physical examination. The second type of examination is to assess the strength and physical status of the individual so that accordingly the type of management required could be planned. For this examination of Prakriti (Body constitution), Saar (Tissue quality), Samhnan (physique), Satva (Mental strength), Satamya (specific adaptability), Aaharshakti (diet intake capacity), Vyayaam shakti (exercise capacity) and Vaya (age) is done. On the basis of this examination the individual is decided to be having Pravar bal (excellent strength), Madhyam Bal (moderate strength) or Heen Bal (low strength).

6.2.1.5. STATUS IN 10TH PLAN PERIOD

Following thrust areas have been identified for strengthening the base for sustained propagation of Ayurveda and other Indian Systems of Medicine: Establishment of specialized treatment facilities of Indian Systems of Medicine like Panchakarma, Ksharsutra therapy etc. as an adjunct to conventional Allopathic treatment for widening the choice of the patients in assessing the health care services.

i. Massive Research and Development efforts for establishing efficacy and safety of drugs of Indian Systems of Medicine has been planned to be launched through intramural and extramural research programmes of the department.
ii. Augmenting availability and quality of Raw materials used in Ayurveda, Unani, Siddha & Homeopathy medicines.
iii. Strengthening of the Medicinal Plants Board with a view to make it pro-active in helping cultivation of medicinal plants keeping in mind the internal and external demands. It is aimed to give authority and powers to the board under the Act of the Parliament during 10th Plan period.
iv. Strengthening of Pharmacopoeial Laboratories and committees will be done so that pharmacopoeial standards of all the drugs used in Ayurveda, Unani , Siddha and Homeopathy systems of medicine are made available at the earliest possible.
v. Quality control measures will be attempted to have enforced maintenance of quality standards of Ayurveda, Unani, Siddha and Homeopathy drugs at all levels including GMP requirements.
vi. Regulatory mechanism for manufacture, quality control and marketing of Neutraceuticals/Food supplements and corresponding legislation have been identified as important thrust areas to be dealt on priority basis.

vii. Encouragement for internal patenting and sensitization will be introduced to manufacturers and researchers dealing in the medicinal uses of plant based drugs.

viii. Medical tourism will be propagated by establishing facilities specialized treatment therapies of Ayurveda like Panchakarma & Yoga in tourist hotels and resorts so as to attract domestic and foreign tourists who, particularly travel to various places for seeking treatment facilities of traditional medicine. These therapies mainly play a significant role in providing rejuvenation and psychophysical relaxation. Such centers will be established at tourist places so that tourist may have dual benefit of site seeing and availing health promotive procedures at the same time and same place. The objective is to exploit the popularity of Ayurveda and Yoga for propagating tourism.

ix. Development of National Centers of excellence of Ayurveda, Unani, Siddha and Homeopathy has been thought of to create high-class education and research facilities meeting the requirements of modern era of tremendous medical advancements and for imparting training to medical scholars from foreign countries.

x. Other thrust areas :

a. Collection, cataloguing and preservation of manuscripts relating to Indian Systems of Medicine.
b. Publication of self contained textbooks of Ayurveda, Unani, Siddha and Yoga disciplines containing essence of traditional literature and results of research findings.
c. Implementation of Continuing Medical Education for ISM & H personnel;
d. Human Resource Development Programme;
e. Effective Information, Education & Communication measures for propagation of ISM& H;
f. use of Modern Technology & Bio-technology;
g. Absorption of results of Operational Research Studies & Clinical Trials in the National Health Programme;
h. Revitalization of Household Health Traditions and Folklore Remedies
i. Integration of ISM&H with Conventional Medical facilities.

STATEWISE NUMBER OF REGISTERED AYURVEDA PRACTITIONERS AS ON 1.4.2002 (as per available information)

SL.No.	STATES/U.T.'s	Ayurveda Practitioners
1	Andhra Pradesh	15028
2	Assam	250
3	Bihar	131121
4	Delhi	5069
5	Gujarat	17081
6	Haryana	18895
7	Himachal Pradesh	6927
8	Jammu & Kashmir	343
9	Karnataka	11144
10	Kerala	13413
11	Madhya Pradesh	47365
12	Maharashtra	52372
13	Meghalaya	0

14	Nagaland	0
15	Orissa	3810
16	Punjab	20379
17	Rajasthan	23483
18	Tamil Nadu	3542
19	Uttar Pradesh	57118
20	West Bengal	2923
21	Chandigarh	0
INDIA		430263

* The figures against these States are provisional. (As on *25/04/04*)

STATEWISE AYURVEDA HOSPITALS AND BED STRENGTH

Sl.No.	**States/UTs**	**No of Hospitals**	**Bed Strength**
1.	Andhra Pradesh	8	464
2.	Arunachal Pradesh	1	10
3.	Assam#	1	100
4.	Bihar	11	1120
5.	Delhi	6	295
6.	Goa#	3	185
7.	Gujarat	48	1845
8.	Haryana	6	635
9.	Himachal Pradesh	22	400
10.	Jammu & Kashmir	2	100
11.	Jharkhand	1	120
12.	Karnataka	119	6967
13.	Kerala	110	2798
14.	Madhya Pradesh#	36	1410
15.	Maharashtra	78	11304
16.	Manipur	-	-
17.	Meghalaya	-	-
18.	Mizoram	-	-
19.	Nagaland	-	-
20.	Orissa	7	343
21.	Punjab	14	1044
22.	Rajasthan#	79	804
23.	Sikkim	1	10
24.	Tamil Nadu	5	425
25.	Tripura	1	10
26.	Uttar Pradesh#	2047	10477
	Uttranchal	322	1605
	West Bengal#	3	309
	A&N Island	-	-
	Chandigarh	1	150
	D & N Haveli#	0	0

Daman & Diu	1	5
Lakshadweep	0	0
Pondichery#	0	0
CGHS	1	25
CCRAS	24	600
Ministry of Railways	0	0
Ministry of Labour	0	0
Ministry of Coal	0	0
TOTAL	**2958**	**43560**

NOTE : - = Nil information.
+ = Information not received.
# = Information for the current year has not been received, hence repeated for the latest available year. *(As on 25/04/04)*

6.2.2 YOGA MEDICINE SYSTEM

6.2.2.1 Basic Concepts

The tradition of Yoga was born in India several thousand years ago. Its founders were great Saints and Sages. The great Yogis gave rational interpretation of their experiences about Yoga and brought a practically sound and scientifically prepared method within every one's reach. Yoga philosophy is an Art and Science of living in tune with **Brahmand- The Universe**. Yoga has its origins in the Vedas, the oldest record of Indian culture. It was systematized by the great Indian sage **Patanjali** in the **Yoga Sutra** as a special **Darshana**. Although, this work was followed by many other important texts on Yoga, but Patanjali's Yoga Sutra is certainly the most significant wherein no change is possible. It is the only book which has touched almost all the aspects of human life.

Unlike earlier, Yoga today is no longer restricted to a privileged minority of hermits; it has taken its place in our every day lives and have undergone a world wide awakening and acceptance in the last few decades. The Science of Yoga and its techniques have now been re-oriented to suit modern sociological needs and lifestyle. Experts of various branches of medicine including modern medical science are realizing the role of these techniques in the prevention of disease and promotion of health.

Swami Vivekananda defines Yoga as "It's a means of compressing one's evolution into a single life or a few months or even a few hours of one's bodily existence". By Yoga, Sri Aurobindo, meant a methodological effort towards self perfection by the development of potentialities latent in the individual.

Yoga is a science as well an art of healthy living physically, mentally, morally and spiritually. It's systematic growth from his animal level to the normalcy, from there to the divinity, ultimately. It's no way limited by race, age, sex, religion, cast or creed and can be practiced by those who seek an education on better living and those who wants to have a more meaningful life.

Yoga is not a religion; It's a philosophy of life based on certain psychological facts and it aims at the development of a perfect balance between the body and the mind that permits union with the divine i.e. perfect harmony between the individual and the cosmos.

Many different interpretations of the word Yoga have been handed down over the centuries. One of the classic definitions of Yoga is "to be one with divine." It does not matter what name we use for the divine-God, Allah, Ishvara, or whatever- anything that brings us closer to understanding that there is a power higher and greater than ourselves is Yoga. When we feel in harmony with that higher power that too is Yoga.

6.2.2.2 Ashtanga Yoga :

Yoga is one among the six systems of Indian orthodox philosophy. Maharishi Patanjali, rightly called as the **"Father of Yoga"** compiled and refined various aspects of Yoga systematically in his **"Yoga Sutras"** (aphorisms). He advocated the eight fold path of Yoga, popularly known as **"Ashtanga Yoga"** for all-round development of human personality. They are – Yama, Niyama, Asana, Pranayama, Pratyahara, Dharana, Dhyana & Samadhi. These eight limbs are so perfectly designed that there is absolutely no scope for any addition or alteration since these are formulated on the basis of multifarious psychological understanding of human personality.

The practice of Yamas – Niyamas i.e. harmlessness towards all living beings, truthfulness, honesty, celibacy, non-hoarding of worldly objects, cleanliness, contentment, austerity, control of lust, anger and infatuation, study of holy books and practice of Japa and selfless action – all these pave way for increasing the power of concentration, mental purity and steadiness.

6.2.2.3 Hatha Yoga :

Svatmarama, who wrote a treatise on this subject after experiencing the nectar of samadhi (absorption of the soul) as *Hatha Yoga Vidya* or *Hatha Yoga Pradeepika.* It gives guidelines from the practical point of view for a beginner to begin Yoga, which leads the students gradually from the culture of the body towards the sight of the soul and God-realization. Hatha Yoga Pradeepika is divided into four chapters or Prakaranas. The first chapter expounds Asanas, the second is on pranayama, the third is on Mudras and Bandhas and the fourth is on Pratyahara, Dharana, Dhyana and samadhi. In between these, the author introduces satkriyaas or the six cleansing processes. As the text begins with asanas, Satmarama's Yoga is called Sadanga Yoga or the six aspects of Yoga beginning with asanas and ending in Samadhi.

A set of Asanas, Mudras and Pranayamas practised with faith, perseverance and insight rejuvenates the brain, heart, lungs, liver, pancreas, kidneys, bowels, nerves, muscles, tissues & glands of the body by ensuring oxygenated and balanced blood supply, kindles up the appetite, bestows control over seminal fluid, senses & mind and imparts increased vitality, vigour & longevity to the practitioner.

6.2.2.4 Streams of Yoga :

There are a large numbers of methods of Yoga catering to the needs of different persons in society. They are broadly classified into four streams. Swami Vivekananda puts them as Work, Worship, Philosophy and Psychic control.

Karma Yoga, the path of work, involves doing action in a skilful way. In other words, it can be said as a way of enjoying work, doing it effortlessly. The success or failure should not be allowed to cause ripples in the mind.

'Bhakti Yoga' the path of worship is a systematic method of engaging the mind in the practice of divine love. This attitude of love softens our emotions and tranquillises our mind.

Jnana Yoga, the path of philosophy, is a systematic way of tutoring the mind about the realities of life by contemplation. This will strip off the garb of Avidya (ignorance) from our mind and the mind goes to its natural state of rest.

Raja Yoga, the path of psychic control, is a systematic process of culturing the mind. It is based on the 8-limbed Yoga of Patanjali.

Yoga is a science as well as an art of healthy living. It is no way limited by race, age, sex, religion, caste, creed and any other boundaries and can be practiced by those who seek an education on better living and those who want to have a more meaningful life.

6.2.2.5 Principles

Yoga means a holistic approach towards the cause and treatment of disease. According to Yoga, most of the diseases Mental, Psychosomatic and Physical originate in mind through wrong way of thinking, living and eating which is caused by attachment.

The basic approach of Yoga is to correct the life style by cultivating a rational positive and spiritual attitude towards all life situations.

Yoga does not treat gross body alone, it takes into consideration all the five Kosa's (Sheaths) i.e. Manomaya Kosa, Annamaya Kosa, (grass Sheath) Pranamaya Kosa (External Body) (Psychic Body), Vijyanmaya Kosa (intellect Sheath) and Anandamaya Kosa (Bliss sheath).

Like Ayurveda and Naturopathy Yoga also takes up the cleansing of the body as the first measure to fight disease. While Ayurveda performs its pancha karma through the help of ametics purgative Yoga performs them without the help of any drug i.e. by developing full efficiency and control of eliminative systems of the body. Which no other system of health care can do.

All the systems of medicine at their best aim at curing the disease whereas Yoga aims at preventing the disease and promoting health by reconditioning the psycho-physiological mechanism of the individual.

Yoga emphasizes the development of brotherhood, harmony, fraternity and equality not only towards all human beings irrespective of Colour, caste, nationality, age and sex but towards all living beings also. This attitude renders the thinking so positive that man is liberated from all mental malice and also all the mental, psychosomatic and physiological diseases arising thereof.

The approach of Yoga is not confirmed to various disorders, it aims at bringing under perfect control of the mind, senses and pranic energy and direct them towards healthier channels with a view to acquire mental purity, intellectual stability and spiritual bliss.

Yoga is very wide and comprehensive system embracing all walks of human life. It is unlike Ayurvedic, Unani and Homoeopathy. It is not merely a system of treatment but has potential to develop all-round health i.e. physical, social, mental and spiritual. For social health, it prescribes the practice of Yama & Niyama and Karma Yoga. A man devoted to karma Yoga looks all the living beings as his brethrens and helps them getting rid of painful situations. This concept of "Vasudhaiv Kutmba Kama" is the basic Philosophy of Yoga.

Yoga emphasizes the practitioners to withstand the environmental influences both external & internal as well as physical & mental processes. This practice cultivates strong immunity in them and make them capable of offering an effective resistance to various environmental pressures and thus, maintains behavioral equanimity and intellectual stability.

The practice of Yama – Niyamas purifies the heart of practitioner from vices like attachment, aversion, avarice and infatuation etc. and generates higher ethical qualities like sincerity, honesty, straightforwardness, cheerfulness, courage, detachment, patience, perseverance, tranquility, self control, truth, harmony and uprightness.

Our ancient seers have very sagaciously designed the Yogic practices to invigorate the entire psychosomatic constitution of man. A set of Asanas, Mudras and Pranayamas practised with faith, perseverance and insight rejuvenates the brain, heart, lungs, liver, pancreas, kidneys, bowels, all nerves, muscles, tissues, glands of the body by ensuring oxygenated and balanced blood supply, kindles up the appetite, bestows control over seminal fluid, senses and mind and imparts increased vitality, vigour and longevity to the practitioners.

6.2.2.6 Development and Status

In our country, generations of Yogis and Scholars have contemplated their life in timeless fashion to realize that there is a meaning to life and some purpose beyond the human sufferings. They were even convinced that there is a way to escape the tragic problems of life by diverting our mind to something more interesting and everlasting. They were also moved by the suffering they saw around them and wanted that the human being should be free from sufferings & ignorance, to set him on the road to freedom and live healthy . In ancient days, most of the Yogis & Sages used to live in forests. They use to eat whatever is provided by the Nature in its natural form. Not only that the ever changing climate could not harm them a bit. They use to apply holy ash of Havana on their body to keep away the germs & bacteria. The great Yogis and Scholars gave rational interpretations of their experiences and brought these within every one's reach by making a practically designed and scientifically prepared method of healthy living. Hence, the science of Yoga emerged to counter all these problems and human sufferings.

In the ancient days, Medicine was dominated by magical and religious beliefs which were an integral part of almost all ancient cultures and civilizations. Although primitive man may be extinct, his progeny - the so called " Traditional Healers " , are found everywhere. They live close to the people and their treatment are based on various combinations of religion, magic and empiricism.

The greatest Physician in Greek medicine was Hippocrates, who is often called the "Father of Medicine". He studied such things as climate, water, air, clothing, habits of eating & drinking and the effect they have in producing diseases. The Greeks believed that matter was made up of four elements - Earth, Air, Fire, Water and the same is applicable to body also. They also believed that the equilibrium among these elements maintains normal health status.

Medicine has moved from organism to organ and from organ to cell and from the cell to molecular properties. Despite spectacular bio-medical advances and massive expenditures, the death rate and the life expectancy in the developed countries have remained unchanged. Medicine, as practiced today has begun to be

questioned and criticized. High technology medicine seems to be getting out of hand and leading health systems in wrong directions. There is an increasing concern about the cost and allocation of health resources, but the efficacy of modern medicine is fundamentally questioned through various points of view. Contemporary medicine is no longer solely an art and science for the diagnosis and treatment of diseases. It is also the science for prevention of disease and promotion of health. With increasing recognition of the failure of existing health services to provide health care, alternative ideas and methods to provide health care have been considered and tried in large scale in the recent past.

The sacred land of India, from the time immemorial contributed in its own way to the better living of mankind. Yoga & Naturopathy are the two of its kinds which can be the only answer to the rising levels of health care problems.

In recent times there is a growing awareness among the people about the efficacy and utility of Yoga and Nature Cure in keeping one fit at physical, mental, emotional, social and spiritual planes. These systems are emerging as the effective methods and means to improve the total personality and to build a healthy society. Above all, these systems are adopted as a way of life rather than a mode of treatment.

6.2.3. UNANI MEDICINE

6.2.3.1 Concept and Principles

Unani Medicine is based on the Greece philosophy. According to Basic Principles of Unani the body is made up of the four Basic elements i.e. Earth, Air, Water, Fire which have different Temperaments i.e. Cold, Hot, Wet, Dry. After mixing and interaction of four elements a new compound having new temperament comes into existence i.e. Hot Wet, Hot Dry, Cold Wet, Cold Dry. The body have the Simple and Compound Organs which got their nourishment through four Humours i.e. Blood, Phlegm, Yellow Bile, Black Bile. The humor also assigned temperament as blood is hot and wet, Phlegm is cold and hot, yellow bile is hot and dry and black bile is cold and dry.

Health is a state of Body in which there is equilibrium in the Humours and functions of the body are normal in accordance to its own temperament and the environment. When the equilibrium of the Humours is disturbed and functions of the body are abnormal ,in accordance to its own temperament and environment, that state is called Disease.

Unani medicine believes in Promotion of Health , prevention of diseases and cure. Health of human is based on the six essentials (Asbabe Sitta Zaroorya) if these are followed health is maintained otherwise there will be diseases.

Six essentials are 1.Atmospheric Air 2.Drinks and Food 3.Sleep and Wakefulness 4.Excretion and Retention 5.Physical activity and rest 6. Mental activity and Rest.

6.2.3.2 Diagnosis

Diseases are mainly diagnosed with the help of Pulse (Nabz), physical examination of the Urine and Stool. Also, patients are examined systematically to make the diagnosis easy as spot diagnosis with the help of simple, modern gadgets.

6.2.3.3 Treatment

Diseases are treated in the following ways
Ilajbil Tadbeer (Regimenal Therapy)
Ilajbil Ghiza (Dietotherapy)
Ilajbil Dava (Pharmacotherapy)
Ilajbil Yad (Surgery)

1. Ilajbil Tadbeer(Regimenal Therapy):-Some drugless regimens are advised for the treatment of certain ailments i.e. Exercise, Massage, Hamam(Turkish Bath), Douches(Cold and Hot) and the Regimen for Geriatrics.

2. Ilajbil Ghiza(Dietotherapy):-Different diets are recommended for the patients of different diseases.

3. Ilajbil Dava (Pharmaco-therapy):- The basic concept of treatment is to correct the cause of the disease that may be Abnormal temperament due to

Environmental factors

Abnormal humours either due to internal causes or external causes which may be pathogenic micro-organism, through (a)drugs of opposite temperament to the temperament of the disease that is called Ilaj-bil-zid or (b) drugs of similar temperament as of the temperament of the disease that is called as Ilaj-bil-misl

The drugs used are mostly of the Plant origin. Some drugs of Animal and Mineral Origin are also used. Patients are treated either by single drugs (crude drugs) or by compound drugs (formulations of single drugs).

There are two types of compound drugs used in the treatment of the diseases i.e. Classical compound drugs which are in use for the hundreds and thousands years and Patent/Proprietary

compound drugs which have been formulated by the individuals or institutions as per their research and experiences.

6.2.3.4 Development and Status

Unani system of medicine is one of the oldest systems of medicine in the world it is still popular & practiced in Indian sub continent & other parts of the world.

The scientists and experts of different countries have contributed in development of Unani system in different periods as under.

The development of Unani Medicine can be divided into following periods

1. Greek Period

Unani medicine was originated in Greece and its founder was great philosopher & Physician ,*Hippocrates (Buqrat* 460-377 BC).He was the first Unani Physician who opened the education of Medicine to all communities, so he is known as the father of medicine in Allopathic also because modern medical science was developed on the foundation of Hippocratic philosophy of health and disease. Before Hippocrates it was restricted to the Aesclabius family only. After Buqrat, Galen(Jalinoos130-201 BC) contributed a lot to the Unani Medicine. *Aristotle (Arastoo*384-322 BC) laid down foundation of Anatomy & physiology.

Dioscorides was the famous physician in the Ist Century AD. He was famous for his book on Ilmuladviya(Pharmacology) named as *Kitabulhashayash.*

2. Arabic-Persian Era

(a) In Egyptian period the pharmacy was very much developed and they prepared the medicine in different dosage forms like alcohol, oils, powder and ointment etc.

(b) Persia encouraged and developed physicians and philosophers by the Iranian .They further developed this medicine into a complete science and it got deep roots in the masses. Eminent Physician of this period are:-

1. Ibne Raban Tabari (810-895AD) was famous physician and wrote a book *Firdous ul Hikmat* and introduced concept of official formulary,
2. *Abu Bakar Zarakariya Razi or Rhazes* (865-925 AD) etc. He wrote the book "*Alhawi fit tibb".* He was first scholar who described the concept of Acquired Immunity by his experiments in the article "*Maqala fi Judri wa Hasba"*.

(c) The Islamic rulers of the Arabian countries further developed and adopted the Unani Medicine at government level and here at first they recognized the importance of the official formulary (Qarabadeen). They made many additions /deletions on the basis of their experiments, advance knowledge of Medicine in Greek and Persian literature. They developed the chemistry, pharmacy and pharmaceutical procedures. In this period they invented the process of distillation, sublimation, calcinations and fermentation to promote the efficacy of the medicine and to remove the impurities and toxic effects of the drugs. 1.Jabir bin Hayyan(717-813AD) who was settled in the Arab as Royal physician was a famous physician and Chemist. He was the first who had described Chemistry.

2.The very eminent scholar of this period was Bu Ali Sina (Avicenna 980-1037AD) He was the great philosopher, physician of the Arab. He gave a final shape to the Unani medicine & redefined many concepts based on his clinical experiences. His book *Alqanoon or (The canon of medicine)* was an internationally accepted book on medicine, which was taught in European countries till the 17th century.

3. Spanish Period

The Arabs have introduced Unani medicine in the Spain in the patronage of Spanish Ruler, many scholars contributed a lot to Unani Medicine for instance

1. *Abul Qasim Zohravi (Abulcasus* 946 -1036AD) was the famous surgeon was attached to Royal Hospital of Cordoba. He wrote a famous book on surgery "*Al Tasreef"*

2.Ibn-e-Haisham (965-1039AD)was a renowned scientist and Unani physician from Syria laid down the foundation of optics in his famous book"*Kitabul Manazir*"

*3.Ibn-e-Zohar (Avenzor*1091-1162AD) was a renowned physician and Scholar. He was known for his famous book "*Kitabul Tasreef"*.

4. *Ibn Rushd* (1126-1198AD) was famous for his book on Basic Principals of Unani Medicine known as *Kitabul Kulliyat*

5.Ibne Baitar (1197-1248AD) was Pharmacognosist and Botanist. His famous book on extensive survey and experiments on Single Drugs of Plant origin *Kitabul jameul Mufradat.* Was widely acclaimed.

6.*Ibn-e-Nafees* (1210-1288 AD) was the first scientist who described the blood pulmonary circulation and prescribed anatomy as separate chapters.

4. Indian era

Unani medicine in India was introduced in 1351AD by Arabs. The first known Hakim was Zia Mohd Masood Rasheed zangi. Unani Medicine soon got acceptance by the masses due to its efficacy and no toxicity of the drugs.

Following eminent scholars of that period are:

1. Akbar. Mohd. Akbar Arzani (1721 AD death.). He was known for his book Qarabadin Qadri and Tibbe Akbar,based on his own lifelong clinical experience.

2.Hakim M. Shareef Khan (1725-1807) A famous Hakim of Delhi in Mughal Period. He was famous for his book Ilaj ul Amraz.

3. Hakim Ajmal Khan (1864-1927) Hkm Ajmal Khan. was renowned Hakim,scientist,politician and freedom fighter and a great patriot. He was established Unani and Ayurvedic College at Karol Bagh Delhi. He is remembered as Masihul Mulk Hkm Ajmal Khan. He was the first person who opened the door of research in Indian Systems of medicine and under his supervision Asarol (Rauwolfia serpentina) was analyzed and isolated various alkaloids i.e. Ajmaloon, Reserpine etc and most effective drug for Hypertension was introduced in world.

4. Hakim kabeeruddin (April 1894-9th January 1976) was very dedicated scholar of Unani Medicine . He was translated 88 Unani books of Arabic and Persian languages into Urdu. Which was the greatest achievement. Due to these achievements today, the Unani colleges in India are in existence. The first institution of Unani medicine was established in 1872 as Oriental College at Lahore. Thereafter much institution came into existence.

Post independence period:-

After independence Govt. of India at first constituted Unani pharmacopoeia Committee in 1964.,consisting of Unani experts and scientist with a view to maintain uniformity in the standards of drugs and to prescribe standards for compound formulations. And also to prescribe tests for identity, purity, efficacy and quality of the drugs. Pharmacopoeial Laboratory of Indian Medicine at Ghaziabad was established under Govt. of India to workout standards and drug testing for Indian System of Medicine at national level.

Govt. of India has also established Central Council of Indian Medicine ,a statutory body, for laying down standards and maintaining uniform standard of education in the Indian System of Medicine including Unani and to regulate the practices in Indian System of Medicine.

In order to develop high standards of education and research in Unani Medicine at national level a National Institute of Unani Medicine has been established at Bangalore in 1983 in collaboration with the Govt. of Karnataka which provided 55 acres of land for the Institute.

In addition to these developments Central Council for Research in Indian Medicine was established in 1969.During 1978 these Council were bifurcated into separate Central Councils as such Central Council for Research in Unani Medicine was established in 1979, with a view to initiate ,guide, aid, develop, coordinate scientific research in different aspects of fundamental and applied Unani System of Medicine.

In the combined Council Hk. A. Razzaque was the Head of the Unani Council. He was the expert and educationist who has established different wings of the present council all over India. As such there are 11 Regional Research Institutes, 7 Clinical Research Units, one Literary Research Units, 2 Survey and Cultivation of Medicinal Plants Unit, 7 Drug Standardization Research Unit. Now, the **Unani** is an established **Indian System of Medicine**.

INFRASTRUCTURE IN UNANI

S No.	*State*	*Colleges*	*Qualified. Doctors*	*Hospital*	*Beds*	*Dispensaries*
1	Andhra Pradesh	2	2156	6	315	207
2	Arunachal Pradesh	-	-	-	-	-
3	Assam	-	-	-	-	1
4	Bihar	4	3250	4	414	128
5	Delhi	2	1810	4	311	19
6	Goa	-	-	-	-	-
7	Gujarat	1	43	-	-	-
8	Haryana	-	135	1	10	20
9	Himachal Pradesh	-	21	-	-	3
10	Jammu & Kashmir	2	162	2	200	171
11	Karnataka	2	286	10	167	45
12	Kerala	-	3	-	-	1
13	Madhya Pradesh	1	326	1	60	55
14	Maharashtra	6	2298	5	795	23

15	Manipur	-	-	-		-
16	Meghalaya	-	-	-	-	-
17	Mizoram	-	-	-	-	-
18	Nagaland	-	-	-	-	-
19	Orissa	-	15	-	-	9
20	Punjab	-	421	-	-	35
21	Rajasthan	3	1432	5	270	77
22	Sikkim	-	-	-	-	-
23	Tamil Nadu	1	262	-	-	6
24	Tripura	-	-	-	-	-
25	Uttar Pradesh	7	7043	136	1186	148
26	West Bengal	1	22	2	110	-
27	U.T. Chandigah	-	-	-	-	-
28	Andaman& Nicobar	-	-	-	-	-
29.	Dadar & Nagar Haveli	-	-	-	-	-
30	Daman & Diu	-	-	-	--	-
31	Lakshadweep	-	-	-	-	-
32	Pondicherry	-	-	-	-	9
33	CGHS					1
34	Ministryof Labour(ESI)					
	Total	**33**	**19685**	**177**	**3892**	**958**

Thrust Areas

Preparation of Formularies of Unani medicine.
Preparation of Unani Pharmacopoeia of India.
Education.
Research and Development.

1. Unani Pharmacopoeia of India (UPI), Part-II-consisting of 122 single drugs will be brought out after publication during the next 6 months.
2. Unani Pharmacopoeia of India, Part-I-consisting of 103 compound formulations will be brought out after publication during the next 6 months.
3. National Formulary of Unani Medicine (NFUM), Part-III- consisting of 102 formulations will be brought out after publication during the next 6 months.
4. Regimenal Therapy (Ilaj-bil-Tadbir) on five methods of Regimenal Therapy a book will be brought out by December, 2002.

5. Extra Mural Research:- Most of the classical literature of Unani is now available in Urdu but rare books of Persian and Arabic languages are to be translated into Urdu, Hindi and English languages. Hence under Extra Mural Research Programe some important classical literature will be translated through a separate programme.
6. Expansion of Unani services in the States by the interaction between the State and Centre is a must. Through the centrally sponsored programmes/schemes some expansion, promotion of Unani system is possible, which has taken up in priority and will continue.
7. Setting up of Specialty Clinic:- One specialty clinic of Unani has been established by Govt. of India at Ram Manohar Lohia Hospital, some more in other states are under plan process.
8. In the coming years Educational Audio-Visual Cassettes on all subject/topics of BUMS will be prepared.
9. Some Pharmacy Colleges will be established in the States.
10. Education:- Bachelor of Unani Medicine (BUMS) education will be streamlined.
11. Regimenal Therapy (Ilaj-bil-Tadbir) is a specialty of Unani system will be started in Unani hospitals.
12. As far as research work is concerned the Central Council for Research in Unani Medicine (CCRUM) will be monitored to enter into the areas where there is high scope of success through Unani drugs like Family Welfare Programmes, Mother and Child Health Care and Reproductive Child Health etc.
13. Preparation of books on Unani single drugs.
14. Booklet on Reproductive Child Health (Unani).
15. Essential Unani Drugs for dispensaries and hospitals has been published.
16. Creation of 20 beds for Unani in Govt. hospitals is in progress.

6.3 CONCLUSION

The discussion of this lesson, must have allowed you in understanding the various alternative systems of medicine. In this lesson, we have learnt the basic concepts and principles of three systems, viz, Ayurveda, Yoga and Unani. The other systems are discussed in the following lesson.

6.4 KEY TERMS

Ayurveda: It is made up of two words-Ayuh and Veda. Ayuh means life and Veda means knowledge or science. Thus "Ayurveda' in totality means 'Science of life'.

Yoga: It's a means of compressing one's evolution into a single life or a few months or even a few hours of one's bodily existence.

Unani: Unani Medicine is based on the Greece philosophy. According to Basic Principles of Unani the body is made up of the four Basic elements i.e. Earth, Air, Water, Fire which have different Temperaments i.e. Cold, Hot, Wet, Dry.

6.5 SELF CHECK

What are various alternative systems of medicine?

Explain the philosophy, diagnosis of

Ayurveda
Yoga and
Unani

Discuss the difference between the orientations of these three systems.

LESSON - 7

ALTERNATIVE SYSTEMS OF MEDICINE – PART II

STRUCTURE

7.0 OBJECTIVES

Studying this lesson should enable you to

- Understand some more alternative systems of medicine
- Develop knowledge in the systems of
  - Siddha
  - Homeopathy
  - Naturopathy

7.1 INTRODUCTION

In continuation, to the previous discussion, in this lesson, the discussion is on the other available systems of alternatives to the existing medicine system. The meaning, interpretation, diagnosis, treatment, infrastructural facilities of Siddha, Homeopathy and Naturopathy were discussed.

7.1.1 SIDDHA MEDICINE SYSTEM

7.1.1.1. Introduction

Siddha system is one of the oldest systems of medicine in India. The term ‘Siddha’ means achievement and the ‘Siddhars’ were saintly figures who achieved results in medicine through the practice of Yoga. Eighteen ‘Siddhars’ seem to have contributed towards the development of this

medical system. Siddha system's literature is in Tamil and it is practiced in Tamil speaking parts of India. The system is also called Agasthyar system in the name of its famous exponent sage Agasthya. A number of medical works of this system are ascribed to him but it may be difficult at this time to say the exact number that can be credited to him. This system of medicine developed within the Dravidian culture, which is of the pre-vedic period. The Siddha system is largely therapeutic in nature.

7.1.1.2. History

The original Home allotted to mankind by the Creator was in the temperate and fertile region of the East and pointedly in India. It is from here that the human race began its culture and career. India may, therefore, be safely stated as that the first country from which human culture and civilization originated and spread. According to Indian history prior to Aryans migration, the Dravidian was the first inhabitant of India of whom the Tamilians were the most prominent.

The Tamilians were not only the earliest civilized but also those who may more considerable progress in civilization than any other early people. The languages of India were divided into two great classes, the northern with Sanskrit as the pre-pondering element and the southern with Dravidian language as independent bases. The science of medicine is of fundamental importance to man's well being be and his survival and so it must have originated with man and developed as civilization. It is, therefore rather pointless to try to determine the exact point of time to which the beginning of these systems could be traced they are eternal, they began with man and may end with him. The Siddha was flouriest in south and Ayurveda prevalent in the north. Instead of giving the name of any of individual as the founder of these systems our ancestors attributed their origin to the creator. According to the tradition it was Shiva who unfolded the knowledge of Siddha system of medicine to his concert Parvati who handed it down to Nandi Deva and him the Siddhars. The Siddhars were great scientists in ancient times.

According to tradition, the origin of Siddha system of medicine is attributed to the great Siddha Ayastiyar. Some of his works are still standard books of medicine and surgery in daily use among the Siddha Medical practitioners.

7.1.1.3. Basic Concepts

This principles and doctrines of this system, both fundamental and applied, have a close similarity to Ayurveda, with specialization in Iatro-chemistry. According to this system the human body is the replica of the universe and so are the food and drugs irrespective of their origin.

Like Ayurveda, this system believes that all objects in the universe including human body are composed of five basic elements namely, earth, water, fire, air and sky. The food, which the human body takes and the drugs it uses are all, made of these five elements. The proportion of the elements present in the drugs vary and their preponderance or otherwise is responsible for certain actions and therapeutic results.

As in Ayurveda, This system also considers the human body as a conglomeration of three humours, seven basic tissues and the waste products of the body such as faeces, urine and sweat. The food is considered to be basic building material of human body which gets processed into humours, body tissues and waste products. The equilibrium of humours is considered as health and its disturbance or imbalance leads to disease or sickness.

This system also deals with the concept of salvation in life. The exponents of this system consider achievement of this state is possible by medicines and meditation.

7.1.1.4. Materia Medica

The system has developed a rich and unique treasure of drug knowledge in which use of metals and minerals is very much advocated. Some idea about the depth of knowledge the system possesses in the field of mineral, materia medica can be formed from the detailed drug classification, briefly described below:

There are 25 varieties of water-soluble inorganic compounds called 'UPPU. These are different types of alkalies and salts.

There are 64 verities of mineral drugs that do not dissolve in water but emit, vapors when put in fire. Thirty-two of these are natural and remaining is artificial. There are seven drugs that do not dissolve in water but emit vapor on heating.

The system has classified separately classes of metals and alloys, which melt when, heated and solidifies on cooling. These include items like gold, silver, copper, tine, lead and iron. These are incinerated by special processes and used in medicine.

There is a group of drugs that exhibit sublimation on heating and includes mercury and its different forms like red sulphide of mercury, mercuric chloride and red oxide of mercury etc. Sulpher, which is insoluble in water, finds a crucial place in Siddha materia medica along with mercury for use in therapeutics and in maintenance of health.

The above classification shows detailed knowledge and study of minerals that this system has evolved for treatment. In addition there are drugs obtained from animal sources. The system has published and hand-book on Siddha treatment for common diseases and ailments.

Chemistry in Siddha

In Siddha system chemistry had been found well developed into a science auxiliary to medicine and alchemy. It was found useful in the preparation of medicine as well as in transmutation of basic metals into gold. The knowledge of plants and mineral were of very high order and they were fully acquainted with almost all the branches of science. The Siddhars were also aware of several alchemical operations divided into several processes such as – calcinations, sublimation, distillation, fusion, separation conjunction or combination, congelation, cibation, fermentation, exaltation i.e. the action or process of refining gold, fixation i.e. bringing to the condition of being non-volatile i.e. to the state of resisting the action of fire, purification, incineration of metals, liquifaction, extraction and so on.

Even cupellation of gold and silver which is an essential process in Alchemy in which is claimed to have been discovered by the Arabs, was known to the Siddhars long before.

They were even polypharmacists and as such were engaged in boiling, dissolving, precipitating and coagulating chemical substances. Some of their secret methods, especially those in fixing and consolidating certain volatile substances that could not resist the action of fire, such as Mercury, Sulphur, Orpiment, Vermilion, Arsenic etc. continue still a mystery.

Strength

The Siddha system is capable of treating all types of disease other than emergency cases. In general this system is effective in treating all types of skin problems particularly Psoriasis, STD, urinary tract infections, diseases of liver and gastro intestinal tract, general debility, postpartum anaemia, diarrhoea and general fevers in addition to arthritis and allergic disorders.

DIAGNOSIS AND TREATMENT

The diagnosis of disease involves identifying its causes. Identification of causative factors is done through the examination of pulse reading, urine examination, examination of eyes, and study of voice, Colour of body, examination of the tongue and status of the digestive system of

human body. The system has worked out detailed procedure of urine examination, which includes study of its Colour, smell, density, quantity and oil drop-spreading pattern. Diagnosis involves the study of person as a whole as well as his disease.

This Siddha system of medicine emphasis's that the medical treatment shall be oriented not merely to disease but has to take into account the patient, his environment, the meteorological consideration, age, sex race, habits, mental frame, habitat, diet, appetite, physical condition, physiological constitution etc. This means the treatment has to be individualized with far less chances of committing mistakes in diagnosis of treatment.

7.1.1.5. INFRASTRUCTURE

The health care service under this system is provided by the registered practitioners of this system numbering about 14,000. This system is being practiced in Tamil Nadu, Pondicherry, Kerala, Karnataka and countries like Sri Lanka, Malaysia and Singapore, where the Tamil Language is being spoken.

(i) About 2,000 are institutionally qualified and
(ii) 12,000 hereditary practitioners.

In addition to these private practitioners there is a viable official infrastructure which provides health services to the people by the different State Governments. There are about 106 Siddha Hospitals and 225 Dispensaries. There is a provision of 983 beds in these hospitals.

Under the Central Government Health Scheme the Government of India opened two units for Siddha System, one at Delhi and the other at Chennai in the year 1988 and 1982 respectively.

Hospital: 204
Beds: 1681
Dispensaries: 357
Regd.Practitioners: 12911
College: 6 (2 are PG institutions)
Admn. Capacity: 290 (UG)
Admn. Capacity: 80 (PG)
CGHS Units: 2 (Delhi & Chennai one each)

Hereditary Practitioners:

This class of Siddha Practitioners inherited the knowledge of Siddha Practice from their fathers mostly available in and around the villages. They do cater the needs of the public but they are mostly trained to treat a particular disease for which they have some family secret of preparing the medicines. Generally these practitioners prepare medicines as per the needs of their patients.

Availability of Siddha Treatment

1. Siddha Research Units/Institutes of CCRAS.
2. Siddha Units under Central Govt. Health scheme at Chennai and New Delhi.
3. Siddha Dispensaries under Govt. of Tamil Nadu.
4. Private Siddha Medical Practitioners, available in Tamil Nadu/Pondicherry/Kerala & Bangalore (Karnataka).

7.1.2. HOMOEOPATHY MEDICINE SYSTEM

7.1.2.1 Introduction

Homoeopathy today is a rapidly growing system and is being practiced almost all over the world. In India it has become a household name due the safety of its pills and gentleness of its

cure. A rough study indicates that about 10% of the Indian population solely depends on Homoeopathy for their Health care needs.

It is more than a century and a half now that Homoeopathy is being practiced in India. It has blended so well into the roots and traditions of the country that it has been recognized as one of the National Systems of Medicine and plays an important role in providing health care to a large number of people. Its strength lies in its evident effectiveness as it takes a holistic approach towards the sick individual through promotion of inner balance at mental, emotional, spiritual and physical levels.

The word 'Homoeopathy' is derived from two Greek words, *Homois* meaning similar and *pathos* meaning suffering. Homoeopathy simply means treating diseases with remedies, prescribed in minute doses, which are capable of producing symptoms similar to the disease when taken by healthy people. It is based on the natural law of healing- "*Similia Similibus Curantur*" which means "likes are cured by likes". Dr. Samuel Hahnemann (1755-1843) gave it a scientific basis in the early 19th century. It has been serving suffering humanity for over two centuries and has withstood the upheavals of time and has emerged as a time-tested therapy. The scientific principles propounded by Hahnemann are natural and well proven and continue to be followed with success.

7.1.2.2 ORIGIN

The principle of Homoeopathy has been known since the time of *Hippocrates* from Greece, the founder of medicine, around 450 BC More than a thousand years later the Swiss alchemist *Paracelsus* employed the same system of healing based upon the principle that "like cures like". But it was not until the late 18th century that Homoeopathy as it is practiced today was evolved by the great German physician, Dr. Samuel Hahnemann. He was appalled by the medical practices of that time and set about to develop a method of healing which would be safe, gentle, and effective. He believed that human beings have a capacity for healing themselves and that the symptoms of disease reflect the individuals struggle to overcome his illness.

Over two hundred years ago, the German physician Dr. Samuel Hahnemann discovered the principle that what substance could cause in the way of symptoms, it could also cure.

Hahnemann was struck by the effect that certain drugs, when taken by him while quite healthy, produced symptoms that the drug was known to cure in sick. For instance, when he took *Cinchona Bark*, which contains quinine, he became ill with symptoms that exactly mimicked intermittent fever (now called malaria). He wondered if the reason Cinchona worked against intermittent fever was because it caused symptoms indistinguishable from intermittent fever in a healthy human.

Hahnemann continued to experiment, noting that every substance he took, whether a herb, a mineral, an animal product or a chemical compound, produced definite distinct symptoms in him. He further noted that no two substances produced exactly the same set of symptoms. Each provoked its own unique pattern of symptoms. Furthermore the symptoms were not just confined to the physical plane. Every substance tested also affected the mind and the emotions apart from the body.

Eventually, Hahnemann began to treat the sick on the principle 'let likes be treated by likes'. From the outset he achieved outstanding clinical success.

7.1.2.3 CONCEPTS AND PRINCIPLES

Homoeopathy is the system of treatment based on demonstrable laws and principles, which are -

a) The Law of Similars - It is also called the Law of Cure. This law demonstrates that the selected remedy is able to produce a range of symptoms in a healthy person similar to that observed in the patient, thus leading to the principle of *Similia Similibus Curentur i.e. let likes be treated by likes*. To give a simple example the effects of peeling an onion are very similar to the symptoms of acute cold. The remedy prepared from the red onion, *Allium cepa*, is used to treat the type of cold in which the symptoms resemble those we get from peeling onion. The principle has been verified by millions of Homoeopaths all over the world.

b) The Law of Single Remedy - This law directs to choose and administer such a single remedy, which is most similar to the symptom complex of the sick person at a time.

c) The Law of Minimum Dose - The similar remedy selected for a sick should be prescribed in minimum dose, so that when administered there is no toxic effects on the body. It just acts as a triggering and catalytic agent to stimulate and strengthen the existing defense mechanism of the body. It does not need to be repeated frequently.

Holistic as well as Individualistic approach in Medicine through Homoeopathy:

This is a key point and unique to Homoeopathy. Even though it may sound strange, Homoeopathy does not treat disease per se. A Homoeopath does not concentrate his therapy on, say arthritis or bronchitis or cancer. In other words he does not limit his treatment to painful joints, inflamed bronchi or a malignant growth. Rather, he treats all aspects mental, emotional and physical of the person who happens to be suffering with arthritis or bronchitis or cancer. Homoeopathy regards each patient as a unique individual, e.g. six persons with hepatitis might get a different Homoeopathic remedy, each one aimed at the individual's totality of symptoms rather than at his liver alone. The physicians' interest is not only to alleviate the patients' present symptoms but also his long-term well being.

Concept of Vital Force

Dr. Hahnemann discovered that the human body is endowed with a force that reacts against the inimical forces, which produce disease. It becomes deranged during illness and the best-selected Homoeopathic remedies stimulate this failing vital force so that, as Hahnemann said "it can again take the reins and conduct the system on way to health".

Concept of Miasm

Psora, Syphilis and Sycosis are the three fundamental causes of all chronic diseases that afflict the human race as discovered by Dr. Hahnemann and called them *miasms*. This word is derived from Greek word *miainein* meaning 'to pollute'.

Syphilis and Sycosis are the venereal and contagious chronic diseases, whereas Psora is a non-venereal chronic disease. Psora is present from the beginning to end of life and is the root cause of most of the diseases.

Principle of Drug Proving

To apply drugs for therapeutic use, their curative powers should be known. The proving of the drug is the method employed to know these powers and is unique to Homoeopathy as they are proved on healthy human beings. The symptoms thus known are the true record of the curative properties of a drug or the pathogenesis of a drug.

Drug Dynamisation or Potentisation

Drugs are prepared in such a way that they retain maximum medicinal powers without producing any toxic action on the body. It was found experimentally by Dr. Hahnemann that when diluted drugs are powerfully succussed they develop lasting medicinal powers.

7.1.2.4 HISTORICAL EVOLUTION IN INDIA

Homoeopathy entered India in 1839 when Dr. John Martin Honigberger was called to treat Maharaja Ranjit Singh, the ruler of Punjab, for paralysis of vocal cords and oedema. The Maharaja was relieved of his complaints and in return received valuable rewards and later on was made officer-in-charge of a hospital. Dr. Honigberger later on went to Calcutta and started practice there. This royal patronage helped the system to have its roots in India. A large number of missionaries, amateurs in Indian civil and military service personals practiced Homoeopathy extensively and spread this system mostly in Bengal and South India.

7.1.2.5 RECOGNITION BY THE GOVERNMENT:

The Government of India soon after Independence did not lost time to develop Homoeopathic System of Medicine. The setting up of Homoeopathic Enquiry Committee in 1948, the Committee by Planning Commission in 1951 and the Homoeopathic Pharmacopoeia Committee in 1962 testify to this. At the instance of the recommendation of these Committees, the Government of India have accepted Homoeopathy as one of the national System of Medicine and started releasing funds for its development, during the Second five-year Plan. Some of the States also made their own contribution to Homoeopathic Education, the employment of Homoeopathic practitioners in health services and regulating the practice by enacting States Acts & Rules, etc.

7.1.2.6 NATIONAL HEALTH POLICY & HOMOEOPATHY:

The National Health Policy as passed by the Indian Parliament assigns to the Indian Systems of Medicine and Homoeopathy an important role in the delivery of primary health care and envisages its integration in the over all health care delivery system, specially in the preventive and promotive aspects of health care in the context of the national target of achieving "Health for all by 2000 AD"

7.1.2.7 GROWTH AND DEVELOPMENT IN INDIA

Homoeopathy continued to spread and by the beginning of 20th century most of the important cities in India had Homoeopathic dispensaries. The popularity of the system led to a mushroom growth of quacks practicing Homoeopathy. Seeing this deplorable state of affairs, efforts were made by the Government. It took several steps and in 1948, a Homoeopathic Enquiry Committee was set up to evolve a suitable arrangement to regulate teaching and practice of Homoeopathy. A Homoeopathic Advisory Committee was appointed in 1952 by the Govt. of India and the recommendations of these committees led to passing of a Central Act in 1973 for recognition of this system of medicine. Homoeopathy now has been accepted as one of the National Systems of Medicine in India.

PRESENT SET UP:

Homoeopathy in India enjoys Government support along with the other systems of medicine because Government is of the view that presence of all these complementary alternative systems of therapeutics offers a much wider spectrum of curative medicine than is available in any other country.

INFRASTRUCTURE - AN OVERVIEW

No	Infrastructure	Number	Reference date
(I)	No. of Registered Medical Practitioners	1,97,252	01.01.2001
(ii)	Institutionally qualified Practitioners	128142	-do-
(iii)	Non Institutionally Qualified	69110	-do-
(iv)	Number of dispensaries	7411	1.4..2002
(v)	Number of hospitals	307	-do-
(vi)	Bed strength	13693	-do-
(vii)	Number of teaching institutions(UG)	172	1.4.2002
	Number of UG seats	10895	-do-
(viii)	Number of PG faculties	24(Out of these 2 colleges are exclusively for PG Course only)	-do-
(ix)	Number of specialties in Post graduation	7	-do-
(x)	Number of PG seats available	543	-do-

7.1.3. NATUROPATHY MEDICINE SYSTEM

7.1.3.1 Basic Concepts

In fact, Nature Cure is a way of life of which we find a number of references in the Vedas and other ancient texts. The morbid matter theory, concept of vital force and other concepts upon which Nature Cure is based are already available in old texts which indicate that these methods were widely practised in ancient India. The whole practice of Nature cure based on the following three principles:

- Accumulation of morbid matter
- Abnormal composition of blood and lymph
- Lowered vitality

Nature Cure believes that all the diseases arise due to accumulation of morbid matter in the body and if scope is given for its removal, it provides cure or relief. It also believes that the human body possesses inherent self constructing and self healing powers. The fundamental difference in Nature Cure with other systems is that its theory and practice are based on holistic view point whereas the later's approach is specific. Nature Cure does not believe in the specific cause of disease and its specific treatment but takes into account the totality of factors responsible for diseases such as one's un-natural habits in living, thinking, working, sleeping, relaxation, sexual indulgence etc, and also considers the environmental factors involved which on the whole disturbs the normal functioning of the body and lead it to a morbid, weak and toxic state.

For treatment it primarily stresses on correcting all the factors involved and allowing the body to recover itself. A Nature Cure physician helps in Nature's effort to overcome disease by applying correct natural modalities and controlling the natural forces to work within safe limits. The five main modalities of treatment are air, water, heat, mud and space.

7.1.3.2 Principles

1. All disease, their cause and their treatment are one.
2. The basic cause of disease is not bacteria. Bacteria develop after the accumulation of morbid matter when a favorable atmosphere for their growth develops in body. Basic cause is morbid matter and not the bacteria.
3. Acute diseases are our friends not he enemies. Chronic diseases are the outcome of wrong treatment and suppression of the acute diseases.
4. Nature is the greatest healer. Body the capacity to prevent it from diseases and regain health if unhealthy.
5. In Naturopathy patient is treated and not the disease.
6. In Naturopathy diagnosis is easily possible. Ostentation is not required. Long waiting for diagnosis is not required for treatment.
7. Patients suffering from chronic ailments are also treated successfully in comparatively less time in Naturopathy.
8. After emerging, suppressed diseases can be cured by Naturopathy.
9. Nature Cure treats physical, mental, social (moral) and spiritual all four aspects at the same time.
10. Nature Cure treats body as a whole instead of giving treatment to each organ separately.
11. Naturopathy does not use medicines. According to Naturopathy "Food is Medicine".
12. According to Gandhi Ji "Rama Nama is the best Natural Treatment", means doing prayer according to one's spiritual faith is an important part of treatment.

In short, Nature Cure includes all the available non-in vasive treatments and diagnostic modalities which do not interfere with the body's natural functional capacity and healing process and are in affirmity with Nature's constructive Principles.

7.1.3.3 Development and Status

Naturopathy is a system of healing science stimulating the body's inherent power to regain health with the help of five great elements of nature – Earth, Water, Air, Fire and Ether. Naturopathy is a call to "Return to Nature" and to resort to simple way of living in harmony with the self, society and environment.

Naturopathy provides not only a simple practical approach to the management of diseases, but a firm theoretical basis which is applicable to all the holistic medical care and by giving attention to the foundations of health; also offers a more economical frame work for the medicine of future generation.

Though the basic Nature Cure deals only with Pancha Mahabhoota's, the recent developments advocates the practice of drugless therapies like Massage, Electrotherapy, Physiotherapy, Acupuncture and Acupressure, Magnetotherapy etc., Diet plays a major role, above all.

7.1.3.4 History

Nature Cure movement started in Germany & other western countries with "Water cure" (Hydrotherapy). Water cure was synonymous with Nature Cure in those early days. The credit of making Water cure world famous goes to Vincent Priessnitz (1799-1851) who was a farmer. Dr. Henry Lindlahr and others go to the extent of crediting him as "Father of Naturopathy". The word "Naturopathy" has been coined by Dr. John Scheel in the year 1895 and was propagated and popularized in the western world by Dr. Benedict Lust. A number of Doctors of modern medicine and others became Nature Cure enthusiasts and gradually added a number of modalities within the fold of Naturopathy and scientifically developed them. Nature Cure movement gained momentum in India as Mahatma Gandhi, "Father of the Nation" became much interested in this

system and included it in his programmes. He has also established a Nature Cure Hospital in Uruli Kanchan, Distt. Poona, Maharashtra which is still functioning.

7.1.3.5 Background

- Naturopathy adopts the following diagnostic methods:
- Full life case history – covering all the facts of life, since birth.
- Facial diagnosis – the science of facial expressions by studying the various characteristic features upon the body.
- Iris diagnosis – study of iris indicating the condition of various visceral organs.
- Modern clinical diagnosis to some extent.

The methods applied for cure in Naturopathy are the following: -

1. **Water Therapy**: Water is the most ancient of all the remedial agents. It is employed in different forms in treatment and produces several types of physiological effects depending upon temperature and duration. Hydrotherapy is employed in almost all types of disease conditions.
2. **Air Therapy**: Fresh air is essential for good health. Air therapy is employed in different pressures and temperatures in variety of disease conditions.
3. **Fire Therapy**: Existence of all the creatures and forms depends upon “Agni” (Fire). In Nature Cure treatment, different temperatures are employed through different heating techniques to produce different specific effects.
4. **Space Therapy**: Congestion causes disease. Fasting is the best therapy to relieve congestion of body and mind.
5. **Mud Therapy**: Mud absorbs, dissolves and eliminates the toxins and rejuvenates the body. It is employed in treatment of various diseases like constipation, skin diseases etc.
6. **Food Therapy**: Most of the disease is amenable through food therapy. As you eat so will you be physically as well as mentally. Your food is your medicine. These are the main slogans of Nature Cure.
7. **Massage Therapy**: Massage is generally employed for tonic, stimulant and sedative effects. It is an effective substitute for exercise.
8. **Acupressure**: There are different points on hands, feet & body which are associated with different organs. By applying pressure on these selected points, related organs can be influenced for getting rid of their ailments.
9. **Magneto Therapy**: Magnets influence health. South and North poles of different powers and shapes are employed in treatment, by applying directly on different parts of the body or through charged up water or oil.
10. **Chromo Therapy**: Sun rays have seven colours – violet, indigo, blue, green, yellow, orange and red. These colours are employed through irradiation or body or by administering charged water, oil and pills for treatment.

7.2 CONCLUSION

The discussion in this lesson, is continuation to the previous lesson, as already, you mush have understood. Your understanding about the remaining alternative systems of medicine should have risen with this. In this lesson, we have learnt the basic concepts and principles of three other systems, viz, Siddha, Homeopathy and Naturopathy.

7.3 KEY TERMS

1. **Siddha:** Siddha system is one of the oldest systems of medicine in India. The term 'Siddha' means achievement and the 'Siddhars' were saintly figures who achieved results in medicine through the practice of Yoga.

2. **Homeopathy:** The word 'Homoeopathy' is derived from two Greek words, *Homois* meaning similar and *pathos* meaning suffering. Homoeopathy simply means treating diseases with remedies, prescribed in minute doses, which are capable of producing symptoms similar to the disease when taken by healthy people.

3. **Naturopathy:** Nature Cure believes that all the diseases arise due to accumulation of morbid matter in the body and if scope is given for its removal, it provides cure or relief. It also believes that the human body possesses inherent self constructing and self healing powers. The fundamental difference in Nature Cure with other systems is that its theory and practice are based on holistic view point whereas the later's approach is specific.

7.3 SELF CHECK

1. Explain the philosophy, diagnosis of
    a. Siddha system
    b. Homeopathy system
    c. Naturopathy system
2. Discuss the difference between the orientations of these three systems.
3. Also discuss the situations in India leading to gaining importance to alternative systems of medicine.

LESSON - 8

NATIONAL HEALTH POLICY

STRUCTURE

8.0 OBJECTIVES

This lesson should provide you

- Know the important points in the National Health Policy
- Understand various components of NHP
- Interpret the prescriptions made

8.1 NATIONAL HEALTH POLICY – 2002

8.1.1. INTRODUCTION

1.1 A National Health Policy was last formulated in 1983, and since then there have been marked changes in the determinant factors relating to the health sector. Some of the policy initiatives outlined in the NHP-1983 have yielded results, while, in several other areas, the outcome has not been as expected.

1.2 The NHP-1983 gave a general exposition of the policies which required recommendation in the circumstances then prevailing in the health sector. The noteworthy initiatives under that policy were:-

(i) A phased, time-bound programme for setting up a well-dispersed network of comprehensive primary health care services, linked with extension and health education, designed in the context of the ground reality that elementary health problems can be resolved by the people themselves;

(ii) Intermediation through 'Health volunteers' having appropriate knowledge, simple skills and requisite technologies;

(iii) Establishment of a well-worked out referral system to ensure that patient load at the higher levels of the hierarchy is not needlessly burdened by those who can be treated at the decentralized level;

(iv) An integrated net-work of evenly spread specialty and super-specialty services; encouragement of such facilities through private investments for patients who can pay, so that the draw on the Government's facilities is limited to those entitled to free use.

Government initiatives in the pubic health sector have recorded some noteworthy successes over time. Smallpox and Guinea Worm Disease have been eradicated from the country; Polio is on the verge of being eradicated; Leprosy, Kala Azar, and Filariasis can be expected to be eliminated in the foreseeable future. There has been a substantial drop in the Total Fertility Rate and Infant Mortality Rate. The success of the initiatives taken in the public

health field are reflected in the progressive improvement of many demographic / epidemiological / infrastructural indicators over time – (Box-I).

Box-1: Achievements Through The Years - 1951-2000

Indicator	**1951**	**1981**	**2000**
Demographic Changes			
Life Expectancy	36.7	54	64.6(RGI)
Crude Birth Rate	40.8	33.9(SRS)	26.1(99 SRS)
Crude Death Rate	25	12.5(SRS)	8.7(99 SRS)
IMR	146	110	70 (99 SRS)
Epidemiological Shifts			
Malaria (cases in million)	75	2.7	2.2
Leprosy cases per 10,000 population	38.1	57.3	3.74
Small Pox (no of cases)	>44,887	Eradicated	
Guineaworm (no. of cases)		>39,792	Eradicated
Polio		29709	265
Infrastructure			
SC/PHC/CHC	725	57,363	1,63,181(99-RHS)
Dispensaries & Hospitals (all)	9209	23,555	43,322 (95–96-CBHI)
Beds (Pvt & Public)	117,198	569,495	8,70,161(95-96-CBHI)
Doctors(Allopathy)	61,800	2,68,700	5,03,900(98-99-MCI)
Nursing Personnel	18,054	1,43,887	7,37,000(99-INC)

While noting that the public health initiatives over the years have contributed significantly to the improvement of these health indicators, it is to be acknowledged that public health indicators / disease-burden statistics are the outcome of several complementary initiatives under the wider umbrella of the developmental sector, covering Rural Development, Agriculture, Food Production, Sanitation, Drinking Water Supply, Education, etc. Despite the impressive public health gains as revealed in the statistics in Box-I, there is no gainsaying the fact that the morbidity

and mortality levels in the country are still unacceptably high. These unsatisfactory health indices are, in turn, an indication of the limited success of the public health system in meeting the preventive and curative requirements of the general population.

Out of the communicable diseases which have persisted over time, the incidence of Malaria staged resurgence in the1980s before stabilizing at a fairly high prevalence level during the 1990s. Over the years, an increasing level of insecticide-resistance has developed in the malarial vectors in many parts of the country, while the incidence of the more deadly P-Falciparum Malaria has risen to about 50 percent in the country as a whole. In respect of TB, the public health scenario has not shown any significant decline in the pool of infection amongst the community, and there has been a distressing trend in the increase of drug resistance to the type of infection prevailing in the country. A new and extremely virulent communicable disease – HIV/AIDS - has emerged on the health scene since the declaration of the NHP-1983. As there is no existing therapeutic cure or vaccine for this infection, the disease constitutes a serious threat, not merely to public health but to economic development in the country. The common water-borne infections – Gastroenteritis, Cholera, and some forms of Hepatitis – continue to contribute to a high level of morbidity in the population, even though the mortality rate may have been somewhat moderated.

The period after the announcement of NHP-83 has also seen an increase in mortality through 'life-style' diseases- diabetes, cancer and cardiovascular diseases. The increase in life expectancy has increased the requirement for geriatric care. Similarly, the increasing burden of trauma cases is also a significant public health problem.

Another area of grave concern in the public health domain is the persistent incidence of macro and micro nutrient deficiencies, especially among women and children. In the vulnerable sub-category of women and the girl child, this has the multiplier effect through the birth of low birth weight babies and serious ramifications of the consequential mental and physical retarded growth.

NHP-1983, in a spirit of optimistic empathy for the health needs of the people, particularly the poor and under-privileged, had hoped to provide 'Health for All by the year 2000 AD', through the universal provision of comprehensive primary health care services. In retrospect, it is observed that the financial resources and public health administrative capacity which it was possible to marshal, was far short of that necessary to achieve such an ambitious and holistic goal. Against this backdrop, it is felt that it would be appropriate to pitch NHP-2002 at a level consistent with our realistic expectations about financial resources, and about the likely increase in Public Health administrative capacity. The recommendations of NHP-2002 will, therefore, attempt to maximize the broad-based availability of health services to the citizenry of the country on the basis of realistic considerations of capacity. The changed circumstances relating to the health sector of the country since 1983 have generated a situation in which it is now necessary to review the field, and to formulate a new policy framework as the National Health Policy-2002. NHP-2002 will attempt to set out a new policy framework for the accelerated achievement of Public health goals in the socio-economic circumstances currently prevailing in the country.

8.1.2. CURRENT SCENARIO

8.1.2.1 FINANCIAL RESOURCES

The public health investment in the country over the years has been comparatively low, and as a percentage of GDP has declined from 1.3 percent in 1990 to 0.9 percent in 1999. The aggregate expenditure in the Health sector is 5.2 percent of the GDP. Out of this, about 17 percent of the aggregate expenditure is public health spending, the balance being out-of-pocket expenditure. The central budgetary allocation for health over this period, as a percentage of the

total Central Budget, has been stagnant at 1.3 percent, while that in the States has declined from 7.0 percent to 5.5 percent. The current annual per capita public health expenditure in the country is no more than Rs. 200. Given these statistics, it is no surprise that the reach and quality of public health services has been below the desirable standard. Under the constitutional structure, public health is the responsibility of the States. In this framework, it has been the expectation that the principal contribution for the funding of public health services will be from the resources of the States, with some supplementary input from Central resources. In this backdrop, the contribution of Central resources to the overall public health funding has been limited to about 15 percent. The fiscal resources of the State Governments are known to be very inelastic. This is reflected in the declining percentage of State resources allocated to the health sector out of the State Budget. If the decentralized pubic health services in the country are to improve significantly, there is a need for the injection of substantial resources into the health sector from the Central Government Budget. This approach is a necessity – despite the formal Constitutional provision in regard to public health, -- if the State public health services, which are a major component of the initiatives in the social sector, are not to become entirely moribund. The NHP-2002 has been formulated taking into consideration these ground realities in regard to the availability of resources.

8.1.2.2 EQUITY

2.2.1 In the period when centralized planning was accepted as a key instrument of development in the country, the attainment of an equitable regional distribution was considered one of its major objectives. Despite this conscious focus in the development process, the statistics given in Box-II clearly indicate that the attainment of health indices has been very uneven across the rural – urban divide.

Box II: Differentials in Health Status Among States

Sector	**Population BPL (%)**	**IMR Per 1000 Live Births (1999-SRS)**	**<5Mort-ality per 1000 (NFHS II)**	**Weight For Age-% of Children Under 3 years (<-2SD)**	**MMR/Lakh (Annual Report 2000)**	**Leprosy cases per 10000 population**	**Malaria +ve Cases in year 2000 (in thousands)**
India	**26.1**	**70**	**94.9**	**47**	**408**	**3.7**	**2200**
Rural	27.09	75	103.7	49.6	-	-	-
Urban	23.62	44	63.1	38.4	-	-	-
Better Performing States							
Karalla	12.72	14	18.8	27	87	0.9	5.1
Maharashtra	25.02	48	58.1	50	135	3.1	138

TN	21.12	52	63.3	37	79	4.1	56
Low Performing States							
Orison	47.15	97	104.4	54	498	7.05	483
Bihar	42.60	63	105.1	54	707	11.83	132
Rajasthan	15.28	81	114.9	51	607	0.8	53
UP	31.15	84	122.5	52	707	4.3	99
MP	37.43	90	137.6	55	498	3.83	528

Also, the statistics bring out the wide differences between the attainments of health goals in the better- performing States as compared to the low-performing States. It is clear that national averages of health indices hide wide disparities in public health facilities and health standards in different parts of the country. Given a situation in which national averages in respect of most indices are themselves at unacceptably low levels, the wide inter-State disparity implies that, for vulnerable sections of society in several States, access to public health services is nominal and health standards are grossly inadequate. Despite a thrust in the NHP-1983 for making good the unmet needs of public health services by establishing more public health institutions at a decentralized level, a large gap in facilities still persists.

Applying current norms to the population projected for the year 2000, it is estimated that the shortfall in the number of SCs/PHCs/CHCs is of the order of 16 percent. However, this shortage is as high as 58 percent when disaggregated for CHCs only. The NHP-2002 will need to address itself to making good these deficiencies so as to narrow the gap between the various States, as also the gap across the rural-urban divide.

Access to, and benefits from, the public health system have been very uneven between the better-endowed and the more vulnerable sections of society. This is particularly true for women, children and the socially disadvantaged sections of society. The statistics given in Box-III highlight the handicap suffered in the health sector on account of socio-economic inequity.

Box-III: <u>Differentials in Health status Among Socio-Economic Groups</u>

Indicator	**Infant Mortality/1000**	**Under 5 Mortality/1000**	**% Children Underweight**
<u>India</u>	**70**	**94.9**	**47**
Social Inequity			
Scheduled Castes	83	119.3	53.5
Scheduled Tribes	84.2	126.6	55.9

Other Disadvantaged	76	103.1	47.3
Others	61.8	82.6	41.1

It is a principal objective of NHP-2002 to evolve a policy structure which reduces these inequities and allows the disadvantaged sections of society a fairer access to public health services.

8.1.2.3 DELIVERY OF NATIONAL PUBLIC HEALTH PROGRAMMES

It is self-evident that in a country as large as India, which has a wide variety of socio-economic settings, national health programmes have to be designed with enough flexibility to permit the State public health administrations to craft their own programme package according to their needs. Also, the implementation of the national health programme can only be carried out through the State Governments' decentralized public health machinery. Since, for various reasons, the responsibility of the Central Government in funding additional public health services will continue over a period of time, the role of the Central Government in designing broad-based public health initiatives will inevitably continue. Moreover, it has been observed that the technical and managerial expertise for designing large-span public health programmes exists with the Central Government in a considerable degree; this expertise can be gainfully utilized in designing national health programmes for implementation in varying socio-economic settings in the States. With this background, the NHP-2002 attempts to define the role of the Central Government and the State Governments in the public health sector of the country.

Over the last decade or so, the Government has relied upon a 'vertical' implementation structure for the major disease control programmes. Through this, the system has been able to make a substantial dent in reducing the burden of specific diseases. However, such an organizational structure, which requires independent manpower for each disease programme, is extremely expensive and difficult to sustain. Over a long time-range, 'vertical' structures may only be affordable for those diseases which offer a reasonable possibility of elimination or eradication in a foreseeable time-span.

It is a widespread perception that, over the last decade and a half, the rural health staff has become a vertical structure exclusively for the implementation of family welfare activities. As a result, for those public health programmes where there is no separate vertical structure, there is no identifiable service delivery system at all. The Policy will address this distortion in the public health system.

8.1.2.4 THE STATE OF PUBLIC HEALTH INFRASTRUCTURE

The delineation of NHP-2002 would be required to be based on an objective assessment of the quality and efficiency of the existing public health machinery in the field. It would detract from the quality of the exercise if, while framing a new policy, it were not acknowledged that the existing public health infrastructure is far from satisfactory. For the outdoor medical facilities in existence, funding is generally insufficient; the presence of medical and para-medical personnel is often much less than that required by prescribed norms; the availability of consumables is frequently negligible; the equipment in many public hospitals is often obsolescent and unusable; and, the buildings are in a dilapidated state. In the indoor treatment facilities, again, the equipment is often obsolescent; the availability of essential drugs is minimal; the capacity of the facilities is grossly inadequate, which leads to over-crowding, and consequentially to a steep deterioration in the quality of the services. As a result of such inadequate public health facilities, it

has been estimated that less than 20 percent of the population, which seek OPD services, and less than 45 percent of that which seek indoor treatment, avail of such services in public hospitals. This is despite the fact that most of these patients do not have the means to make out-of-pocket payments for private health services except at the cost of other essential expenditure for items such as basic nutrition.

8.1.2.5 EXTENDING PUBLIC HEALTH SERVICES

While there is a general shortage of medical personnel in the country, this shortfall is disproportionately impacted on the less-developed and rural areas. No incentive system attempted so far, has induced private medical personnel to go to such areas; and, even in the public health sector, the effort to deploy medical personnel in such under-served areas, and has usually been a losing battle. In such a situation, the possibility needs to be examined of entrusting some limited public health functions to nurses, paramedics and other personnel from the extended health sector after imparting adequate training to them.

India has a vast reservoir of practitioners in the Indian Systems of Medicine and Homoeopathy, who have undergone formal training in their own disciplines. The possibility of using such practitioners in the implementation of State/Central Government public health programmes, in order to increase the reach of basic health care in the country, is addressed in the NHP-2002.

8.1.2.6 ROLE OF LOCAL SELF-GOVERNMENT INSTITUTIONS

Some States have adopted a policy of devolving programmes and funds in the health sector through different levels of the Panchayat Raj Institutions. Generally, the experience has been an encouraging one. The adoption of such an organisational structure has enabled need-based allocation of resources and closer supervision through the elected representatives. The Policy examines the need for a wider adoption of this mode of delivery of health services, in rural as well as urban areas, in other parts of the country.

8.1.2.7 NORMS FOR HEALTH CARE PERSONNEL

It is observed that the deployment of doctors and nurses, in both public and private institutions, is ad-hoc and significantly short of the requirement for minimal standards of patient care. This policy will make a specific recommendation in regard to this deficiency.

8.1.2.8 EDUCATION OF HEALTH CARE PROFESSIONALS

Medical and Dental Colleges are not evenly spread across various parts of the country. Apart from the uneven geographical distribution of medical institutions, the quality of education is highly uneven and in several instances even sub-standard. It is a common perception that the syllabus is excessively theoretical, making it difficult for the fresh graduate to effectively meet even the primary health care needs of the population. There is a general reluctance on the part of graduate doctors to serve in areas distant from their native place. NHP-2002 will suggest policy initiatives to rectify the resultant disparities.

Certain medical disciplines, such as molecular biology and gene-manipulation, have become relevant in the period after the formulation of the previous National Health Policy. The components of medical research in recent years have changed radically. In the foreseeable future such research will rely increasingly on the new disciplines. It is observed that the current under-graduate medical syllabus does not cover such emerging subjects. The Policy will make appropriate recommendations in respect of such deficiencies.

Also, certain specialty disciplines – Anesthesiology, Radiology and Forensic Medicine – are currently very scarce, resulting in critical deficiencies in the package of available public health services. This Policy will recommend some measures to alleviate such critical shortages.

8.1.2.9 NEED FOR SPECIALISTS IN 'PUBLIC HEALTH' & 'FAMILY MEDICINE'

In any developing country with inadequate availability of health services, the requirement of expertise in the areas of 'public health' and 'family medicine' is markedly more than the expertise required for other clinical specialties. In India, the situation is that public health expertise is non-existent in the private health sector, and far short of requirement in the public health sector. Also, the current curriculum in the graduate / post-graduate courses is outdated and unrelated to contemporary community needs. In respect of 'family medicine', it needs to be noted that the more talented medical graduates generally seek specialization in clinical disciplines, while the remaining go into general practice. While the availability of postgraduate educational facilities is 50 percent of the total number of qualifying graduates each year, and can be considered adequate, the distribution of the disciplines in the postgraduate training facilities is overwhelmingly in favour of clinical specializations. NHP-2002 examines the possible means for ensuring adequate availability of personnel with specialization in the 'public health' and 'family medicine' disciplines, to discharge the public health responsibilities in the country.

8.1.2.10 NURSING PERSONNEL

The ratio of nursing personnel in the country vis-à-vis doctors/beds is very low according to professionally accepted norms. There is also an acute shortage of nurses trained in super-specialty disciplines for deployment in tertiary care facilities. NHP-2002 addresses these problems.

8.1.2.11 USE OF GENERIC DRUGS AND VACCINES

India enjoys a relatively low-cost health care system because of the widespread availability of indigenously manufactured generic drugs and vaccines. There is an apprehension that globalization will lead to an increase in the costs of drugs, thereby leading to rising trends in overall health costs. This Policy recommends measures to ensure the future Health Security of the country.

8.1.2.12 URBAN HEALTH

In most urban areas, public health services are very meager. To the extent that such services exist, there is no uniform organizational structure. The urban population in the country is presently as high as 30 percent and is likely to go up to around 33 percent by 2010. The bulk of the increase is likely to take place through migration, resulting in slums without any infrastructure support. Even the meager public health services which are available do not percolate to such unplanned habitations, forcing people to avail of private health care through out-of-pocket expenditure.

The rising vehicle density in large urban agglomerations has also led to an increased number of serious accidents requiring treatment in well-equipped trauma centres. NHP-2002 will address itself to the need for providing this unserved urban population a minimum standard of broad-based health care facilities.

8.1.2.13 MENTAL HEALTH

Mental health disorders are actually much more prevalent than is apparent on the surface. While such disorders do not contribute significantly to mortality, they have a serious bearing on the quality of life of the affected persons and their families. Sometimes, based on

religious faith, mental disorders are treated as spiritual affliction. This has led to the establishment of unlicensed mental institutions as an adjunct to religious institutions where reliance is placed on faith cure. Serious conditions of mental disorder require hospitalization and treatment under trained supervision. Mental health institutions are woefully deficient in physical infrastructure and trained manpower. NHP-2002 will address itself to these deficiencies in the public health sector.

8.1.2.14 INFORMATION, EDUCATION AND COMMUNICATION

A substantial component of primary health care consists of initiatives for disseminating to the citizenry, public health-related information. IEC initiatives are adopted not only for disseminating curative guidelines (for the TB, Malaria, Leprosy, Cataract Blindness Programmes), but also as part of the effort to bring about a behavioral change to prevent HIV/AIDS and other life-style diseases. Public health programmes, particularly, need high visibility at the decentralized level in order to have an impact. This task is difficult as 35 percent of our country's population is illiterate. The present IEC strategy is too fragmented, relies too heavily on the mass media and does not address the needs of this segment of the population. It is often felt that the effectiveness of IEC programmes is difficult to judge; and consequently it is often asserted that accountability, in regard to the productive use of such funds, is doubtful. The Policy, while projecting an IEC strategy, will fully address the inherent problems encountered in any IEC programme designed for improving awareness and bringing about a behavioral change in the general population.

It is widely accepted that school and college students are the most impressionable targets for imparting information relating to the basic principles of preventive health care. The policy will attempt to target this group to improve the general level of awareness in regard to 'health-promoting' behavior.

8.1.2.15 HEALTH RESEARCH

Over the years, health research activity in the country has been very limited. In the Government sector, such research has been confined to the research institutions under the Indian Council of Medical Research, and other institutions funded by the States/Central Government. Research in the private sector has assumed some significance only in the last decade. In our country, where the aggregate annual health expenditure is of the order of Rs. 80,000 crores, the expenditure in 1998-99 on research, both public and private sectors, was only of the order of Rs. 1150 crores. It would be reasonable to infer that with such low research expenditure, it is virtually impossible to make any dramatic break-through within the country, by way of new molecules and vaccines; also, without a minimal back-up of applied and operational research, it would be difficult to assess whether the health expenditure in the country is being incurred through optimal applications and appropriate public health strategies. Medical Research in the country needs to be focused on therapeutic drugs/vaccines for tropical diseases, which are normally neglected by international pharmaceutical companies on account of their limited profitability potential. The thrust will need to be in the newly-emerging frontier areas of research based on genetics, genome-based drug and vaccine development, molecular biology, etc. NHP-2002 will address these inadequacies and spell out a minimal quantum of expenditure for the coming decade, looking to the national needs and the capacity of the research institutions to absorb the funds.

8.1.2.16 ROLE OF THE PRIVATE SECTOR

Considering the economic restructuring under way in the country, and over the globe, in the last decade, the changing role of the private sector in providing health care will also have to be addressed in this Policy. Currently, the contribution of private health care is principally through independent practitioners. Also, the private sector contributes significantly to secondary-level care

and some tertiary care. It is a widespread perception that private health services are very uneven in quality, sometimes even sub-standard. Private health services are also perceived to be financially exploitative, and the observance of professional ethics is noted only as an exception. With the increasing role of private health care, the implementation of statutory regulation, and the monitoring of minimum standards of diagnostic centres / medical institutions becomes imperative. The Policy will address the issues regarding the establishment of a comprehensive information system, and based on that the establishment of a regulatory mechanism to ensure the maintaining of adequate standards by diagnostic centres / medical institutions, as well as the proper conduct of clinical practice and delivery of medical services.

Currently, non-Governmental service providers are treating a large number of patients at the primary level for major diseases. However, the treatment regimens followed are diverse and not scientifically optimal, leading to an increase in the incidence of drug resistance. This policy will address itself to recommending arrangements which will eliminate the risks arising from inappropriate treatment.

The increasing spread of information technology raises the possibility of its adoption in the health sector. NHP-2002 will examine this possibility.

8.1.2.17 THE ROLE OF CIVIL SOCIETY

Historically, it has been the practice to implement major national disease control programmes through the public health machinery of the State/Central Governments. It has become increasingly apparent that certain components of such programmes cannot be efficiently implemented merely through government functionaries. A considerable change in the mode of implementation has come about in the last two decades, with the increasing involvement of NGOs and other institutions of civil society. It is to be recognized that widespread debate on various public health issues has, in fact, been initiated and sustained by NGOs and other members of the civil society. Also, an increasing contribution is being made by such institutions in the delivery of different components of public health services. Certain disease control programmes require close inter-action with the beneficiaries for regular administration of drugs; periodic carrying out of pathological tests; dissemination of information regarding disease control and other general health information. NHP-2002 will address such issues and suggest policy instruments for the implementation of public health programmes through individuals and institutions of civil society.

8.1.2.18 NATIONAL DISEASE SURVEILLANCE NETWORK

The technical network available in the country for disease surveillance is extremely rudimentary and to the extent that the system exists, it extends only up to the district level. Disease statistics are not flowing through an integrated network from the decentralized public health facilities to the State/Central Government health administration. Such an arrangement only provides belated information, which, at best, serves a limited statistical purpose. The absence of an efficient disease surveillance network is a major handicap in providing a prompt and cost-effective health care system. The efficient disease surveillance network set up for Polio and HIV/AIDS has demonstrated the enormous value of such a public health instrument. Real-time information on focal outbreaks of common communicable diseases – Malaria, GE, Cholera and JE – and the seasonal trends of diseases, would enable timely intervention, resulting in the containment of the thrust of epidemics. In order to be able to use integrated disease surveillance network for operational purposes, real-time information is necessary at all levels of the health administration. The Policy would address itself to this major systemic shortcoming in the administration.

8.1.2.19 HEALTH STATISTICS

The absence of a systematic and scientific health statistics data-base is a major deficiency in the current scenario. The health statistics collected are not the product of a rigorous methodology. Statistics available from different parts of the country, in respect of major diseases, are often not obtained in a manner which make aggregation possible or meaningful.

Further, the absence of proper and systematic documentation of the various financial resources used in the health sector is another lacuna in the existing health information scenario. This makes it difficult to understand trends and levels of health spending by private and public providers of health care in the country, and, consequently, to address related policy issues and to formulate future investment policies.

NHP-2002 will address itself to the programme for putting in place a modern and scientific health statistics database as well as a system of national health accounts.

8.1.2.20 WOMEN'S HEALTH

2.20.1 Social, cultural and economic factors continue to inhibit women from gaining adequate access even to the existing public health facilities. This handicap does not merely affect women as individuals; it also has an adverse impact on the health, general well-being and development of the entire family, particularly children. This policy recognizes the catalytic role of empowered women in improving the overall health standards of the community.

8.1.2.21 MEDICAL ETHICS

Professional medical ethics in the health sector is an area which has not received much attention. Professional practices are perceived to be grossly commercial and the medical profession has lost its elevated position as a provider of basic services to fellow human beings. In the past, medical research has been conducted within the ethical guidelines notified by the Indian Council of Medical Research. The first document containing these guidelines was released in 1960, and was comprehensively revised in 2001. With the rapid developments in the approach to medical research, a periodic revision will no doubt be more frequently required in future. Also, the new frontier areas of research – involving gene manipulation, organ/human cloning and stem cell research _ impinge on visceral issues relating to the sanctity of human life and the moral dilemma of human intervention in the designing of life forms. Besides this, in the emerging areas of research, there is the uncharted risk of creating new life forms, which may irreversibly damage the environment as it exists today. NHP – 2002 recognizes that this moral and religious dilemma, which was not relevant even two years ago, now pervades mainstream health sector issues.

8.1.2.22 ENFORCEMENT OF QUALITY STANDARDS FOR FOOD AND DRUGS

There is an increasing expectation and need of the citizenry for efficient enforcement of reasonable quality standards for food and drugs. Recognizing this, the Policy will make an appropriate policy recommendation on this issue.

8.1.2.23 REGULATION OF STANDARDS IN PARA MEDICAL DISCIPLINES

It has been observed that a large number of training institutions have mushroomed, particularly in the private sector, for para medical personnel with various skills – Lab Technicians, Radio Diagnosis Technicians, Physiotherapists, etc. Currently, there is no regulation/monitoring, either of the curriculae of these institutions, or of the performance of the practitioners in these disciplines. This Policy will make recommendations to ensure the standardization of such training and the monitoring of actual performance.

8.1.2.24 ENVIRONMENTAL AND OCCUPATIONAL HEALTH

The ambient environmental conditions are a significant determinant of the health risks to which a community is exposed. Unsafe drinking water, unhygienic sanitation and air pollution significantly contribute to the burden of disease, particularly in urban settings. The initiatives in respect of these environmental factors are conventionally undertaken by the participants, whether private or public, in the other development sectors. In this backdrop, the Policy initiatives, and the efficient implementation of the linked programmes in the health sector, would succeed only to the extent that they are complemented by appropriate policies and programmes in the other environment-related sectors.

Work conditions in several sectors of employment in the country are sub-standard. As a result, workers engaged in such employment become particularly vulnerable to occupation-linked ailments. The long-term risk of chronic morbidity is particularly marked in the case of child labour. NHP-2002 will address the risk faced by this particularly vulnerable section of society.

8.1.2.25 PROVIDING MEDICAL FACILITIES TO USERS FROM OVERSEAS

The secondary and tertiary facilities available in the country are of good quality and cost-effective compared to international medical facilities. This is true not only of facilities in the allopathic disciplines, but also of those belonging to the alternative systems of medicine, particularly Ayurveda. The Policy will assess the possibilities of encouraging the development of paid treatment-packages for patients from overseas.

8.1.2.26 THE IMPACT OF GLOBALIZATION ON THE HEALTH SECTOR

There are some apprehensions about the possible adverse impact of economic globalization on the health sector. Pharmaceutical drugs and other health services have always been available in the country at extremely inexpensive prices. India has established a reputation around the globe for the innovative development of original process patents for the manufacture of a wide-range of drugs and vaccines within the ambit of the existing patent laws. With the adoption of Trade Related Intellectual Property Rights (TRIPS), and the subsequent alignment of domestic patent laws consistent with the commitments under TRIPS, there will be a significant shift in the scope of the parameters regulating the manufacture of new drugs/vaccines. Global experience has shown that the introduction of a TRIPS-consistent patent regime for drugs in a developing country results in an across-the-board increase in the cost of drugs and medical services. NHP-2002 will address itself to the future imperatives of health security in the country, in the post-TRIPS era.

8.1.2.27 INTER-SECTORAL CONTRIBUTION TO HEALTH

It is well recognized that the overall well-being of the citizenry depends on the synergistic functioning of the various sectors in the socio-economy. The health status of the citizenry would, inter alia, be dependent on adequate nutrition, safe drinking water, basic sanitation, a clean environment and primary education, especially for the girl child. The policies and the mode of functioning in these independent areas would necessarily overlap each other to contribute to the health status of the community. From the policy perspective, it is therefore imperative that the independent policies of each of these inter-connected sectors, be in tandem, and that the interface between the policies of the two connected sectors, be smooth.

Sectoral policy documents are meant to serve as a guide to action for institutions and individual participants operating in that sector. Consistent with this role, NHP-2002 limits itself to making recommendations for the participants operating within the health sector. The policy aspects relating to inter-connected sectors, which, while crucial, fall outside the domain of the

health sector, will not be covered by specific recommendations in this Policy document. Needless to say, the future attainment of the various goals set out in this policy assumes a reasonable complementary performance in these inter-connected sectors.

8.1.2.28 POPULATION GROWTH AND HEALTH STANDARDS

Efforts made over the years for improving health standards have been partially neutralized by the rapid growth of the population. It is well recognized that population stabilization measures and general health initiatives, when effectively synchronized, synergistically maximize the socio-economic well-being of the people. Government has separately announced the `National Population Policy – 2000'. The principal common features covered under the National Population Policy-2000 and NHP-2002, relate to the prevention and control of communicable diseases; giving priority to the containment of HIV/AIDS infection; the universal immunization of children against all major preventable diseases; addressing the unmet needs for basic and reproductive health services, and supplementation of infrastructure. The synchronized implementation of these two Policies – National Population Policy – 2000 and National Health Policy-2002 – will be the very cornerstone of any national structural plan to improve the health standards in the country.

8.1.2.29 ALTERNATIVE SYSTEMS OF MEDICINE

Under the overarching umbrella of the national health frame work, the alternative systems of medicine – Ayurveda, Unani, Siddha and Homoeopathy – have a substantial role. Because of inherent advantages, such as diversity, modest cost, low level of technological input and the growing popularity of natural plant-based products, these systems are attractive, particularly in the underserved, remote and tribal areas. The alternative systems will draw upon the substantial untapped potential of India as one of the eight important global centers for plant diversity in medicinal and aromatic plants. The Policy focuses on building up credibility for the alternative systems, by encouraging evidence-based research to determine their efficacy, safety and dosage, and also encourages certification and quality-marking of products to enable a wider popular acceptance of these systems of medicine. The Policy also envisages the consolidation of documentary knowledge contained in these systems to protect it against attack from foreign commercial entities by way of malafide action under patent laws in other countries. The main components of NHP-2002 apply equally to the alternative systems of medicines. However, the Policy features specific to the alternative systems of medicine will be presented as a separate document.

8.1.3. OBJECTIVES

The main objective of this policy is to achieve an acceptable standard of good health amongst the general population of the country. The approach would be to increase access to the decentralized public health system by establishing new infrastructure in deficient areas, and by upgrading the infrastructure in the existing institutions. Overriding importance would be given to ensuring a more equitable access to health services across the social and geographical expanse of the country. Emphasis will be given to increasing the aggregate public health investment through a substantially increased contribution by the Central Government. It is expected that this initiative will strengthen the capacity of the public health administration at the State level to render effective service delivery. The contribution of the private sector in providing health services would be much enhanced, particularly for the population group which can afford to pay for services. Primacy will be given to preventive and first-line curative initiatives at the primary health level through increased sectoral share of allocation. Emphasis will be laid on rational use of drugs within the allopathic system. Increased access to tried and tested systems of traditional medicine

will be ensured. Within these broad objectives, NHP-2002 will endeavor to achieve the time-bound goals mentioned in Box-IV.

Box-IV: Goals to be achieved by 2000-2015

Eradicate Polio and Yaws	2005
Eliminate Leprosy	2005
Eliminate Kala Azar	2010
Eliminate Lymphatic Filariasis	2015
Achieve Zero level growth of HIV/AIDS	2007
Reduce Mortality by 50% on account of TB, Malaria and Other Vector and Water Borne diseases	2010
Reduce Prevalence of Blindness to 0.5%	2010
Reduce IMR to 30/1000 And MMR to 100/Lakh	2010
Increase utilization of public health facilities from current Level of <20 to >75%	2010
Establish an integrated system of surveillance, National Health Accounts and Health Statistics.	2005
Increase health expenditure by Government as a % of GDP from the existing 0.9 % to 2.0%	2010
Increase share of Central grants to Constitute at least 25% of total health spending	2010
Increase State Sector Health spending from 5.5% to 7% of the budget Further increase to 8%	2005 2010

8.1.4. NHP-2002 - POLICY PRESCRIPTIONS

8.1.4.1. FINANCIAL RESOURCES

The paucity of public health investment is a stark reality. Given the extremely difficult fiscal position of the State Governments, the Central Government will have to play a key role in augmenting public health investments. Taking into account the gap in health care facilities, it is planned, under the policy to increase health sector expenditure to 6 percent of GDP, with 2 percent of GDP being contributed as public health investment, by the year 2010. The State Governments would also need to increase the commitment to the health sector. In the first phase, by 2005, they would be expected to increase the commitment of their resources to 7 percent of the Budget; and, in the second phase, by 2010, to increase it to 8 percent of the Budget. With the stepping up of the public health investment, the Central Government's contribution would rise to 25 percent from the existing 15 percent by 2010. The provisioning of higher public health

investments will also be contingent upon the increase in the absorptive capacity of the public health administration so as to utilize the funds gainfully.

8.1.4.2 EQUITY

4.2.1 To meet the objective of reducing various types of inequities and imbalances – inter-regional; across the rural – urban divide; and between economic classes – the most cost-effective method would be to increase the sectoral outlay in the primary health sector. Such outlets afford access to a vast number of individuals, and also facilitate preventive and early stage curative initiative, which are cost effective. In recognition of this public health principle, NHP-2002 sets out an increased allocation of 55 percent of the total public health investment for the primary health sector; the secondary and tertiary health sectors being targeted for 35 percent and 10 percent respectively. The Policy projects that the increased aggregate outlays for the primary health sector will be utilized for strengthening existing facilities and opening additional public health service outlets, consistent with the norms for such facilities.

8.1.4.3 DELIVERY OF NATIONAL PUBLIC HEALTH PROGRAMMES

This policy envisages a key role for the Central Government in designing national programmes with the active participation of the State Governments. Also, the Policy ensures the provisioning of financial resources, in addition to technical support, monitoring and evaluation at the national level by the Centre. However, to optimize the utilization of the public health infrastructure at the primary level, NHP-2002 envisages the gradual convergence of all health programmes under a single field administration. Vertical programmes for control of major diseases like TB, Malaria, HIV/AIDS, as also the RCH and Universal Immunization Programmes, would need to be continued till moderate levels of prevalence are reached. The integration of the programmes will bring about a desirable optimization of outcomes through a convergence of all public health inputs. The Policy also envisages that programme implementation be effected through autonomous bodies at State and district levels. The interventions of State Health Departments may be limited to the overall monitoring of the achievement of programme targets and other technical aspects. The relative distancing of the programme implementation from the State Health Departments will give the project team greater operational flexibility. Also, the presence of State Government officials, social activists, private health professionals and MLAs/MPs on the management boards of the autonomous bodies will facilitate well-informed decision-making.

The Policy also highlights the need for developing the capacity within the State Public Health administration for scientific designing of public health projects, suited to the local situation.

The Policy envisages that apart from the exclusive staff in a vertical structure for the disease control programmes, all rural health staff should be available for the entire gamut of public health activities at the decentralized level, irrespective of whether these activities relate to national programmes or other public health initiatives. It would be for the Head of the District Health administration to allocate the time of the rural health staff between the various programmes, depending on the local need. NHP-2002 recognizes that to implement such a change, not only would the public health administrators be required to change their mindset, but the rural health staff would need to be trained and reoriented.

8.1.4.4 THE STATE OF PUBLIC HEALTH INFRASTRUCTURE

As has been highlighted in the earlier part of the Policy, the decentralized Public health service outlets have become practically dysfunctional over large parts of the country. On account of resource constraints, the supply of drugs by the State Governments is grossly inadequate. The patients at the decentralized level have little use for diagnostic services, which in any case would

still require them to purchase therapeutic drugs privately. In a situation in which the patient is not getting any therapeutic drugs, there is little incentive for the potential beneficiaries to seek the advice of the medical professionals in the public health system. This results in there being no demand for medical services, so medical professionals and paramedics often absent themselves from their place of duty. It is also observed that the functioning of the public health service outlets in some States like the four Southern States – Kerala, Andhra Pradesh, Tamil Nadu and Karnataka – is relatively better, because some quantum of drugs is distributed through the primary health system network, and the patients have a stake in approaching the Public Health facilities. In this backdrop, the Policy envisages kick-starting the revival of the Primary Health System by providing some essential drugs under Central Government funding through the decentralized health system. It is expected that the provisioning of essential drugs at the public health service centres will create a demand for other professional services from the local population, which, in turn, will boost the general revival of activities in these service centres. In sum, this initiative under NHP-2002 is launched in the belief that the creation of a beneficiary interest in the public health system will ensure a more effective supervision of the public health personnel through community monitoring, than has been achieved through the regular administrative line of control.

This Policy recognizes the need for more frequent in-service training of public health medical personnel, at the level of medical officers as well as paramedics. Such training would help to update the personnel on recent advancements in science, and would also equip them for their new assignments, when they are moved from one discipline of public health administration to another.

Global experience has shown that the quality of public health services, as reflected in the attainment of improved public health indices, is closely linked to the quantum and quality of investment through public funding in the primary health sector. Box-V gives statistics which clearly show that standards of health are more a function of the accurate targeting of expenditure on the decentralized primary sector (as observed in China and Sri Lanka), than a function of the aggregate health expenditure.

Box-V: Public Health Spending in select Countries

Indicator	%Population with income of <$1 day	Infant Mortality Rate/1000	%Health Expenditure to GDP	%Public Expenditure on Health to Total Health Expenditure
India	44.2	70	5.2	17.3
China	18.5	31	2.7	24.9
Sri Lanka	6.6	16	3	45.4
UK	-	6	5.8	96.9
USA	-	7	13.7	44.1

Therefore the Policy, while committing additional aggregate financial resources, places great reliance on the strengthening of the primary health structure for the attaining of improved public health, outcomes on an equitable basis. Further, it also recognizes the practical need for levying

reasonable user-charges for certain secondary and tertiary public health care services, for those who can afford to pay.

8.1.4.5 EXTENDING PUBLIC HEALTH SERVICES

This policy envisages that, in the context of the availability and spread of allopathic graduates in their jurisdiction, State Governments would consider the need for expanding the pool of medical practitioners to include a cadre of licentiates of medical practice, as also practitioners of Indian Systems of Medicine and Homoeopathy. Simple services/procedures can be provided by such practitioners even outside their disciplines, as part of the basic primary health services in under-served areas. Also, NHP-2002 envisages that the scope of the use of paramedical manpower of allopathic disciplines, in a prescribed functional area adjunct to their current functions, would also be examined for meeting simple public health requirements. This would be on the lines of the services rendered by nurse practitioners in several developed countries. These extended areas of functioning of different categories of medical manpower can be permitted, after adequate training, and subject to the monitoring of their performance through professional councils.

NHP-2002 also recognizes the need for States to simplify the recruitment procedures and rules for contract employment in order to provide trained medical manpower in under-served areas. State Governments could also rigorously enforce a mandatory two-year rural posting before the awarding of the graduate degree. This would not only make trained medical manpower available in the underserved areas, but would offer valuable clinical experience to the graduating doctors.

8.1.4.6 ROLE OF LOCAL SELF-GOVERNMENT INSTITUTIONS

NHP-2002 lays great emphasis upon the implementation of public health programmes through local self-government institutions. The structure of the national disease control programmes will have specific components for implementation through such entities. The Policy urges all State Governments to consider decentralizing the implementation of the programmes to such Institutions by 2005. In order to achieve this, financial incentives, over and above the resources normatively allocated for disease control programmes, will be provided by the Central Government.

8.1.4.7 NORMS FOR HEALTH CARE PERSONNEL

Minimal statutory norms for the deployment of doctors and nurses in medical institutions need to be introduced urgently under the provisions of the Indian Medical Council Act and Indian Nursing Council Act, respectively. These norms can be progressively reviewed and made more stringent as the medical institutions improve their capacity for meeting better normative standards.

8.1.4.8 EDUCATION OF HEALTH CARE PROFESSIONALS

In order to ameliorate the problems being faced on account of the uneven spread of medical and dental colleges in various parts of the country, this policy envisages the setting up of a Medical Grants Commission for funding new Government Medical and Dental Colleges in different parts of the country. Also, it is envisaged that the Medical Grants Commission will fund the upgradation of the infrastructure of the existing Government Medical and Dental Colleges of the country, so as to ensure an improved standard of medical education.

To enable fresh graduates to contribute effectively to the providing of primary health services as the physician of first contact, this policy identifies a significant need to modify the existing curriculum. A need-based, skill-oriented syllabus, with a more significant component of practical training, would make fresh doctors useful immediately after graduation. The Policy also recommends a periodic skill-updating of working health professionals through a system of continuing medical education.

The Policy emphasizes the need to expose medical students, through the undergraduate syllabus, to the emerging concerns for geriatric disorders, as also to the cutting edge disciplines of contemporary medical research. The policy also envisages that the creation of additional seats for post-graduate courses should reflect the need for more manpower in the deficient specialties.

8.1.4.9 NEED FOR SPECIALISTS IN 'PUBLIC HEALTH' & 'FAMILY MEDICINE'

4.9.1 In order to alleviate the acute shortage of medical personnel with specialization in the disciplines of 'public health' and 'family medicine', the Policy envisages the progressive implementation of mandatory norms to raise the proportion of postgraduate seats in these discipline in medical training institutions, to reach a stage wherein ¼ th of the seats are earmarked for these disciplines. It is envisaged that in the sanctioning of post-graduate seats in future, it shall be insisted upon that a certain reasonable number of seats be allocated to `public health' and `family medicine'. Since the `public health' discipline has an interface with many other developmental sectors, specialization in Public health may be encouraged not only for medical doctors, but also for non-medical graduates from the allied fields of public health engineering, microbiology and other natural sciences.

8.1.4.10 NURSING PERSONNEL

In the interest of patient care, the policy emphasizes the need for an improvement in the ratio of nurses' vis-à-vis doctors/beds. In order to discharge their responsibility as model providers of health services, the public health delivery centres need to make a beginning by increasing the number of nursing personnel. The Policy anticipates that with the increasing aspiration for improved health care amongst the citizens, private health facilities will also improve their ratio of nursing personnel vis-à-vis doctors/beds.

The Policy lays emphasis on improving the skill -level of nurses, and on increasing the ratio of degree- holding nurses vis-à-vis diploma-holding nurses. NHP-2002 recognizes a need for the Central Government to subsidize the setting up, and the running of, training facilities for nurses on a decentralized basis. Also, the Policy recognizes the need for establishing training courses for super-specialty nurses required for tertiary care institutions.

8.1.4.11 USE OF GENERIC DRUGS AND VACCINES

This Policy emphasizes the need for basing treatment regimens, in both the public and private domain, on a limited number of essential drugs of a generic nature. This is a pre-requisite for cost-effective public health care. In the public health system, this would be enforced by prohibiting the use of proprietary drugs, except in special circumstances. The list of essential drugs would no doubt have to be reviewed periodically. To encourage the use of only essential drugs in the private sector, the imposition of fiscal disincentives would be resorted to. The production and sale of irrational combinations of drugs would be prohibited through the drug standards statute.

The National Programme for Universal Immunization against Preventable Diseases requires to be assured of an uninterrupted supply of vaccines at an affordable price. To minimize

the danger arising from the volatility of the global market, and thereby to ensure long-term national health security, NHP-2002 envisages that not less than 50% of the requirement of vaccines/sera is sourced from public sector institutions.

8.1.4.12 URBAN HEALTH

4.12.1.1 NHP-2002 envisages the setting up of an organized urban primary health care structure. Since the physical features of urban settings are different from those in rural areas, the policy envisages the adoption of appropriate population norms for the urban public health infrastructure. The structure conceived under NHP-2002 is a two-tiered one: the primary centre is seen as the first-tier, covering a population of one lakh, with a dispensary providing an OPD facility and essential drugs, to enable access to all the national health programmes; and a second-tier of the urban health organization at the level of the Government general hospital, where reference is made from the primary centre. The Policy envisages that the funding for the urban primary health system will be jointly borne by the local self-government institutions and State and Central Governments.

The Policy also envisages the establishment of fully-equipped 'hub-spoke' trauma care networks in large urban agglomerations to reduce accident mortality.

8.1.4.13 MENTAL HEALTH

. NHP – 2002 envisages a network of decentralized mental health services for ameliorating the more common categories of disorders. The programme outline for such a disease would involve the diagnosis of common disorders, and the prescription of common therapeutic drugs, by general duty medical staff.

In regard to mental health institutions for in-door treatment of patients, the Policy envisages the upgrading of the physical infrastructure of such institutions at Central Government expense so as to secure the human rights of this vulnerable segment of society.

8.1.4.14 INFORMATION, EDUCATION AND COMMUNICATION

NHP-2002 envisages an IEC policy, which maximizes the dissemination of information to those population groups which cannot be effectively approached by using only the mass media. The focus would therefore be on the inter-personal communication of information and on folk and other traditional media to bring about behavioral change. The IEC programme would set specific targets for the association of PRIs/NGOs/Trusts in such activities. In several public health programmes, where behavioral change is an essential component, the success of the initiatives is crucially dependent on dispelling myths and misconceptions pertaining to religious and ethical issues. The community leaders, particularly religious leaders, are effective in imparting knowledge which facilitates such behavioral change. The programme will also have the component of an annual evaluation of the performance of the non-Governmental agencies to monitor the impact of the programmes on the targeted groups. The Central/State Government initiative will also focus on the development of modules for information dissemination in such population groups, who do not normally benefit from the more common media forms.

NHP-2002 envisages giving priority to school health programmes which aim at preventive-health education, providing regular health check-ups, and promotion of health-seeking behavior among children. The school health programmes can gainfully adopt specially designed modules in order to disseminate information relating to 'health' and 'family life'. This is expected to be the most cost-effective intervention as it improves the level of awareness, not only of the extended family, but the future generation as well.

8.1.4.15 HEALTH RESEARCH

This Policy envisages an increase in Government-funded health research to a level of 1 percent of the total health spending by 2005; and thereafter, up to 2 percent by 2010. Domestic medical research would be focused on new therapeutic drugs and vaccines for tropical diseases, such as TB and Malaria, as also on the sub-types of HIV/AIDS prevalent in the country. Research programmes taken up by the Government in these priority areas would be conducted in a mission mode. Emphasis would also be laid on time-bound applied research for developing operational applications. This would ensure the cost-effective dissemination of existing / future therapeutic drugs/vaccines in the general population. Private entrepreneurship will be encouraged in the field of medical research for new molecules / vaccines, inter alia, through fiscal incentives.

8.1.4.16 ROLE OF THE PRIVATE SECTOR

In principle, this Policy welcomes the participation of the private sector in all areas of health activities – primary, secondary or tertiary. However, looking to past experience of the private sector, it can reasonably be expected that its contribution would be substantial in the urban primary sector and the tertiary sector, and moderate in the secondary sector. This Policy envisages the enactment of suitable legislation for regulating minimum infrastructure and quality standards in clinical establishments/medical institutions by 2003. Also, statutory guidelines for the conduct of clinical practice and delivery of medical services are targeted to be developed over the same period. With the acquiring of experience in the setting and enforcing of minimum quality standards, the Policy envisages graduation to a scheme of quality accreditation of clinical establishments/medical institutions, for the information of the citizenry. The regulatory/accreditation mechanisms will no doubt also cover public health institutions. The Policy also encourages the setting up of private insurance instruments for increasing the scope of the coverage of the secondary and tertiary sector under private health insurance packages.

In the context of the very large number of poor in the country, it would be difficult to conceive of an exclusive Government mechanism to provide health services to this category. It has sometimes been felt that a social health insurance scheme, funded by the Government, and with service delivery through the private sector, would be the appropriate solution. The administrative and financial implications of such an initiative are still unknown. As a first step, this policy envisages the introduction of a pilot scheme in a limited number of representative districts, to determine the administrative features of such an arrangement, as also the requirement of resources for it. The results obtained from these pilot projects would provide material on which future public health policy can be based.

NHP-2002 envisages the co-option of the non-governmental practitioners in the national disease control programmes so as to ensure that standard treatment protocols are followed in their day-to-day practice.

This Policy recognizes the immense potential of information technology applications in the area of tele-medicine in the tertiary health care sector. The use of this technical aid will greatly enhance the capacity for the professionals to pool their clinical experience.

8.1.4.17 THE ROLE OF CIVIL SOCIETY

NHP-2002 recognizes the significant contribution made by NGOs and other institutions of the civil society in making available health services to the community. In order to utilize their high motivational skills on an increasing scale, this Policy envisages that the disease control programmes should earmark not less than 10% of the budget in respect of identified programme components, to be exclusively implemented through these institutions. The policy also

emphasizes the need to simplify procedures for government – civil society interfacing in order to enhance the involvement of civil society in public health programmes. In principle, the state would encourage the handing over of public health service outlets at any level for management by NGOs and other institutions of civil society, on an 'as-is-where-is' basis, along with the normative funds earmarked for such institutions.

8.1.4.18 NATIONAL DISEASE SURVEILLANCE NETWORK

This Policy envisages the full operationalization of an integrated disease control network from the lowest rung of public health administration to the Central Government, by 2005. The programme for setting up this network will include components relating to the installation of data-base handling hardware; IT inter-connectivity between different tiers of the network; and in-house training for data collection and interpretation for undertaking timely and effective response. This public health surveillance network will also encompass information from private health care institutions and practitioners. It is expected that real-time information from outside the government system will greatly strengthen the capacity of the public health system to counter focal outbreaks of seasonal diseases.

8.1.4.19 HEALTH STATISTICS

The Policy envisages the completion of baseline estimates for the incidence of the common diseases – TB, Malaria, and Blindness – by 2005. The Policy proposes that statistical methods be put in place to enable the periodic updating of these baseline estimates through representative sampling, under an appropriate statistical methodology. The policy also recognizes the need to establish, in a longer time-frame, baseline estimates for non-communicable diseases, like CVD, Cancer, Diabetes; and accidental injuries, and communicable diseases, like Hepatitis and JE. NHP-2002 envisages that, with access to such reliable data on the incidence of various diseases, the public health system would move closer to the objective of evidence-based policy-making.

Planning for the health sector requires a robust information system, inter-alia, covering data on service facilities available in the private sector. NHP-2002 emphasizes the need for the early completion of an accurate data-base of this kind.

In an attempt at consolidating the data base and graduating from a mere estimation of the annual health expenditure, NHP-2002 emphasizes the need to establish national health accounts, conforming to the `source-to-users' matrix structure. Also, the policy envisages the estimation of health costs on a continuing basis. Improved and comprehensive information through national health accounts and accounting systems would pave the way for decision-makers to focus on relative priorities, keeping in view the limited financial resources in the health sector.

8.1.4.20 WOMEN'S HEALTH

NHP-2002 envisages the identification of specific programmes targeted at women's health. The Policy notes that women, along with other under-privileged groups, are significantly handicapped due to a disproportionately low access to health care. The various Policy recommendations of NHP-2002, in regard to the expansion of primary health sector infrastructure, will facilitate the increased access of women to basic health care. The Policy commits the highest priority of the Central Government to the funding of the identified programmes relating to woman's health. Also, the policy recognizes the need to review the staffing norms of the public health administration to meet the specific requirements of women in a more comprehensive manner.

8.1.4.21 MEDICAL ETHICS

NHP – 2002 envisages that, in order to ensure that the common patient is not subjected to irrational or profit-driven medical regimens, a contemporary code of ethics are notified and rigorously implemented by the Medical Council of India.

By and large, medical research within the country in the frontier disciplines, such as gene-manipulation and stem cell research, is limited. However, the policy recognizes that a vigilant watch will have to be kept so that the existing guidelines and statutory provisions are constantly reviewed and updated.

8.1.4.22 ENFORCEMENT OF QUALITY STANDARDS FOR FOOD AND DRUGS

NHP – 2002 envisages that the food and drug administration will be progressively strengthened, in terms of both laboratory facilities and technical expertise. Also, the policy envisages that the standards of food items will be progressively tightened up at a pace which will permit domestic food handling / manufacturing facilities to undertake the necessary upgradation of technology so that they are not shut out of this production sector. The Policy envisages that ultimately food standards will be close, if not equivalent, to Codex specifications; and that drug standards will be at par with the most rigorous ones adopted elsewhere.

8.1.4.23 REGULATION OF STANDARDS IN PARAMEDICAL DISCIPLINES

NHP-2002 recognizes the need for the establishment of statutory professional councils for paramedical disciplines to register practitioners, maintain standards of training, and monitor performance.

8.1.4.24 ENVIRONMENTAL AND OCCUPATIONAL HEALTH

This Policy envisages that the independently -stated policies and programmes of the environment -related sectors be smoothly interfaced with the policies and the programmes of the health sector, in order to reduce the health risk to the citizens and the consequential disease burden.

NHP-2002 envisages the periodic screening of the health conditions of the workers, particularly for high- risk health disorders associated with their occupation.

8.1.4.25 PROVIDING MEDICAL FACILITIES TO USERS FROM OVERSEAS

To capitalize on the comparative cost advantage enjoyed by domestic health facilities in the secondary and tertiary sectors, NHP-2002 strongly encourages the providing of such health services on a payment basis to service seekers from overseas. The providers of such services to patients from overseas will be encouraged by extending to their earnings in foreign exchange, all fiscal incentives, including the status of "deemed exports", which are available to other exporters of goods and services.

8.1.4.26 IMPACT OF GLOBALISATION ON THE HEALTH SECTOR

The Policy takes into account the serious apprehension, expressed by several health experts, of the possible threat to health security in the post-TRIPS era, as a result of a sharp increase in the prices of drugs and vaccines. To protect the citizens of the country from such a threat, this policy envisages a national patent regime for the future, which, while being consistent with TRIPS, avails of all opportunities to secure for the country, under its patent laws, affordable access to the latest medical and other therapeutic discoveries. The policy also sets out that the Government will bring to bear its full influence in all international foray – UN, WHO, WTO, etc. – to secure commitments on the part of the Nations of the Globe, to lighten the restrictive features of TRIPS in its application to the health care sector.

8.2. CONCLUSION

The crafting of a National Health Policy is a rare occasion in public affairs when it would be legitimate, indeed valuable, to allow our dreams to mingle with our understanding of ground realities. Based purely on the clinical facts defining the current status of the health sector, we would have arrived at a certain policy formulation; but, buoyed by our dreams, we have ventured slightly beyond that in the shape of NHP-2002, which, in fact, defines a vision for the future.

The health needs of the country are enormous and the financial resources and managerial capacity available to meet them, even on the most optimistic projections, fall somewhat short. In this situation, NHP-2002 has had to make hard choices between various priorities and operational options. NHP-2002 does not claim to be a road-map for meeting all the health needs of the populace of the country. Further, it has to be recognized that such health needs are also dynamic, as threats in the area of public health keep changing over time. The Policy, while being holistic, undertakes the necessary risk of recommending differing emphasis on different policy components. Broadly speaking, NHP – 2002 focuses on the need for enhanced funding and an organizational restructuring of the national public health initiatives in order to facilitate more equitable access to the health facilities. Also, the Policy is focused on those diseases which are principally contributing to the disease burden – TB, Malaria and Blindness from the category of historical diseases; and HIV/AIDS from the category of 'newly emerging diseases'. This is not to say that other items contributing to the disease burden of the country will be ignored; but only that the resources, as also the principal focus of the public health administration, will recognize certain relative priorities. It is unnecessary to labour the point that under the umbrella of the macro-policy prescriptions in this document, governments and private sector programme planners will have to design separate schemes, tailor-made to the health needs of women, children, geriatrics, tribals and other socio-economically under-served sections. An adequately robust disaster management plan has to be in place to effectively cope with situations arising from natural and man-made calamities.

One nagging imperative, which has influenced every aspect of this Policy, is the need to ensure that 'equity' in the health sector stands as an independent goal. In any future evaluation of its success or failure, NHP-2002 would wish to be measured against this equity norm, rather than any other aggregated financial norm for the health sector. Consistent with the primacy given to 'equity', a marked emphasis has been provided in the policy for expanding and improving the primary health facilities, including the new concept of the provisioning of essential drugs through Central funding. The Policy also commits the Central Government to an increased under-writing of the resources for meeting the minimum health needs of the people. Thus, the Policy attempts to provide guidance for prioritizing expenditure, thereby facilitating rational resource allocation.

This Policy broadly envisages a greater contribution from the Central Budget for the delivery of Public Health services at the State level. Adequate appropriations, steadily rising over the years, would need to be ensured. The possibility of ensuring this by imposing an earmarked health cess has been carefully examined. While it is recognized that the annual budget must accommodate the increasing resource needs of the social sectors, particularly in the health sector, this Policy does not specifically recommend an earmarked health cess, as that would have a tendency of reducing the space available to Parliament in making appropriations looking to the circumstances prevailing from time to time.

The Policy highlights the expected roles of different participating groups in the health sector. Further, it recognizes the fact that, despite all that may be guaranteed by the Central

Government for assisting public health programmes, public health services would actually need to be delivered by the State administration, NGOs and other institutions of civil society. The attainment of improved health levels would be significantly dependent on population stabilization, as also on complementary efforts from other areas of the social sectors – like improved drinking water supply, basic sanitation, minimum nutrition, etc. - to ensure that the exposure of the populace to health risks is minimized.

Any expectation of a significant improvement in the quality of health services, and the consequential improved health status of the citizenry, would depend not only on increased financial and material inputs, but also on a more empathetic and committed attitude in the service providers, whether in the private or public sectors. In some measure, this optimistic policy document is based on the understanding that the citizenry is increasingly demanding more by way of quality in health services, and the health delivery system, particularly in the public sector, is being pressed to respond. In this backdrop, it needs to be recognized that any policy in the social sector is critically dependent on the service providers treating their responsibility not as a commercial activity, but as a service, albeit a paid one. In the area of public health, an improved standard of governance is a prerequisite for the success of any health policy.

8.3 KEY TERMS

1. National Health Policy: The NHP is a general exposition of the policies which required recommendation in the circumstances prevailing in the health sector

8.4 SELF CHECK

1. Discuss the basic reason of scribing a NHP?
2. Explain various components of NHP?
3. With your awareness, discuss how far these objectives have been realized?
4. Do you see any amendments required?
5. Discuss the impact of globalization on Indian Health care?

INTRODUCTION

In this unit we will be studying four lessons.

In the first lesson (lesson – 9), the concept of epidemiology is discussed. The scope and importance of epidemiology along with the aim, various uses of epidemiology were also given due importance. The epidemiological principles and some important epidemiological statistics also took place in the discussion. Subsequently epidemiological triad, natural history of disease, risk approach and epidemiological measurement were discussed.

In the second lesson (lesson – 10) the discussion on two broad types of communicable diseases was provided. The various types of respiratory infections, and intestinal infections were discussed comprehensively, with a view of providing the information to you in glance.

LESSON - 9

EPIDEMIOLOGY OF COMMUNICABLE DISEASES

PART I

STRUCTURE

9.0 OBJECTIVES

Studying this lesson should enable you understanding the

- Purpose of studying cause and effect in epidemiology to prevent and control disease
- The way of various epidemiological statistics helping in enhancing your knowledge
- Some important concepts and principles of epidemiology

9.1 INTRODUCTION

Understanding the epidemiology is very important. The scope and importance will tell us about the wide usage of epidemiological principles. While discussing some important epidemiological statistics, the discussion below has also included in understanding epidemiological triad, natural history of disease, risk approach and epidemiological measurement. Discussion on the types of communicable and non-communicable diseases is followed in future lessons.

9.2 EPIDEMIOLOGY –AN OVERVIEW

Epidemiology is the science and practice which describes and explains disease patterns in populations, and points this knowledge to use to improve health. The central paradigm of epidemiology is that patterns of disease in populations may be analyzed systematically to provide understanding of the causes and control of disease. Epidemiology seeks out the differences and similarities in the disease patterns of populations to gain new knowledge. Valid measurement of

the frequency of disease and factors which may influence disease, and are therefore potential explanations of the observed patterns, is crucial to the epidemiological goal.

9.2.1 DEFINITION

The origin of the word epidemiology is unknown but it is derived from the Greek words meaning study upon populations (epi = upon, demos = people, ology = study). Epidemiology (pathos is the Greek word for suffering and disease) would be more accurate but clumsy. Epidemic was used by Hippocrates. Last's dictionary gives a detailed definition of epidemiology that includes these words "The study of the distribution and determinants of health-related states or events in specified populations, and the application of this study to control of health problems".

9.2.2 USES OF EPIDEMIOLOGY

Currently epidemiology is seen as useful in:

- Yielding understanding of what causes or sustains disease in populations.
- Preventing and controlling disease in populations.
- Guiding health and health care policy and planning.
- Assisting in the management and care of health and disease in individuals.

9.2.3 SCOPE OF EPIDEMIOLOGY

Epidemiology is particularly relevant to medicine rather than laboratory science, but the increasing collaboration between geneticists and epidemiologists is changing the balance. It is concerned with disease in populations. Humans live in societies, where behavior and attitudes are shaped by interaction among people, which in turn are governed by the conventions and laws.

Epidemiology is therefore not only a bio-science but also a social science. Populations exist in a physical environment which is a dominant force in determining health. The study of life in relation to the environment is ecology, so epidemiology is, in addition, the science of the ecology of disease. The science of epidemiology, therefore, combines elements of biology, social sciences & ecology, and a bio-social-environmental science focusing on disease in populations.

9.2.4 IMPORTANCE OF EPIDEMIOLOGY

Most of the important measures adopted by society have its roots in the study of the epidemiology of the disease. For e.g.: the risk factors for heart disease were studied in a landmark study the Framingham heart study. Thus we know today that obesity, smoking, high cholesterol is all important in the prevention of heart attacks. Many such examples can be given.

9.2.5 AIMS OF EPIDEMIOLOGY

- To describe the distribution and magnitude of health and disease problems in human populations.
- To identify risk factors for diseases.
- To provide the data essential to the planning, implementation and evaluation of services for the prevention, control and treatment of disease.

The ultimate goal of epidemiology is to promote the health and well being of society as a whole. In clinical medicine, the physician is concerned with disease in the individual patient, whereas the epidemiologist is concerned with disease patterns in the entire population.

9.3 USE OF STATISTICS IN EPIDEMIOLOGY

A number of statistics are used in epidemiology. We shall outline some of the important ones. These statistics deal with a number of factors.

1. Measurement of mortality, morbidity, disability.
2. Measurement of medical needs, health care facilities, utilization of health services and other health related events.
3. Measurement of the presence, absence or distribution of the environmental and other factors suspected of causing the disease.
4. Measurement of the demographic variables. Examples include infant mortality rate, maternal mortality rate etc.

SOME OF STATISTICS

Incidence

Incidence rate is defined as "the number of NEW cases occurring in a defined population during a specified period of time"

Prevalence

The term "disease prevalence" refers specifically to all current cases (old and new) existing at a given point in time, or over a period of time in a given population.

Infection

It is the entry and development or multiplication of an infectious agent in the body of man and animals.

Contamination

The presence of an infectious agent on a body surface; also on or in clothes, beddings, toys, surgical instruments or dressings, or other inanimate articles or substances including water, milk and food.

Infestation

For persons or animals the lodgment, development and reproduction of arthropods on the surface of the body or in the clothing, e.g. lice, itch mite.

Infectious Disease

It is a clinically manifest disease, of men or animals, resulting from an infection.

Contagious Disease

It is a disease that is transmitted through contact. Examples include scabies, trachoma, STD and leprosy.

Communicable Diseases

An illness due to a specific infectious agent or its toxic products capable of being directly or indirectly transmitted from man to man, animal to animal or from the environment through air, dust, soil, water, food etc.

Epidemic

It is the unusual occurrence in a community or region of disease, specific health-related behavior clearly in excess of "expected occurrence." It applies to infectious diseases as well as the "slow modern epidemics" such as heart disease cancer etc.

Endemic

It refers the constant presence of a disease or infectious agent within a given geographic area or population group, without importation from outside. For e.g. in some areas malaria has a constant presence called endemic malaria.

Zoonosis

It is an infection or infectious disease transmissible under natural conditions from vertebrate animals to man e.g. rabies, plague, and bovine tuberculosis.

Nosocomial infection

Nosocomial (hospital acquired) infection is an infection originating in a patient while in a hospital or other health care facility. It includes infections acquired in the hospital but appearing after discharge and also such infections which affects the working staff.

Opportunistic infection

This is infection by an organism(s) that takes the opportunity provided by a defect in host defense to infect the host and hence cause disease. It is commonly seen in people whose immunity is compromised such as people who are on steroids.

Latrogenic Disease

Any untoward or adverse consequence of a preventive, diagnostic or therapeutic regimen or procedure, that causes impairment, handicap, disability or death resulting from a physician's professional activity or from the professional activity of other health professionals.

9.4 CONCEPTS & PRINCIPLES

The following are few important epidemiological concepts and principles.

9.4.1 Epidemiological Triad

The occurrence of disease is determined by the combination of agent and secondary factors. This is nothing but the Theory of Multiple Causation. The etiological agent thus would be related by those causal factors to the host and to the environment in which both host and agent exist.

The epidemiological triad will be formed then with the interaction between these three factors, i.e., agent, host and environment. The dominant factor role played by the agent leads to disease. If the lead role is of host, it would not.

9.4.2 Natural History of Disease

A natural course of disease contains a pre-pathogenic phase, which facilitates an interaction between the agent, host and the environment. This phase involves starting of incubation process which leads to clinical manifestation with occurrence of symptoms and signs, development of disease advancement including complications, disabilities. The resultant could be either recovery or death.

9.4.3 Prevention/Intervention

Different levels of prevention/intervention can be applied depending upon the stage in the natural history of disease. They can be

- Pre-pathogenic Phase: First level prevention includes promoting health and specific protection.
- Pathogenic Phase:
    - Second level prevention includes early diagnosis and prompt treatment
    - Tertiary prevention includes disability limitation and rehabilitation.

9.4.4 Risk Approach

For an effective and efficient utilization of resources, risk approach in health care is being used as an appropriate management tool. In this approach, the risk factors which predispose, persons to higher chances of suffering from undesirable outcomes of disease or death are assumed to be known.

Also, all those individuals can be grouped based on the degree of risk as high, moderate and low categories. This would facilitate a specialised care provision to those who need them by directing the allocation of limited resources particularly for this purpose. An epidemiological study is an essential prerequisite to ascertain the risk factors.

9.4.5 Epidemiological Measurement

The relative frequency of the event in a population against the frequency of the same event in another population stands as a comparison helps in concluding the epidemiology. This is necessary because the appropriate allocation of resources is made based on this evaluation. The other basic tools available for measuring the epidemiology are

- Proportions
- Rates
- Ratios

More over, the disease frequency measurement used in epidemiology can be categorized into

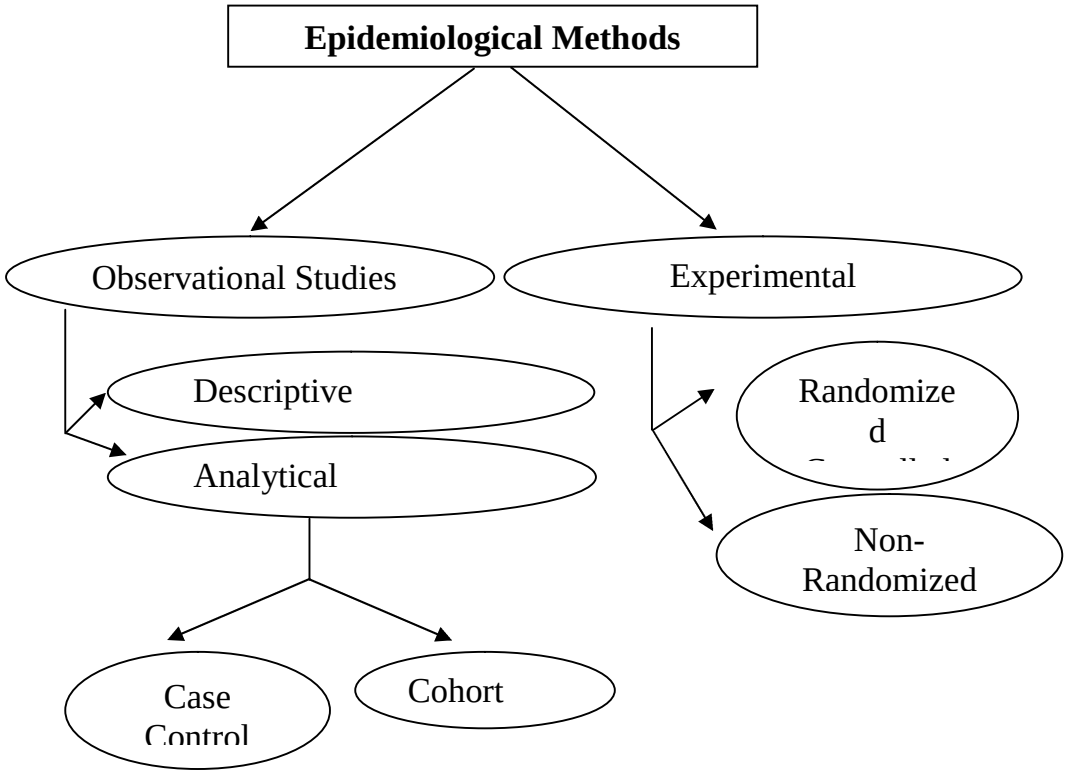
1. Prevalence

   It can be calculated with the ratio of number of existing cases for a disease to total population at a given point of time.

2. Incidence

   It is the ratio of number of new cases of a disease during a given period of time to the total population at risk.

EPIDEMIOLOGICAL METHODS



Descriptive study is confined to the description of the occurrence of a disease in a population. Usually this is the first phase of an epidemiological investigation. Studies here deal with observation about the distribution of disease or health-related characteristics inhuman populations and identifying the characteristics with which the disease in question seems to be associated.

The procedure starts with clear definition of the population to be studied, leading to clear definition of the disease under study. Then subsequently the study requires concentrating on description of disease with respect to time, place and person. This allows the measurement of disease using cross-sectional studies or longitudinal studies. The outcome facilitates the formulation of an aetiological hypothesis.

Whereas the analytical epidemiological study attempts to analyze the relationship between the health status and other variables, thus moves ahead of the descriptive studies. The case control study also called as retrospective study, involves two populations, both cases and controls. Basically these are comparison studies. Cases and controls must be comparable with respect to known confounding factors such as occupation, age, social status, gender etc.

Cohort study is another variation of analytical epidemiology, usually attempts to obtain additional evidence to refute or support the existence of an association between suspected cause and disease. The cohorts are identifies prior to the appearance of the disease under investigation. After defining the study groups, they will be observed over some time period, to determine the frequency of disease among such groups. Subsequently, the study moves further to project the cause to effect.

Experimental or Intervention Epidemiology concentrates on changing a certain disease determinant or the progress of a disease. But here one can find the involvement of some extra

constrains, since the health of the people in the study group may be at stake. To provide the scientific proof of aetiological or risk factors which would permit the modification or control of those diseases and also to come out with a method of measuring the effectiveness and efficiency of health services for the prevention, control and treatment of disease and improve the health of the community are the two major aims of the experimental epidemiological studies. Randomized controlled trials and non-randomized controlled trials are the two important methods of conducting the experimental studies.

Epidemiology can be studied about communicable diseases like,

1. Respiratory Infections
2. Intestinal Infections
3. Arthropod-borne Infections
4. Zoonoses
5. Surface Infections etc.

And about non-communicable diseases like,

1. Coronary heart diseases
2. Hypertension
3. Cancer
4. Diabetes
5. Obesity
6. Blindness etc.

9.5 CONCLUSION

This lesson provided us scope to learn about the basics of epidemiology. We have learnt the meaning, definition, various uses, scope, importance and also the aims of epidemiology. The interpretation of some epidemiological statistics also should increase your awareness level. At the end, some of the epidemiological principles and concepts have been discussed and they should have added further value to your learning. In the next lesson, some of the important communicable diseases and non-communicable diseases will be discussed.

9.6 KEY TERMS

1. Epidemiology: Epidemiology is the science and practice which describes and explains disease patterns in populations, and points this knowledge to use to improve health. The central paradigm of epidemiology is that patterns of disease in populations may be analyzed systematically to provide understanding of the causes and control of disease. Epidemiology seeks out the differences and similarities in the disease patterns of populations to gain new knowledge.
2. Epidemiological Triad: The epidemiological triad will be formed with the interaction between three factors, i.e., agent, host and environment.
3. Epidemiological Measurement: The relative frequency of the event in a population against the frequency of the same event in another population stands as a comparison helps in concluding the epidemiology.

9.7 SELF CHECK

1. What is Epidemiology? Discuss its scope and uses in the current situation.
2. Discuss some important statistics of Epidemiology.
3. Explain the significance of Epidemiological Triad?
4. What is Risk Approach?
5. Explain the significance of Epidemiological Measurement?

LESSON - 10

EPIDEMIOLOGY OF COMMUNICABLE DISEASES – PART II

STRUCTURE

10.0 OBJECTIVES

At the end of study of this lesson, you should understand

- Various types of communicable diseases (only two types are covered in this lesson)
- Some important concepts in each type of respiratory and intestinal infections

10.1 INTRODUCTION

Respiratory infections and Intestinal infections are only two types of communicable diseases. Understanding the symptoms / clinical features will facilitate clear diagnosis and will help appropriate treatment. For each of the both categories, Introduction of that infection, various Epidemiological Determinants (Agent Factors, Host Factors and Environmental Factors), Mode of Transmission, Clinical Features, Control / Prevention Measures have been discussed in this lesson.

10.2 RESPIRATORY INFECTIONS

SMALLPOX

An acute infectious disease caused by variola virus, and clinically characterized by sudden onset of fever, headache, backache, vomiting and sometimes convulsions, especially in children. On the third day of fever, a typical rash appears which is centrifugal in distribution and passes through successive stages of macule, papule, vesicle, pustule and scab with subsequent scarring.

Smallpox was once a major killer throughout the world. As late as 1967, it was endemic in no less than thirty three countries. A vast international campaign by WHO between 1967 and 1979 led to the eradication of smallpox. The last indigenous case in India occurred on 17th May 1975 in Bihar. On 24th May 1975, India's last known case of smallpox, an importation from Bangladesh occurred. On 5th July 1975, India was proclaimed to be no longer a smallpox-endemic country. Finally in April 1977, India was declared smallpox-free by an International Commission for Assessment of Smallpox Eradication.

Epidemiological basis of Smallpox Eradication

The following are the epidemiological factors which have led to the eradication of smallpox. These could form the basis for the eradication of other similar diseases.

1. No known animal reservoir
2. No long term carrier of the virus
3. Life long immunity, after recovery from the disease
4. The detection of cases comparatively simple because the rash was so characteristic and occurred in visible parts of the body.
5. Persons with subclinical infection did not transmit the disease
6. Vaccine highly effective; easily administered, heat stable and confers long term protection.
7. International cooperation.

Smallpox Eradication Surveillance

2004 marked the thirty fifth anniversary of the smallpox free status in India. Despite the absence of smallpox, surveillance of rumors continues in order to sustain public confidence in the eradication of the disease. However, the smallpox virus has not been completely destroyed. Stocks are still held at government research centres in the Russian Federation and at the United States. A resolution from WHO's Executive board to the World Health Assembly in May 1996 recommended that the stocks be destroyed in 1999.

After the global eradication of smallpox, two potential sources of poxvirus infection of humans still remain. They are

- Accidental infection with laboratory associated stocks and
- Infection with animal poxviruses

The different kinds of poxviruses so far observed in different parts of the world are as listed under. The other types are yet to be identified.

1. Monkeypox
2. Cowpox
3. Camelpox
4. Tanapox
5. Tateropox

CHICKENPOX

Chickenpox or Varicella is an acute, highly infectious disease caused by Varicella-Zoster (V-Z) virus. It is characterized by vesicular rash that may be accompanied by fever and malaise. It is world wide in distribution and occurs in both epidemic and endemic forms. Chickenpox and herpes zoster are now regarded as different host responses to the same aetiological agent.

Mode of Transmission

It is transmitted from person to person by droplet infection and by droplet nuclei. Most patients are infected by face-to-face contact. The portal of entry of the virus is the respiratory tract. Since the virus is extremely labile, it is unlikely that fomites play a significant role in its transmission. The virus can cross the placental barrier and infect the foetus, a condition known as congenital Varicella.

Clinical Features

The clinical spectrum of chickenpox may vary from a mild illness with only a few scattered lesions to a severe febrile illness with widespread rash. Unapparent infection is estimated to

occur in no more than 5% of susceptible children. In the majority of cases, the disease tends to be mild and typical. The clinical course of chickenpox may be divided into two stages, as follows.

1) **Pre-Eruptive Stage:**

   Onset is sudden with meld or moderate fever, pain in the back, shivering and malaise. This stage is very brief, lasting about 24 hours. In adults, the prodromal illness is usually more severe and may last for 2-3 days before the rash comes out.

2) **Eruptive Stage:**

   In children the rash is often the first sign. It comes on the day the fever starts. The distinctive features of the rash are

   i. **Centripetal Distribution:** The rash is symmetrical. It first appears on the trunk where it is abundant, and then comes on the face, arms and legs where it is less abundant. Mucosal surfaces like buccal, pharyngeal etc are generally involved. Axilla may be affected, but palms and soles are not usually affected. The density of the eruption diminishes centrifugally.
   ii. **Rapid Evolution:** The rash advances quickly through the stages of macule, papule, vesicle and scab. In fact, the first to attract attention are often the vesicles filled with clear fluid and looking like “dew-drops” on the skin they are superficial in site, with easily ruptured walls and surrounded by an area of inflammation. Usually they are not umbilicated. The vesicles may form crusts without going through the pustular stage. May of the lesions may abort. Scabbing begins 4 to7 days after the rash appears.
   iii. **Pleomorphism:** A characteristic feature of the rash in chickenpox is its Pleomorphism, that is, all stages of the rash (pupules, vesicles and crusts) may be seen simultaneously at one time, in the same area. This is due to the rash appearing in successive crops for 4 to 5 days in the same area.
   iv. **Fever:** The fever does not run high but shows exacerbations with each fresh crop of eruption.

Control

There is no specific treatment for chickenpox. The usual control measures are notifications, isolation of cases for about 6 days after onset or rash and disinfection of articles soiled by nose and throat discharges.

Prevention

1. VZIG (Varicella Zoster Immunoglobulin)

   Varicella Zoster Immunoglobulin (VZIG) given within 72 hours of exposure has been recommended for prevention. A dose of 1.25 to 5 ml given intramuscularly will modify or prevent the disease. The curre3nt recommendation is that it should be rev\served for immuno-suppressed contacts of acute cases or newborn contacts. It has also been shown to provide some improvement in high risk children with Varicella.

2. Vaccine

   A live attenuated vaccine (OKA strain) developed by Takashasi in Japan has been extensively studied in field trials. Sero conversion, after vaccination, in health sero negative children is over 90 percent. The vaccine has proved safe and effective in

preventing the disease. However, opinion is divided bout the need for a vaccine against chickenpox. Some consider that since chickenpox is a relatively mild illness, there is little need for a vaccine. Further, it may be disastrous if chickenpox is postponed from childhood, when it is mild, to adulthood when it is more severe.

Differences between Chickenpox and Smallpox

		CHICKENPOX		**SMALLPOX**
1		Incubation: About 15 days (range: 7-21 days)		About 12 days (range: 7-17 days)
2		Prodromal symptoms: Usually mild		Severe
3		Distribution of rash:		
	a.	Centripetal	a.	Centrifugal
	b.	Seldom affected	b.	Palms and soles frequently involved
	c.	Axilla affected	c.	Axilla usually free
	d.	Rash mostly on flexor surfaces	d.	Rash predominant on extensor surfaces and bony prominences
4		Characteristics of the rash:		
	a.	Superficial	a.	Deep-seated
	b.	Unilocular; dew-drop like appearance	b.	Vesicles multilocular and umbilicated
	c.	Rash pleomorphic, i.e. different stages of the rash evident at one given time, because rash appears in successive crops	c.	Only one stage of rash may be seen at one time
	d.	An area of inflammation is seen around the vesicles	d.	No area of inflammation is seen around the vesicles
5		Evolution of rash:		
	a.	Evolution of rash very rapid	a.	Evolution of rash is slow, deliberate and majestic, passing through definite stages of macule, papule, vesicle and pustule.
	b.	Scabs begin to form 4-7 days after the rash appears	b.	Scabs begin to form 10-14 days after the rash appears
6		Fever: Temperature rises with each fresh crop of rash		Fever subsides with the appearance of rash, but may rise again in the pustular stage (secondary rise of fever)

MEASLES (Rubeola)

An acute highly infectious disease of childhood caused by a specific virus of the group myxoviruses. It is clinically characterized by fever and catarrhal symptoms of the upper respiratory tract (coryza, cough), followed by a typical rash. Measles is associated with high morbidity and mortality in developing countries.

The word “rubeola” means red spots. The earlier description of measles was given by the noted Arab physician, Abu Bacr (865-925 AD) known to the West as Rhazes. In 1954, measles virus was isolated by Enders and his colleagues in USA. In 1958, measles vaccine was first used in a clinical trial and in 1963, live measles vaccine was licensed for use.

Measles is endemic virtually in all parts of the world. It tends to occur in epidemics when the proportion of susceptible children reaches about 40 %. When the disease is introduced into a virgin community more than 90 % of that community will be infected.

The mortality of measles varies greatly in different parts of the world. It is 100 to 400 times more likely to cause death in a preschool child of a developing county that it is in the USA and Europe. In develop0ing countries, case fatality rates range from 2 to 15 percent as compared to less than 0.2 per 10,000 notifies cases in developed countries. Before the vaccine became available in the 1960s, measles killed between 7 to8 million children a year and caused an estimated 135 million cases a year worldwide. Today, it still killed about 1 million children of the estimated 42 million who get measles. Thus measles is still a leading killer among vaccine-preventable diseases of childhood, taking its toll mainly among malnourished children whose natural defenses have been weakened by other infections, and who live in crowded urban localities.

Epidemiological Determinants

Agent factors

1. Agent: Measles is caused by an RNA paramyxovirus. So far as is known, there is only one serotype. The virus cannot survive outside the human body for any length of time, but retains infectivity when stored at sub-zero temperature. The virus has been grown in cell cultures.
2. Source of Infection: The only source of infection is a case of measles. Carriers are not known to occur. There is some evidence to suggest that subclinical measles occurs more often than previously thought.
3. Infective Material: Secretions of the nose, throat and respiratory tract of a case of measles during the prodromal period and the early stages of the rash.
4. Communicability: Measles is highly infectious during the prodromal period and at the time of eruption communicability declines rapidly after the appearance of the rash. The period of communicability is approximately 4 days before and 5 days after the appearance of the rash. Isolation of patient for a week from the onset or rash more than covers the period of communicability.
5. Secondary Attack Rate: This is over 80 % among susceptible household contacts.

Host Factors

1. Age: Affects virtually every one in infancy. Between 6 months to 3 years in developing countries and usually over 5 years in developed countries. After the vaccination program, now it has shifted to little older age groups like 10 years.
2. Sex: Equal incidence in both categories.
3. Immunity: No age is immune if there was no previous immunity.
4. Nutrition: Measles tends to be very severe in the malnourished child, carrying mortality up to 400 times higher than in well nourished children having measles.

Environmental Factors

In temperate climates, measles is a winter disease, probably because people crowd together indoors. Epidemics of measles are common in India during winter and early spring. Population density and movement do affect epidemicity.

Mode of Transmission

Occurs directly from person to person mainly by droplet infection and droplet nuclei, from 4 days before onset of rash until 5 days thereafter. The portal of entry is the respiratory tract.

Infection through conjunctiva is also considered likely as the virus instilled into the conjunctiva can cause infection. Recipients of measles vaccine are not contagious to others.

Clinical Features

1. **Prodromal Stage:** it begins 10 days after infection, and lasts until day 14. it is characterized by fever, coryza with sneezing and nasal discharge, cough, redness of the eyes, lacrimation and often photophobia. There may be vomiting or diarrhoea. A day or two before the appearances of the rash Koplik's spots appear on the buccal mucosa opposite the first and second upper molars. They are small; bluish-white spots on a red base, smaller that the heat of a pin. Their presence is pathognomonic of measles.
2. **Eruptive Stage:** This phase is characterized by a typical, dusky-red, macular or maculo-papular rash which begins behind the ears and spreads rapidly in a few hours over the face and neck and extends down the body taking 2 to3 days to progress to the lower extremities. The rash may remain discrete, but often it becomes confluent and blotchy. In the absence of complications, the lesions and fever disappear in another 3 to 4 days signaling the end of the disease. The rash fades in the same order of appearance leaving a brownish discoloration which may persist for 2 months or more.
3. **Post Measles Stage:** The child will have lost weight and will remain weak for a number of days. There may be failure to recover and a gradual deterioration into chronic illness, due to increases susceptibility to other bacterial and viral infections, nutritional and metabolic effects and the tissue destructive effects of the virus. There may be growth retardation and diarrhoea, cancrum oris, pyogenic infections, candidosis, reactivation of pulmonary tuberculosis etc.

Measles Prevention

The following guidelines are important in combating measles.

a. achieving an immunization rate of over 95 %, and
b. on-going immunization against measles through successive generations of children.

1. Measles Vaccination

   Measles is best prevented by active immunization. Only live attenuated vaccines are recommended for use; they are both safe and effective. Following are the check points during this.

   i. Vaccine
   ii. Age
   iii. Administration
   iv. Reactions
   v. Immunity
   vi. Contacts
   vii. Contraindications
   viii. Adverse effects of vaccine
   ix. Combined vaccine

2. Immunoglobulin

   Measles may be prevented by administration of immunoglobulin (human) early in the incubation period. The dose recommended by WHO is 0.25 ml per kg of body weight. It should be given within 3-4 days of exposure. The person passively immunized should be given live measles vaccine 8-12

weeks later. The need for immunoglobulin is now much reduced because of the availability of an effective live attenuated vaccine.

RUBELLA (German Measles)

Rubella or German Measles is an acute childhood infection, usually mild, of short duration (approximately 3 days) and accompanied by low grade fever, lymphadenopathy and a maculo-papular rash. Infection in early pregnancy may result in serious congenital defects, including death of the fetus. The disease is world-wide in distribution and tends to occur in epidemics, in non-immunized population, every 6 to 8 years.

Rubella was considered a mild and benign disease until 1941 when Norman Gregg, an ophthalmologist reported an epidemic of congenital cataracts, associated with other congenital defects in children born to mothers who had rubella during their pregnancies. This discovery changed the concept that rubella is not merely a benign disease of childhood but also one with teratogenic potential. In 1962, the virus was isolated; in 1967, an attenuated vaccine was developed.

Congenital Rubella Syndrome (CRS) refers to infants born with defects secondary to intrauterine infection or who manifest symptoms or signs of intrauterine infection sometime after birth. Congenital infection is considered to have occurred if the infant has IgM rubella antibodies shortly after birth or if IgG antibodies persist for more than 6 months, by which time maternally derived antibodies would have disappeared. Congenital rubella is a chronic infection while acquired rubella is an acute infection.

Epidemiological Determinants

Agent Factors

1. Agent: Rubella is caused by an RNA virus of the toga virus family. Only one antigenic type of the virus seems to exist. The virus has been recovered from the naso-pharynx, throat, blood, CSF and urine. It can be propagated in cell culture.
2. Source of Infection: Clinical or Subclinical cases of rubella. A large number of rubella infections are, in fact, subclinical. This represents one of the major differences between measles and rubella. There is no known carrier state for postnatally acquired rubella. Infants born with congenital rubella may shed the virus for may months. The vaccine virus is not communicable.
3. Period of Communicability: Rubella is much less communicable than measles probably because of the absence coughing in rubella. It is difficult to state the exact period of infectivity. It probably extends from a week before symptoms to about a week after rash appears. Infectivity is greatest when the rash is erupting.

Host Factors

1. Age: Mainly a disease of childhood particularly in the age group of 3 to 10 years.
2. Immunity: One attack results in life long immunity; second attacks are rare. Studies in India indicate that approximately 40 % of women of child bearing age are susceptible to rubella.

Mode of Transmission

The virus is transmitted directly from person to person by droplets from nose and throat, and droplet nuclei (aerosols), from one week before onset or rash to one week after it has faded, via respiratory route. By chain transmission, this virus can cross the placenta (vertical transmission) and infect the foetus in utero, leading to congenital rubella in the newborn.

Clinical Features

1. **Stage of Prodromal:** The prodromal symptoms (coryza, sore throat, low grade fever) herald the onset of viraemia. They are generally mild and insignificant, and less frequent in children.
2. **Lymphadenopathy Stage:** In susceptible individuals, the enlargement of the post auricular and posterior cervical lympth nodes appears as early as 7 days before the appearance of the rash. The glands may be found enlarged for 10 to 14 days after the rash.
3. **Rashes Stage:** The rash is often the first indication of the disease in children. It appears first on the face, usually within 24 hours of the onset of prodromal symptoms. It is a minute, discrete, pinkish, macular rash and not confluent as the rash of measles. Conjunctivitis may occur. The rash spreads rapidly to the trunk and extremities, by which time it is often no longest apparent on the face. The rash spreads much faster and clears more rapidly than the rash of measles. It disappears altogether by the third day. The rash is an inconstant feature of the disease; it is absent in subclinical cases. The incidence of rubella infection without rash may be up to 25 %.
4. **Complications:** In rare instances arthralgia may occur in several joints in adults, especially young women. Encephalitis is very rare. Thrombocytopenic purpura has also been observed as a complication.

Prevention

Active immunization against rubella is now possible with live attenuated vaccines. Since the isolation of the virus in 1962, several live attenuated vaccines have been developed. In 1979, the RA 27/3 vaccine, produced in human diploid fibro-blast has replaced all the other vaccines. This is because RA 27/3 vaccine induces higher antibody titers and produces an immune response more closely paralleling natural infection than the other vaccines. It is administered in a single dose of 0.5 ml subcutaneously.

Infants under one year should not be vaccinated due to possible interference from persisting rubella antibody. Pregnancy is considered a contraindication to rubella immunization. The recipients of the vaccine should be advised not to become pregnant over the next 3 months.

MUMPS

An acute infectious disease caused by a specific virus which has a predilection for glandular and nervous tissues. Clinically, the disease is recognized by non-suppurative enlargement and tenderness of one or both the parotid glands. Other organs may also be involved. Constitutional symptoms vary, or may be unapparent. The disease occurs throughout the world. Although morbidity rate tends to be high, mortality rate is negligible.

Agent Factors

1. Agent: The causative agent, Myxovirus parotiditis is a RNA virus of the myxovirus family. The virus can be grown readily in chick embryo or tissue culture. There is only one serotype.
2. Source of Infection: Both clinical and subclinical cases. Subclinical cases which account for 30-40 percent of all cases appear to be responsible for maintaining the cycle of infection. The virus can be isolated from the saliva or from swabs taken from the surface of stenson's duct. Virus has also been found in the blood, urine, human milk and on occasion in the CSF.
3. Period of Communicability: Usually 4-6 days before the onset of symptoms and a week or more thereafter. The period of maximum infectivity is just before and at the onset of

parotitis. Once the swelling of the glands has subsided, the case may be regarded as no longer infectious.

4. Secondary Attack Rate: Estimated to be about 86 percent.

Host Factors

1. Age and Sex: Mumps is the most frequent cause of parotitis in children in the age group of 5-15 years. The average age of incidence of mumps is higher than with measles, chickenpox or whooping cough. The disease tends to be more severe in adults than in children.
2. Immunity: One attack, clinical or subclinical is assumed to induce life long immunity. Second attacks can occur, but their rate is unknown. Most infants below the age of 6 months are immune because of maternal antibodies.

Environmental Factors

Mumps is largely an endemic disease. Cases occur throughout the year, but the peak incidence is in winter and spring. Epidemics are often associated with overcrowding.

Mode of Transmission

The disease is spread mainly by droplet infection and after direct contact with an infected person.

Clinical Features

Mumps is a generalized virus infection. In 30-40 percent of cases mumps infection is clinically no apparent. In clinically apparent cases, it is characterized by pain and swelling in either on or both the parotid glands but may also involve the sublingual and submandibular glands. Often the child complains of ear ache on the affected side prior to the onset of swelling. There may be pain and stiffness on opening the mouth before the selling of the gland is evident. Mumps may also affect the testes, pancreas, CNS, ovaries, prostate, etc. In severe cases, there may be fever, headache and other constitutional symptoms which may last from 3-5 days. The selling subsides slowly over 1-2 weeks.

Complications may be frequent but may not be serious. These include orchitis, ovaritis, pancreatitis, meningo-encephalitis and myocarditis. Bilateral orchitis is rare and the assumption that mumps orchitis may lead to sterility is ill founded. While some instances of diabetes have occurred in children following mumps infection, a causal relationship has yet tot be demonstrated. Rarer complications include nerve deafness, polyarthritis and hydrocephalus.

Prevention

1. Vaccination

   A highly effective live attenuated vaccine is now available for the prevention of mumps. A single dose of 0.5 ml intramuscularly produces detectable antibodies in 95 percent of vaccines. The duration of long term immunity is not known. The vaccine is also available as combined vaccine, viz. combined measles-mumps-rubella vaccine / rubella mumps vaccine. It should not be administered to pregnant women, patients receiving immunosuppressive therapy or those who are severely ill.

2. Immunoglobulin

   A specific immunoglobulin (Mlg) is available, but its protective effect has not been established, as antibody studies have not been carried out on recipients.

INFLUENZA

Influenza is an acute respiratory tract infection caused by influenza virus, of which there are 3 types – A, B and C. all known pandemics were b\caused by influenza A strains. The disease is characterized by sudden onset of chills, malaise, fever, muscular pains and cough. It occurs in all countries and affects millions of people. Outbreaks of influenza A occur virtually every year. Recent pandemics occurred in 1957-58 owing to influenza A ($H_2N_{2)}$ and in 1968 owing to influenza A (H_3N_2). Outbreaks of influenza B also occur annually with epidemics occurring at intervals of 4-7 years. Influenza due to type C virus sporadically as small outbreaks.

The unique features of influenza epidemics are the suddenness with which they arise, and the speed and ease with which they spread. The short incubation period, large number of subclinical cases, high proportion of susceptible population, short duration of immunity, and absence of cross immunity all contribute to its rapid spread.

Agent Factors

1. Agent: Influenza viruses are classified within the family orthomyxoviridae. There are three viral subtypes, namely influenza type A, type B, and type C. these three viruses are antigenically distinct. There is no cross immunity between them. Both influenza A and B viruses have two distinct surface antigens – the haemagglutinin (H) and the neuraminidase (N) antigens. The H antigen initiates infection following attachment of the virus to susceptible cells. The N antigen is responsible for the release of the virus form the infected cell.

   Influenza A is frequently subjected to antigenic variation, both major and minor. When there is a sudden completed or major change, it is called a shift, and when the antigenic change is gradual over a period of time, it is called a drift.
2. Reservoir of Infection: It has become increasingly evident that a major reservoir of influenza virus exists in animals and birds like swine, horses, dogs, cats, domestic poultry, wild birds etc. Some of these include the major H and N antigens related to human strains. It is hypothesized. There is increasing evidence that the animal reservoirs provide new strains of influenza virus by recombination between the influenza viruses of man, animals and birds.
3. Source of Infection: Usually a case or subclinical case. During epidemics, a large number of mild and asymptomatic infections occur, which play an important role in the spread of infection. The secretions of the respiratory tract are infective.
4. Period of Infectivity: Virus is present in the nasopharynx from 1 to 2days after onset of symptoms.

Host Factors

1. Age and Sex: Influenza affects all ages and both sexes. In general, the attack rate is lower among adults. The highest morality rate during an epidemic occurs among certain high risk groups in the population such as old people of over 65 years and children under 18 months, and persons with diabetes or chronic heart disease, kidney and respiratory ailments.

2. Immunity: Antibodies are important in immunity against influenza. Antibody to H neutralizes the virus; antibody to N modifies the infection. Secretory antibodies develop in the respiratory tract after infection and consist predominantly of IgG. Antibodies appear in about 7 days after an attack and reach a maximum level in about 2 weeks. After 8 to 12 months, the antibody level drops to pre infection levels.

Environmental Factors

The seasonal incidence is striking, epidemics usually occurring in winter months and rainy season. In India, epidemics have often occurred in summer. Over crowding enhances transmission.

Mode of Transmission

Influenza is spread mainly from person to person by droplet infection or droplet nuclei created by sneezing, coughing or talking. The portal of entry of the virus is the respiratory tract.

Clinical Features

The virus enters the respiratory tract and causes inflammation and necrosis of superficial epithelium of the tracheal and bronchial mucosa, followed by secondary bacterial invasion. There is no viraemia. Both the viruses cause much the same symptoms – fever, chills, aches and pains, coughing and generalized weakness. Fever lasts from 1-5 days, averaging 3 days in adults. The most dreaded complication is pneumonia, which should be suspected if fever persists beyond 4-5 days or recurs abruptly after convalescence.

Prevention

All attempts to control influenza epidemics have so far met with little success and the prospects of achieving control remain poor. Killed Vaccines (grown in the allantoic cavity of developing chick embryos, harvested, purified, killed by formalin or beta propiolactone, and standardized according to the haemagglutinin content. A single inoculation of 0.5 ml is given). Live Attenuated Vaccines based on temperature sensitive mutants have been extensively used in European countries. They may be administered as nose drops into the respiratory tract. Newer Vaccines like Split Virus Vaccine, Neuraminidase Specific Vaccine and Recombinant Vaccine are also used.

DIPHTHERIA

Diphtheria is an acute infectious disease caused by toxigenic strains of corynebacterium diphtheriae. Three major clinical types have been described; anterior nasal, facial and laryngeal. However, the skin, conjunctiva, vulva and other parts of the body may be affected.

The bacilli multiply locally, usually in the throat, and elaborate a powerful exotoxin which is responsible for the formation of a grayish or yellowish membrane (false membrane) commonly over the tonsils, phyarynx or larynx or at the site of implantation, with well defined edges and the membrane cannot be wiped away. Apart to that, marked congestion, oedema or local tissue destruction, enlargement of the regional lympth nodes and signs and symptoms of toxaemia may also exist.

Fatality rate on the average is about 10 % which ahs changed little in the past 50 years in untreated cases, and about 5 % in treated cases. It is a rare disease in most developed countries owing to routine children vaccination. The following table tells about the statistics in England and Wales.

Year	1920	1930	1940	1950	1960	1970	1980
Cases	69481	74043	46281	692	49	22	5
Deaths	5648	3497	2480	40	5	3	0

In India diphtheria is an endemic disease. The available retrospective data indicate a declining trend of diphtheria in the I.D. hospitals of Mumbai, Chennai, New Delhi and Bangalore. This may be due to increasing coverage of the child population by immunization.

Agent Factors

1. Agent: The causative agent, C diphtheriae is a gram positive, non motile organism it has no invasive power, but produces a powerful exotoxin. Three types of diphtheria bacilli are differentiated – gravis, mitis, and intermedius, all pathogenic to man. In general, gravis infections tend to be more severe than mitis infections. Not all the strains of the organism are toxigenic. There is evidence that a non toxigenic strain may become toxigenic when exposed to a particular bacteriophage – the beta phage – carrying the gene fro toxin production. The toxin can affect the heart leading to myocarditis or the nerves leading to paralysis. Diphtheria bacilli are sensitive to penicillin and are readily killed by heat and chemical agents. The may survive for short periods in dust and somites.
2. Source of Infection: The source of infection may be a case or carrier. Cases range from subclinical to frank clinical cases. Mild or silent infections may exhibit no more than a mere running nose or sore throat. These cases play a more important role than frank cases in spreading the infection. Carriers are common sources of infection; their ratio is estimated to be 95 carriers for 5 clinical cases. Carriers may be temporarily chronic. Immunization does not prevent the carrier state. The incidence of carriers in a community may vary from 0.1% to 5 %.
3. Infective Material: Nasopharyngeal secretions, discharges from skin lesions, contaminated fomites and possibly infected dust.
4. Period of Infectivity: Unless treated, the period of infectivity may vary from 14 – 28 days from the onset of the disease, but carriers may remain infective for much longer periods. A case or carrier may be considered no communicable, when at least two cultures properly obtained from nose and throat, 24 hours apart, are negative for diphtheria bacilli.

Host Factors

1. Age and Sex: Diphtheria particularly affects children aged 1 to 5 years of both sexes. In countries where widespread immunization is practiced, a shift in age incidence has been observed from preschool to school age.
2. Immunity: Infants born of immune mothers are relatively immune during the first few weeks or months of life. Schick test surveys in India have shown that about 70 % of children over the age of 3 years and 99 % over the age of 5 years are already immune to diphtheria.

Environmental Factors

Cases of diphtheria occur in all seasons, although winter months favour its spread. In Kolkata, the highest incidence was reported in August; in Mumbai, in winter months: and in New Delhi, during August to October.

Mode of Transmission

The disease is spread mainly by droplet infection. It can also be transmitted directly to susceptible persons from infected cutaneous lesions. Transmission by objects like cups, thermometers, toys, pencils etc. contaminated by the nasopharyngeal secretions of the patient is possible, but for only short periods.

Clinical Features

Respiratory tract forms of diphtheria consist of pharyngotonsillar, laryngotracheal, nasal, and combinations thereof. Patients with pharynogotonsillar diphtheria usually have a sore throat, difficulty in swallowing, and low grade fever at presentation. Examination of the throat may show only mild erythema, localized exudate, or a membrane. The membrane may be localized or a

patch of the posterior pharynx or tonsil may cover the entire tonsil, or, less frequently, may spread to cover the soft and hard palates and the posterior portion of the pharynx. In the early stage of a membrane may be whitish and may wipe off easily, the membrane may extend to become thick, blue white to grey black, and adherent. Attempts to remove the membrane result in bleeding. A minimal area of mucosal erythema surrounds the membrane. Patients with severe disease may have marked oedema of the submandibular area and the anterior portion of the neck, along with lymphadenopathy, giving a characteristic bullnecked appearance.

Laryngotracheal diphtheria most often is preceded by pharyngotonsillar disease usually is associated with hoarseness and croupy cough at presentation, and, if the infection extends into bronchial tree, is the most severe form of disease. Initially it may be clinically indistinguishable from viral croup or epiglottis. Nasal diphtheria, the mildest form of respiratory diphtheria, usually is localized to the septum or turbinates of one side of the nose. Occasionally a membrane may extend into the pharynx. Non-respiratory mucosal surface i.e. the conjunctivae and genitals may also be sites of infection.

Cutaneous diphtheria is common in tropical areas. It often appears as a secondary infection of a previous skin abrasion or infection. The presenting lesion, often an ulcer, may be surrounded by erythema and covered with a membrane. Patients generally seek treatment because of the chronicity of the skin lesion.

Control of Diphtheria

Early detection of cases and carriers must be started. All cases, suspected cases and carriers should be promptly isolated, preferably in a hospital, for atleast 14 days or until proved free of infection. When diphtheria is suspected, diphtheria antitoxin should be given without delay, IM or IV, in doses ranging from 10000 to 80000 units or more depending upon the severity of the case, after a preliminary test dose of 0.2 ml subcutaneously to detect sensitization to horse serum.

In addition to antitoxin, every case should be treated with penicillin of 205 lakh units every 6 hours or erythromycin of 250 mg every 6 hours, for 5-6 days to clear the throat of C diphtheriae and thereby decrease toxin production. The carriers should be treated with 10 day course of oral erythromycin, which is the most effective drug for the treatment of carriers.

Combined or Mixed Vaccines like DPT (diphtheria-pertussis-tetanus vaccine), DT (diphtheria-tetanus toxoid), dT (diphtheria-tetanus, adult type), Single Vaccines like FT (formal-toxoid), APT (alum-precipitated toxoid), PTAP (purified toxoid aluminium phosphate), PTAH (purified toxoid aluminium hydroxide), TAF (toxoid-antitoxin floccules) and Antisera like Diphtheria anti-toxin may be used for the effective administration depending upon the situation.

WHOOPING COUGH (Pertussis)

An acute infectious disease, usually of young children, caused by B. pertussis. It is clinically characterized by an insidious onset with mild fever and an irritating cough, gradually becoming paroxysmal with the characteristic “whoop” (loud crowing inspiration). The spectrum of disease varies from severe illness to atypical and mild illness without whoop. The Chinese call it a “Hundred Day Cough”.

Whooping cough occurs in all countries but most deaths are in countries of Africa, Asia, and Central and Latin America. Since the beginning of this century, there has been a marked and continuous drop in deaths from whooping cough. Whooping cough occurs endemically and epidemically. In tropical countries, it rivals measles in importance and severity among children.

Agent Factors

1. Agent: The causative agent in a large proportion of cases is B. pertussis. In a small percentage of cases i.e. less than 5 %, B. parapertussis is probably responsible. Certain viruses (e.g., adenoviruses, para-influenza viruses) are also implicated in the whooping cough syndrome, but their presence in cases of whooping cough is probably coincidental and not causal.

   B. pertussis occurs in smooth and rough phases, capsulated and no capsulated forms, and elaborated\s an exotoxin and endotoxin. Clinical disease is associated with encapsulated, phase 1 strains. B. pertussis is antigenically highly complex. It carriers 3 major agglutinogens – 1, 2 and3 and several minor ones. The nature of the protective antigen is not known.
2. Source of Infection: B. Pertussis infects only man. The source of infection is a case of pertussis. More often, the source may be mild, missed and unrecognized cases. There is no evidence that infection is ever subclinical. A chronic carrier state does not exist.
3. Infective Material: The bacilli occur abundantly in the nasopharyngeal and bronchial secretions, which are infective. Objects freshly contaminated by such discharges are also infective.
4. Infective Period: Whooping cough is most infectious during catarrhal stage. The infective period may be considered to extend from a week after exposure to about 3 weeks after the onset of the paroxysmal stage. The disease is unlikely to be infectious before the child has developed catarrhal symptoms.
5. Secondary Attack Rate: Averages 90 % in unimmunized household contacts.

Host Factors

1. Age and Sex: Whooping cough is primarily a disease of infants and preschool children. The highest incidence is found below the age of 5 years. Infants below 6 months have the highest mortality. Incidence and fatality are observed to be more among female than male children.
2. Immunity: Recovery from whooping cough or adequate immunization is followed by immunity. Second attacks may occur in persons with declining immunity, but these are usually mild. Infants are susceptible to infection from birth because maternal antibody does not appear to give them protection. There is no cross immunity with B. parapertussis.

Environmental Factors

Pertussis occurs throughout the year, but the disease shows a seasonal trend with more cases occurring during winter and spring months, due to overcrowding. Socioeconomics conditions and ways of life also play a role in the epidemiology of the disease.

Mode of Transmission

Whooping cough is spread mainly by droplet infection and direct contact. Each time the patient coughs, sneezes or talks, the bacilli are sprayed into the air. Most children contract infection from their playmates that are in the early stages of the disease. Freshly contaminated fomites also have a role.

Clinical Features

B. pertussis produces a local infection; the organism is not invasive. It multiplies on the surface epithelium of the respiratory tract and causes inflammation and necrosis of the mucosa leading to secondary bacterial invasion. Catarrhal Stage lasting for about 10 days, Paroxysmal

Stage lasting about 2 – 4 weeks and Convalescent Stage lasting for 1-2 weeks. The illness generally lasts 6 to 8 weeks.

The chief complications of pertussis are bronchitis; bronchopneumonia and bronchiectasis. The violence of the paroxysms may precipitate subconjunctival haemorrhages, epistaxis, and haemoptysis and punctuate cerebral haemorrhages which may cause convulsions and coma.

Control of Whooping Cough

Early diagnosis, isolation and treatment of cases and disinfection of discharges form nose and throat are the general principles of control of whooping cough. Although several antibiotics are effective against B. pertussis, erythromycin is probably the drug of choice. A dose of 30-50 mg/kg of body weight in 4 divided doses for 10 days has been recommended. Possible alternatives are ampicillin, septran or tetracycline. Antibiotics are useful in controlling the secondary bacterial infections.

Those known to have been in tact with whooping cough may be given prophylactic antibiotic (erythromycin or ampicillin) treatment for 10 days to prevent the infecting bacteria to become established. The best protection that can be given to an infant is to administer a booster dose of DPT/DT to his siblings before he is born. Immunization including DPT, Pertussis Vaccine is available for effective control of whooping cough,

MENINGOCOCCAL MENINGITIS

Meningococcal meningitis or cerebro-spinal fever is an acute communicable disease caused by N. meningitidis. It usually begins with intense headache, vomiting and stiff neck and progresses to comma within a few hours. The meningitis is part of a septicaemic process. The fatality of typical untreated cases is about 80%. With early diagnosis and treatment, case fatality rates have declined to less than 10 percent. Distribution worldwide, occurring sporadically and in small outbreaks in most parts of the world.

The zone lying between 5 and 15 degree N of the equator in tropical Africa is called the “meningitic belt” because of the frequent epidemic waves that have been occurring in that region. During recent years, several serious outbreaks affecting numerous counties occurred, not only in the so called meningitic belt in Africa but also in both tropical and temperate zones of other continents, viz. America, Asia and Europe.

Without epidemics, 1 million cases of bacterial meningitis are estimated to occur with at least 2,00,000 deaths. About 3,00,000 of these cases and 30,000 deaths are due to meningococcal meningitis.

Agent Factors

1. Agent: The causative agent, N. meningitidis is gram-negative diplococci. Several serotypes have been identified; viz. groups A, B, C, D, X, Y, 29E, W135 etc. Groups A and C, and to a lesser extent group B meningococcal are capable of causing major epidemics. The incidence of infections by groups Y and W135 strains are increasing in some countries. N. meningitidis is a delicate organism. It dies rapidly on exposure to heat and cold.
2. Source of Infection: The organism is found in the nasopharynx of cases and carriers. Clinical cases present only a negligible source of infection. 5 to 30 % of the normal population may harbour the organism in the nasopharynx during inter-epidemic periods. Carriers are the most important source of infection. During epidemics, the carrier rate may go up to 70-80 percent.

3. Period of Communicability: Until meningococci are no longer present in discharges from nose and throat. Cases rapidly lose their infectiousness within 24 hours of specific treatment.

Host Factors

1. Age and Sex: This is predominantly a disease of children and young adults of both sexes.
2. Immunity: all ages are susceptible. Immunity is acquired by mostly subclinical infection, clinical disease or vaccination. Infants derive passive immunity from the mother.

Environmental Factors

The seasonal variation of the disease is well established. Outbreaks occur more frequently in the dry and cold months of the year. Incidence is also greater in the low socioeconomic groups living under poor housing conditions and overcrowding also.

Mode of Transmission

The disease spreads mainly by droplet infection. The portal of entry is the nasopharynx.

Prevention and Control

Treatment with antibiotics can save the cases of 95% of patients provided that it is started during the first 2 days of illness. Penicillin is the drug of choice. In penicillin-allergic patients, chloramphenicol should be substituted. Isolation of cases is of limited usefulness in controlling epidemics because the carriers outnumber cases. In case of carriers, treatment with penicillin does not eradicate their state; more powerful antibiotics such as rifampicin are needed to eradicate the carrier state.

Close contacts of persons with confirmed meningococcal disease are at an increase risk of developing meningococcal illness (about 1000 times the general population). Nearly on-third of secondary cases occur in the first 4 days. Chemoprophylaxis has been suggested for close contacts with early institution of rifampicin (the drug of choice unless the organism is know to be sensitive to sulfadiazine) 600 mg twice a day for 2 days for adults. Dosage of sulfadiazine for adults is 1 gm twice a day for 2 days. Appropriate immunization and environmental measures are additive.

ACUTE RESPIRATORY INFECTIONS

Infections of the respiratory tract are perhaps the most common human ailment. While they are a source of discomfort, disability and loss of time for most adults, they are a substantial cause of morbidity and mortality in young children and the elderly. Many of these infections run their natural course in older children and in adults without specific treatment and without complications. However, in young infants, shall children and in the elderly, or in persons with impaired respiratory tract reserves, it increases the morbidity and mortality rates.

Acute respiratory infections (ARI) may cause inflammation of the respiratory tract anywhere from nose to alveoli, with wide range of combination of symptoms and signs. SRI is often classified by clinical syndrome depending on the site of infection and is referred to as ARI of Upper (AURI) or Lower (ALRI) respiratory tract. The upper respiratory tract infections include common cold, pharyngitis and otitis media. The lower respiratory tract infections include epiglottitis, laryngitis, laryngotracheitis, bronchitis, bronchiolitis and pneumonia.

The clinical features include running nose, cough, sore throat, difficult breathing and ear problem. Fever is also common in acute respiratory infections. Most children with these infections

have only mild infection, such as cold or cough. However some children may have pneumonia which is a major cause of death. In less developed countries, measles and whooping cough are important causes of severe respiratory tract infection.

Agent Factors

The microbial agents that cause acute respiratory infections are numerous and include bacteria and viruses. Even within species they can show a wide diversity of antigenic type. The bacteria involved can all be isolated with varying frequency from carriers, and cause illness in only minority of infected persons. Their most serious effects are usually found in persons whose resistance is already impaired by general debility resulting from malnutrition, chronic systemic disease, chronic lower respiratory tract disease, or a concomitant primary infection such as influenza. Bacterial usually cause epiglottises. Epiglottis, croup, bronchiolitis and pneumonia may be severe and cause death though respiratory failure.

The viruses that have been found in association with acute respiratory disease are numerous. Rhinoviruses are most closely related with colds, parainfluenza virus with croup, respiratory syncytial virus and parainfluenza virus with pneumonia.

Host Factors

Small children can succumb to the disease within a matter of days and case fatality rates are higher in young infants and malnourished children. Age specific mortality rates show wide differences between counties. The size of the discrepancies in mortality rates between countries is much great in infants that in elderly. Upper respiratory tract infections, e.g. common cold and pharyngitis are several times higher in children than in adults. Rates for pharyngitis and otitis media increase from infancy to a peak at the age of 5 years. Illness rates are highest in young children and decrease with the increasing age, except in the third decade of life when young adults are exposed to infection by their own young children. Adult women experience more illness than men. Under 3 years of age, boys are affected more often and more severely.

Mode of Transmission

All the causative organisms are normally transmitted by the air-born route. As most viruses do no survive for long outside the respiratory tract, the chain of transmission is maintained by direct person to person contact.

Control of Acute Respiratory Infections

The high mortality and morbidity rates attributable to acute respiratory infections have long been a matter of serious concern in all countries. The recommendations by WHO for the management of acute respiratory infections in children and the practical guidelines for outpatient care are listed as under.

- Clinical Assessment: Assessing a child means obtaining information about a child's illness by asking the mother questions, and looking at and listening to the child. Careful assessment of a child can help to prevent death from pneumonia and other diseases.
- Physical Examination:
    1. Count the breaths in one minute
    2. Look for chest in-drawing
    3. Look and listen for Stridor
    4. Look for Wheeze
    5. See if the child is abnormally sleepy or difficult to wake
    6. Feel for fever or low body temperature

7. Check for severe Malnutrition
8. Cyanosis is a sign of hypoxia.

Prevention of Acute Respiratory Infections

Immunization though stands as important measure to reduce cases of pneumonia which occur as complication of vaccine preventable disease; especially measles, improved living conditions, better nutrition and reduction of smoke pollution indoor sill reduce the burden of mortality and morbidity associated with ARI. The Acute Respiratory Disease Control Programme was taken up as a pilot project in India in the year 1990. Since 1992-93, the programme is being implemented as part of the CSSM (Child Survival and Safe Motherhood) programme.

TUBERCULOSIS

Tuberculosis is a specific infectious disease caused by M. tuberculosis. The disease primarily affects lungs and causes pulmonary tuberculosis. It can also affect intestine, meninges, bones and joints, lymph glands, skin and other tissues of the body. The disease is usually chronic with varying clinical manifestations. The disease also affects animal like cattle; this is known as “bovine tuberculosis”, which may sometimes be communicated to man. Pulmonary tuberculosis, the most important form of tuberculosis which affects man, will be considered here.

Tuberculosis remains a world wide public health problem despite the fact that the causative organism was discovered more than 100 years ago and highly effective drugs and vaccine are available making tuberculosis a preventable and curable disease. According to conservative estimates, there are 15-20 million cases of infectious tuberculosis in the world. This infectious pool is maintained by the occurrence of 4-5 million new cases and 3 million deaths each year.

The following table presents tuberculosis case notifications and the corresponding rates per 1,00,000 population by WHO region, comparing the average of 1984-1986 and that of 1990-1993, with the percentage change between the two periods.

WHO Region	1984-1986		1990-1993		Percentage Changes	
	Cases	Rate	Cases	Rate	Cases	Rate
Africa	273825	67.9	414542	79.3	51.4	16.8
America	227232	34.2	235794	32.1	38	-6.2
Eastern Mediterranean	213535	65.0	261284	66.2	22.4	1.7
Europe	304415	37.0	251032	29.5	-17.5	-20.4
South-East Asia	1339896	115.5	1839133	141.2	37.3	22.3
Western Pacific	600195	42.6	781163	50.4	30.2	18.3
Global	2959097	61.8	3782948	70.7	27.8	14.2

The magnitude of the problem is such that WHO declared it a global emergency in 1993. During 1996, an estimated 7.4 million people developed tuberculosis bringing the global total of sufferers to about 22 million, of whom about 3 million will have died in the same space of time.

8 out of 10 of all those struck by tuberculosis are in the economically productive age group of 15-49 years. About 95% are in the developing world, with South-East Asia, the Western Pacific and Africa the worst affected regions. Outbreaks are occurring in the USA were the number of cases increase by 14%. The make the global situation worse, tuberculosis has formed a lethal combination with HIV. At the same time, drug resistant tuberculosis is a growing threat worldwide.

In India too, tuberculosis continued to be major public health problem. Several surveys have been carried out by different institutes like ICMR (Indian Council for Medical Research), NTI (National Tuberculosis Institute), Bangalore, interested workers like Raj Narain, Frimodt-Moller, Pamra and Gothi etc. all left unrepresentative, to convey about the magnitude of the tuberculosis problem in Indian population.

Agent Factors

1. Agent: M. tuberculosis is a facultative intracellular parasite, i.e., it is readily ingested by phagocytes and is resistant to intracellular killing. Of importance to man are the human and bovine strains. The human strain is responsible for the vast majority of cases. The bovine strain affects mainly cattle and other animals. The Indian tubercle bacillus is said to be less virulent than the European bacillus. In recent years, a number of atypical mycobacteria have been isolated from men, which are mainly saprophytic. They are grouped as photochromogens (e.g., M. Kansasii), scotochromogens (e.g., M. scrofulaceum), non-photochromogens (e.g., M. intercellulare) and rapid growers (e.g., M. fortuitum).
2. Source of Infection: There are two sources of infection.
    a. Human Source: The most common source of infection is the human case whose sputum is positive for tubercle bacilli and who has either received no treatment or not treated fully. Such sources can discharge the bacilli in their sputum for years. The more rapidly a bacillary strain multiplies the more susceptible it is to the bactericidal action of chemotherapeutic drugs. The slow multipliers are the source of persister or dormant bacilli; they can remain alive for years without causing harm to the host.
    b. Bovine Source: The bovine source of infection is usually infected milk. There is no definite evidence that bovine tuberculosis is a problem in this country because of the practice of boiling mil before consumption.
3. Communicability: Patients are infective as long as they remain untreated. Effective anti-microbial treatment reduces infectivity by 90 % within 48 hours.

Host Factors

1. Age and Sex: Tuberculosis affects all ages. More prevalent in males than in females.
2. Heredity: Tuberculosis is not a hereditary disease. However, twin studies indicate that inherited susceptibility is an important risk factor.
3. Nutrition: Malnutrition is widely believed to predispose to tuberculosis, but the available evidence on this point is only indirect. The studies of Tuberculosis Chemotherapy Center, Chennai, India, showed that diet had no discernible influence on the recovery of patients in the context of potent chemotherapeutic drugs.
4. Immunity: It is acquired as a result of natural infection or BCG vaccination. Past infection with atypical mycobacteria is also credited with certain amount of naturally acquire immunity.

Environmental Factors

Tuberculosis is a social disease with medial aspects. It has also been described as a barometer of social welfare. Poor quality of life, poor housing, overcrowding, population explosion, under nutrition, lack of education, large families, early marriages, lack of awareness of causes of illness etc, are all factors interrelated and contribute to the occurrence and spread of tuberculosis.

Mode of Transmission

Tuberculosis is transmitted mainly by dro0let infection and droplet nuclei generated by sputum positive patients with pulmonary tuberculosis. The frequency and vigor of cough and the ventilation of the environment influence transmission of infection. Tuberculosis is not transmitted by fomites, such as dishes and other articles used by the patients. Sterilization of these articles is therefore of little or no value. Patients with extra pulmonary tuberculosis or smear-negative tuberculosis constitute a minimal hazard for transmission of infection.

Control of Tuberculosis

Tuberculosis control means reduction in the prevalence and incidence of disease in the community. The WHO defines that Tuberculosis "control" is said to be achieved when the prevalence of natural infection in the age group of 0 to 14 years is of the order of 1 %. This is about 40% in India. It means we have to go a long way to reach the goal of control set by WHO.

Since the Tuberculosis is an infectious disease, the basic principles of prevention and control are the same as for any other infectious disease. The control measures consist of a curative component – namely case finding and treatment; and a preventive component – namely BCG vaccination. These are the tow fundamental components of a National Tuberculosis Programme. The most powerful weapon, however, is the combination of case finding and treatment.

The case finding tools like Sputum Examination, Mass Miniature Radiography, and Tuberculin Test will be of great use. Chemotherapy, Anti – Tuberculosis Drugs, Bactericidal Drugs like Rifampicin (RMP), INH, Streptomycin, Pyrazinamide, and Bacteriostatic Drugs like Ethambutol, Thioacetazone, and Two – Phase Chemotherapy etc. are extending good support in treatment of Tuberculosis.

10.2.1. INTESTINAL INFECTIONS

10.2.1.1 POLIOMYELITIS

Poliomyelitis is an acute viral infection caused by an RNA virus. It is primarily an infection of the human alimentary tract but the virus may infect the central nervous system in a very small percentage (about 1%) of cases resulting in varying degrees of paralysis, and possibly death.

In pre-vaccination era, poliomyelitis was found in all countries of the world. The extensive use of polio vaccines since 1954 has virtually eliminated the disease in developed counties. During the year 1996, 20000 cases of poliomyelitis were reported to WHO, with about 7000 deaths. Tragic as this figure is, it still represents remarkable progress. In some countries, the decline has been spectacular. The OPV_3 immunization coverage has gone up and during 1995, 83 percent of the children up to 12 months were immunized world wide.

Lameness surveys in several North Indian states showed annual incidence rates of 2 to 5 per 1000 rural pre-school children and 1 to 3 per 1000 urban pre-school children. Surveys in south India suggest that the prevalence of polio lameness among school children is about 3.5 per 1000 implying an annual incidence in the whole population of around 15 per 1,00,000. The Government of India, is now going in a comprehensive with an objective to completely eradicate the poliomyelitis from our community. Regular and frequent immunization program, named as Pulse Polio Immunization (PPI), is a part of this, started on 9th December 1995, immunizing more than 87.81 million children with OPV. Six weeks later on 20th January 1996, 93.58 million children were immunized with OPV.

Agent Factors

1. Agent: The causative agent is the poliovirus which has three serotypes 1, 2 and 3. Most outbreaks of paralytic polio are due to type – 1 virus. Polio virus can survive for

long periods in the external environment. In a cold environment, it can live in water for 4 months and in faeces for 6 months. It is therefore well adapted for the faecal-oral route of transmission. However, the virus may be rapidly inactivated by pasteurization, and a variety of physical and chemical agents.

2. Reservoir of Infection: Man is the only known reservoir of infection. Most infections are subclinical. It is the mild and subclinical infections that play a dominant role in the spread of infection; they constitute the submerged portion of the iceberg. It is estimated that for every clinical case, there may be 1000 subclinical cases in children and 75 in adults. There are no chronic carriers. No animal source has yet been demonstrated.
3. Infectious Material: The virus is found in the faeces and oropharyngeal secretions of an infected person.
4. Period of Communicability: The cases are most infectious 7 to 10 days before and after onset of symptoms. In the faeces, the virus is excreted commonly for 2 to 3 weeks, sometimes as long as 3 to 4 months.

Host Factors

1. Age and Sex: In India, polio is essentially a disease of infancy and childhood. About 50 % of cases are reported in infancy. The most vulnerable age is between 6 months and 3 years. Sex differences have been noted in the ratio of 3 males to 1 female.
2. Risk Factors: Several provocative or risk factors have been found to precipitate an attack of paralytic polio in individuals already infected with polio viruses. They include fatigue, trauma, intramuscular infections, operative procedures such as tonsillectomy undertaken especially during epidemics of polio and administration of immunizing agents particularly alum-containing DPT.
3. Immunity: the maternal antibodies gradually disappear during the first 6 months of life. Immunity following infection is fairy solid although re-infection can occur since infection with one type does onto protect completely against the other tow types of viruses. Type 2 virus appears to be the most effective antigen. Neutralizing antibody is widely recognized as an important index of immunti8y to polio after infection.

Environmental Factors

Polio is more likely to occur during the rainy season. Approximately 60 % of cases recorded in India were during June to September. The environmental sources of infection are contaminated water, food and flies. Polio virus survives for a long time in a cols environment. Overcrowding and poor sanitation provide opportunities for exposure to infection.

Mode of Transmission

Faecal-Oral route is the main route of spread in developing countries. The infection may spread directly though contaminated fingers where hygiene is poor, or indirectly thorough contaminated water, milk, foods, flies and articles of daily use. Droplet infection may occur in the acute phase of disease when the virus occurs in the throat. Close personal contact with an infected person facilitates droplet spread. This mode of transmission may be relatively more important in developed countries where faecal transmission is remote.

Prevention of Poliomyelitis

Immunization is the sole effective means of preventing poliomyelitis. Both killed and live attenuated vaccines are available and both are safe and effective when used correctly. It is

essential to immunize all infants by 6 months of age to protect them against polio. Two types of vaccine are used throughout the world. They are

- Inactivated (Salk) Polio Vaccine (IPV)
- Oral (Sabin) Polio Vaccine (OPV)

10.2.1.2 VIRAL HEPATITIS

Viral hepatitis may be defined as infection of the liver caused by any of a half dozen viruses: hepatitis A virus (HAV), hepatitis B virus (HBV), hepatitis D virus (the delta agent), epidemic non-A hepatitis virus and by atleast tow non-A, non-B viruses i.e. hepatitis C (HCV) and hepatitis E (HEV). It is known that many other viruses may be implicated in hepatitis such as Cytomegalo-virus, Epstein-Barr virus, Yellow Fever virus and Rubella virus. Viruses of Herpes Simplex, Varicella and Adenoviruses can also cause severe hepatitis in immuno-compromised individuals, but are rare.

It is widely prevalent in India. Hepatitis A virus causes a relatively benign disease and does not constitute a major public health problem in India. In contrast, hepatitis B is responsible for severe liver damage and is associated with chronic liver disease and hepatocellular carcinoma. Hepatitis virus non-A, non-B (NANB) consists of atleast two distinct viruses – one that is parenterally transmitted like hepatitis C, and other hepatitis E, transmitted through the faecal-oral route like hepatitis A virus. It has been estimated that approximately 4 million people in India suffer every year form one or the other form of acute viral hepatitis.

10.2.1.3 HEPATITIS A

Hepatitis A formerly known as “infectious” hepatitis or epidemic jaundice is an acute infectious disease caused by hepatitis A virus. The disease is heralded by non specific symptoms such as fever, chills, headache, fatigue, generalized weakness and aches and pains, followed by anorexia, nausea, vomiting, dark urine and jaundice. The disease spectrum is characterized by the occurrence of numerous subclinical or asymptomatic cases. The disease is benign with complete recovery in several weeks. The case fatality rate of icteric cases is less than 0.1 percent, usually forms acute liver failure and mainly affects older adults. Although the disease has, in general, a low mortality i.e. 0.1 percent, patients may be incapacitated for many weeks.

Agent Factors

1. Agent: The causative agent, the hepatitis A virus, is an enterovirus (type 72) of the Picornaviridae family. It multiplies only in hepatocytes.
2. Resistance: the virus is fairly resistant to heat and chemicals. It has shown to survive more than 10 weeks in well water. Formalin is stated to be an effective disinfectant. The virus is inactivated by ultraviolet rays and by boiling for 5 minutes or autoclaving.
3. Reservoir of Infection: the human cases are the only reservoir of infection. Asymptomatic infections are especially common in children. There is no evidence of a chronic carrier state.
4. Period of Infectivity: the risk of transmitting HAV is greatest from 2 weeks before to 1 week after the onset of jaundice.
5. Infective Material: Mainly man’s faeces. Blood, serum, and other fluids are infective during the brief stage of viraemia.

Host Factors

1. Age and Sex: It is more frequent among children than in adults, however, all ages and both sexes may be infected if susceptible.

2. Immunity: Immunity after attack probably lasts for life; second attacks have been reported in about 5 % of patients.

Environmental Factors

Cases may occur throughout the year. In India the disease tends to be associated with periods of heavy rainfall. When standards of hygiene and sanitation are improved, morbidity from infection with enteric viruses may increase.

Mode of Transmission

Faecal-Oral route, Parenteral Route and Sexual Transmission are most observed modes of transmitting this HAV.

Prevention of HAV

Effective control of reservoir, control of transmission, control of susceptible population and vaccination are the few ways of preventing this HAV.

10.2.1.4 HEPATITIS B

Hepatitis B formerly known as “serum” hepatitis is an acute systemic infection with major pathology in the lover, caused by hepatitis B virus (HBV) and transmitted usually by the parenteral route. It is clinically characterized by a tendency to a long incubation period (6 weeks to 6 months) and a protracted illness with a variety of outcomes. In approximately 5 to 15 % of cases, HBV infection fails to resolve and the affected individuals then become persistent carriers of the virus.

Persistent HBV infection may cause progressive liver disease including chronic active hepatitis and hepatocellular carcinoma. There is also evidence of a close association between hepatitis B and primary liver cancer. Hepatitis B virus can form a dangerous alliance with delta virus and produce a new form of virulent hepatitis which is considered to be a widespread threat for much of the world.

Agent Factors

1. Agent: HBV was discovered by Blumberg in 1963. HBV is a complex, 42-nm, double shelled DNA virus, originally known as the “Dane Particle”. It replicates in the liver cells. It occurs in three morphological forms in the serum of a patient.

   HBV has three distinct antigens, a surface antigen (known as “Australian Antigen” (HBsAg)), a core antigen (HBcAg), AND AN “e” antigen (HBeAg). The presence of “e” antigen indicates that the patient is highly infectious.
2. Reservoir of Infection: Man is the only reservoir of infection which and be spread either form carriers or form cases.
3. Infective Material: Contaminated blood is the main source of infection apart from body secretions such as saliva, vaginal secretions and semen of infected persons.
4. Period of Communicability: The virus is present in the blood during the incubation period for a month before jaundice and acute phase of the disease and usually runs for several months or until disappearance of HBsAg and appearance of surface antibody.

Host Factors

1. Age and Sex: Age of 20 - 40 age groups, where HBV is uncommon and during early childhood where it is common.

2. High Risk Groups: Recipients of blood transfusions, health care and laboratory personnel, homosexuals, prostitutes, and percutaneous drug abusers, infants of HBV carrier mothers and patients who are immuno-compromised carry higher risks.

Mode of Transmission

Parenteral route, Perinatal transmission, Sexual transmission, Horizontal transmission (child – child through physical contact) etc, are found to be various possible modes of transmission of HBV.

Prevention of HBV

Plasma derived vaccine, RDNA-yeast derived vaccine, Hepatitis B Immunoglobulin (HBIG), Passive-Active immunization, etc, are few methods of preventing this HBV.

10.2.1.5 HEPATITIS C

Hepatitis C Virus (HCV) was identified in the year 1989. It has been shown to be the major cause of parenterally transmitted non-A, non-B (PT – NANB) hepatitis. Infection with HCV has become an issue of global significance with 170 million cases world wide. It is a single stranded RNA virus with properties similar t those of flavivirus. It bears no genomic resemblance to hepatitis B or D. the virus is mainly transmitted through transfusion of contaminated blood or blood products. The risk of sexual and maternal neonatal transmission is small.

Testing donated blood fro HCV has helped reduce the risk of transfusion associated hepatitis C from 10% to 1% in the industrialized countries. In India, screening for HCV has been made mandatory for all blood banks from July 1, 1997. Interferon is the only drug that has been found effective in the treatment of HCV infection, though very costly. For a number of technical reasons, the development of a vaccine to prevent HCV infection is unlikely fro many years.

HEPATITIS E

The infection caused by the Hepatitis E Virus (HEV) which was discovered in 1990, is essentially a waterborne disease. Formerly termed enterically transmitted hepatitis non-A non-B (HNANM) virus, HEV is a 29 –nm to 32 –nm RNA virus.

Water or food supplies contaminated by faeces in which the virus is excreted have been implicated in major outbreaks reported in all parts of the world that have a hot climate. Mainly young adults, aged 15-40 years, have been affected by acute hepatitis E.

Hepatitis E has a propensity to induce a fulminating form of acute disease where the mortality ranges 0.5% to 4%, particularly in pregnant women, up to 20% of whom may develop fulminating hepatitis E, with a mortality that may reach about 80% of such cases.

The first major epidemic was reported in New Delhi in the winter of 1955 -56. After the flooding of Yamuna River, 30,000 cases of jaundice were described, and retrospectively attributed to hepatitis E.

Diagnosis is made by the level of anti-HEV antibodies in the serum. No confirmatory assay is currently available. Hepatitis E appears to be widespread problem in developing countries where there are problems in providing safe drinking water and adequate sewage disposal. No vaccine or specific immunoglobulin prophylaxis is available.

DELTA HEPATITIS

A new form of hepatitis that is considered to be widespread threat is “delta hepatitis” or hepatitis D. delta hepatitis infection always occurs in association with hepatitis B (carrier state). The mode of transmission of this infection, its prevention and control are identical to those for

hepatitis B. immunization against hepatitis B also protects against delta infection. Delta hepatitis has not been reported as significant in India.

CHOLERA

Cholera is an acute diarrhoeal disease caused by V. Cholerae 01 (classical or El Tor). It is now commonly due to the El Tor biotype. Cases range from symptom less to severe infections. The majority of infections are mild or asymptomatic.

Typical cases are characterized by the sudden onset of profuse, effortless, watery diarrhoea followed by vomiting, rapid dehydration, muscular cramps and suppression of urine. Unless there is rapid replacement of fluid and electrolytes, the case fatality may be as high as 30 to 40%.

Cholera is by no means a disease of the 18th century. Cholera alone causes 1,20,000 deaths a year. A new strain of cholera, code named 0139, emerges in India in 1992.. It spread west to Pakistan and east to China, and in the early months of 1993 caused an estimated 1,00,000 cases and 1000 deaths in southern Bangladesh. The global cholera situation is shown in the following table.

Year	Cases (000)	Deaths (%)
1961	62	49.3
1971	176	14.8
1981	51	4.8
1991	595	3.2
1992	46.2	1.7
1993	297	1.7
1994	384	2.7
1995	208	2.4

Agent Factors

1. Agent: The organism that causes cholera is labeled as V. Cholerae O Group 1 or Vibrio Cholerae 01. The term “epidemic strain” has also been used for these vibrios. It is now re3congnised that the NCV/NAG vibrios include some species that are pathogenic for human which have caused outbreak of cholera like diarrhoea.
2. Resistance: V. Cholerae is killed within 30 minutes by heating at 56 degree. C or within a few seconds by boiling. They remain in ice for 4 to 6 weeks or longer.
3. Reservoir of Infection: The human being is the only known reservoir cholera infection he may be a case or carrier.
4. Infective Material: Stools and vomit of cases and carriers found to be the immediate sources of infection.
5. Period of Communicability: A case of cholera is infectious for a period of 7 to 10 days. Convalescent carriers are infectious for 2 to 3 weeks. The chronic carrier state may last from a month up to 10 years or more.

Host Factors

1. Age and Sex: Cholera affects all ages and both sexes. In endemic areas, attack rate is highest in children.

2. Immunity: Natural infection confers quite effective immunity. It appears that immunity to V. Cholerae is mediated mainly by the local intestinal immune system. Vaccination gives only temporary, partial immunity for 3 to 6 months.

Environmental Factors

Vibrio transmission is readily possible in a community with poor environmental sanitation. Flies, numerous social factors, certain human habits, water & soil pollution, low living standards, lack of educational and absence of hygiene etc stand as other factors.

Mode of Transmission

Faecally contaminated water, contaminated food & drinks and direct contact of infected persons observed as reported different modes of transmitting the cholera.

Control of Cholera

The various guide lines proposed by WHO are as under.

- Verification of the diagnosis,
- Notification
- Early case finding
- Establishment of treatment centers
- Rehydration therapy
    - Oral Rehydration
    - Intravenous Rehydration
    - Maintenance therapy
- Adjuncts to therapy
- Epidemiological investigation
- Sanitation measures
- Chemoprophylaxis
- Vaccination
- Health education
    - Diarrrohoeal diseases control programme

10.2.1.6 TYPHOID FEVER

Typhoid fever is the result of systemic infection mainly by S. typhi found only in man. The disease is clinically characterized by atypical continuous fever for 3 to 4 weeks, relative bradycardia with involvement of lymphoid tissues and considerable constitutional symptoms. The term “enteric fever” includes both typhoid and paratyphoid fevers. The disease, may occur sporadically, epidemically or endemically.

Typhoid fever occurs in all parts of the world where water supplies and sanitation are sub standard. It is endemic in India. Health surveys conducted by the central ministry of health in the community development areas indicated a morbidity rate varying from 102 to 2219 per 1,00,000 population in different parts of the country.

Agent Factors

1. Agent: S. typhi is the major cause of enteric fever. S. para A and S. para B are relatively infrequent. S. typhi has three main antigens – o, h and Vi and a number of phage types (at least 80). S. typhi survives intracellular in the tissues of various organs. It is readily killed by drying, pasteurization, and common disinfectants.

2. Reservoir of Infection: Man is the only known reservoir o infection both as cases and carriers.
3. Source of Infection: The primary sources of infection are faeces and urine of cases or carriers; the secondary sources contaminated water, food, fingers and flies.

Host Factors

1. Age and Sex: Typhoid fever may occur at any age. Highest incidence of this disease occurs in the 5 to 19 years of age group. More cases are reported among males than females. But carrier rate is more in females.
2. Immunity: All ages are susceptible to infection. The antibody to the somatic antigen (O) is usually higher in the patient with the disease, and the antibody to the flagellar antigen (H) is usually higher in immunized individuals.

Environmental Factors

Enteric fevers are observed all through the year. The peak incidence is reported during July – September. Typhoid bacilli do not multiply in water but grow rapidly in mild. Much of times, typhoid fever is regarded as an index of general sanitation in any country.

Mode of Transmission

Typhoid fever is transmitted via the faecal-oral route or urine-oral routes. This may take place directly though soiled hands contaminated with faeces or urine of cases or carriers, or indirectly by the ingestion of contaminated water, milk and / or food, or through flies.

Control of Typhoid Fever

The control of reservoir, the control of sanitation and the process of immunization can be taken up as control measures. Immunization includes anti – typhoid vaccines like

- Monovalent anti- typhoid vaccine
- Bivalent anti- typhoid vaccine
- TAB vaccine

AMOEBIASIS

The term “Amoebiasis” has been defined by WHO as the condition of harboring the protozoan parasite Entamoeba histolytica with or without clinical manifestations. The symptomatic disease symptomatic group has been further subdivided into intestinal and extra-intestinal amoebiasis. The intestinal disease varies form mild abdominal discomfort and diarrhoea to acute fulmination dysentery. Extra-intestinal amoebiasis includes involvement of liver, lungs, brain, spleen, skin etc. Amoebiasis is potentially lethal disease.

Agent Factors

1. Agent: Amoebiasis is caused by potentially pathogenic strains of E. histolytica. E. histolytica, which can be differentiated into atleast 18 zymodemes (a zymodeme is a population of organisms differing form similar populations in the electrophoretic mobilities of one or more enzymes), can exist in two forms. They are vegetative (trophozoite) and cystic form.
2. Reservoir of Infection: Man is the only reservoir of infection. The immediate source of infection the faeces containing the cysts.
3. Period of Communicability: As long as cysts are excreted; the period may be several years, if cases are unrecognized and untreated.

Host Factors

Amoebiasis may occur at any age. There is no sex or racial difference in the occurrence of the diseases. Amoebiasis is frequently a household infection. There is strong evidence that cell – mediated immunity plays an important part in controlling the recurrence of invasive amoebiasis.

Environmental Factors

Amoebiasis is more closely related to poor sanitation and socioeconomic status than to climate. Epidemic outbreaks are usually associated with sewage seepage into the water supply.

Mode of Transmission

Faecal-Oral route, Sexual transmission and some vectors like flies, cockroaches and rodents are capable of carrying cysts and contaminating food and drink.

Prevention

Primary prevention (sanitation, water supply, food hygiene, health education) and secondary prevention (early diagnosis, treatment) are the two methods of preventing amoebiasis.

ASCARIASIS

An infection of the intestinal tract cause by the adult, Ascaris lumbricoides and clinically manifested by vague symptoms of nausea, abdominal paid and cough. Live worms are passed in the stool or vomited. Occasionally, thy may produce intestinal obstruction or may migrate into the peritoneal cavity. Ascaris is cosmopolitan in distribution. It is the most common Helminthic infestation.

Agent Factors

1. Agent: Ascaris lumbricoides lives in the lumen of small intestine, where it moves freely. Sexes are separate. The female measure 20-35 cm in length, and the male 12-30 cm. Egg production is very heavy – an estimated 2,40,000 eggs per day by each female, which counterbalances the heaby losses in the environment. In the lungs, they moult twice. They are coughed up though the trachea and then swallowed by the human host.
2. Reservoir of Infection: Man is the only reservoir.
3. Infective Material: Faeces containing the fertilized eggs.
4. Period of Communicability: Until all fertile females are destroyed and stools are negative.

Host Factors

Infection rates are high in children. They are the most important disseminators of infection. Adults seem to acquire some resistance. There is a high degree of host parasite tolerance. Roundworms rob man of his food. They contribute to malnutrition especially in children who may show growth retardation.

Environmental Factors

Ascaris is a soil transmitted helminth. A low temperature inhibits the development of eggs.

Prevention

Primary prevention methods like sanitary disposal of human excreta to prevent or reduce faecal contamination of the soil, provision of safe drinking water, food hygiene habits, and health

education of the community found to be effective. Secondary prevention method like usage of effective drugs (piperazine, mebendazole, levamisole and pyrantel) is also available.

10.3 CONCLUSION

With the help of the above discussion, you should have understood, the importance of studying the respiratory infections and intestinal infections. The sequential approach in studying each sub type of above infections should have provided you a direction in learning them. The other types of communicable disease and non-communicable diseases are discussed in the following lessons.

10.4 KEY TERMS

1. Epidemiological Determinants: The combination of Agent Factors, Host Factors and Environmental Factors.
2. Clinical Features: Clinical Observations useful for Medical Practitioners in segregating the diseases.

10.5 SELF CHECK

1. Discuss various types of communicable diseases.
2. Check what the basic common reasons for these diseases are?
3. Explain the possibilities of complete eradication of these diseases in India?
4. Identify the differences between the two categories of diseases discussed in this lesson?

Lesson 11

EPIDEMIOLOGY OF COMMUNICABLE DISEASES - PART III

11.0 OBJECTIVES

- Understanding the meaning of Arthropod – Borne infections
- Knowing the types of Arthropod – Borne infections
- Understanding the meaning of Zoonoses
- Knowing the types of Zoonoses
- Understanding the meaning of Surface infections
- Knowing the types of Surface infections

STRUCTURE

11.1 Arthropod – Borne infections

During the past few years, a large number of arthropod-borne viruses (arthropod viruses) have been isolated from sick persons, animals and arthropods throughout the world. Arthropod-borne viruses are defined as viruses “which are maintained in nature principally, or to an important extent through biological transmission between susceptible vertebrate hosts by haematophagous arthropods; they multiply in the tissues of arthropods, and are passed on to new vertebrates by the bites of arthropod after a period of extrinsic incubation”.

Over 500 viruses have been listed in the International Catalogue of Arboviruses published in 1985. Most of these are silent infections in the lower vertebrates. About 100 of these can infect man. in India, 40 have been detected, of which 10 are known to cause disease in man. The naming of the arboviruses is according to the disease caused (Yellow Fever), according to the place of first isolation (Kyasanur Forest Disease), or according to local name (Chikungunya). Three antigens are important in serological study of arboviruses: hemagglutinins, complement fixing, and neutralizing. These viruses cause typical clinical syndromes.

11.2 Types of Arthropod – Borne infections

11.2.1 The Dengue Syndrome:

Dengue viruses are arboviruses capable of infecting humans, and causing disease. These infections may be asymptomatic or may lead to (a) "classical" dengue fever, or (b) dengue haemorrhgic fever without shock, or (c) dengue haemorrhgic fever with shock. Dengue fever is a self-limiting disease and represents the majority of cases of dengue infection. A prevalence of Aedes aegypti and Aedes albopictus together with the circulation of dengue virus of more than one type in any particular area tends to be associated with outbreaks of DHF / DSS.

Control Measures:

a) **Mosquito control:** The vectors of DF and DHF (e.g., A. aegypti) breed in and around houses and, in principle can be controlled by individual and community action, using antiadult and antilarval measures.
b) **Vaccines:** So far, there is no satisfactory vaccine and no immediate prospect of preventing the disease by immunization.
c) **Other measures:** Isolation under bed nets during the first few days; individual protection against mosquitoes.

11.1.2 Malaria:

Malaria is a protozoal disease caused by infection with parasites of the genus **Plasmodium** and transmitted to man by certain species of infected female Anopheline mosquito. A typical attack comprises three distinct stages: cold stage, hot stage and sweating stage. The clinical features of malaria vary from, mild to severe, and complicated, according to the species of parasite present, the patient's state of immunity, the intensity of the infection and also the presence of concomitant conditions such as malnutrition or other disease. The febrile paroxysms occur with definite intermittent periodicity repeating every third or fourth day depending upon the species of the parasite involved.

11.1.3 Lymphatic Filariasis:

The tern "lymphatic filariasis" covers infection with three closely related nematode worms-W.bancrofti, B.malayi and B.timori. All three infections are transmitted to man by the bites of infective mosquitoes. All three parasites have basically similar life cycles in man-adult worms living in lymphatic vessels whilst their offspring, the microfilariae circulate in peripheral blood and are available to infect mosquito vectors when they come to feed. The disease manifestations range from none to both acute and chronic manifestation such as lymphangitis, lymphadenitis, elephantiasis of genitals, legs and arms or as a hypersensitivity state such as tropical pulmonary eosinophilia or as an atypical form such as filarial arthritis. Though not fatal, the disease is responsible for considerable suffering, deformity and disability.

11.3 Zoonoses

Zoonotic diseases have been known since antiquity. Bubonic plague and rabies were known since biblical times. The discovery of causative agents during the "golden era" of microbiology called attention principally to diseases exclusively pathogenic to man. Zoonotic diseases were overshadowed by diseases peculiar to man alone. Only as human infections came under better control was attention drawn to zoonotic diseases.

More than 150 zoonoses have been recognized. In recent years, several new zoonotic diseases have emerged e.g. KFD, Monkey Pox etc., Quite apart from the morbidity and mortality they

cause, zoonoses are responsible for great economic losses, particularly in animals, meat, milk and other foods and products of animal origin. The developing countries suffer much more severe losses than do the industrialized countries, partly because they have less well-developed public health and veterinary services and partly because of their unfavourable climatic and environmental conditions. Zoonoses have been defined as “Those diseases and infections [the agents of] which are naturally transmitted between [other] vertebrate animals and man.

11.4 Zoonoses - Viral

11.4.1 RABIES:

Rabies, also known as hydrophobia is an acute, highly fatal viral disease of the central nervous system, caused by Lyssavirus type. It is primarily a zoonotic disease of warm-blooded animals, particularly carnivorous such as dogs, cats, jackals and wolves. It is transmitted to man usually by bites or licks of rabid animals. Classical hydrophobia is clinically characterized by a ling and variable incubation period, a short period of illness due to encephalomyelitis ending in death, despite intensive care. It is the only communicable disease of man that is always fatal.

11.4.2. YELLOW FEVER:

Yellow fever is a zoonotic disease caused by an arbo-virus. It affects principally monkeys and other vertebrates in tropical America and Africa and is transmitted to man by certain culicine mosquitoes. It shares clinical features with other viral haemorrhagic fevers (e.g., dengue HF, Lassa fever) but is characterized by more severe hepatic and renal involvement. The spectrum of disease varies form clinically indeterminate to severe cases. Severe cases develop jaundice with haemorrhagic manifestations (black vomit, epistaxis, melena) and albuminuria or anuria, shock, agitation, stupor and coma. In general death occurs between the fifth and tenth day of illness. The case fatality rate may reach 80 per cent in severe cases. Survivors exhibit long-lasting immunity.

11.4.3. JAPANISE ENCEPHALITIS:

Japanese encephalitis (JE) is mosquito-borne encephalitis caused by a group B arbovirus (Flavivirus) and transmitted by culicine mosquitoes. It is a zoonotic disease, i.e., infecting mainly animals and incidentally man. Twenty-five years ago, JE was known as an endemic disease in East Asia, especially in Japan, China and Korea. In recent years, it has spread widely in SE Asia, and outbreaks of considerable magnitude have occurred in Thailand, Indonesia, Vietnam, India, Myanmar and Sri Lanka.

11.4.4 Kyasanur Forest Disease:

Kyasanur Forest Disease (KFD) is a febrile disease associated with haemorrhages caused by an arbovirus flavivirus and transmitted to man by bite of infective ticks. It is antigenically related to other tick-borne encephalitis viruses. Rats and squirrels are its natural reservoir. Monkeys are the amplifiers. Cattle provide blood-food to the ticks and are thus important in the transmission chain. KFD was first reported in 1957 in the Shimoga district of Karnataka, India.

11.5 Zoonoses – Bacterial

11.5.1 Brucellosis:

Brucellosis is one of the major bacterial zoonoses, and in humans is also known as Undulent fever, Malta fever or Mediterranean fever. It is occasionally transmitted to man by direct or indirect contact with infected animals. It is caused by different species of the brucella group of organisms and characterised by intermittent or irregular febrile attacks, with profuse sweating,

arthritis and an enlarged spleen. The disease may last for several days, months or occasionally years. Brucellosis is both a severe human disease and a disease of animals with serious economic consequences.

11.5.2 Leptospirosis:

Leptospirosis is essentially animal infection by several serotypes of Leptospira (Spirocheates) and transmitted to man under certain environmental conditions. The disease manifestations are many and varied, ranging in severity from a mild febrile illness to sever, and sometimes fatal disease with liver and kidney involvement. Weils disease is one of the many manifestations of human leptospirosis.

11.5.3 Plague:

Plague is primarily and basically a zoonoses, caused by Y.pestis, involving rodents and fleas. It exists in natural foci, and is transmitted by infected flea bites to humans living or intruding into the same ecological environment. Plague occurs in many form-enzootically, epizootically, sporadically and in epidemics of all types including anthroponotic and primary pneumonic forms. Despite the enormous body of knowledge regarding plague, this communicable disease continues to pose a threat in many areas.

11.5.4 Human Salmonellosis:

The term “salmonellosis” covers a complex group of foodborne infections affecting both man and animals. The disease causes illness and even death in humans, as well as economic losses in the animal and food industries. The term “food poisoning” is also commonly applied to salmonellosis.

11.6 Zoonoses – Rickettsial Diseases

Rickettsial zoonoses are a group of specific communicable diseases caused by rickettsial organisms and transmitted to man by arthropod vectors, (Q fever excepted). Increasingly, it is realised that rickettsial diseases are under-diagnosed and that they contribute substantially to the acute febrile burden and preventive illness in many populations.

11.6.1 Scrub Typhus:

Of the diseases caused by rickettsiae in man, the most widespread is scrub typhus. It exists as a zoonoses in nature between certain species of trombiculid mites and their small mammals (e.g., field mice, rats, shrews). Scrub typhus broke out in an epidemic form in Assam and West Bengal during World War II. Later the presence of scrub typhus was found throughout India in humans, trombiculid mites, rodents and experimental animals exposed in these areas. The causative agent of scrub typhus is Rickettsia tsutsugamushi. There are several serologically distinct stains. The true reservoir of infection is the trombiculid mite (Leptotrombidium delinese and L.akamushi). The infection is maintained in nature transovarially from one generations of mite to the next.

11.6.2 Murine Typhus:

Murine typhus (MT) is zoonoses. It is world-wide in distribution especially in areas of high rat infestation. Focal infections are often associated with docks and shipping places where rats abound. The causative agent is Rickettsia typhi (R.mooseri). Rats are the reservoir. Infection in rats is inapparent, long-lasting and non-fatal.

11.6.3 Q Fever:

Q fever is a highly infectious zoonotic disease with worldwide distribution. It occurs mainly in persons associated with sheep, goats, cattle or other domestic animals. Serological surveys indicate that Q fever is present in the animal and human population in Haryana, Punjab, Delhi, Rajasthan and various places in India. The causative agent is Coxiella burnetii. It is found in ticks which act as vectors as well as reservoir.

11.7 Parasitic Zoonoses

11.7.1 Taeniasis:

A group of cestode infections which are important zoonotic diseases. Two parasites of importance in taeniasis are Taenia saginata and T.solium. These are classified as “cyclo-zoonoses” because they require more than one vertebrate host species (but no invertebrate host) to complete their developmental cycles.

11.7.2 Hydated Disease:

Hydatid Disease is a zoonoses – a group of cestode infections which are important zoonotic diseases of man. The disease in man is caused by the metacystode stage (infective larva) of the canine intestinal tapeworm Echinococcus; the adult worms are found in dogs and other carnivores.

11.7.3 Leishmaniasis:

Leishmaniasis are a group of protozoal diseases caused by parasites of the genus Leishmania, and transmitted to man by the bite of female phlebotomine sandfly. They are responsible for various syndromes in humans - kala-azar or visceral leishmaniasis (VL), cutaneous leishmaniasis (CL), muco-cutaneous leishmaniasis (MCL), anthroponotic cutaneous leishmaniasis (ACL), zoonotic cutaneous leishmaniasis (ZCL), post-kala-azar dermal leishmaniasis (PKDL), etc. The visceral types of disease, kala-azar, is still an important disease in India. The majority of the leishmaniasis are zoonoses involving wild or domestic mammals (rodents, canines). Some forms (e.g., Indian kala-azar) are considered to be nonzoonotic infections.

11.8 Surface infections

In the following section important surface infections were discussed in detail. They are;

a. Trachoma
b. Tetanus
c. Leprosy
d. Sexually Transmitted Diseases
e. Yaws
f. AIDS

11.9 Types of surface infections

11.9.1 Trachoma :

Trachoma is a chronic infectious disease of the conjunctiva and cornea, caused by Chlamydia trachomatis, but other pathogenic microorganisms often contribute to the disease. Trachoma inflammation may undergo spontaneous resolution or may progress to conjunctival scarring which can cause inward deviation of eyelashes (trichiasis) or of the lid margin (entropion). The

abrasion of the cornea by eyelashes frequently result in corneal ulceration, followed by scarring and visual loss.

From the public health point of view, trachoma is classified as blinding and non-blinding. A community with blinding trachoma can be recognized by the presence of persons with lesions such as entropion, trichiasis and corneal ulcers. It is the blinding trachoma that requires urgent control measures. Non-blinding trachoma often becomes blinding trachoma when other ocular pathogens interact synergistically and enhance the risk of damage to eyesight.

11.9.2 Tetanus:

An acute disease induced by the exotoxin of Clostridium tetani and clinically characterised by muscular rigidity which persists throughout illness punctuated by painful paroxysmal spasms of the voluntary muscles, especially the masseters (trismus or "lock-jaw"), the facial muscles (risus sardonicus), the muscles of the back and neck (opisthotonus), and those of the lower limbs and abdomen. The mortality tends to be very high, varying form 40 to 80 per cent.

11.9.3 Leprosy:

Leprosy (Hansen's disease) is a chronic infectious disease caused by M.leprae. It affects mainly the peripheral nerves. It also affects the skin, muscles, the eye, bones, testes and internal organs. The disease manifest itself in two polar forms, namely the lepromatous leprosy and tuberculoid leprosy, lying at the two ends of a long spectrum of the disease. Between these tow polar types occur the borderline and indeterminate forms depending upon the host response to infection. Leprosy is clinically characterised by one or more of the following cardinal features:

a. hypopigmented patches
b. partial or total loss of cutaneous sensation in the affected areas (the earliest sensation to be affected is usually light touch)
c. presence of thickened nerves, and
d. presence of acid-fast bacilli in the skin or nasal smears

The signs of advanced disease are; striking presence of nodules or lumps especially in the skin of the face and ears; plantar ulcers; loss of fingers or toes, nasal depression, foot-drop, claw toes and other deformities.

11.9.4 Sexually Transmitted Diseases:

The sexually transmitted disease (STD) are a group of communicable diseases that are transmitted predominantly by sexual contact and caused by a wide range of bacterial, viral, protozoal and fungal agents and ectoparasites. During the past two decades, STDs have undergone a dramatic transformation. First, the change in name from venereal diseases (V.D.) to sexually transmitted diseases (STD) indicate this transformation. The list of pathogens, which are sexually transmissible, has expanded from the 5 "classical" venereal diseases (syphilis, gonorrhoea, chancroid, lymphogranuloma venereum and donovanosis) to include more than 20 agents. Secondly, attention is now given not only to specific diseases, but also to clinical syndromes associated with STDs. Most of the recently recognized STDs are now referred to, as second generation STDs. AIDS, the most recently recognized, is a totally new disease.

11.9.5 Yaws:

Yaws is a chronic contagious non-venereal disease caused by T.pertenue, usually beginning in early childhood. It resembles syphilis in its clinical course and is characterised by a primary skin

lesion (mother yaw) followed by a generalised eruption and a late stage of destructive lesions of the skin and bone. Yaws is also known as pian, bubas or framboesia.

11.9.6 AIDS:

AIDS, the acquired immuno-deficiency syndrome (sometimes called “slim disease”) is a fatal illness caused by a retrovirus known as the human immuno-deficiency virus (HIV) which breaks down the body’s immune system, leaving the victim vulnerable to a host of life-threatening opportunistic infections, neurological disorders, or unusual malignancies. Among the special features of HIV infection are that once infected, it is probable that a person will be infected for life. Strictly speaking, the term AIDS refers only to the last stage of the HIV infection. AIDS can be called our modern pandemic, affecting both industrialised and developing countries.

11.10 Summary

Today the world stands on the threshold of a new era in which hundreds of millions of people will be safe from some of the most terrible diseases. Soon poliomyelitis, neonatal tetanus, leprosy, guiena-worm disease, river blindness, Chagas’ disease will join smallpox as diseases of the past. On the other hand world also stands on the brink of a global crisis in infectious diseases. No country is safe from them and no country can afford to ignore their threat any longer. Today the infectious diseases are not only a health issue; they have become a social problem with tremendous consequences for the wellbeing of the individual and the world we live in. The factors responsible for emergence and re-emergence of infectious diseases are: (1) unplanned and under-planned urbanization; (2) over-crowding and rapid population growth; (3) poor sanitation; (4) inadequate public health infrastructure; (5) resistance to antibiotics; (6) increased exposure of humans to disease vectors and reservoirs of infection in nature; and (7) rapid and intense international travel.

11.11 Technical terms

Arbo-viruses (Arthropod Borne Viruses): are heterogeneous groups of viruses that are transmitted by the haematophagous insect vectors. Their main reservoir is the vertebrates. Transmission occurs by bite of the infected insect.

Malaria: is a protozoal disease caused by infection with parasites of the genus Plasmodium and transmitted to man by certain species of infected female Anopheline mosquito.

Leishmaniasis: are a group of protozoal diseases caused by parasites of the genus Leishmania, and transmitted to man by the bite of female phlebotomine sandfly.

Lymphatic filariasis: covers infection with three closely related nematode worms- W.bancrofti, B.malayi and B.timori. All three infections are transmitted to man by the bites of infective mosquitoes.

Yaws: is a chronic contagious non-venereal disease caused by T.pertenue, usually beginning in early childhood.

Zoonoses: Those diseases and infections [the agents of] which are naturally transmitted between [other] vertebrate animals and man

11.12 Self - assessment questions

1. What are the important types of Arthropod – Borne infections? Give brief account of each.
2. Define Zoonoses disease. Describe briefly different types of zoonoses diseases.
3. What are the important types surface infections? Give brief account of each.

11.13 Books for further reading

Park K, Preventive and Social Medicine, M/s Banarsidas Bhanot publishers, Jabalpur, 2005

Bhaskara Rao T, Textbook of Community Medicine, Paras Medcal Publisher, Hyderabad, 2004

Kulakarni A.P, Baride J P, Text Book of Community Medicine, Vora Medical Publication, Mumbai

Lesson 12

NATIONAL PROGRAMMES

12.0 OBJECTIVES

- Understanding the importance of National Health Programmes
- To know the various types of National Health Programmes
- Understanding about programmes for communicable diseases
- Understanding about programmes for non-communicable diseases
- Understanding about programmes related to maternal and child health
- Understanding about nutritional programmes

STRUCTURE

12.1 Importance of National Health Programmes

Since India became free, several measures have been undertaken by the National Government to improve the health of the people. Prominent among these measures are the National Health Programmes, which have been launched by the Central Government for the control / eradication of communicable diseases, improvement of environmental sanitation, raising the standard of nutrition, control of population and improving rural health. Various international agencies like WHO, UNICEF, UNFPA, World Bank, as also a number of foreign agencies like SIDA, DANIDA, NORAD AND USAID have been providing technical and material assistance in the implementation of these programmes.

12.2 National Health Programmes

National Health Programmes in India can be broadly classified into the following categories:

A) Programmes for communicable diseases.

1. National Malaria Eradication Programme.
2. National Filaria Control Programme.
3. National Leprosy Eradication Programme.
4. National Tuberculosis Control Programme.
5. National AIDS Control Programme.
6. National Kala-azaar Control Programme.
7. National Programme for Control of Diarrhoeal Diseases.
8. National Programme for Control Programme
9. National Programme for Surveillance.

B). Programmes for non-communicable diseases.

1. National Mental Health Programme.
2. National Diabetes Control Programme.
3. National Cancer Control Programme.
4. National Blindness Control Programme.

C). Programmes related to maternal and child health.

1. Universal Immunization Programme.
2. National Family Welfare Programme.
3. Integrated Child Development Scheme

D). Nutritional Programmes.

1. National Programme for Control of Iodine Deficiency Disorders.
2. Midday School Meal Programme.
3. Applied Nutrition Programme.

12.3 Programmes for communicable diseases

1. National Malaria Eradication Programme (NMEP):

The programme was started in 1958. The programme worked satisfactorily till about 1961 when incidence was about 50,000. Since then the programme has received set back, in 1977, Modified Plan of Operation (MPO) was devised. The disease incidence increased in spite of MPO. An expert committee was appointed in 1994 to look into the problem. The recommendations of this committee have resulted in Malaria Action Programme (MAC) since 1995. In 1999, the government decided to drop the term “National Malaria Eradication Programme” and renamed it “National Anti-Malaria Programme”.

Objectives: The objectives of the programme are;

1.To prevent deaths due to malaria.
2.To reduce malaria morbidity substantially.
3.To consolidate the gains already achieved by reducing transmission.
4.To support industrial and agricultural development by reduction of malaria cases.

Strategy under MPO

1. Reorganization of malaria units according to administrative units (i.e. districts) instead of population based units.
2. Functional changes in the implementation according to API
3. Decentralization of laboratory services.
4. Development of P. falciparum containment programme, Urban malaria Scheme, Drug Distribution centers, and Fever Treatment Depots.
5. Integration of staff from District Malaria Officer to Multi Purpose Worker for effective surveillance.

Activities under MPO/MAC:

a. Reclassification of endemic areas: The report of the consultative committee of experts indicated that in order to stabilize the malarial situation in the country, areas with Annual Parasite Incidence (API) 2 and above should be taken up for spray operations.

b. Areas with API more than 2: All areas with API 2 and above are brought under regular insecticidal spray with 2 rounds of DDT, unless the vector is refractory. Where the vector is refractory to DDT, 3 rounds of malathion are recommended.

c. Drug distribution centres and fever treatment depots: With the increasing number of malaria cases, the demand for anti malarial drugs has increased tremendously. Drug Distribution Centres and Fever Treatment Depots were established. Drug Distribution Centres (DDC) are only to dispense the antimalarial tablets as per NMEP schedules. Fever Treatment Depots (FTD) collect the blood slides in addition to the distribution of antimalarial tablets.

d. P.falciparum containment: Within the Modified Plan of Operation, an additional component known as "P.falciparum containment programme" has been introduced from October 1977. The specific purpose of this component is to prevent or control the spread of falciparum malaria.

e. Health Education: In the Modified Plan of Operation, due emphasis has been given to the health education of the public to enlist their cooperation in malaria control activities.

f. Urban malaria scheme: The urban malaria scheme was launched in 1971 to reduce or interrupt malaria transmission in towns and cities. The methodology comprises vector control by intensive antilarval measures and drug treatment.

Indicators for Evaluation/ Monitoring:

1. Number of blood smears collected through active and passive surveillance.
2. Number of blood smears collected by village health guide (VHG).
3. Number of blood smears collected by FTDs
4. Number of blood smears positive for different methods of collection.
5. Total number of positive cases.
6. Number and percentage of P falciparum cases.
7. Number of deaths due to malaria and number of deaths investigated.
8. Number and percentage of positive cases given radical treatment within 21days.
9. Number of smears examined within 15 days of collection.
10. Annual parasite rate.

Goals for the Tenth Plan: The set goals for malaria control in the country during the Tenth five-year Plan are:

a. Annual Blood Examination Rate (ABER) over 10 per cent
b. Annual Parasite Incidence (API) 1.3 or less
c. 25 per cent reduction in morbidity and mortality due to malaria by 2007 and 50 per cent by 2010.

2. National Filaria Control Programme (NFCP):

The NFCP has been in operation since 1955. In June 1978, the operational control of the programme was merged with the urban malaria scheme for maximum utilization of available resources. The intended objectives of the programme are;

a. to delimit the problem of filariasis in the country;
b. to undertake control measures in endemic areas;
c. to train the required manpower.

Filaria control strategy includes vector control through anti larval operations, source reduction, detection and treatment of microfilaria carriers, morbidity management and IEC. Conduction of preliminary survey, assessment survey, training of medical and paramedical persons, and control measures which include anti-mosquito, anti-larval, mass treatment forms the major activities under the programme.

3.National Leprosy Eradication Programme (NLEP):

NLEP was launched in 1954 as a National Leprosy Control Programme to achieve control of leprosy through early detection of cases and DDS (dapsone) monotherapy on an ambulatory basis.

Objectives:

a. To detect of all cases of leprosy irrespective of the endemicity of the area through various case detection activities;
b. To treat all detected cases of leprosy and its complications till its cure or recovery;
c. To impart training to all categories of health personnel by establishing training centers;
d. To recommend grant in aid to various voluntary agencies engaged in anti-leprosy work;
e. To promote medico-surgical rehabilitation of the disease arrested deformed cases;
f. To encourage research on various aspects of leprosy.

Tenth Five Year Plan Goals for leprosy elimination:

The Tenth Five Year Plan goal is to bring prevalence rate of leprosy to less than 1 case per 10,000 population and the strategies are as follows:

1. Completing horizontal integration of the programme into the general health care system by 2007. The personnel employed under NLEP will be transferred to the status;
2. Skill upgradation and redeployment of the over 30,000 leprosy workers and laboratory technicians so that the existing gaps in male MPWs and laboratory technicians in PHC/CHC are filled and these workers get integrated into the primary health care system;
3. Training of the existing personnel in primary health care institutions for the early detection and management of leprosy patients, and identification and referral of those with complications;
4. Re-constructive surgery to improve functional status of the individuals;
5. Rehabilitation of leprosy patients; and
6. Involvement of NGOs.

4.National Tuberculosis Programme:

National Tuberculosis programme (NTP) has been in operation since 1962. Its objectives are:

(a) Long term objective: to reduce tuberculosis in the community to that level when it ceases to be a public health problem, i.e.,

(i) one case infects less than new person annually:
(ii) the prevalence of infection in age group below 14 years is brought down to less than 1 per cent, against about 30 per cent as at present.

(b) Operational or short term objectives:

(i) to detect maximum number of TB cases among the outpatients attending any health institution with symptoms suggestive of tuberculosis and treat them effectively

(ii) to vaccinate newborns and infants with BCG

(iii) to undertake the above objectives in an integrated manner through all the existing health institutions in the country.

Revised National Tuberculosis Control Programme

The Government of India, WHO and World Bank together reviewed the NTP in the year 1992. Based on the findings a revised strategy for NTP was evolved. The salient features of this strategy are:

(1) Achievement of at least 85 per cent cure rate of Chemotherapy involving peripheral health functionaries:

(2) Augmentation of case finding activities through quality sputum microscopy to detect at least 70 per cent estimated cases; and

(3) Involvement of NGOs; Information, Education and Communication and improved operational research.

Goals for the Tenth Five Year Plan

The goals for the Tenth Five-Year Plan are indicated in Table 1. The National Tuberculosis control Programme has been accorded high priority by the government. With the inclusion of NTP in the 20 point programme, there is expansion of essential activities under the programme. There has been considerable increase in budget allotment. The international agencies like WHO, USAID, DANIDA, World Bank etc. are providing the assistance to RNTCP and NTP.

Table 1

Goals for Revised National Tuberculosis Control Programme (RNTCP) for Tenth Five Year Plan

Indicator	2002	2003	2004	2005	2006	2007
Coverage under RNTCP (population in million)	350	650	800	900	1000	1070
Numbers of patients Examined (million)	2.08	2.50	3.04	3.42	3.80	4.07
Total number of patients put on DOTS treatment (million)	0.52	0.61	0.75	0.85	0.94	1.00
New sputum smear positive patients Put on treatment under RNTCP (million)	0.21	0.24	0.29	0.33	0.37	0.40
Cure rate of new sputum smear Positive patients in RNTCP(%)	83	84	>85	>85	>85	>85

Source: India's Five Year Plans, Complete Documents

5. National AIDS Control Programme (NACP):
Government of India constituted a task force in 1985 to study and make recommendations about the control of AIDS in India. The programme was started in India in 1987. In 1992, the Ministry of Health established National AIDS Control Organization (NACO) with the aim of implementing the monitoring the programme.

Objectives: The objectives of the programme are listed below.
1. Prevent HIV transmission.
2. Decrease the morbidity and mortality due to HIV infection.
3. Minimize the socioeconomic impact resulting from the HIV infection.

Strategy: The current programme strategy is
1. Establishment of surveillance centers throughout the country.
2. Identification of high risk groups and their screening.
3. Issuing the specific guidelines for management of cases, and their follow-up.
4. Formulating guidelines for blood banks, blood product manufacturers, blood donors, and dialysis units.
5. Undertaking and promoting Information, Education and Communications (IEC) activities.

Organizational Setup:
1. **National AIDS Committee:** This was formed in 1986 under the chairmanship of The Union Minister of Health and Family Welfare. It has members from various sectors and works to bring together the various ministries, non-governmental organizations and private organizations for the effective coordination.

2. **National AIDS Control Board: (NACB):** This has been constituted under the chairmanship of The Union Secretary (Health). Its job is to review NACO policies, to expedite grants sanction, approve procurements, and undertake and award contracts to private agencies.

3. **National AIDS Control Organization:** NACO is an executive body of the programme and is headed by the Project Officer-Addl. Secretary Health in the Union Government. The objectives before NACO are
   A) To ensure high level of awareness of HIV/AIDS and its prevention in the population.
   B) To provide technical support to the State AIDS Control Societies/ Cell
   C) To promote use of condom for safe sex.
   D) To target interventions at groups identified as risk groups.
   E) To ensure safety of blood.
   F) To establish effective surveillance in all states and union territories.
   G) To develop services required for providing support to HIV infected persons.

4.**State AIDS Control Societies:** (SACS) In order to avoid the usual administrative bottlenecks and for effective implementation of the programme, states are encouraged to form State AIDS Control Societies. These are registered under the State Secretary of Health. These are broad based with representations from ministries like Education, Industry, Social Welfare, Transport, Finance etc.

6.National Kala-Azar Control Programme:
Kala-azar is now endemic in 33 districts of Bihar, 3 districts of Jharkhand, 10 districts of West Bengal and 2 districts of Uttar Pradesh, besides sporadic cases in few other districts of

Uttar Pradesh. A centrally sponsored programme was launched in 1990-91. This has brought down the incidence and death rate of the disease by 75 per cent by the year 2002.

The strategy for Kala-Azar control broadly includes 3 major activities; interruption of transmission for reducing vector population by undertaking indoor residual insecticidal spray twice annually; early diagnosis and complete treatment of Kala-Azar cases; and health education for community awareness. In view of the success achieved so far, National Health Policy envisages Kala-Azar elimination by the year 2010. The Tenth Five year Plan targets are; Prevention of deaths due to Kala-Azar by 2004 with annual reduction of at least 25 per cent; zero level incidence by 2007 with at least 20 per cent annual reduction using 2001 as the base year; and elimination of Kala-Azar by year 2010. To achieve these goals, Government of India has decided to provide 100 per cent central support from the year 2003-04.

7.National Diarrhoeal Diseases:

The programme was launched during VII Five Year Plan.

Objectives:

a) Creation of awareness that most diarrhoea cases can be managed at home using home based solutions.
b) Educating mothers on feeding of children with diarrhoea.
c) Making ORS widely available.
d) Reduction in under-five mortality by 50% over a period of 5 years.

Activities:

Following activities are taken under the programme to fulfill the objectives.

a) Training health personnel in management diarrhoea.
b) Supply of ORS packets at peripheral health centers.
c) Health education
d) Monitoring.

At present the programme component of supply of ORS packets and home management of diarrhoea in children is integrated with the Reproductive and Child Health (RCH) programme. The training component is emphasized, with in service training and training of the trainers. Social marketing of ORS packets is also recommended.

8. National Guinea – Worm Eradication Programme:

India launched its National Guinea-worm Eradication Programme in 1984 with technical assistance from WHO. From the very beginning the programme was integrated into the national health system at village level. With well-defined strategies, an efficient information and evaluation system, intersectoral coordination at all level and close collaboration with WHO and UNICEF, India wad able to significantly reduce the disease in affected areas. The country has reported zero cases since August 1996. In February 2000, the International Commission for the Certification of Dracunculiasis Eradication recommended that India be certified free of dracunculiasis transmission.

9. National Surveillance Programme For Communicable Disease:

Ministry of Health and Family Welfare has launched the National Surveillance Programme for Communicable Diseases for detection of early warning signals of outbreaks and rapid

response for prevention and control of these outbreaks and diseases. Outbreak of plague (1994), malaria (1995) and dengue haemorrhagic fever (1996) highlighted the urgency for strengthening disease surveillance system so that early warning signals are recognized and appropriate follow-up action initiated. In 1997, a model district surveillance plan was drafted. Subsequently, in 1998 a concept plan was developed by the National Apical Advisory Committee under the Secretary (Health). Under the programme, the surveillance system is strengthened through training of medical and paramedical personnel, dissemination of technical information and guidelines, upgradation of laboratories, modernization of communication and data processing systems. The programme includes IEC activities to promote community participation in the prevention and control of outbreaks. Presently the programme is in operation in 110 districts of 28 states / union territories. Multi-disciplinary Rapid Response Teams (RRTS) have been constituted at state and district levels under the programme. These teams have been provided training in surveillance, prevention and control of outbreaks.

12. 4 Programmes for non-communicable diseases

1. National Mental Health Programme:
The National Mental Health Programme was launched during Seventh Five Year Plan with a view to ensure availability of Mental Health Care Services for all, especially the community at risk and underprivileged section of the population, to encourage and social development. A National Advisory Group on mental health was constituted under the Chairmanship of the Secretary, Ministry of Health Family Welfare for the effective implementation of the National Health Programme. Eleven institutions have been identified imparting training in basic knowledge and skills in the field of mental health to the primary health care physicians and para-medical personnel.

2.National Diabetes Control Programme:

The National Diabetes Control Programme was started on a pilot basis during Seventh Five Year Plan in some districts of Tamil Nadu, Karnataka and Jammau and Kashmir, but due to paucity of funds in subsequent years this programme could not be expanded further. The main objectives of the programme are (i) identification of high risk subjects at an early stage and imparting appropriate health education (ii) early diagnosis and management of cases (iii) Prevention, arrest or slowing of acute metabolic as well as chronic cardiovascular – renal complications of the disease.

3.National Cancer Control Programme (NCCP):

NCCP was started in 1975-76. Initial activity consisted of provision of cobalt therapy units at tertiary care centres. During the Eighth five year plan emphasis was on prevention, early detection of cancer and augmentation of treatment facilities in the country. The following new schemes have been initiated starting from the year 1990-1991

a) **Scheme for District projects:** The scheme envisages projects at district level for preventive health education, early detection and pain relief measures. Under the scheme financial assistance of Rs. 15 lakh is provided to the concerned State Government for each district project selected under the scheme.

b) **Development of Oncology Wings in Medical Colleges / Hospitals:** This scheme has been initiated to fill up geographical gaps in the availability of cancer treatment facilities

in the country. Financial assistance up to Rs.1 crore is provided. State governments have to provide infrastructure and manpower to the colleges.

c) **Scheme for financial assistance to voluntary organizations:** Financial assistance up to Rs. 5 lakh is given to registered voluntary organization for the purpose of health education and early detection activities.

4.National Programme for Control Blindness (NPCB):
This programme was launched in the year 1976. This is 100 per cent centrally sponsored programme and incorporates the earlier trachoma control program started in the year 1968. The strategy of the programme is as follows:

1. Strengthening service delivery;
2. Developing human resources for eye care;
3. Promoting out-reach activities and public awareness;
4. Developing institutional capacity; and
5. To establish eye care facilities for every 5 lakh persons

Revised strategies:

- To make NPCB more comprehensive by strengthening services for other causes of blindness like corneal blindness (requiring transplantation of donated eyes), refractive errors in school going children, improving follow-up services of cataract operated persons and treating other causes of blindness like glaucoma;

- To shift from the eye camp approach to a fixed facility surgical approach and from conventional surgery to IOL implantation for better quality of post operative vision in operated patients;

- To expand the World bank project activities like construction of dedicated eye operation theatres, eye wards at district level, training of eye surgeons in modren cataract surgery and other eye surgeries and supply of opthalmic equipment etc. to whole country;

- To strengthening participation of Voluntary Organizations in the programme and to earmark geographic areas to NGOs and Government Hospitals to avoid duplication of effort and improve the performance of Government Units like Medical colleges, District Hospitals, Sub Divisional Hospitals, Community Health Centres, Primary Health Centres, etc.

- To enhance the coverage of eye care services in tribal and other under-served areas through identification of bilateral blind patients, preparation of village-wise blind register and giving preference to bilateral blind patients for cataract surgery.

12. 5 Programmes related to maternal and child health

1. Universal Immunization Programme (UIP):

In developing countries (including India) most of the child deaths are due to vaccine preventable diseases, i.e., polio, tetanus, diphtheria, whooping cough, measles and tuberculosis. To prevent these six killer diseases, in the year 1974, WHO launched EPI (expanded programme of immunization). Here expanded means expanding it to reach all over the world and less-privileged sectors of society;. EPI was started in India in the year 1978. In 1985, UNICEF renamed it as universal child immunization (UCI). Both have the same goals and same concept. Later the name was changed to UIP which was started in India in November 1985 in a phased manner. In 1987, a Technology mission on

immunization was set up to cover all the aspects of immunization activity from research and development to actual delivery of services to the target population.

Two Vital Components:

a. Immunization of all pregnant women against tetanus.
b. Immunization of all children in their 1st year of life against six killer diseases (diphtheria, whooping cough, tetanus, polio, measles, tuberculosis).

Objectives:

a. 85% coverage of all the newborn with three doses of DPT, three doses of OPV and one dose of BCG and measles vaccine by the end of 1st year of the child.
b. All pregnant women should receive (100% coverage) two doses of tetanus toxoid.
c. To lower the neonatal mortality and number of orthopaedically handicapped children.
d. To reduce neonatal tetanus mortality to less than 1 per 1000 live births and poliomyelitis incidence rate to less than 0.5 per 100,000 population.
e. To generate people's demand of immunization by involving the community and by health education.
f. To ensure cooperative and active involvement of ministries of social welfare, rural development, education, information and broadcasting, voluntary organisations and international agencies.

2. National Family Welfare Programme:

India launched a nation-wide family planning programme in 1952, making it the first country in the world to do so, though records show that birth control clinics have been functioning in the country since 1930. The early beginnings of the programme were modest with the establishment of a few clinics and distribution of educational material, training and research. During the Third Five Year Plan (1961-66), family planning was declared as "the very centre of planned development". The emphasis was shifted from the purely "clinic approach" to the more vigorous "extension education approach for motivating the people for acceptance of the "small family norm". The investment on family welfare programme during successive plan-periods are given in Table 2. It can be seen that from a modest sum of 0.65 crores during the First Plan, the investment has reached a colossal amount of Rs.27,125 crores during the Tenth Plan period.

Table 2
Expenditure under the National Family Welfare programme from the first to tenth five year plans.

Period	Expenditure (Rs. in crores)
First Plan (1951-56)	0.65
Second Plan (1956-61)	5.00
Third Plan (1961-66)	27.00
Annual Plan (Inter Plan (1966-69)	82.90
Fourth Plan (1969-74)	285.8
Fifth Plan (1974-79)	285.6
Annual Plan (1978-79)	101.8
Annual Plan (1979-80)	116.2
Sixth Plan (1980-85)	1309.00

Seventh Plan (1985-90)	2868.00
Annual Plan (1990-91)	675.00
Annual Plan (1991-92)	748.00
Eight Plan (1992-97)	6195.00
Ninth Plan (1997-2002)	14170.00
Tenth Plan (2002-2007)	27125.00

Source: Government of India (2003), Health Information of India 2000 & 2001, DGHS, New Delhi

A WHO Study Group in 1976 proposed the following indices for evaluating the impact: (a) Family size (number of living children (b) desired number of additional children (c) birth interval (d) age of the mother at birth of first child and last child (e) birth order, and (f) number of abortions. To this may be added, changes in birth rate and growth rate.

Evaluation is a technical activity that requires trained personnel, statistical facilities and adequate flow of data and information. The Family Welfare Programme in India has come a long way and holds forth the promise that in the not very distance future it may be accepted as a way of life by most people. Although birth control continues to occupy the same important position in the programme as it used to be in the earlier days the programme now aims at achieving a higher end-and that is, to improve, in conjunction with other development programmes, the quality of life of the people.

3. Integrated Child Development Scheme (ICDS):

ICDS was started on 2nd October 1975 in 33 experimental blocks. ICDS is a multisectorial programme involving several departments. The primary responsibility for the implementation of the programme lies with the Department of Women and Child Development and Ministry of Human Resource Development at the centre in coordination with departments of food and agriculture and at the state level women and child welfare, rural development, tribal welfare, health and family welfare departments are responsible.

Objectives:

a. To improve nutritional and health status of children in the age group of 0-6 years.
b. To reduce incidence of malnutrition, morbidity, mortality and school dropouts.
c. To lay the foundations for proper psychological, physical and social development of the child.
d. To achieve interdepartmental coordination for effective implementation of the programme to promote child development.
e. Health and nutritional education to mothers to look after health and nutritional needs of the children.

12. 6 Nutritional Programmes

1.Iodine Deficiency Disorders (IDD) Programme:

India commenced a goitre control programme in 1962, based on iodized salt. At the end of three decades, the prevalence of the disease still remains high. In retrospect, it became clear that the failure was mostly due to operational and logistic difficulties. That is, the production of iodized salt did not keep pace with requirement. Operational difficulties such as inadequate production, difficulties in prevention of sale of uniodized salt in endemic areas resulted in this programme having little impact on the goitre problem in the country.

Reassessment of the magnitude of the problem by ICMR showed that the problem was not restricted to the "goitre-belt" as was thought earlier, but is extremely prevalent in other parts of India as well (e.g., Gujarat, Punjab, Maharashtra, Madhya Pradesh, Andhra Pradesh and Kerala). Similarly, the iodine-deficiency manifestations were not limited to endemic goiter and cretinism but to a wider spectrum of disability including dear-mutism, mental retardation, and various degrees of impairment of intellectual and motor functions . It is estimated that nearly 167 million persons are exposed to the risk of IDD, of which 71 million are having goitre, cretins and mild neurological disorders. As a result, a major national programme- the IDD Control Programme – has been initiated in which nation-wide, rather than area-specific use of iodized salt is being promoted. It was decided as national policy to fortify all edible salt in a phased manner by end of 8^{th} plan. The essential components of a national IDD programme are use of iodized salt in place of common salt, monitoring and surveillance, manpower training and mass communication.

2 . Midday School Meal Programme (MDSMP):

MDSMP is in operation since 1962-63. Its objective is to attract more children to schools and to prevent dropouts. The broad principles suggested are;

a. The meal should supply at least one-third of calories and half of the protein requirement.

b. It should be supplement and not substitute to home diet.

c. The menu should be such that it can be easily prepared in school without any complicated cooking process.

d. Locally available food items should be encouraged.

e. Menu should be changed frequently to avoid monotony.

It is also recommend that a child should receive 250 feeds in a year. MDSMP has now become a part of The Minimum Needs Programme. A large scale evaluation of the programme was carried out by NIN. Its findings are summarized below:

a. Positive nutritional effect was seen in participants in the form of better anthropometric measurements, reduction in clinical signs of nutritional deficiency and a higher level of haemoglobin.

b. No difference in the school performance was observed in the participants and nonparticipants.

c. Poor community involvement, poor standard of food, and lack of training of school teachers were the other problems identified.

3 Applied Nutrition Programme(ANP):

ANP was started in Andhra Pradesh and Orissa in 1960 and subsequently in other states. It aimed at improving the nutritional status of pregnant/lactating mothers and children 2-6 years age. This was to be achieved trough nutrition education and promotion of production/consumption of nutritious foods through community involvement, raising kitchen gardens, poultry raising, supply of better seeds were some of the methods adopted. The

programme did not show the intended results due to non-availability of land, low financial inputs, inability to establish school gardens, and community kitchens.

12.7 Summary

Health has been declared a fundamental human right. This implies that the State has a responsibility for the health of its people. National governments all over the world are striving to expand and improve their health care services. The present concern in both developed and developing countries is not only to reach the whole population with adequate health care services, but also to secure an acceptable level of Health for All, through the application of primary health care programmes. Indian government Since India became free, several measures have been undertaken by the National Government to improve the health of the people. Prominent among these measures are the National Health Programmes, which have been launched by the Central Government for the control / eradication of communicable diseases, improvement of environmental sanitation, raising the standard of nutrition, control of population and improving rural health. Various international agencies like WHO, UNICEF, UNFPA, World Bank, as also a number of foreign agencies like SIDA, DANIDA, NORAD and USAID have been providing technical and material assistance in the implementation of these programmes.

12.8 Technical terms

AIDS: Acquired immuno-deficiency syndrome is a fatal illness caused by a retrovirus known as the human immuno-deficiency virus (HIV) which breaks down the body's immune system, leaving the victim vulnerable to a host of life-threatening opportunistic infections, neurological disorders, or unusual malignancies.

RNTPC: (Revised National Tuberculosis Control Programme) The government of India, WHO and World Bank together reviewed the National Tuberculosis Programme (NTP) and a revised strategy for NTP was evolved.

DOTS: Direct Observed Therapy Short-term is a community-based tuberculosis treatment and care strategy which combines the benefits of supervised treatment, and the benefits of community-based care and support.

12.9 Self-assessment Questions

1. Highlight the importance of National Health Programmes in India.
2. What are the important National Health Programmes implemented in India since independence?
3. Give a brief account of various programmes for communicable diseases.
4. Give a brief account of various programmes for non-communicable diseases.
5. Give a brief account of various programmes related to maternal and child health.
6. Give a brief account of various nutritional programmes implemented in India.

12.10 Books for further reading

Park K, Preventive and Social Medicine, M/s Banarsidas Bhanot publishers, Jabalpur, 2005
Bhaskara Rao T, Textbook of Community Medicine, Paras Medcal Publisher, Hyderabad, 2004
Kulakarni A.P, Baride J P, Text Book of Community Medicine, Vora Medical Publication, Mumbai.

Lesson 13

Epidemiology of Non-Communicable Diseases Part –I

13.0 OBJECTIVES

- Understanding the meaning of Non-Communicable Diseases
- Knowing the key sets of Non-Communicable Diseases risk factors
- To know the gaps in knowledge about the natural history of chronic diseases
- Studying the methods of prevention and control of Non-Communicable Diseases
- Understanding Coronary Heart Diseases
- Knowing the important risk factors causing Coronary Heart Diseases
- To know the strategies for prevention of Coronary Heart Diseases

STRUCTURE

13.1 Meaning of Non-Communicable Diseases

Non-communicable diseases (NCDs) include cardiovascular, renal, nervous and mental diseases, musculosketal conditions such as arthritis and allied diseases, chronic non-specific respiratory diseases (e.g., chronic bronchitis, emphysema, asthma), permanent results of accidents, senility, blindness, cancer, diabetes, obesity and various other metabolic and degenerative diseases and chronic results of communicable diseases. Disorders of unknown cause and progressive course are often labelled “degenerative”.

Chronic non-communicable diseases are assuming increasing importance among the adult population in both developed and developing countries. Cardiovascular diseases and cancer are at present the leading causes of death in developed countries. The prevalence of chronic disease is showing an upward trend in most countries, and for several reasons this trend is likely to increase. For one reason, life expectancy is increasing in most countries and a greater number of people are living to older ages and are at greater risk to chronic diseases of various kinds. For another, the life-styles and behavioural patterns of people are changing rapidly, these being favourable to the beginning of chronic diseases.

The impact of chronic diseases on the lives of people is serous when measured in terms of loss of life, disablement, family hardship and poverty and economic loss to the country. Developing countries have to take appropriate measures to avoid the “epidemics” of non-communicable diseases likely to come with socio-economic and health developments.

13.2 Non-communicable disease risk factors

Most epidemiologists accept that six key sets of "risk factors" are responsible for a major share of adult non-communicable disease morbidity and premature mortality. These are as follows:

1. Cigarette use and other forms of smoking
2. Alcohol abuse
3. Failure or inability to obtain preventive health services (e.g., for hypertension control, cancer detection, management of diabetes)
4. Life-style changes (e.g., dietary patterns, physical activity)
5. Environmental risk factors (e.g., occupational hazards, air and water pollution, and possession of destructive weapons)
6. Stress factors.

13.3 Gaps in knowledge about natural history of chronic diseases

There are many gaps in our knowledge about the natural history of chronic diseases. These gaps cause difficulties in medical investigations and research. These are:

1. **Absence of known agent:** There is much to learn about the cause of chronic disease. Whereas in some chronic diseases the cause is known, for many chronic diseases the causative agent is not known. The absence of a known agent makes both diagnosis and specific prevention difficult.

2. **Multifactorial causation:** Most chronic diseases are the result of multiple causes. Rarely there is a simple one-to-one cause-effect relationship. In the absence of a known agent, the term "risk factor (s)" is used to describe certain factors in a person's background or life-style that make the likelihood of the chronic condition more probable. Further, chronic diseases appear to result from the cumulative effects of multiple risk factors. These factors may be both environmental and behavioural or constitutional. Epidemiology has contributed massively in the identification of risk factors of chronic diseases. Many more are yet to be identified and evaluated.

3. **Long latent period:** A further obstacle to our understanding of the natural history of chronic diseases is the long latent (or incubation) period between the first exposure to "suspected cause" and the eventual development of disease (e.g., cervical cancer). This makes it difficult to link suspected causes (antecedent events) with outcomes, e.g., the possible relation between oral contraceptives and the occurrence of cervical cancer. In an attempt to overcome this problem, a search has been made for precursor lesions in, for example, cancer cervix, oral cancer and gastric cancer. But this is not possible in all chronic diseases. However, it has now become increasingly evident that the factors favouring the development of chronic disease are often present early in life, preceding the appearance of chronic disease by many years. Examples include hypertension, diabetes, stroke, etc.

4. **Indefinite onset:** Most chronic diseases are slow in onset and development, and the distinction between diseased and non-diseased states may be difficult to establish (e.g., diabetes and hypertension). In many chronic diseases (e.g., cancer) the underlying pathological processes are well established long before the disease manifests itself. By the time the patient seeks medical advice, the damage already caused may be irreversible or difficult to treat.

13. 4 Prevention and control of Non-Communicable Diseases

The preventive measures on chronic diseases are based on the knowledge that they are caused by the many factors. This demands a complex mix of interventions. Previously only tertiary prevention seemed possible to prevent or delay the development of further disability or the occurrence of premature death. But, now, with the identification of risk factors, health promotion activities aimed at primary prevention are being increasingly applied in the control of chronic diseases (e.g., elimination of reduction of risk factors, modification of life-style patterns).

Present knowledge indicates that the chronically ill require a wide spectrum of services. They are;

a. case-finding through screening and health examination techniques
b. application of improved methods of diagnosis
c. treatment and rehabilitation
d. control of food, water and air pollution
e. reducing accidents
f. influencing patterns of human behaviour and life styles through intensive education
g. upgrading standards of institutional care, and
h. developing and applying better methods of comprehensive medical care including primary health care.

Suitable governmental policies are also required in the case of smoking control, control of alcohol and drug abuse. A holistic approach is needed in handling the complex medical and social needs of the chronically ill and should always be considered in relation to the family and community.

It is now felt that the principles of prevention of chronic health diseases can be applied also to other major non-communicable diseases (NCDs) because of common risk factors. A broader concept is emerging, that is, to develop an overall integrated programme for the prevention and control of NCDs as a part of primary health care systems, simultaneously attacking several risk factors known to be implicated in the development of non-communicable diseases. Such concerted preventive action should reduce not only cardiovascular diseases but also other major NCDs, with an overall improvement in health and length of life. The following sections and lessons will discuss some of the more important chronic non-communicable diseases and conditions.

13. 5 Definition and types of Coronary Heart Disease

Cardiovascular diseases (CVD) comprise of a group of diseases of the heart and the vascular system. The major conditions are ischaemic heart disease (IHD), hypertension, cerebrovascular disease (stroke) and congenital heart disease. Rheumatic heart disease (RHD) continues to be an important health problem in many developing countries.

Coronary Heart Disease (CHD) also known as ischaemic heart disease has been defined as “impairment of heart function due to inadequate blood flow to the heart compared to its needs, caused by obstructive changes in the coronary circulation to the heart”. It is the main cause of 25-30 per cent of deaths in most industrialized countries.

The World Health Organisation (WHO) has drawn attention to the fact that CHD is our modern “epidemic”, i.e., a disease that effects populations, not an unavoidable attribute of ageing. CHD may manifest in many presentations:

a. angina pectoris of effort
b. myocardial infarction
c. irregularities of the heart
d. cardiac failure
e. sudden death

Myocardial infarction is specific to CHD; angina pectoris and sudden death are not. Rheumatic heart disease and cardiomyopathy are potential sources of diagnostic confusion. The natural history of CHD is very variable. Death may occur in the first episode or after a long history of disease.

13. 6 Risk factors causing Coronary Heart Disease

CHD is a worldwide disease. Mortality rates vary widely in different parts of the world. The highest coronary mortality is seen at present in North Europe and in English – speaking countries (e.g., Scotland, Northern Ireland, Finland). On the other hand rates in southern Europe are much lower (e.g., Italy, France), and those in Japan, although a rich industrialized country, are extremely low. The pattern of CHD in India has been reported to be as follows;

(a) CHD appears a decade earlier compared with the age incidence in developed countries. The peak period is attained between 51-60 years
(b) Males are affected more than females
(c) Hypertension and diabetes account for about 40 per cent of all cases
(d) Heavy smoking is responsible aetiologically in a good number of cases

Risk factors:

The aetiology of CHD is multifactorial. Apart from the obvious ones such as increasing age and male sex, studies have identified several important "risk "factors (i.e., factors that make the occurrence of the disease more probable). Some of the risk factors are modifiable, others immutable (Table 1). Presence of any one of the risk factors places an individual in a high-risk category for developing CHD. The greater the number of risk factors present, the more likely one is to develop CHD. The main risk factors are discussed in the following section.

Table 1
Risk Factors for CHD

Not modifiable	Modifiable
Age	Cigarette smoking
Sex	High blood pressure
Family history	Elevated serum cholesterol
Genetic factors	Diabetes
Personality	Obesity
	Sedentary habits
	Stress

Source: Preventive and Social Medicine, K.Park, p289

1.Smoking:
Smoking which is a uniquely human habit has been identified as major CHD risk factor. It has been calculated that in countries where smoking has been a widespread habit, it is responsible for 25 per cent of CHD deaths under 65 years of age in men. Cigarettes seem to be particularly important in causing sudden death from CHD especially in men under 50 years of age. The

degree of risk of developing CHD is directly related to the number of cigarettes smoked per day. Filter cigarettes are probably not protective as widely believed. There is evidence that the influence of smoking is not only independent of, but also synergistic with other risk factors such as hypertension and elevated serum cholesterol. This means that the effects are more than additive. The risk of death from CHD decreases on stopping of smoking. Smoking with several possible mechanisms like – carbon monoxide induced atherogenesis; nicotine stimulation of adrenergic drive raising both blood pressure and myocardial oxygen demand; lipid metabolism with fall in "protective" high-density lipoprotenis, etc., is a major risk factor in causing CHD.

2 Hypertension:
The blood pressure is the single most useful test for identifying individuals at a high risk of developing CHD. Hypertension accelerates the atherosclerotic process, especially in hyperlipidemia is also presents and contributes importantly to CHD. Both diastolic and systolic blood pressures are significant risk factors.

3. Serum cholesterol:
Elevation of serum cholesterol was one of the factors which carried an increased risk for the development of myocardial infarction. Evidence suggesting that there is a triangular relationship between habitual diet, blood choloesterol – lipoprotein levels and CHD and that these relationships are judged to be causal. Many studies empirically proven that normally CHD is associated with those people having a relatively high mean level of cholesterol (i.e. greater than 200 mg / dl in adults). Various studies suggest that the risk of CHD rise steadily with the serum cholesterol concentration. Beyond a certain level of serum cholesterol there is a strong association with CHD.

When we look at the various types of lipoproteins, it is the level of low – density lipoprotein (LDL) cholesterol that is most directly associated with CHD. While very low – density lipoprotein (VLDL) has also been shown to be associated with premature atherosclerosis, it is more strongly associated with peripheral vascular disease (e.g., intermittent claudication) than with CHD. High – density lipoprotein (HDL) cholesterol is protective against the development of CHD – the higher its mean level in group of individuals, the lower the incidence of infarction in that group. HDL should be more than 30 mg/dl. To further understand the CHD risk prediction based on serum lipid levels, a total "Cholesterol / HDL ratio" has been developed. A ratio of less than 3.5 has been recommended as a clinical goal for CHD prevention.

5. Other risk factors:

a) **Diabetes:** The risk of CHD is 2 –3 times higher in diabetics than in non – diabetics. CHD is responsible for 30 to 50 per cent of deaths in diabetics over the age of 40 years in industrialized countries.

b) **Genetic factors:** A family history of CHD is known to increase the risk of premature death. Genetic factors are probably the most important determinants of a given individual's TC and LDL levels. However, the importance of genetic factors in the majority of cases is largely unknown.

c) **Physical activity:** Sedentary life – style is associated with a greater risk of the development of early CHD. There is evidence that regular physical exercise increases the concentration of HDL and decreases both body weight and blood pressure, which are beneficial to cardiovascular health.

d) **Type A personality:** Type A behaviour is associated with competitive drive, restlessness, hostility and a sense of urgency or impatience. Type A individuals are more coronary prone to CHD than the calmer, more philosophical Type B individuals.

e) **Alcohol:** High alcohol intake, defined as 75 g or more per day is an independent risk factor for CHD, hypertension and all cardio-vascular diseases. The evidence that moderate alcohol intake leads to a reduction in the risk of CHD is unsubstantiated.

f) **Hormones:** The profound difference in the mortality rates for CHD between male and female subjects suggests that the underlying factor may have a hormonal basis. It has been hypothesized that hyperoestrogenemia may be the common underlying factor that leads to atherosclerosis and its complications such as CHD, stroke and peripheral vascular disease.

g) **Oral contraceptives:** Women using oral contraceptives have higher systolic and diastolic blood pressure. The risk of myocardial infarction in women seems to be increased by oral contraceptives, and the risk is compounded by cigarette smoking.

13. 7 Prevention of Coronary Heart Disease

According to the report of the WHO Expert Committee on Prevention of CHD the following strategies may be useful:

A. Population strategy
   i) Prevention in whole populations
   ii) Primordial prevention in whole populations
B. High risk strategy
C. Secondary prevention

A) Population strategy:

CHD is primarily a mass disease. The strategy should therefore be based on mass approach focusing mainly on the control of underlying causes in whole populations, not merely in individuals. This approach is based on the principle that small changes in risk factor levels in total populations can achieve the biggest reduction in mortality. This requires the mobilization and involvement of the whole community to alter its life-style practices that are associated with CHD.

i) Prevention in whole populations:

The population strategy centres round the following key areas:

a) Dietary changes: Dietary modification is the principal preventive strategy in the prevention of CHD. The WHO Expert Committee considered the following dietary changes to be appropriated for high incidence populations:

- Reduction of fat intake to 20-30 per cent of total energy intake;
- Consumption of saturated fats must be limited to less than 10 per cent of total energy intake;
- A reduction of dietary cholesterol to below 100 mg per 1000 kcal per day
- An increase in complex carbohydrate consumption (i.e., vegetables, fruits, whole grains, legumes)
- Avoidance of alcohol consumption; and
- Reduction of salt intake to 5 g daily or less;

b) Smoking: As there is no supportive evidence to the concept of “safer cigarette”, the goal should be to achieve a smoke-free society, and several countries are progressing towards this goal. To achieve goal of a smoke-free society, a comprehensive health programme would be required which includes effective information and education activities, legislative restrictions, fiscal measures and smoking cessation programmes.

c) Blood pressure: It has been estimated that even a small reduction in the average blood pressure of the whole population by a mere 2 or 3 mm Hg would produce a large reduction in the incidence of cardiovascular complications. This involves a multifactorial approach based on a prudent diet, regular physical activity and weight control.

d) Physical activity: Regular physical activity should be a part of normal daily life. It is particularly important to encourage children to take up physical activities that they can continue throughout

ii) Primordial prevention: It involves preventing the emergence and spread of CHD risk factors and lifestyles that have not yet appeared or become endemic. This applies to developing countries in particular. These countries should seek to preserve their traditional eating patterns and life-styles associated with low levels of CHD risk factors. Since the aetiology of CHD is multifactorial the approach to prevention should be multifactorial aimed at controlling or modifying as many risk factors as possible. The aim should be to change the community as a whole, not the individual subjects living in it.

B) High risk strategy: High risk intervention can only start once those at high risk have been identified. By means of simple tests such as blood pressure and serum cholesterol measurement it is possible to identify individuals at special risk. Individuals at special risk also include those who smoke, those with a strong family history of CHD, diabetes and obesity and young women using oral contraceptives. Having identified those at high risk, the next step will be to bring them under preventive care and motivate them to take positive action against all the identified risk factors, e.g., an elevated blood pressure should be treated; the patient should be helped to break the smoking habit permanently; serum cholesterol concentration should be reduced in those in whom it has raised, etc.,

C)Secondary Prevention: Secondary prevention must be seen as a continuation of primary prevention. It forms an important part of an overall strategy. The aim of secondary prevention is to prevent the recurrence and progression of CHD. Secondary prevention is a rapidly expanding field with much research in progress (e.g., drug trials, coronary surgery, and use of pace makers). Secondary prevention also includes the principles followed in other strategies such as cessation of smoking, control of hyper tension and diabetes, healthy nutrition, exercise promotion, etc.,

13.8 Summary

Chronic non-communicable diseases are assuming increasing importance among the adult population in both developed and developing countries. The prevalence of chronic disease is showing an upward trend in most countries, and for several reasons this trend is likely to increase. Alcohol, cigarette smoking, life style, stress, environmental risk factors like air and water pollution, occupational hazards are the major NCD risk factors. Coronary heart disease is one of the important diseases causing high mortality in present day world. Hypertension, blood cholesterol levels indicate to some extent the risk exposure to CHD. Some of the strategies to prevent CHD include population strategy, high-risk strategy, and secondary prevention. These

strategies have their own advantages and disadvantages. As CHD is a mass disease population strategy is having great potential in prevention.

13.9 Technical terms

Non-communicable Diseases (NCDs): Non-communicable diseases (NCDs) include cardiovascular, renal, nervous and mental diseases, musculosketal conditions such as arthritis and allied diseases, chronic non-specific respiratory diseases (e.g., chronic bronchitis, emphysema, asthma), permanent results of accidents, senility, blindness, cancer, diabetes, obesity and various other metabolic and degenerative diseases and chronic results of communicable diseases. Disorders of unknown cause and progressive course are often labelled "degenerative".

Coronary Heart Disease (CHD): also known as ischaemic heart disease has been defined as "impairment of heart function due to inadequate blood flow to the heart compared to its needs, caused by obstructive changes in the coronary circulation to the heart"

Primordial prevention: It involves preventing the emergence and spread of CHD risk factors and lifestyles that have not yet appeared or become endemic.

Type-A personality: Type A behaviour is associated with competitive drive, restlessness, hostility and a sense of urgency or impatience.

13.10 Self-assessment Questions

1. Which diseases are called as Non-communicable diseases? List out the major risk factors causing these diseases.
2. What are the gaps in our knowledge about natural history of chronic diseases?
3. What are the preventive and control measures to tackle chronic diseases?
4. Define Coronary Heart Disease. What are the types of Coronary heart diseases?
5. List out the major risk factors causing CHD.
6. What are the major preventive strategies adopted to control CHD and also give the important challenges in implementing these challenges?

13.11 Books for further reading

Park K, Preventive and Social Medicine, M/s Banarsidas Bhanot publishers, Jabalpur, 2005

Bhaskara Rao T, Textbook of Community Medicine, Paras Medcal Publisher, Hyderabad, 2004

Kulakarni A.P, Baride J P, Text Book of Community Medicine, Vora Medical Publication, Mumbai

Lesson - 14

EPIDEMIOLOGY OF NON-COMMUNICABLE DISEASES-PART II

14.0 OBJECTIVES

- Understanding the meaning of hypertension
- Knowing the classification of hypertension by extent of organ damage
- To know the risk factors for hypertension
- Studying the methods of prevention and control of hypertension
- Understanding cancer disease
- Knowing the important risk factors causing cancer
- To know the preventive measures of cancers

STRUCTURE

14.1 Meaning of Hypertension

Hypertension is a chronic condition of concern due to its role in coronary heart disease. Definition of hypertension is difficult. Sir George Peckering first formulated a concept that blood pressure in a population is distributed continuously as a bell-shaped curve with no separation between normotension and hypertension. The dividing line between normal and high blood pressure can be defined only in operational way.

Definition:

A statement that a given arterial pressure is above normal requires knowledge of range of normality for a true definition of a raised arterial pressure (such as is used in epidemiological studies) above the mean of a population (studied under standard conditions) is usually used. It is easy to say that an arterial pressure of 120 systolic, 80 diastolic in mm of mercury is normal from the age of 15 years onwards.

14.2 Blood pressure measurement

Blood pressure should be monitored with well-calibrated sphygmomanometer with the cuff of proper size. The cuff should encircle at least 80% of the arm circumference after patient has been resting comfortably. Back support in the sitting or supine position for at least 5 minutes and at least 30 minutes after smoking or coffee ingestion should be given. The diagnosis of hypertension should be made only after elevation is noted on 3 readings on different occasions usually over a period of few months unless the elevation severity or associated symptoms

demand immediate treatment. Transient element of blood pressure caused by excitement or apprehension does not constitute disease. The WHO Expert committee has laid down following criteria for hypertension.

"Systolic BP (SBP) above 160mm, and / or diastolic BP (DBP) above 95 mm of Hg"
Recently, the cutoff point for SBP has been shifted to 140 mm instead of 160 mm.

Tracking of blood pressure:
If blood pressure levels of individuals were followed up over a period of years from early childhood into adult life, then those individuals whose pressures were initially high in the distribution, would probably continue in the same "track" as adults. In other words, low blood pressure levels tend to remain low, and high levels tend to become higher as individuals grow older. This knowledge can be applied in identifying children and adolescents "at risk" of developing hypertension at a future date.

Classification: Hypertension is divided into primary (essential) and secondary. Hypertension is classified as "essential" when the causes are generally unknown. Essential hypertension is the most prevalent form of hypertension accounting for 90 per cent of all cases of hypertension. Hypertension is classified as "secondary" when some other disease process or abnormality is involved in its causation. Prominent among these are diseases of kidney (chronic glomerulo-nephritis and chronic pyelonephritis), tumours of the adrenal glands, congenital narrowing of the aorta and toxemias of pregnancy. Altogether, these are estimated to account for about 10 per cent or less of the cases of hypertension.

Interestingly, hypertension is one of the chronic diseases, which has shown the largest decline in mortality in some countries during the last four decades. This fall is attributed to the use of more effective drugs introduced during the past 15-20 years to control hypertension. Table 1 shows the classification of hypertension by blood pressure level.

Table 1
Classification of blood pressure and management

Category	Systolic BP mm Hg	Diastolic BP mm Hg	Recommendations of follow up	Treatment
Normal	<130	<85	Recheck in 2 years	No treatment needed
High Normal	130-140	85-90	Recheck in 1 year	Diet therapy
Mild Hypertension (stage 1)	140-160	90-100	Confirm within three months	Start treatment diet + chemotherpy
Moderate Hypertension (stage 2)	160-180	100-110	Start treatment and check monthly	ACE inhibitors or beta blocker
Severe Hypertension (stage 3)	180-200	110-120	Rigorous treatment; Check every week; look for complications	Same as above; 2 drug Combinations needed
Very severe hypertension	>200	>120	Rigorous treatment; check every week; look for complications	Same as above; 2 or 3 drug combination may be needed

Source: Textbook of Community Medicine, Paras Medical publisher

14.3 Classification of hypertension by extent of organ damage

Although the extent of organ damage often correlates with the level of blood pressure, it is not always the case. In addition the rate of progression of organ damage varies from one individual to another depending on many influences, most of which are incompletely understood. Therefore, blood pressure and organ impairment should be evaluated separately, since markedly high pressures may be seen without organ damage and, conversely, organ damage may be present with only moderate elevation of blood pressure. The presence of signs of organ damage confers an increased cardiovascular risk to any level of blood pressure. The classification of hypertension by extent of organ damage uses stages to indicate progression of the severity of disease with time.

Table 2
Classification of hypertension by extent of organ damage

Stage 1	No manifestations of organic change
Stage II	At least one of the following manifestations of organ involvement;
	Left ventricular hypertrophy (detected by radiogram, electrocardiogram, echocardiogram)
	Generalized and focal narrowing of the retinal arteries
	Micro-albuminuria, proteinuria and/or slight elevation of the plasma creatinine concentration (1.2-2.0 mg/dl)
	Ultrasound or radiological evidence of atherosclerotic plaque (in the aorta or carotid, iliac or femoral arteries)
Stage III	Both symptoms and signs have appeared as a result of organ damage. These include:
	Heart: Angina pectoris Myocardial infarction Heart failure
	Brain: Stroke Transient ischaemic attack Hypretensive encephalopathy Vascular dementia
	Optic fundi: Retinal haemorrhages and exudates with or without papilloedema (these features are pathognomonic of the malignant or accelerated phase)
	Kidney: Plasma creating concentration > 2.0 mg/dl Renal failure
	Vessel: Dissecting aneurysm Symptomatic arterial occlusive disease

Source: WHO Expert Committee on Arterial Hypertension

14.4 Risk factors for hypertension

Hypertension is not only one of the major risk factors for most forms of cardiovascular disease, but that it is a condition with its own risk factors. A WHO Scientific Group has classified the risk factors for hypertension as follows.

1. Non-modifiable risk factors:

a) Age: Blood pressure rises with age in both sexes and the rise is greater in those with higher initial blood pressure. Age probably represents an accumulation of environmental influences and the effect of genetically programmed senescence in body systems. Some communities from primitive societies with calorie and often salt intakes at subsistence level have now been identified whose mean blood pressure does not rise with age.

b) **Sex:** Early in life there is little evidence of a difference in blood pressure between sexes. However, at adolescence, men display a higher average level. The difference is most evident in young and middle aged adults. Late in life the difference narrows and the pattern may even be reversed.

c) Genetic Factors: There is considerable evidence that blood pressure levels are determined in part by genetic factors, and that the inheritance is polygenic. The evidence is based on twin and family studies. Twin studies have confirmed the importance of genetic factors in hypertension.

d) Ethnicity: Population studies have consistently revealed higher blood pressure levels in black communities than other ethnic groups. Average difference in blood pressure between the two groups vary from slightly less than 5 mm Hg during the second decade of life to nearly 20 mm Hg during the sixth.

2. Modifiable risk factors:

a) Obesity: Epidemiological observations have identified obesity as a risk factor for hypertension. The greater the weight gain, the greater the risk of high blood pressure. Data also indicate that when people with high blood pressure lose weight, their blood pressure generally decreases.

b) Salt Intake: There is an increasing body of evidence to the effect that a high salt intake (i.e., 7 – 8 g per day) increases the blood pressure proportionately. Low sodium intake has been found to lower the blood pressure. It has been found that essential hypertensives have a genetic abnormality of the kidney, which makes salt excretion difficult except at raised levels of arterial pressure.

c) Saturated Fat: Recent evidence suggests that saturated fat raises blood pressure as well as serum cholesterol.

d) Dietary Fibre: Several studies indicate that the risk of CHD and hypertension is inversely related to the consumption of dietary fibre. Most fibres reduce plasma total and LDL cholesterol.

e) Alcohol: High alcohol intake is associated with an increased risk of high blood pressure. It appears that alcohol consumption raises systolic pressure more than the diastolic.

f) Heart Rate: When groups of normotensive and untreated hypertensive subjects, matched for age and sex, are compared, the heart rate of the hypertensive group is invariably higher. This may reflect a resetting of sympathetic activity at a higher level.

g) Physical Activity: Physical activity by reducing body weight may have an indirect effect on blood pressure.

h) Environmental Stress: The term hypertension itself implies a disorder initiated by tension or stress. It is an accepted fact that psychosocial factors operate through mental processes, consciously or unconsciously, to produce hypertension.

i) Socio-economic status: In countries that are in post-transitional stage of economic and epidemiological change, consistently higher levels of blood pressure have been noted in lower socio-economic groups. This inverse relation has been noted with levels of education, income and occupation.

j) Other Factors: The commonest present cause of secondary hypertension is oral contraception, because of the oestrogen component in combined preparations.

14.5 Prevention of hypertension

The WHO has recommended the following approaches in the prevention of hypertension:

1. Primary prevention: Although control of hypertension can be successfully achieved by medication (secondary prevention) the ultimate goal in general is primary prevention. Primary prevention has been defined as "all measures to reduce the incidence of disease in a population by reducing the risk of onset". The earlier the prevention starts the more likely it is to be effective. The WHO has recommended the following approaches in the prevention of hypertension. Both the approaches are complimentary.

a) Population strategy: The population approach is directed at the whole population, irrespective of individual risk levels. The concept of population approach is based on the fact that even a small reduction in the average blood pressure of a population would produce a large reduction in the incidence of cardiovascular complications such as stroke and CHD. The goal of the population approach is to shift the community distribution of blood pressure towards lower levels or "biological normality". This involves multifactorial approach, based on the following nonpharmacotherapeutic interventions.

i) Nutrition: Dietary changes such as reduction of salt intake, moderate fat intake, avoidance of a high alcohol intake and restriction of energy intake appropriate to body needs are very important.

ii) Weight reduction: The prevention and correction of obesity (Body Mass Index greater than 25) is a prudent way of reducing the risk of hypertension and indirectly CHD; it goes with dietary changes.

iii) Exercise Promotion: The evidence that regular physical activity leads to a fall in body weight, blood lipids and blood pressure goes to suggest that regular physical activity should be encouraged as part of the strategy for risk-factor control.

iv) Behavioural changes: Reduction of stress and smoking, modification of personal life-style, yoga and transcendental meditation could be useful.

v) **Health education:** The general public require preventive advice on all risk factors and related health behaviour. The whole community must be mobilized and made aware of the possibility of primary prevention.

vi) **Self-care:** An important element in a community–based health programme is patient participation. The patient is taught self-care, i.e., to take his own blood pressure and keep a log-book of his readings. By doing so, the burden on the official health services would be considerably reduced.

b) High-risk strategy: The aim of this approach is " to prevent the attainment of levels of blood pressure at which the institution of treatment would be considered". This approach is appropriate if the risk factors occur with very low prevalence in the community. Detection of high-risk subjects should be encouraged by the optimum use of clinical methods. Since hypertension tends to cluster in families, the family history of hypertension and tracking of blood pressure from childhood may be used to identify individuals at risk.

2.Secondary prevention:

The goal of secondary prevention is to detect and control high blood pressure in affected individuals. Modern anti-hypertensive drug therapy can effectively reduce high blood pressure and consequently, the excess risk of morbidity and mortality from coronary, cerebrovascular and kidney disease. The control measures comprise:

i) **Early case detection:** Early detection is a major problem. This is because high blood pressure rarely causes symptoms until organic damage has already occurred, and our aim is to control it before this happens.

ii) **Treatment:** In essential hypertension, as in diabetes, we cannot treat the cause, because we do not know what it is. Instead, we try to scale down the high blood pressure to acceptable levels. The aim of the treatment should be to obtain a blood pressure below 140/90, and ideally a blood pressure of 120/80. Control of hypertension has been shown to reduce the incidence of stroke and other complication.

iii) **Patient compliance:** The treatment of high blood pressure must normally be life-long and this presents problems of patient compliance, which is defined as "the extent to which patient behaviour (in terms of taking medicines, following diets or executing other life-style changes) coincides with clinical prescription". The compliance rates can be improved through education directed to patients, families and the community.

14.6 Meaning of cancer

Cancer may be regarded as a group of diseases characterized by an (i) abnormal growth of cells (ii) ability to invade adjacent tissues and even distant organs, and (iii) the eventual death of the affected patient if the tumour has progressed beyond that stage when it can be successfully removed. Cancer can occur at any site or tissue of the body and may involve any type of cells.

Major categories of cancer:

(a) **Caremomas,** which arise from epithelial cells lining the internal surfaces of the various organs (e.g. mouth, oesophagus, intestines, uterus) and from the skin epithelium;
(b) **Sarcomas**, which arises from mesodermal cells constituting the various connective tissues (e.g. fibrous tissue, fat and bone); and

(c) **Lymphomas, myeloma and leukaemias** arising from the cells of bone marrow and immune systems.

The term **"primary tumour**" is used to denote cancer in the organ of origin, while **"secondary tumour"** denotes cancer that has spread to regional lymph nodes and distant organs. When cancer cells multiply and reach a critical size, the cancer is clinically evident as a lump or ulcer localized to the organ of origin in early stages. As the disease advances, symptoms and signs of invasion and distant metastases becomes clinically evident.

Table 3
Common Cancers in India

Females	Males
Cancer of the cervix	Cancer of the lung
Breast cancer	Oropharyngeal cancers
Cancer of the stomach	Prostate cancers
Colorectal cancer	Colorectal cancer
Oropharyngeal cancers	Cancer of the stomach
Cancer of the lung	Oesophageal cancer
Ovarian cancer	Liver cancer
Oesophageal cancer	Lymphomas
Liver cancer	

14.7 Causes of cancer

1) Environmental Factors:
Environmental factors are generally held responsible for 80 to 90 per cent of all human cancers. The major environmental factors identified so far include:

a) **Tobacco:** Tobacco in various forms of its usage (e.g. smoking, chewing) is the major environmental cause of cancers of the lung, larynx, mouth, pharynx, oesophagus, bladder, pancreas and probably kidney.

b) Alcohol: Excessive intake of alcohol beverages is associated with oesophageal and liver cancer.

c) Dietary factors: Dietary factors are also related to cancer. Smoked fish is related to stomach cancer, dietary fibre to intestinal cancer, beef consumption to bowel cancer and a high fat diet to breast cancer.

d) Occupational exposures: These include exposure to benzene, arsenic, cadmium, chromium, vinyl chloride, asbestos, polycyclic hydrocarbons, etc., The risk of occupational exposure is considerably increased if the individuals also smoke cigarettes.

e) Viruses: An intensive search for a viral origin of human cancers revealed that hepatitis B and C virus is casually related to hepatocellular carcinoma. The relative risk of Kaposi's sarcoma occurring in patient with HIV infection is so high that it was the first manifestation of the AIDS epidemic to be recognized.

f) Parasites: Parasitic infections may also increase the risk of cancer, as for example, schistosomiasis in middle East producing carcinoma of the bladder.

g) **Customs, Habits and Life-styles:** To the above causes must be added customs, habits and lifestyles of people, which may be associated with an increased risk for certain, cancers. The familiar examples are the demonstrated association between smoking and lung cancer, tobacco and betel chewing and oral cancer, etc.

h) **Others:** There are numerous other environmental factors such as sunlight, radiation, air and water pollution, medications (e.g. oestrogen) and pesticides which are related to cancer.

2) Genetic Factors:
Genetic influences have long been suspected. For example, retinoblastoma occurs in children of the same parent. Mongols are more likely to develop cancer (leukaemia) than normal children. However, genetic factors are less conspicuous and more difficult to identify. There is probably a complex interrelationship between hereditary susceptibility and environmental carcinogenic stimuli in the causation of a number of cancers.

14.8 Cancer Control

Cancer Control:
Cancer control consists of a series of measures based on present medical knowledge in the fields of prevention. Detection, diagnosis, treatment, after care and rehabilitation, aimed at reducing significantly the number of new cases, increasing the number of cures and reducing the invalidism due to cancer. The basic approach to the control of cancer is through primary and secondary prevention.

1. Primary prevention:
Cancer prevention until recently was mainly concerned with the early diagnosis of the disease (secondary prevention) preferably at a precancerous stage. Advancing knowledge has increased our understanding of causative factors of some cancers and it is now possible to control these factors in the general population as well as in particular occupational groups. They include the following:

a) **Control of tobacco and alcohol consumption:** Primary prevention offers the greatest hope for reducing the number of tobacco- induced and alcohol related cancer deaths. Control of tobacco smoking alone would reduce the burden of cancer greatly.
b) **Personal Hygiene:** Improvements in personal hygiene may lead to declines in the incidence of certain types of cancer, e.g. cancer cervix.
c) **Radiation:** Special efforts should be made reduce the amount of radiation (including medical radiation) received by each individual to a minimum without reducing the benefits.
d) **Occupational exposures:** The occupational aspects of cancer are frequently neglected. Measures to protect workers from exposure to industrial carcinogens should be enforced in industries.
e) **Immunization:** In the case of primary liver cancer, immunization against hepatitis B virus presents an exciting prospect.
f) **Foods, drugs and cosmetics:** These should be tested for carcinogens.
g) **Air pollution:** Control of air pollution is another preventive method.
h) **Treatment of precancerous lesions:** Early detection and prompt treatment of precancerous lesions such as cervical tears, intestinal polyposis, warts, chronic gastritis, chronic cervicitis, and adenomata is one of the cornerstones of cancer prevention.

i) Legislation: Legislation has also a role in primary prevention. For example, legislation to control known environmental carcinogens (e.g. tobacco, alcohol, air pollution) is inadequate or only moderately enforced in a number of countries.

j) Cancer education: An important area of primary prevention is cancer education. It should be directed at "high-risk" groups. The aim of cancer education is to motivate people to seek early diagnosis and early treatment. Cancer organizations in many countries remind the public of the early warning signs ("danger signals") of cancer. These are:

- a lump or hard area in the breast
- a change in a wart or mole
- a persistent cough or hoarseness
- excessive loss of blood at the monthly period or loss of blood outside the usual dates
- blood loss from any natural orifice
- a swelling or sore that does not get better
- unexplained loss of weight

There is no doubt that the possibilities for primary prevention are many. Since primary prevention is directed at large population groups, the cost can be high and programmes difficult to conduct.

2. Secondary prevention:

Secondary prevention comprises the following measure:

a) Cancer registration:

Cancer registration is a sine qua non for any cancer control programme. It provides a base for assessing the magnitude of the problem and for planning the necessary services. Cancer registers are basically of two types:

i) **Hospital-based registries:** The hospital –based registry includes all patients treated by a particular institution, whether in-patients or out-patients. For a long-term follow -up of patients, hospital-based registries can be of considerable value in the evaluation of diagnostic and treatment programmes.

ii) Population-based registries: A right step is to set up a "hospital-based cancer registry" and extend the same to a "population-based cancer registry". The aim is to cover the complete cancer situation in a given geographic area.

b) Early detection of cases: Cancer screening is the main weapon for early detection of cancer at a pre-invasive or pre-malignant stage. Effective screening programmes have been developed for cervical cancer, breast cancer and oral cancer. Like primary prevention, early diagnosis has to be conducted on a large scale. Early detection programmes will require mobilization of all available resources and development of a cancer infrastructure starting at the level of primary health care, ending with complex cancer centres or institutions at the state or national levels.

c) Treatment: Treatment facilities should be available to all cancer patients. Certain forms of cancer are amenable to surgical removal, while some others respond favourably to radiation or chemotherapy or both. Since most of the known methods of treatment have complementary effect on the ultimate outcome of the patient, multi-modality approach to cancer control has become a standard practice in cancer centres all over the world.

14.9 Summary

Hypertension is a chronic condition of concern due to its role in the causation of coronary heart disease, stroke, and other vascular complications. It is the commonest cardiovascular disorder, posing a major public health challenge to population in socioeconomic and epidemiological transition. It is one of the major risk factors for cardiovascular mortality, which accounts for 20-50 per cent of all deaths. Intensive research carried out during the past decade, aiming at control of hypertension at the community level, has already provided valuable results. Cancer afflicts all communities worldwide. In terms of incidence, the most common cancers worldwide are lung cancer (12.3%), breast cancer (10.4%) and colorectal cancer (9.4%). For any disease, the relationship of incidence to mortality is an indication of prognosis.

14.10 Technical terms

Essential Hypertension: Hypertension is classified as “essential” when the causes are generally unknown. Essential hypertension is the most prevalent form of hypertension accounting for 90 per cent of all cases of hypertension.

Secondary Hypertension: Hypertension is classified as “secondary” when some other disease process or abnormality is involved in its causation.

Primary Tumour: is used to denote cancer in the organ of origin.

Secondary Tumour: denotes cancer that has spread to regional lymph nodes and distant organs.

Cancer: Cancer may be regarded as a group of diseases characterized by an (i) abnormal growth of cells (ii) ability to invade adjacent tissues and even distant organs, and (iii) the eventual death of the affected patient if the tumour has progressed beyond that stage when it can be successfully removed

14.11 Self-assessment questions

1. What is meant by hypertension? How do you measure blood pressure?
2. List out the risk factors for causing hypertension.
3. What are the preventive methods in vogue to reduce hypertension?
4. What is meant by cancer? List out the major categories of cancer.
5. What are the main causes of cancer?
6. What are the preventive methods in practice to reduce the incidence of cancer?

14.12 Books for further reading

Park K, Preventive and Social Medicine, M/s Banarsidas Bhanot publishers, Jabalpur, 2005
Bhaskara Rao T, Textbook of Community Medicine, Paras Medcal Publisher, Hyderabad, 2004
Kulakarni A.P, Baride J P, Text Book of Community Medicine, Vora Medical Publication, Mumbai

Lesson 15

EPIDEMIOLOGY OF NON-COMMUNICABLE DISEASES-PART III

15.0 OBJECTIVES

- Understanding the meaning of diabetes
- Knowing the classification of diabetes
- To know the risk factors for diabetes
- Studying the methods of prevention and control of diabetes
- To understand obesity
- Knowing the methods of assessment of obesity
- To know the preventive measures of obesity

STRUCTURE

15.1 Meaning of diabetes

Diabetes once regarded as a single diseases entity, now seen as a heterogeneous group of diseases, characterised by a state of chronic hyperglycemia, resulting from a diversity of aetiologies, environmental and genetic, acting jointly. The underlying cause of diabetes is the defective production or action of insulin, a hormone that controls glucose, fat and amino acid metabolism. Characteristically, diabetes is a long-term disease with variable clinical manifestations and progression. Chronic hyperglycemia, from whatever cause, leads to a number of complications – cardiovascular, renal, neurological, ocular and others such as intercurrent infections. Table 1 gives us the clinical classification of diabetes mellitus.

Table 1
Clinical classification of diabetes mellitus

S.No	Types
1	Diabetes mellitus (DM)
	i) insulin-dependent diabetes mellitus (IDDM, Type 1)
	ii) Non-insulin dependent diabetes mellitus (NIDMM, Type 2)
	iii) Malnutrition-related diabetes mellitus (MRDM)
	iv) Other types (secondary to pancreatic, hormonal, drug-induced, genetic and other abnormalities)
2	Impaired glucose tolerance (IGT)
3	Gestational diabetes mellitus (GDM)

Source: WHO (1985) Technical Report.

IDDM (Insulin-dependent diabetes mellitus) is the most severe form of the disease. Its onset is typically abrupt and is usually seen in individuals less than 30 years of age. It is lethal unless promptly diagnosed and treated. NIDDM is much more common than IDDM. It is often discovered by chance. It is typically gradual in onset and occurs mainly in the middle-aged and elderly, frequently mild, slow to ketosis is compatible with long survival if given adequate treatment. Impaired glucose tolerance (IGT) describes a state intermediate – "at risk" group – between diabetes mellitus and normality. It can only be defined by the oral glucose tolerance test. Table 2 depicts the diagnostic values for the oral glucose tolerance test.

Table 2
Diagnostic values for the oral glucose tolerance test

	Glucose (mg/dl)			
	White blood		Plasma	
	Venous	Capillary	Venous	Capillary
Diabetes mellitus				
(a) Fasting value	≥120	≥120	≥140	≥140
(b) 2 hrs after glucose load	≥180	≥200	≥200	≥200
Impaired glucose tolerance				
(a) Fasting value	<120	<120	<140	<140
(b) 2 hrs after glucose load	120-180	140-200	140-200	160-220

Source: WHO (1985) Technical Report.

Insulin resistance syndrome (Syndrome X):

In obese patients with type 2 diabetes, the association of hyperglycaemia, hyperinsulinaemia, dyslipidaemia and hypertension, which leads to coronary artery disease and stroke, may result from a genetic defect producing insulin resistance, with the latter being exaggerated by obesity. It has been proposed that insulin resistance predisposes to hyperglycaemia, which results in hyperinsulaemia (which may or may not be of sufficient magnitude to correct the hyperglycaemia) and this excessive insulin level then contributes to high levels of triglycerides and increased sodium retention by renal tubules, thus inducing hypertension. High level of insulin can stimulate endothelial proliferation to initiate atherosclerosis.

The underlying cause of diabetes is insulin deficiency which is absolute in IDDM and partial in NIDDM. This may be due to a wide variety of mechanisms:

a) Pancreatic disorders – inflammatory, neoplastic and other disorders such as cystic fibrosis,
b) Defects in formation of insulin, e.g., synthesis of an abnormal, biologically less active insulin molecule,
c) Destruction of beta cells, e.g., viral infections and chemical agents,
d) Decreased insulin sensitivity, due to decreased numbers of adipocyte and monocyte insulin receptors,
e) Genetic defects, e.g., mutation of insulin gene; and
f) Auto-immunity.

Evidence is suggesting that the insulin response to glucose is genetically controlled. The overall effect of these mechanisms is reduced utilization of glucose, which leads to hyperglycemia accompanied by glycosuria.

15.2 Host factors

The following factors are considered host factors, which increase the risk of diabetes;

a) **Age:** Although diabetes may occur at any age, surveys indicate that prevalence rises steeply with age. NIDMM usually comes to light in the middle years of life and thereafter begins to rise in frequency. Malnutrition related diabetes affects large number of young people. The prognosis is worse in younger diabetics who tend to develop complications earlier than older diabetics.
b) **Sex:** In some countries the overall male-female ratio is about equal (e.g.UK). In south-east Asia, an excess of male diabetics has been observed, but this is open to question.
c) **Genetic factors:** The genetic nature of diabetes is undisputed. Identical twins who developed NIDDM, concordance was approximately 90, thus demonstrating a strong genetic component. In IDDM, the concordance was only 50 per cent indicating that IDDM is not totally a genetic entity.
d) **Genetic Markers:** IDDM is associated with HLA-B8 and B15, and more powerfully with HLA-DR3 and DR4. Individuals carry the highest risk of IDDM with both DR3 and DR4. On the other hand NIDDM is not HLA-associated.
e) **Immune Mechanisms:** There is some evidence of both cell-mediated and of humoral activity against islet cells. Some people appear to have defective immunological mechanisms, and under the influence of some environmental “trigger”, attack their own insulin producing cells.
f) **Obesity:** Obesity particularly central adiposity has long been accepted as a risk factor for NIDDM and the risk is related to both the duration and degree of obesity. Various studies demonstrated that a striking gradient of risk apparent with increasing level of BMI, adult weight gain, waist circumference or waist to hip ratio.
g) **Maternal Diabetes:** Offspring’s of diabetic pregnancies including gastational diabetes are often large and heavy at birth, tend to develop obesity in childhood and are at high risk of developing type 2 diabetes at an early age. Those born to mothers after they have developed diabetes have a three-fold higher risk of developing diabetes than those born before.

15.3 Environmental Risk factors – Diabetes

The following are the environmental factors acting on genetically susceptible individuals:

a) **Sedentary Life Style:** Sedentary life style appears to be an important risk factor for the development of NIDDM. Lack of exercise may alter the interaction between insulin and its receptors and subsequently lead to NIDDM.

b) **Diet:** A high saturated fat intake has been associated with a higher risk of impaired glucose tolerance, and higher fasting glucose and insulin levels.

c) **Dietary Fibre:** Various research studies reveals that high intake of dietary fibre have been shown to result in reduced blood glucose and insulin levels in people with type 2 diabetes and impaired glucose tolerance. A minimum daily intake of 20 grams of dietary fibre is recommended.

d) **Malnutrition:** Malnutrition in early infancy and childhood may result in partial failure of β-cell function.

e) **Alcohol:** Excessive intake of alcohol can increase the risk of diabetes by damaging the pancreas and liver and by promoting obesity.

f) **Viral infections:** Among the viruses that have been implicated are rubella, mumps, and human coxsackie virus B4. Viral infections may trigger in immunogenetically susceptible people a sequence of events resulting in β–cell destruction.

g) **Chemical Agents:** A number of chemical agents are known to be toxic to beta cells, e.g., alloxan, streptozotocin, the rodenticide VALCOR, etc. A high intake of cyanide producing foods (cassava and certain beans) may also have toxic effects on β–cells.

h) **Stress:** Surgery, trauma and stress of situations, internal or external, may "bring out" the disease.

i) **Other factors:** High and low rates of diabetes have been linked to a number of social factors such as occupation, marital status, religion, economic status, education, urbanization and changes in life style which are elements of what is broadly known as social class.

15.4 Screening for diabetes

In the past, the commonest approach to diabetes screening was a preliminary, semi-quantitative test for glucose in a urine sample, followed by an oral glucose tolerance test for those found to have glycosuria. The underlying assumption is that early detection and effective control of hyperglycemia in asymptomatic diabetics reduces morbidity.

1. **Urine examination:** Urine test for glucose, 2 hours after a meal, is commonly used in medical practice for detecting cases of diabetes. All those with glycosuria are considered diabetic unless otherwise proved by a standard oral glucose tolerance test. Lack of sensitivity to the test in some cases resulting in "false positives" or "false negatives". For these reasons, urine testing is not considered an appropriate tool for case finding or epidemiological surveys of the population.

2. **Blood sugar testing:** Because of the inadequacies of urine examination, "standard oral glucose test" remains the cornerstone of diagnosis of diabetes. Mass screening programmes have used glucose measurements of fasting, post-prandial or random blood sample. The measurement of glucose levels in random blood samples is considered unsatisfactory for epidemiological use; at the most, it can give only a crude estimate of the frequency of diabetes in a population.

Screening of the whole population for diabetes is not considered a rewarding exercise. However, screening of high-risk groups is considered more appropriate. These groups are:

- Those in the age group 40 and over
- Those with a family history of diabetes
- The obese
- Women who have had a baby weighing more than 4.5 kg
- Women who show excess weight gain during pregnancy, and
- Patients with premature atherosclerosis.

15.5 Prevention and care - diabetes

1. **Primary prevention:** Two strategies for primary prevention have been suggested:
   a) **Population strategy:** The scope for primary prevention of IDDM is limited on the basis of current knowledge and is probably not appropriate. However, the development of prevention programmes for NIDDM based on elimination of environmental risk factors is possible. There is a greater need for primordial prevention – that is, prevention of the emergence of risk factors in which they have not yet appeared. The preventive measures comprise maintenance of normal body weight through adoption of healthy nutritional habits and physical exercise. The nutritional habits include an adequate protein intake, a high intake of dietary fibre and avoidance of sweet foods. These measures should be fully integrated into other community-based programmes for the prevention of non-communicable diseases.

   b) **High-risk strategy:** There is no high-risk strategy for IDDM diabetes. At present, there is no practical justification for genetic counselling as a method of prevention. Since NIDDM appears to be linked with sedentary life-style, over-nutrition and obesity, correction of these may reduce the risk of diabetes and its complications. Alcohol, smoking, elevated cholesterol, high blood pressure and high triglyceride levels should be reduced.

2. **Secondary prevention:** When diabetes is detected, it must be adequately treated. The aims of treatment are: (a) to maintain blood glucose levels as close within the normal limits as is practicable and (b) to maintain ideal body weight.
   Treatment is based on:
   (a) diet alone – small balanced meals more frequently,
   (b) diet and oral anti-diabetic drugs, or
   (c) diet and insulin.

   Good control of blood glucose protects against the development of complications. Routine checking of blood sugar, of urine for proteins and ketones, of blood pressure, visual acuity and weight should be done periodically. The feet should be examined for any defective blood circulation, loss of sensation and the health of skin. Primary health care is of great importance to diabetic patients since most care is obtained at this level.

3. **Tertiary prevention:** Diabetes is major cause of disability through its complications, e.g., blindness, kidney failure, coronary thrombosis, gangrene of the lower extremities, etc. The main objective at the tertiary level is to organize specialized clinics and units capable of providing diagnostic and management skills of a high order. There is a great need to establish such clinics in large towns and cities. The tertiary level should also be involved in

basic, clinical and epidemiological research. It has also been recommended that local and national registries for diabetics should be established.

15.6 Meaning of obesity

Obesity may be defined as an abnormal growth of the adipose tissue due to an enlargement of fat cell size (hypertrophic obesity) or an increase in fat cell number (hyper plastic obesity) or a combination of both. Obesity is often expressed in terms of body mass index (BMI). Overweight is usually due to obesity but can arise from other causes such as abnormal muscle development or fluid retention.

However, obese individuals differ not only in the amount of excess fat that they store, but also in the regional distribution of the fat within the body. The distribution of fat induced by the weight gain affects the risk associated with obesity, and the kind of disease that results. It is useful therefore, to be able to distinguish between those at increased risk as a result of "abdominal fat distribution" or "android obesity" from those with the less serious "gynoid" fat distribution, in which fat is more evenly and peripherally distributed around the body.

Obesity is perhaps the most prevalent form of malnutrition. As a chronic disease, prevalent in both developed and developing countries, and affecting children as well as adults, it is now so common that it is replacing the more traditional public health concerns including undernutrition. It is one of the most significant contributors to ill health. As obesity is a key risk factor in natural history of other chronic and communicable diseases, the typical time sequence of emergence of chronic diseases following the increased prevalence of obesity is important in public health planning.

Epidemiological factors: The aetiology of obesity is complex, and is one of multiple causation:

(a) **Age:** Obesity can occur at any age, and generally increases with age. Infants with excessive weight gain have an increased incidence of obesity in later life.

(b) **Sex:** Women generally have higher rate of obesity than men, although men may have higher rates of overweight.

(c) **Genetic factors:** There is a genetic component the aetiology of obesity. Twin studies have shown a close correlation between the weights of identical twins even when they are reared in dissimilar environments.

(d) **Physical inactivity:** There is convincing evidence that regular physical activity is protective against unhealthy weight gain. Sedentary lifestyle particularly sedentary occupation and inactive recreation such as watching television will increase obesity. Physical activity and physical fitness are important modifiers of mortality and morbidity related to overweight and obesity.

(e) **Socio-economic status:** There is a clear inverse relationship between socio-economic status and obesity.

(f) **Eating habits:** Eating habits (e.g. eating in between meals, preference to sweets, refined foods and fats) are established very early in life. The composition of the diet, the periodicity with which it is eaten and the amount of energy derived from it are all relevant to the aetiology of obesity.

(g) **Psychological factors:** Psychological factors (e.g., emotional disturbances) are deeply involved in the aetiology of obesity. Overeating may be a symptom of depression, anxiety, frustration and loneliness in childhood as it is in adult life.

(h) **Family tendency:** Obesity frequently runs in families(obese parents frequently having obese children), but this is not necessarily explained solely by the influence of genes.

(i) **Endocrine factors:** These may be involved in occasional cases, e.g.Cushing's syndrome, growth hormone deficiency.

(j) **Alcohol:** A recent review of studies concluded that the relationship between alcohol consumption and adiposity was generally positive for men and negative for women.

(k) **Education:** In most affluent societies, there is an inverse relationship between educational level and prevalence of overweight.

(l) **Smoking:** Reports that the use of tobacco lowers body weight began to appear more than 100 years ago, but detailed studies have been reported only during the past ten years. In most populations, smokers weigh somewhat less than the ex-smokers; individuals who have never smoked fall somewhat between two.

(m) **Ethnicity:** Ethnic groups in many industrialized countries appear to especially susceptible to the development of obesity that only become apparent when such groups are exposed to a more affluent life style.

(n) **Drugs:** Use of certain drug, e.g. cortico steroids, contraceptives, insulin, β–adrenergic blockers, etc, can promote weight gain.

15.7 Body Mass Index

Body mass index (BMI) is a simple index of weight-for-height that is commonly used to classify underweight, overweight and obesity in adults. It is defined as the weight in kilograms divided by the square of the height in metres (kg/m^2).

For example, an adult who weighs 70 kg and whose height is 1.75 m will have a BMI of 22.9

BMI = 70 (kg) / 1.752(m^2) = 22.9

The classificat0ion of overweight and obesity, according to BMI, is shown in Table 3. Obesity is classified is classified as BMI > 30.00. These BMI values are age-independent and the same for both sexes. The table shows a simplistic relationship between BMI and the risk of comorbidity, which can be affected by a range of factors, including the nature of the diet, ethnic group and activity level. The risks associated with increasing BMI are continuous and graded and begin at a BMI above 25. Although it can generally be assumed that individual with a BMI of 30 or above have an excess fat mass in their body. BMI does not distinguish between weight associated with muscle and weight associated with fat.

Table 3
Classification of adults according to BMI

Classification	BMI	Risk of comorbidities
Underweight	< 18.50	Low (but risk of other clinical problems increased)
Normal range	18.50-24.99	Average
Overweight:	≥ 25.00	
Preobese	25.00-29.99	Increased
Obese Class I	30.00-34.99	Moderate
Obese Class II	35.00-39.99	Severe
Obese class III	≥ 40.00	Very severe

Source: Preventive and Social Medicine, K.Park, p.317

Assessment of obesity: The state of obesity is characterised by an increase in the fatty mass at the expense of the other parts of the body. The water content of the body is never increased in case of obesity. Although obesity can easily be identified at first sight, a precise assessment requires measurements and reference standards. The most widely used criteria are:

1.Body weight: Body weight, though not an accurate measure of excess fat, is a widely used index. In epidemiological studies it is conventional to accept + 2 SD (standard deviation) from the median weight for height as a cut-off point for obesity. For adults, some people calculate various other indicators such as:

a) Body mass index (Quetelet's index)

$$= \frac{\text{Weight}}{\text{Height2 (m)}}$$

b) Ponderal index

$$= \frac{\text{Height (cm)}}{\text{Cube root of body weight (kg)}}$$

c) Broca index

= Height (cm) minus 100

(for example, if a person's height is 160cm, his ideal weight is (160-100) = 60kg)

d) Lorentz's formula

$$\text{Ht (cm)} - 100 - \frac{\text{Ht (cm)-150}}{\text{2 (women) or 4 (men)}}$$

e) Corpulence index

$$= \frac{\text{Actual weight}}{\text{Desirable weight}}$$

This should not exceed 1.2

The body mass index (BMI) and the Broca index are widely used. A recent FAO/WHO/UNU report gives the much needed reference tables for body mass index which can be used internationally as reference standards for assessing the prevalence of obesity in a community.

2. Skinfold Thickness:

A large portion of total body fat is located just under the skin. Since it is most accessible, the method most used is the measurement of skinfold thickness. It is a rapid and "non invasive" method of assessing body fat. Several varieties of callipers are available for the purpose. The measurement may be taken at all the four sites- mid-triceps, biceps, subscapular and suprailiac regions. The sum of the measurements should be less than 40mm in boys and 50 mm in girl. In extreme obesity, measurements may be impossible. The main drawback of skinfold measurements is their poor repeatability.

3.Waist Circumference and waist: Hip Ratio (WHR):

Waist circumference is measured at the mid point between the lower border of the rib cage and the iliac crest. It is a convenient and simple measurement that is unrelated to height, correlates closely with BMI and WHR and is an approximate index of intra-abdominal fat mass and total body fat. Change in waist circumference reflect changes in risk factors for cardiovascular disease and other forms of chronic diseases. There is an increased risk of metabolic complications for men with a waist circumference ≥102cm, and women with a waist circumference ≥88cm.

4. Others: In addition to the above, three well established and more accurate measurements are used for the estimation of body fat. They are measurement of total body water, of total body potassium and of body density. The techniques involved are relatively complex and cannot be used for routine clinical purposes or for epidemiological studies.

15.8 Hazards of obesity

Obesity is a health hazard and a detriment to well being, which is reflected in the increase morbidity and mortality:

a) **Increased Morbidity:** Obesity is a positive risk factor in the development of hypertension, diabetes, gall bladder disease and coronary heart disease and certain types of cancers, especially the hormonally related and large bowel cancers. Several associated diseases, which, although not usually fatal, cause a great deal of morbidity in the community, e.g. varicose veins, abdominal hernia, osteoarthritis of the knees, hips and lumbar spine, flat feet and psychological stresses particularly during adolescence. Obese persons are exposed to increased risk from surgery. Obesity may lead to lowered fertility.

b) **Increased Mortality:** According to the latest research studies there is a dramatic increase in sudden death among men more than 20 per cent overweight as compared with those with normal weight. The increased mortality is brought about mainly by the increased incidence of hypertension and coronary heart disease. There is also an excess number of deaths from renal diseases. Obesity lowers life expectancy.

15.9 Prevention and control of obesity

According to WHO Expert Committee, 1995 weight control is widely defined as approaches to maintaining weight within the 'healthy' (i.e. 'normal' or 'acceptable' range of body mass index of 18.5 to 24.9 kg/m2 throughout adulthood. It should also include prevention of weight gain of more than 5 kg in all people. Prevention of obesity should begin in early childhood. Obesity is harder to treat in adults than in children. The control of obesity centres around weight reduction. This can be achieved by;

a) **Dietary changes:** The following dietary principle apply both to prevention and treatment: the portion of energy-dense foods such as simple carbohydrates and fats should be reduced; the fibre content in the diet should be increased through the consumption of common un-refined foods; adequate levels of essential nutrients in the low energy diets should be ensured, and reducing diets should be as close as possible to existing nutritional patterns. The most basic consideration is that the food energy intake should not be greater than what is necessary for energy expenditure.

b) **Increased physical activity:** This is an important part of weight reducing programme. Regular physical exercise is the key to increased energy expenditure.

c) **Others:** Appetite suppressing drugs have been tried in the control of obesity. They are generally inadequate to produce massive weight loss in severely obese patients. Surgical treatment for example gastric bypass, gastroplasty, jaw-wiring to eliminate the eating of solid food has all been tried with limited success. In short, one should not expect quick or even tangible results in all cases from obesity prevention programmes.

15.10 Summary

Diabetes is an "ice berg" disease. Currently the number of cases of diabetes worldwide is estimated to be around 170 million. This number is expected to double by 2025 (a prevalence rate of about 5.4 per cent), with the greatest number of cases being expected in China and India. The underlying cause of diabetes is insulin deficiency, which is absolute in IDDM and partial in NIDDM. Obesity is perhaps the most prevalent form of malnutrition. As obesity is a key risk factor in natural history of other chronic and communicable diseases, the typical time sequence of emergence of chronic diseases following the increased prevalence of obesity is important in public health planning. Health education has an important role to play in teaching the people how to reduce overweight and prevent obesity.

15.11 Technical terms

IDDM: Insulin-dependent diabetes mellitus (Type 1) is the most severe form of the disease. Its onset is typically abrupt and is usually seen in individuals less than 30 years of age. It is lethal unless promptly diagnosed and treated.

NIDDM Non-insulin dependent diabetes mellitus (Type 2) is much more common than IDDM. It is often discovered by chance. It is typically gradual in onset and occurs mainly in the middle-aged and elderly, frequently mild, slow to ketosis is compatible with long survival if given adequate treatment.

Obesity may be defined as an abnormal growth of the adipose tissue due to an enlargement of fat cell size (hypertrophic obesity) or an increase in fat cell number (hyper plastic obesity) or a combination of both.

Body mass index (BMI): A simple index of weight-for-height that is commonly used to classify underweight, overweight and obesity in adults. It is defined as the weight in kilograms divided by the square of the height in metres (kg/m2).

15.12 Self-assessment questions

1. What is diabetes? Give clinical classification of diabetes mellitus.
2. List out the environmental factors contributing to the growth of diabetes.
3. What are the screening methods for diabetes?
4. Mention about prevention and care of diabetes management.
5. Define obesity. List out the epidemiological factors in the aetiology of obesity.
6. Define BMI. What are the important assessment standards of obesity?
7. What are the prevention and control measures in obesity.

15.13 Books for further reading

Park K, Preventive and Social Medicine, M/s Banarsidas Bhanot publishers, Jabalpur, 2005
Bhaskara Rao T, Textbook of Community Medicine, Paras Medcal Publisher, Hyderabad, 2004
Kulakarni A.P, Baride J P, Text Book of Community Medicine, Vora Medical Publication, Mumbai.

Lesson 16

EPIDEMIOLOGY OF NON-COMMUNICABLE DISEASES-PART IV

16.0 OBJECTIVES

- Understanding the meaning of blindness
- Knowing the epidemiological factors
- To know the changing concept of health care
- Studying the methods of prevention and control of blindness
- To understand the definition and types of accidents
- Knowing the measurement of problem
- To know the preventive measures of accidents

STRUCTURE

16.1 Definition of blindness

According to WHO, blindness is defined as “visual acuity of less than 3/60 (Snellen) or its equivalent”. The WHO International classification of diseases described the levels of visual impairment (see Table1). In order to facilitate the screening of visual acuity by non-specialized personnel, in the absence of appropriate vision charts, the WHO has now added the “inability to count fingers in daylight at a distance of 3 meters” to indicate less than 3/60 or its equivalent.
Table 1 shows differentiation between “low vision” (categories 1 and 2) and “blindness” (categories 3,4 and 5). If the patient reads 6 / 18 or better, he is coded 0, i.e., no visual impairment.

Table 1
Categories of visual impairment

Categories of visual impairment	Visual acuity	
	Maximum less than	**Minimum equal to or better than**
Low vision	1. 6/18	6/60
	2. 6/60	3/60
Blindness	3. 3/60 (finger counting at 3 meters)	1/60 (finger counting at 1 meter)
	4. 1/60 (finger counting at 1 meter)	Light perception
	5. No light perception	

Source: WHO (1997) 'International Classification of Diseases', Vol 1, p.242

The most frequent causes of blindness in developed countries are accidents, glaucoma, diabetes, vascular diseases (hypertension), cataract and degeneration of ocular tissues especially of the retina, and hereditary conditions. Table 2 gives the causes of blindness in India.

Table 2
Causes of blindness in India
(2001-02 National Survey on Blindness)

Cataract	62.6 per cent
Refractive error	19.7 per cent
Glaucoma	5.8 per cent
Posterior segment pathology	4.7 per cent
Corneal opacity	0.9 per cent
Other causes	6.2 per cent

Source: Govt. of India (2004), Annual Report 2003-2004, Ministry of Health and Family Welfare, New Delhi

16.2 Epidemiological factors of blindness

Epidemiological factors:

a) **Age:** About 30 per cent of the blind in India are said to lose their eyesight before they reach the age of 20 years, and many under the age of 5 years. Refractive error, trachoma, conjunctivitis and malnutrition (vitamin A deficiency) are important causes of blindness among children and the younger age groups; cataract, refractive error, glaucoma and diabetes are causes of blindness in middle age; accidents and injuries can occur in all age groups, but more importantly in the age group 20 to 40 years.

b) **Sex:** A higher prevalence of been attributed to a higher prevalence of trachoma, conjunctivitis and cataract among females than in males.

c) **Malnutrition**: Malnutrition as a cause of blindness was hardly recognized a few years ago. It is closely relate not only with low vitamin A intake, but also with infectious diseases of childhood especially measles and diarrohea (which precipitate malnutrition) in many cases protein energy malnutrition (PEM) is also associated with blindness. Severe blinding corneal destruction due to vitamin A deficiency (e.g., keratomalacia) is largely limited to the first 4-6 years of life and is especially frequent among those 6 months to 3 years of life.

d) **Occupation:** It has long been recognized that people working in factories, workshops and cottage industries are prone to eye injuries because of exposure to dust, airborne particles, flying objects, gases fumes, radiation (usually welding flash), electric flash, etc. Many workers including doctors are known to have developed premature cataracts while exposed to x-rays, ultraviolet rays or heat waves.

e) **Social class:** There is a close relationship between the incidence of blindness and socioeconomic status. Surveys indicate that blindness is twice more prevalent in the poorer classes that in the well-to-do.

f) **Social factors:** Many people lose their eyesight because of meddlesome ophthalmology by quacks. The basic social factors are ignorance, poverty, low standard of personal and community hygiene and inadequate health care services.

16.3 Changing concept of eye health care

1. Primary eye care:

One of the most significant developments in the filed of eye health care over the last few years has been the concept of primary eye care, that is, the inclusion of an eye-care component in primary health care system. The idea of primary eye care, as one of the main ingredients of a primary health care approach to blindness, has rapidly gained acceptance the world over. It is today recognized as a model for eye care at the community level. The promotion and protection of eye health, together with on-the-spot treatment for the commonest eye diseases, are its cornerstones. The final objective of primary eye care is to increase the coverage and quality of eye health care through primary health care approach and thereby improve the utilization of existing resources.

2. **Epidemiological approach:**

The epidemiological approach, which involves studies at the population level, has been recognized. It focuses, among other things, on the measurement of the incidence, prevalence of diseases and their risk factors. The local epidemiological situation will determine the action needed.

3. Team concept:

In many developing countries, there is only one eye specialist for more than a million people. Increasingly, therefore, health care leans on the use of auxiliary health personnel to fill many gaps. In India this gap is filled by village health guides, ophthalmic assistants, multi-purpose workers and voluntary agencies..

4. Establishment of national programmes:

Another important development in connection with the prevention of blindness has been the establishment of national programmes. Many of these programmes were first started by voluntary agencies concerned with blindness prevention (e.g., eye camps) and some of them focused on a single disease, such as trachoma. The increasing recognition of the primary health care approach to blindness results in comprehensive national programmes for the prevention of blindness from all causes.

16.4 Prevention of blindness

The concept of avoidable blindness (i.e., preventable or curable blindness) has gained increasing recognition during recent years. A great many of the causes of blindness lend themselves to prevention and/or control – where by improving nutrition, by treating cases of infectious diseases, or by controlling the organisms which cause infection, or by improving safety conditions – particularly on the roads, at work or in the home.

1. Initial assessment:

The first step is to assess the magnitude, geographic distribution and causes of blindness within the country or region by prevalence surveys. This knowledge is essential for setting priorities and development of appropriate intervention programmes.

2. Methods of Intervention:

(a) Primary eye care :

A wide range of eye conditions (e.g., acute conjunctivitis, ophthalmia neonatorum, trachoma, superficial foreign bodies, xerophthalmia) can be treated / prevented at the grass-root level by locally trained primary health workers (e.g., village health guides, multi-purpose workers) who are the first to make contact with the community. For this purpose, they are provided with essential drugs such as topical tetracycline, vitamin A capsules, eye bandages, shields, etc. They are also trained to refer difficult cases (e.g., corneal ulcer, penetrating foreign bodies, painful eye conditions and infections which do not respond to treatment) to the nearest PHC or district hospital. Their activities also involve promotion of personal hygiene, sanitation, good dietary habits and safety in general. Currently, there is one village health guide for 1,000 population and 2 multipurpose workers for 5,000 population in India.

b) Secondary care :

Secondary care involves definitive management of common blinding conditions such as cataract, trichiasis, entropion, ocular trauma, glaucoma, etc. This care is provided in PHCs and district hospitals where eye departments or eye clinics are established. The secondary care may involve the use of mobile eye clinics. For instance, cataract accounts for over 60 percent of blindness in India. The eye camp approach to make cataract surgery available has been highly successful, and has received wide popular support. Apart from cataract operations, these campus undertake general health surveys for the early detection of visual defects as well as education of the masses. For mobile services to be effective there must be good community participation in the programme. Adequate follow-up and evaluation must also be provided. The “mobile units”, through valuable, lack permanence and are being utilized as part of a comprehensive strategy for eye care. The great advantage of this strategy is, it is problem-specific and makes the best use of local resources and provides inexpensive eye care to the population at the peripheral level.

c) Tertiary care :

These services are usually established in the national or regional capitals and are often associated with Medical Colleges and Institutes of Medicine. They provide sophisticated eye care such as retinal detachment surgery, corneal grafting and other complex forms of management not available in secondary centres. The majority of States in India has passed the Corneal Grafting Acts, which have helped the establishment of Eye Banks. Other measures of rehabilitation comprise education of the

blind in special schools and utilization of their services in gainful employment. The central government has established a National Institute for the Blind in Dehradun (U.P.) to work out new approaches and strategies for solving the problems of the blind.

d) Specific programmes :

i) **Trachoma control:** Endemic trachoma and associated infections are a major cause of preventable blindness in many developing countries. Early diagnosis and treatment will cure trachoma. Mass campaigns with topical tetracycline and the improvement of socio-economic conditions have markedly reduced the severity of trachoma and associated bacterial conjunctival infections.

ii) **School eye health services:** School children who form a sizable segment of the community can be screened and treated for defects such as refraction errors, squint, amblyopia, trachoma, etc. Students should be taught to practice the principles of good posture, proper lighting, avoidance of glare, proper distance and angle between the books and the eyes.

iii) **Vitamin A prophylaxis:** Under the vitamin A distribution scheme in India, 2,00,000 IU of vitamin A are given orally at 6- monthly intervals between the ages 1-6 years. To be able to control xerophthalmia, the whole family should be kept under surveillance for one year and children for 5 years.

iv) **Occupational eye health services:** This is to prevent / treat eye hazards in industries. The key to the prevention of accidents in factories is to improve the safety features of machines, to have proper illumination of the working area, to select workers with the requisite alertness and good vision and to encourage the use of protective devices.

3. Long-term measures:

Long-term measures also have a part to play in controlling eye infections. Broadly these measures are aimed at improving the quality of life and modifying or attacking the factors responsible for the persistence of eye health problems, e.g., poor sanitation, lack adequate safe water supplies, little intake of foods rich in vitamin A, lack of personal hygiene, etc. Health education is an important long-term measure in order to create community awareness of the problem; to motivate the community, to accept total eye health care programmes, and to secure community participation.

4. Evaluation:

Evaluation should be an integral part of intervention programmes to measure the extent to which ocular diseases and blindness have been alleviated, assess the manner and degree to which programme activities have been carried out, and determine the nature of other changes that may have been produced.

16.5 Definition of accidents

An accident has been defined as “an unexpected, unplanned occurrence, which may involve injury”. A WHO Advisory Group in 1956 defined accident as an “unpremeditated event resulting in recognizable damage”. According to another definition, an accident is that “occurrence in a sequence of events, which usually produces unintended injury, death or property damage”.

Accidents represent a major epidemic of non-communicable disease in the present century. Accidents have their own natural history and follow the same epidemiological pattern as any

other disease – that is, the agent, the host and the environment interacting together to produce injury or damage.

16.6 Measurement of the problem

a. Mortality:

The following epidemiological indices will be useful in assessing the magnitude of the problem:

(i) **Proportional mortality rate:** That is, the number if deaths due to accidents per 100 (or 1000) total deaths.

(ii) **Number of deaths per million population:** The term "killed" (in a road traffic accident) is defined as any person who was killed outright or who died within 30 days as a result of the accident

(iii) Death rate per 1000 (or 100,000) registered vehicles per year.

(iv) Number of accidents or fatalities as a ratio of the number of vehicles per kilometre or passengers per kilometre

(v) Deaths of vehicle occupants per 1000 vehicles per year, etc.

b. Morbidity:

Morbidity is measured in terms of "serious injuries" and "slight injuries". A scale known as "Abbreviated Injury Scale" assesses the seriousness of the injury. Morbidity rates are generally less reliable because of under-reporting and misreporting.

c. Disability:

An important outcome of the accident process is disability, which may be temporary or permanent, partial or total. Measurement of disability in terms of its duration is limited concept; it does not take into consideration the psychological or social aspects of an accident or injury. The International classification of impairments, disabilities and handicaps is an attempt by WHO to estimate the disability of individuals at a given moment.

16.7 Types of accidents:

1.Road traffic accidents: In many countries, motor vehicle accidents rank first among all fatal accidents. During 2002 there were almost 1.19 million deaths from road accidents in the world.

2. Domestic accidents: An accident, which takes place in the home or in its immediate surroundings, and, more generally, all accidents not connected with traffic, vehicles or sport. The more frequent causes of domestic accidents are:

a) Drowning;
b) Burns (by a flame, hot liquid, electricity, crackers or fire works, chemicals);
c) Poisoning (e.g., drugs, insecticides, rat poisons, kerosene);
d) Falls;
e) Injuries from sharp or pointed instruments;
f) Bites and other injuries from animals.

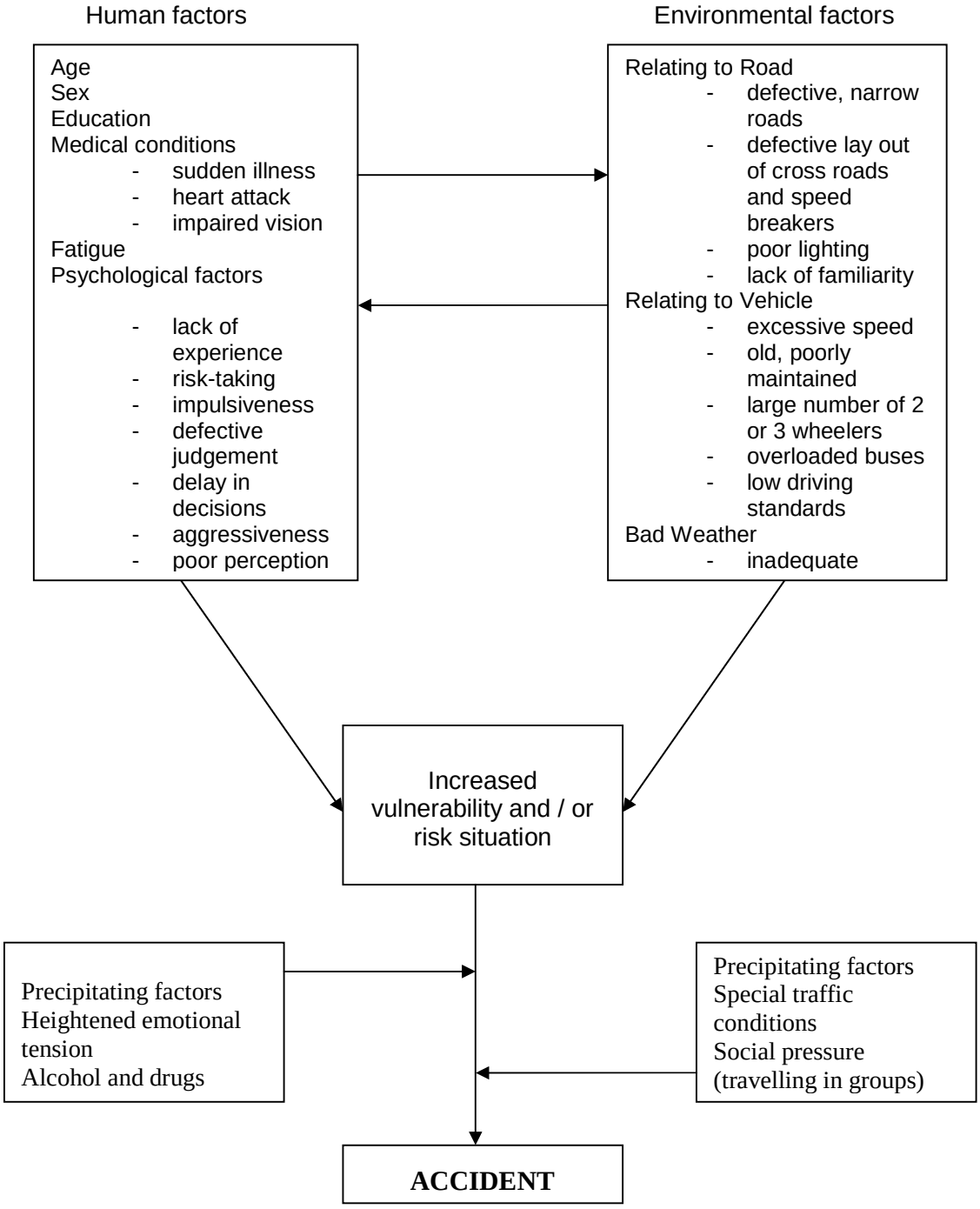
3. **Industrial accidents:** Rapid industrialization ha also resulted in mortality and morbidity of many workers in hazardous industries. Children and people who are challenged physically as well as mentally are at a greater risk of encountering occupational injuries. Data about accidents occurred to workers in unorganized sector is not available.

4. Railway accidents: With the increase in number of trains and passengers, the increase in the number of accidents and casualties resulting therefrom is not unexpected.

5.Violence: Violence is reported to be increasing rapidly. It also follow the same epidemiological pattern as any other disease (host, agent and environment), i.e., a motivated person who injuries; a suitable target; and a suitable environment or the absence of a guardian,

all coinciding in time and space. An estimated 16180000 persons died in 2002 due to violence or intentional injuries (homicide, suicide and war) worldwide. Violence due to war and political unrest is fairly common in several countries. Organized and unorganized, ethnic and communal violence are well known in some places.

Fig 1
Primary factors in accidents



Source: Park's Textbook of Preventive and Social Medicine, p 327

Accidents are a complex phenomena of multiple causation (Fig.1). The aetiological factors may be classified into two broad categories – human and environmental. Up to 90 per cent of the factors responsible for accidents are attributed to human failure. Many of the psychological circumstances in which accidents occur are still poorly known.

16.8 Prevention of Accidents

Accidents don't just happen; they are caused. The causes in a given situation must be identified by epidemiological methods. Since accidents are multifactorial, they call for an intersectoral approach to both prevention and care of the injured. The various measures comprise the following.

1.Data collection:

There should be a basic reporting system of all accidents. The national data should be supplemented by special surveys and in-depth studies. These studies will bring out the risk factors, the circumstances and chain of events leading up to the accident. These details are rarely provided by the basic reporting system. Detailed environmental data relating to the road, vehicle, weather, etc must be collected. The police have a statutory duty in many countries to investigate accidents, for legal as well as preventive purposes; the data collecting systems should recognize this and take police records as their starting point. Without adequate data collection, analysis and interpretation there could be no effective countermeasures, evaluations and strategies for prevention.

2. Safety education:

There is a widespread belief that accidents are inevitable; this fatalistic attitude must be curbed. Safety education must begin with school children. The drivers need to be trained in proper maintenance of vehicles and safe driving. Young people need to be educated regarding risk factors, traffic rules and safety precautions. They should also be trained in first aid. It has been aptly said, "if accident is a disease, education is its vaccine".

3. Promotion of safety measures:

(a) Seat belts: The use of belts reduces the number of fatalities and non-fatal injuries by approximately 50 per cent each. They should be made compulsory for cars, light trucks and similar vehicles.

(b) Safety helmets: They reduce the risk of head injury by 30 percent on an average and that of fatalities by 40 per cent. They prevent laceration of the scalp to great extent. Recently, the full-face integral helmet has become very popular.

(c) Leather clothing and boots: Leather clothing reduces risk of extensive superficial soft-tissue injury. Leather boots can, to some extent, protect the lower legs and feet and their use should therefore be encouraged.

(d) Children: Another safety measure is to ensure that children remain seated when they are in vehicle. They should be prohibited to take the front seats or cars. A few countries have introduced laws, which require that children of under 12-15 years in cars be in the rear seats.

(e) Others: These comprise use of door locks, proper vehicle design, use of laminated high – penetration resistance windscreen glass, etc.

4.Alcohol and other Drugs:

Alcohol impairs driving ability and increases the risk of an accident as well as the severity of its consequences. Conclusions of surveys carried out in several countries have shown that alcohol is the direct cause of 30 to 50 per cent of severe road accidents. Although the legal limit is 80 mg / 100 ml, impairment from alcohol can occur at blood alcohol levels as low as 50mg / 100ml and that accident risk rises significantly between 50 and 80 mg / 100ml.

Drugs such as barbiturates, amphetamines and cannabis impair one's ability to drive safely. They should be avoided totally.

5. Primary Care:

Planning, organization and management of trauma treatment, and emergency care services should be a fundamental element of health service managerial process. Emergency care should begin at the accident site, continue during transportation and conclude in the hospital emergency room. At any of these stages a life may be saved or lost, depending upon the skill of the health care worker and the availability of needed emergency equipment. To achieve these ends, these should be an Accident Services Organisation and one fully equipped specialised trauma care hospital in all major cities.

6. Elimination of causative factors:

The factors which tend to cause accidents must be sought out and eliminated, e.g., improvement of roads, imposition of speed limits, marking of danger points, reduction of electric voltage, provision of fire guards, use of safety equipment in industries, safe storage of drugs, poisons and weapons, etc.

7. Enforcement of laws:

Legislation embodies codified set of rules. These are enforced by the State to prevent accidents. These include driving tests, medical fitness to drive, enforcement of speed limits, compulsory wearing of seat belts and crash helmets, checking of blood alcohol concentration, road-side breath testing for alcohol, regular inspection of vehicles, periodic re-examination of drivers over the age of 55, etc. In addition, there are factories and industrial laws ensure safety of the people at work.

8. Rehabilitation services:

Rehabilitation consists of a number of elements, which each injured person should benefit from. These are medical rehabilitation, social rehabilitation, occupational rehabilitation, etc. The aim of rehabilitation is to prevent, reduce or compensate disability and thereby handicap.

9. Accident research:

The future of accident prevention is in research. Such research will be concerned with gathering precise information about the extent, type and other characteristics of accidents, correlating accident experience with personal attributes and the environments in which accidents occur, investigating new and better methods of altering human behaviour; seeking ways to make environments safer; and evaluating more precisely the efficiency of control measures. This area is now termed 'accidentology'.

16.9 Summary

In ability to count fingers in daylight at a distance of 3 meters is considered as a measure to indicate blindness. Cataract is considered to be one of the main reason for blindness. Cataract can be cured with inexpensive surgery, refractory errorsare correctable with simple optical devices, xerophthalmia and trachoma are easily preventable. Blindness is one of the most significant social problems in India. **Vision 2020 : The Right to Sight**, a global initiative to

eliminate avoidable blindness was launched by WHO on 18th February 1999. Recognition of sight as a fundamental human right by all countries can be an important catalyst of initiatives for the prevention and control of blindness.

Accidents don't just happen; they are caused. Accidents represent a major epidemic of non-communicable disease in the present century. Injuries due to road traffic, occupational accidents, burns, poisoning, suicides and violence are observed to be major causes of mortality and morbidity. Accidents are complex phenomena of multiple causation. Human and environmental factors forms the broader aetiological factors. Up to 90 per cent of the factors responsible for accidents are attributed to human failure.

16.10 Technical terms

Blindness: Visual acuity of less than 3/60 (Snellen) or its equivalent. According to the WHO inability to count fingers in daylight at a distance of 3 meters, indicate less than 3/60 or its equivalent.

Vision 2020: The Right to Sight: a global initiative to eliminate avoidable blindness was launched by WHO on 18th February 1999. The objective of Vision 2020 is to assist member countries in developing sustainable systems which will enable them to eliminate avoidable blindness from major causes, i.e. cataract, xerophthalmia and other causes of childhood blindness, refractive error and low vision, trachoma and other causes of corneal blindness by the year 2020.

Accident: An unexpected, unplanned occurrence, which may involve injury.

16.11 Self-assessment Questions

1. Define blindness. List out the categories of visual impairment.
2. Give an account of epidemiological factors related to blindness.
3. What are the preventive measures of blindness?
4. Define accidents. What are the major types of accident?
5. What are the preventive measures of accidents?

16.12 Books for further reading

Park K, Preventive and Social Medicine, M/s Banarsidas Bhanot publishers, Jabalpur, 2005

Bhaskara Rao T, Textbook of Community Medicine, Paras Medcal Publisher, Hyderabad, 2004

Kulakarni A.P, Baride J P, Text Book of Community Medicine, Vora Medical Publication, Mumbai

Lesson 17

CONTEMPORARY ISSUES OF HEALTH CARE MANAGEMENT

17.0 OBJECTIVES

- Understanding the importance of Health Care Management
- To highlight the important contemporary issues in health care management
- To give a brief account of policy measures of relevance
- To sensitize medical practitioners on important issues
- To summarize international policy measures on contemporary medical issues

STRUCTURE

17.1 Health for All by 2000 – National strategy

In 1977, it was decided in the World Health Assembly to launch a movement known as "Health for All by the year 2000" . The fundamental principle of HFA strategy is equity, that is, an equal health status for people and countries, ensured by an equitable distribution of health resources. The Member countries of WHO at the 30th World Health Assembly defined Health for All as "attainment of a level of health that will enable every individual to lead a socially and economically a productive life".

As a signatory to the Alma-Ata declaration in 1978, the Government of India was committed to taking steps to provide Health for All (HFA) to its citizens by 2000 AD. In pursuance of this objective various attempts were made to evolve suitable strategies and approaches. In this connection two important reports were worth mention.

(i) Report of the Study Group on "Health for All-an alternative strategy", sponsored by ICSSR and ICMR, and

(ii) Report of the Working Group on "Health for All by 2000 AD" sponsored by the Ministry of Health and Family Welfare, Govt. of India.

Both the groups considered in great detail the various issues involved in providing primary health care in the Indian context. These reports formed the basis of the National Health Policy. The National Health Policy echoes the WHO call for HFA and the Alma-Ata Declaration. It had laid down specific goals in respect of the various health indicators by different dates such as 1990 and 2000 AD. Foremost among the goals to be achieved by 2000 AD were:

a) Reduction of infant mortality form the level of 125 (1978) to be below 60
b) To raise the expectation of life at birth from the level of 52 years to 64
c) To reduce the crude death rate from the level of 14 per 1000 population to 9 per 1000
d) To reduce the crude birth rate form the level of 33 per 1000 population to 21.
e) To achieve a Net Reproduction Rate of one.
f) To provide potable water to the entire rural population.

17.2 National Health Policy 2002

National Health Policy -1983, in a spirit of optimistic empathy for the health needs of the people, particularly the poor and under-privileged, had hoped to provide 'Health for All by the year 2000 AD', through the universal provision of comprehensive primary health care services. In retrospect, it is observed that the financial resources and public health administrative capacity which it was possible to marshal, was far short of that necessary to achieve such an ambitious and holistic goal. Against this backdrop, it is felt that it would be appropriate to pitch NHP-2002 at a level consistent with our realistic expectations about financial resources and about the likely increase in Public Health administrative capacity. The recommendations of NHP-2002 will, therefore, attempt to maximize the broad-based availability of health services to the citizenry of the country on the basis of realistic considerations of capacity. The changed circumstances relating to the health sector of the country since 1983 have generated a situation in which it is now necessary to review the field, and to formulate a new policy framework as the National Health Policy-2002. NHP-2002 will attempt to set out a new policy framework for the accelerated achievement of Public health goals in the socio-economic circumstances currently prevailing in the country.

The public health investment in the country over the years has been comparatively low, and as a percentage of GDP has declined from 1.3 percent in 1990 to 0.9 percent in 1999. The aggregate expenditure in the Health sector is 5.2 percent of the GDP. Out of this, about 17 percent of the aggregate expenditure is public health spending, the balance being out-of-pocket expenditure. The central budgetary allocation for health over this period, as a percentage of the total Central Budget, has been stagnant at 1.3 per cent, while that in the States has declined from 7.0 per cent to 5.5 per cent. The current annual per capita public health expenditure in the country is no more than Rs.200. Given these statistics, it is no surprise that the reach and quality of public health services has been below the desirable standard. Under the constitutional structure, public health is the responsibility of the States. In this framework, it has been the expectation that the principal contribution for the funding of public health services will be from the resources of the States, with some supplementary input from Central resources. In this backdrop, the contribution of Central resources to the overall public health funding has been limited to about 15 per cent. The fiscal resources of the State Governments are known to be very inelastic. This is reflected in the declining percentage of State resources allocated to the health sector out of the State Budget. If the decentralized pubic health services in the country are to improve significantly, there is a need for the injection of substantial resources into the health sector from the Central Government Budget. This approach is a necessity – despite the formal Constitutional provision in regard to public health, -- if the State public health services,

which are a major component of the initiatives in the social sector, are not to become entirely moribund. The NHP-2002 has been formulated taking into consideration these ground realities in regard to the availability of resources.

The main objective of this policy is to achieve an acceptable standard of good health amongst the general population of the country. The approach would be to increase access to the decentralized public health system by establishing new infrastructure in deficient areas, and by upgrading the infrastructure in the existing institutions. Overriding importance would be given to ensuring a more

Table 1

S. No	Goal	By year
1	Eradicate Polio and Yaws	2015
2	Eliminate Leprosy	2005
3	Eliminate Kala Azar	2010
4	Eliminate Lymphatic Filariasis	2015
5	Achieve Zero level growth of HIV / AIDS	2007
6	Reduce Mortality by 50% on account of TB, Malaria and Other Vector and Water Borne diseases	2010
7	Reduce Prevalence of Blindness to 0.5%	2010
8	Reduce IMR to 30 / 1000 and MMR to 100 / Lakh	2010
9	Increase utilization of public health facilities from current Level of <20 to <75 %	2010
10	Establish an integrated system of surveillance, National Health Accounts and Statistics	2005
11	Increase health expenditure by Government as a % of GDP from the existing 0.9% to 2.0%	2010
12	Increase share of Central grants to Constitute at least 25% to total health spending	2010
13	Increase State Sector Health spending from 5.5% to 7 % of the budget; Further increase to 8%	2005 2010

equitable access to health services across the social and geographical expanse of the country. Emphasis will be given to increasing the aggregate public health investment through a substantially increased contribution by the Central Government. It is expected that this initiative will strengthen the capacity of the public health administration at the State level to render effective service delivery. The contribution of the private sector in providing health services would be much enhanced, particularly for the population group which can afford to pay for services. Primacy will be given to preventive and first-line curative initiatives at the primary health level through increased sectoral share of allocation. Within these broad objectives, NHP-2002 will endeavour to achieve the time-bound goals mentioned in Table 1.

17.3 Health Hazards in Indian – Critical Issues

17.3.1 Maternal Mortality Ratio:

Maternal health is a problem of serious proportions in India, where an estimated 1,36,000 women die needlessly each year due to causes related to pregnancy, childbirth and abortion. India has an estimated maternal mortality ratio (MMR) of 540 per 1,00,000 live births, which means one woman dying every five minutes. Uttar Pradesh alone accounts for close to 40,000

maternal deaths per year, followed by Orissa, Rajasthan and other states; all due to preventable causes. According to estimates, maternal morbidity is also unacceptably high; between 4 and 5 million suffer ill health due to childbearing complications. The Constitution guarantees the Right to Equality and the Right to Life including the Right to Health. Despite this, India has the highest MMR in South Asia. The MMR is higher in teenaged women or those above the age of 35 years. This becomes a vital factor when a significant proportion of girls between 13 and 19 years in India have already commenced child bearing. Poor health, lack of transport, inadequate medical facilities and the indifferent attitude of medical practitioners have all contributed to India's MMR, according to Women Health Rights Advocacy partnership, a south Asian forum.

17.3.2 AIDS:

Some problems are too big to be handled alone. AIDS in India is one of them. In a country of a billion people, about 4.6 million are HIV positive. If the problem is left unchecked, that number could reach 20 million to 25 million by the decade's end. A single country could have an HIV-positive population larger than the total populations of London, New York, and Tokyo combined. Conditions in India could promote the rapid spread of AIDS in coming years. Although among adults its prevalence is only 0.8 percent—compared with almost 39 percent in Botswana and 33 percent in Zimbabwe, the two most heavily stricken countries—overpopulation and widespread poverty are already straining the government's resources. The public-health infrastructure, facing a variety of gigantic health challenges, can't cope. Public and private attitudes continue to stigmatize people with AIDS and obstruct efforts to combat it. Already, it is spreading beyond the high-risk populations. So far, India's response has been fragmented. The government spent about 11 cents a person on AIDS-related programs in 2003, compared with past expenditures of about $1.85 in Uganda and 55 cents in Thailand, two countries that have had some success in fighting the pandemic. Non-governmental organizations (NGOs) often lack the scale or management capabilities to face such a Herculean task and generally work in isolation from one another.

17.4 National Blood Policy

A well organised Blood Transfusion Service (BTS) is a vital component of any health care delivery system. An integrated strategy for Blood Safety is required for elimination of transfusion transmitted infections and for provision of safe and adequate blood transfusion services to the people. The main component of an integrated strategy include collection of blood only from voluntary, non-remunerated blood donors, screening for all transfusion transmitted infections and reduction of unnecessary transfusion. The Blood Transfusion Service in the country is highly decentralised and lacks many vital resources like manpower, adequate infrastructure and financial base. The main issue, which plagues blood banking system in the country, is it's fragmented management. The standards vary across different states.

The blood component production / availability and utilisation is extremely limited. There is shortage of trained health-care professionals in the field of transfusion medicine. For quality, safety and efficacy of blood and blood products, well-equipped blood centres with adequate infrastructure and trained manpower is an essential requirement. For effective clinical use of blood, it is necessary to train clinical staff. To attain maximum safety, the requirements of good manufacturing practices and implementation of quality system moving towards total quality management have posed a challenge to the organisation and management of blood transfusion service. Thus, a need for modification and change in the blood transfusion service has necessitated formulation of a National Blood Policy and development of a National Blood Programme, which will also ensure implementation of the directives of Supreme Court of India.

MISSION STATEMENT:

The policy aims to ensure easily accessible and adequate supply of safe and quality blood and blood components collected / procured from a voluntary, non-remunerated regular blood donor in well equipped premises, which is free from transfusion transmitted infections, and is stored and transported under optimum conditions. Transfusion under supervision of trained personnel for all who need it irrespective of their economic or social status through comprehensive, efficient and a total quality management approach will be ensured under the policy.

OBJECTIVES OF THE POLICY:

To achieve the above aim, the following objectives are drawn:

a) To reiterate firmly the government commitment to provide safe and adequate quantity of blood, blood components and blood products.
b) To make available adequate resources to develop and re-organise the blood transfusion services in the entire country.
c) To make latest technology available for operating the blood transfusion services and ensure its functioning in an updated manner.
d) To launch extensive awareness programmes for donor information, education, motivation, recruitment and retention in order to ensure adequate availability of safe blood.
e) To encourage appropriate clinical use of blood and blood products.
f) To strengthen the manpower through human resource development.
g) To encourage Research & Development in the field of Transfusion Medicine and related technology.

To take adequate regulatory and legislative steps for monitoring and evaluation of blood transfusion services and to take steps to eliminate profiteering in blood banks.

17.5 NATIONAL POPULATION POLICY 2000

Efforts made over the years for improving health standards have been partially neutralized by the rapid growth of the population. It is well recognized that population stabilization measures and general health initiatives, when effectively synchronized, synergistically maximize the socio-economic well-being of the people.

Population policy in general refers to policies intended to decrease the birth rate or growth rate. Statement of goals, objectives and targets are inherent in the population policy. In April 1976 India formed its first – “National Population Policy”. It called for an increase in the legal minimum age of marriage form 15 to 18 for females, and from 18 to 21 for males. “National Population Policy 2000” is the latest in this series. It reaffirms the commitment of the government towards target free approach in administering family planning services. It gives informed choice to the people to voluntarily avail the reproductive health care services. The new NPP 2000 is more than just a matter of fertility and mortality rates. It deals with women education; empowering women for improved health and nutrition; child survival and health; the unmet needs for family welfare services; health care for the under-served population groups like urban slums, tribal community, hill area population and displaced and migrant population; adolescent’s health and education; increased participation of men in planned parenthood; and collaboration with NGO’s.

The objective of NPP2000 is to bring the TFR to replacement levels by 2010. The long term objective is to achieve requirements of suitable economic growth, social development and

environment protection. The National Socio-Demographic Goals to be achieved by the year 2010 are as follows:

a) Address the unmet needs for basic reproductive and child health services, supplies and infrastructure.
b) Make school education up to the age 14 free and compulsory, and reduce drop-outs at primary and secondary school levels to below 20 percent for both boys and girls.
c) Reduce infant morality rate to below 30 per 1,000 live births.
d) Reduce maternal mortality ration to below 100 per 1,00,000 live births.
e) Achieve universal immunization of children against all vaccine preventable diseases.
f) Promote delayed marriage for girls, not earlier than age 18 and preferably after 20 years of age.
g) Achieve 80 per cent institutional deliveries and 100 per cent deliveries by trained persons.
h) Achieve universal access to information / counseling, and services for fertility regulation and contraception with a wide basket of choices.
i) Achieve 100 per cent registration of births, deaths, marriage and pregnancy.
j) Contain the spread of Acquired Immuno Deficiency Syndrome (AIDS), and promote greater integration between the management of reproductive tract infections (RTI) and sexually transmitted infections (STI) and the National AIDS Control Organisation.
k) Prevent and control communicable disease.
l) Promote vigourously the small family norm to achieve replacement levels of TFR.
m) Bring about convergence in implementation of related social sector programmes so that family welfare becomes a people centred programme.
n) Integrate Indian Systems of Medicine (ISM) in the provision of reproductive and child health services, and in reaching out to households.

If the NPP 2000 is fully implemented, it is anticipated that in the year 2010 the population will be 1107 million instead of 1162 million projected by the Technical Group of Populations. Similarly, the anticipated crude birth rate will be 21 per 1000 population, infant mortality rate 30 per 1000 live births and total fertility rate 2.1. Efforts at population stabilization will be effective only if an integrated package of essential services is directed at village and household levels. Inadequacies in the existing health infrastructure have led to a unmet need of 28 per cent of contraception services and obvious gap in coverage and out reach.

17. 6 Millennium Development Goals

More recently in September 2000, representatives form 189 counties met at the Millennium Summit in New York, to adopt the United Nations Millennium Declaration. The goals in the area of development and poverty eradication are now widely referred to as "**Millennium Development Goals**" (MDGs). The MDGs place health at the heart at the heart of development and represent commitments by governments throughout the world to do more to reduce poverty and hunger and to tackle ill-health; gender inequality; lack of education; access to clean water; and environmental degradation. They are an integral part of the road map towards the implementation of the UN Millennium Declaration. Three of the 8 goals, 8 of the 18 targets required to achieve them, and 18 of 48 indicators of progress, are health related. They assist in the development of national policies focussing on poor, and help track the performance of health programmes and systems. Although, the MDGs do not cover the whole range of public health domains, a broad interpretation of the goals provides an opportunity to tackle important cross cutting issues and key constraints to health and development. Governments have set a date of 2015 by which they would meet the MDGs, i.e. eradicate extreme poverty and hunger; achieve universal primary education; promote gender equality; improve maternal health; combat

HIV / AIDS, malaria and other communicable diseases; ensure environmental sustainability; and develop a global partnership for development.

17.7 Five Year Plans – Health Targets

The five year plans were conceived to re-build rural India, to lay the foundations of industrial progress and to secure the balanced development of all parts of the country. Recognising "health" as an important contributory factor in the utilisation of manpower and the uplifting of the economic condition of the country, the Planning Commission gave considerable importance to health programmes in the five year plans. The broad objectives of the health programmes during the five year plans have been:

(1) Control or eradication of major communicable diseases;
(2) Strengthening of the basic health services through the establishment of primary health centres and subcentres;
(3) Population control; and
(4) Development of health manpower resources.

Tenth Five Year Plan (2002-2007)

Today India has a vast network of governmental, voluntary and private health infrastructure manned by large number of medical and paramedical persons. During the Tenth Plan, efforts will be further intensified to improve the health status the population by optimising coverage and quality of care by identifying and rectifying the critical gaps in infrastructure, manpower, equipment, essential diagnostic reagents and drugs.

The approach during the Tenth Plan will be to improve access to, and enhance the quality of primary health care in urban and rural areas by providing an optimally functioning primary health care system as a part of Basic Minimum Services and to improve the efficiency of existing health care infrastructure at primary, secondary and tertiary care settings through appropriate institutional strengthening and improvement of referral linkages.

The monitorable targets for the Tenth Five Year Plan and beyond are as follows:

1. Reduction of poverty ratio by 5 per cent points by 2007, and by 15 per cent points by 2012;
2. All children in school by 2003; all children to complete 5 years of schooling by 2007;
3. Reduction in gender gaps in literacy and wage rates by at least 50 per cent by 2007;
4. Reduction in the decadal rate of population growth between 2001 and 2011 to 16.2 per cent;
5. Increase in literacy rate to 75 per cent within the plan period;
6. Reduction of infant mortality rate to 45 per 1000 live births by 2007 and to 28 by 2012;
7. Reduction of maternal mortality ratio to 2 per 1000 live births by 2007 and to 1 by 2012; and
8. All villages to have sustained access to potable drinking water within the Plan period.

These targets reflect the concern that economic growth alone may not lead to the attainment of long-term sustainability and of adequate improvement in social justice. Earlier plans have had

many of these issues as objectives, but in no case specific targets were set. As a result, these were viewed in terms of being desirable but not essential. However, in the 10th plan, these targets are considered to be as central to the planning frame work as the growth objective.

Technological improvements and increased access to health care have resulted in a steep fall in mortality, but the disease burden due to communicable diseases and non-communicable diseases, environmental pollution and nutritional problems continue to be high. In spite of the fact that norms for creation of infrastructure and manpower are similar throughout the country, there remains substantial variation between states and districts within the states, in availability and utilization of health care services and health indices of the population. During Tenth Plan there is continued commitment to provide essential primary care, emergency life saving services, services under national disease control programme free of cost to individuals, based on their needs, and not on their ability to pay. Government has set targets in the Tenth Five Year Plan to control certain diseases like HIV / AIDS, tuberculosis, leprosy, malaria, and blindness etc.

17.8 Medical Ethics

Professional medical ethics in the health sector is an area, which has not received much attention. Professional practices are perceived to be grossly commercial and the medical profession has lost its elevated position as a provider of basic services to fellow human beings. In the past, medical research has been conducted within the ethical guidelines notified by the Indian Council of Medical Research. The first document containing these guidelines was released in 1960, and was comprehensively revised in 2001. With the rapid developments in the approach to medical research, a periodic revision will no doubt be more frequently required in future. Also, the new frontier areas of research – involving gene manipulation, organ / human cloning and stem cell research - impinge on visceral issues relating to the sanctity of human life and the moral dilemma of human intervention in the designing of life forms. Besides this, in the emerging areas of research, there is the uncharted risk of creating new life forms, which may irreversibly damage the environment as it exists today. NHP – 2002 recognises that this moral and religious dilemma, which was not relevant even two years ago, now pervades mainstream health sector issues. NHP – 2002 envisages that, in order to ensure that the common patient is not subjected to irrational or profit-driven medical regimens, a contemporary code of ethics be notified and rigorously implemented by the Medical Council of India.

17.9 Consumer Protection Act

Way back in 1987 when the Consumer Protection Act came into existence, nobody even could imagine in that this Act would be a lesson to the medical and para-medical personnel not aware of their functional responsibilities. The Supreme Court on 13th November 1995 upheld the National Consumer Commission's judgement of April 1992 whereby patients who received deficient services by medical profession and hospitals are entitled to claim damages under the Consumer Protection Act.

Important Cases: Important decisions of the Supreme Court made in this regard are;
IMC Vs V.P.Institute (1995):
The decision made in 1995 made it clear that the health services offered by public as well as the private hospitals would come under the purview of Consumer Protection Act. It was clarified that the hospitals offering cost-based or even free of charge services are under the purview but in this context it is essential that the hospitals are following the double-pronged strategy or say, they have been charging more from one segment, charging less or even free of charge services

from another segment. In this case, the patients paying more fee, or paying less fee or paying nothing would be under the purview of the Act. This is due to the fact that the hospitals promise uniformity in the quality of services to the different categories of patients and therefore a discrimination in the quality of services offered is not desirable and the losses on that account to the patients would be payable.

IMC Vs. Prashant (1999):
In the case of Prashant Vs IMC, it was clarified by the Supreme Court that hospitals offering free of charge services to the patients are not under the purview of the Consumer Protection Act 1987.

In a recent, land mark judgement the Supreme Court has vindicated the stand of Indian Medical Association (IMA) that doctors should not be held criminally responsible unless there is a prima-facie evidence before the Court in the form of a credible opinion from another competent doctor, preferably a Government doctor in the same field of medicine supporting the charges of a rash and negligent act.

The Association has always felt that before making a doctor criminally liable, procedure should be laid down to identify that whether at all there is a prima-facie case of gross medical negligence. The Court re-affirm the previous bench judgement that for any act of negligence to be viewed as criminal negligence and hence inviting criminal prosecution, the negligence would have to be of a gross nature. The Court further added that two tests would have to be fulfilled i.e. the doctor did not posses the necessary skill required or that he was possessed of the necessary skill but does not exercise it with the reasonable competence. The act committed ought to be such that no medical professional in the ordinary sense would have committed and being such an act that would result in imminent injury. IMA feels that this is a laudable judgement in the light of criminal procedures filed against the medical professionals in trivial cases under Section 304 A and even 304 where prima-facie there seemed to be no neglect in these medical treatments. IMC also feel that no doctors deliberately wants to harm his patients and if because of some untoward reaction or error of judgement or a known complication of a disease or because of method of treatment patient has unfavourable outcome, doctors should not be held criminally liable.

17.9 Summary

Medical professionals must aware of the contemporary issues in health care system to have understanding about issue s of importance. Various policy initiatives taken by the government in the field of health management must be understood by the medical practitioners. National Health Policy 2002 forms the backdrop for various initiatives undertaken by the government. Government has separately announced the `National Population Policy – 2000'. The principal common features covered under the National Population Policy-2000 and National Health Policy -2002, relate to the prevention and control of communicable diseases; giving priority to the containment of HIV / AIDS infection; the universal immunization of children against all major preventable diseases; addressing the unmet needs for basic and reproductive health services, and supplementation of infrastructure. The synchronized implementation of these two Policies – National Population Policy – 2000 and National Health Policy-2002 – will be the very cornerstone of any national structural plan to improve the health standards in the country. Legal issues and ethical issues also having paramount importance at present. At the same time international organizations like World Health Organization, United Nations also setting some important goals and objectives in the form of Health for All by 2000, Millennium Development

Goals. A deep understanding about social, political, legal, and ethical dimensions of the health issues helps medical practitioners' to serve their patients better.

17.10 Technical terms

Millennium Development Goals: Representatives form 189 counties met at the Millennium Summit in New York, to adopt the United Nations Millennium Declaration. The goals in the area of development and poverty eradication are now widely referred to as "**Millennium Development Goals**" (MDGs).

National Population Policy 2000 It reaffirms the commitment of the government towards target free approach in administering family planning services. It gives informed choice to the people to voluntarily avail the reproductive health care services.

Health for All by 2000: In 1977, it was decided in the World Health Assembly to launch a movement known as "Health for All by the year 2000". The fundamental principle of HFA strategy is equity, that is, an equal health status for people and countries, ensured by an equitable distribution of health resources.

17.11Self-assessment Questions

1. Describe in brief the importance of "Health for All by 2000".
2. What are the important objectives of National Health Policy 2002?
3. Elucidate the importance of National Population Policy in the context of health.
4. How Consumer Protection Act is relevant to the medical practitioners in performing their duty?
5. What are the social and ethical issues involved in health care sector?

17.12 Books for further reading

Park K, Preventive and Social Medicine, M/s Banarsidas Bhanot publishers, Jabalpur, 2005

S M Jha, Hospital Management, Himalaya Publishing House, Mumbai, 2001

Lesson 18

HOSPITAL INFORMATION SYSTEM

18.0 OBJECTIVES

- Understanding the meaning of Information System
- Knowing the key components of Information System
- To know the computer fundamentals
- To understand the design of typical Information System
- To know the importance of Hospital Information System

STRUCTURE

18.1 Definition of Information System

An information system (IS) collects, processes, stores, analyzes, and disseminates information for a specific purpose. Like any other system, an information system includes inputs (data, instructions) and outputs (reports, calculations). It processes the inputs and produces outputs that are sent to the user or to other systems. A feedback mechanism that controls the operation may be included (see Figure 1). Like any other system, an information system operates within an environment. Information systems are not new to organizations, but computerization of information systems is relatively a new concept.

Computer - Based Information System:
CBSI is an information system that uses computer technology to perform some or all of its intended tasks. Such systems can include a personal computer and software, or it may include several thousand computers of various sizes with hundreds of printers, plotters, and other devices as well as communication networks and databases. In most cases an information system also includes people. The basic components of information systems are listed below. Note that not every system includes all these components.

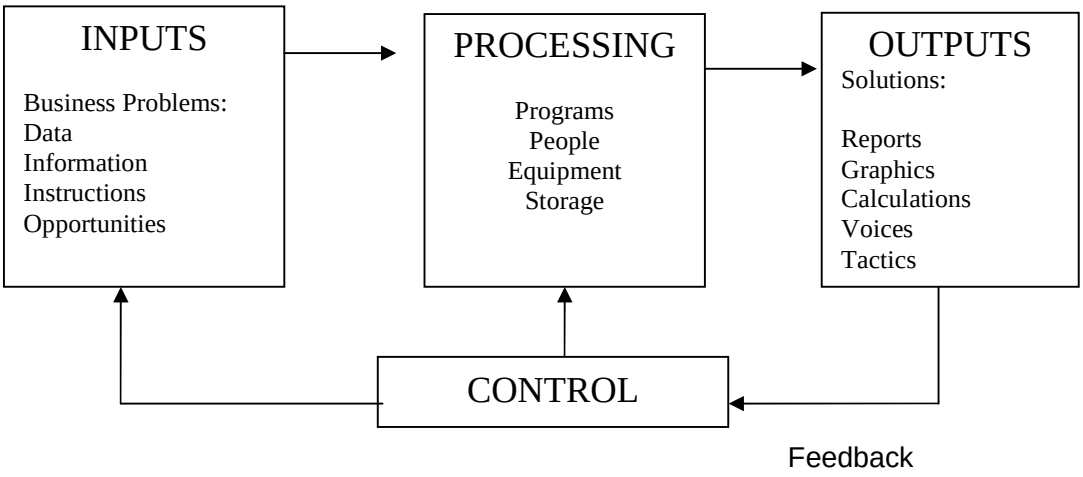
a) Hardware is set of physical devices such as processor, monitor, keyboard and printer;
b) Software is set of programs that enable the hardware to function;
c) Database is a collection of related data stored at one place for multiple usage;
d) Network is connecting system that permits the sharing of resources by different computers.

e) Procedures are the set of instructions about how to combine the above components in order to process information and generate the desired output.
f) People are those individuals who work with the system or use its output.

In addition, all systems have a purpose and a social context. A common purpose is to provide a solution to a business problem. Information systems normally help organizations in reducing costs, improving communication, and expediting administrative processes. The social context of the system consists of values and beliefs that determine what is admissible and possible within the culture of the people and groups involved.

Figure 1

A Schematic View of an Information System

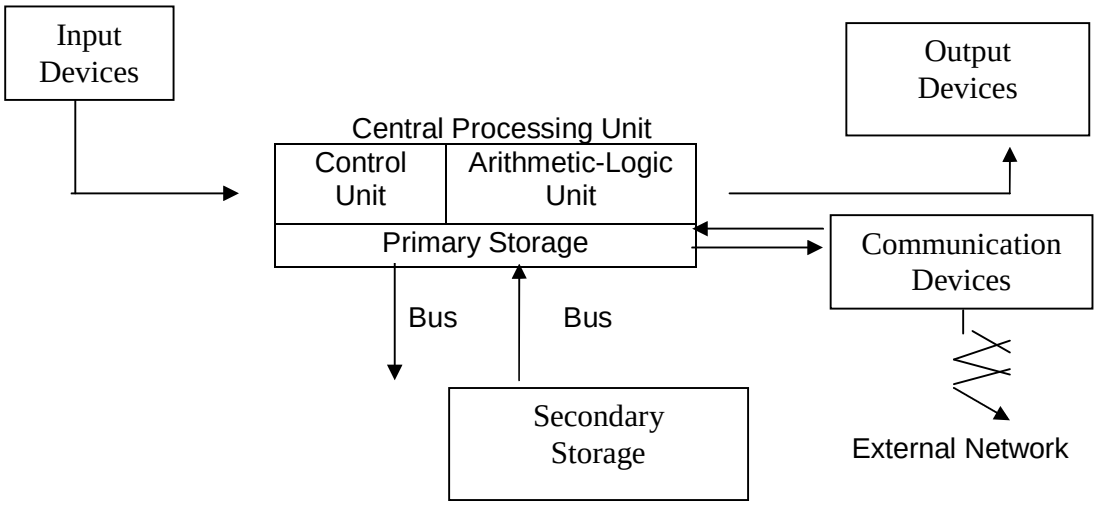


18.2 Fundamentals of computers

A computer is an electronic data processing machine that perform both arithmetic and logical operations on given data with the help of instructions given in the programme.

Computer hardware is composed of the following components:
Central processing unit (CPU), input devices, output devices, primary storage, secondary storage, and communication devices. Each of the hardware components plays an important role in computer. The input devices accept data instructions and convert them to a form that the computer can understand. The output devices present data in a form people can understand. The CPU manipulates the data and controls the tasks done by the other components. The primary storage (internal storage) temporarily stores data and program instructions during processing. It also stores intermediate results of the processing. The secondary storage (external) stores data and programs for future use. Finally, the communication devices provide for the flow of data from external computer networks (e.g., Internet, Intranet) to the CPU and from the CPU to other computer networks. A schematic view of a computer system had shown in Figure 2.

Figure 2
A Schematic view of a computer system



18.3 Design of Typical Information System

There is no standard method for systems design or expansion. The following steps are considered in designing typical hospital information system.

1. Determine the need for computerized information.
2. Determine the data-processing needs of the hospital.
3. Evaluate different computer systems as to their capabilities of meeting the organization's objectives.
4. Select a computer system.
5. Plan and design software based on organizational objectives.
6. Educate personnel to use the system.
7. Implement the system.
8. Conduct ongoing evaluation and development of the system.

Health Information System:

Health information is an integral part of the national health system. It is a basic tool of management and a key input for the progress of any society. A health information system is defined as:

" a mechanism for the collection, procesing, analysis and transmission of information required for organizing and operating health services, and also research and training".

The primary objective of a health information system is to provide reliable, relevant, up-to-date, adequate, timely and reasonably complete information for health managers at all levels (i.e., central, intermediate and local), and at the sharing of technical and scientific (including bibliographical) information by all health personnel participating in the health services of a country; and also to provide at periodic intervals, data that will show the general performance of the health services and to assist planners in studying their current functioning and trends in demand and work load.

Requirements to be satisfied by health information systems:

A WHO Expert Committee identified the following requirements to be satisfied by the health information systems:

(1) The system should be population-based
(2) The system should avoid the unnecessary agglomeration of data
(3) The system should be problem-oriented
(4) The system should employ functional and operational terms (e.g., episodes of illness, treatment regimens, laboratory tests)
(5) The system should express information briefly and imaginatively (e.g., tables, charts, percentages)
(6) The system should make provision for the feed-back of data

Components of a health information system:

The health information system is composed of several related subsystems. A comprehensive health information system requires information and indicators on the following subjects:

(1) demography and vital events
(2) environmental health statistics
(3) health status : mortality, morbidity, disability, and quality of life
(4) health resources : facilities, beds, manpower
(5) Utilization and non-utilisation of health services : attendance, admissions, waiting lists
(6) Indices of outcome of medical care
(7) Financial statistics (cost, expenditure) related to the particular objective

Uses of Health Information:

The important applications of health information may be applied are:

(1) To measure the health status of the people and to quantify their health problems and medical and health care needs
(2) For local, national and international comparisons of health status. For such comparisons the data need to be subjected to rigorous standardization and quality control.
(3) For planning, administration and effective management of health services and programmes
(4) For assessing whether health services are accomplishing their objectives in terms of their effectiveness and efficiency
(5) For assessing the attitudes and degree of satisfaction of the beneficiaries with the health system, and
(6) For research into particular problems of health and disease

18.4 Hospital Information System

Computers in health care are well accepted the world over; as clinical and diagnostic aids, to improve patient care, tone up administration, facilitate accounting and enable effective management control. An important application has been in hospital management, where computes are used as an effective tool for doctors, nursing, administration, and management. Given the universal trend of falling prices of computer equipment and the emergence of excellent software, specially designed for hospitals, there is a marked improvement of computerization in the health care sector. Information, intelligently used, and information systems carefully planned, can be a great asset to the hospital administrator.

Need for computerization in hospitals:

a. Medical professional such as medical doctors, directors spend undue time and attention in managing routine administrative chores, leaving inadequate time to solve medical & clinical problems.
b. Hospitals lose a certain percentage (2-5%) of their revenue from paying patients because of service / materials not being correctly billed. This in turn reflects adversely in their ability. To provide free services.
c. Hospitals can reduce their expenditure on drugs, medical supplies, test kits, X-rays films etc., by at least 5 - 10% by proper inventory controls.
d. Costly medical equipment is often under utilised or even unused because of inadequate monitoring of maintenance and capacity utilisation.
e. Nursing care can be very much facilitated if paper work is reduced; test, drug and diet requisitions are automatic and up-to-date patient data available.
f. Medical audit, epidemiological analysis, community surveys and medical education and research are areas where major improvements can result if patient medical records are computerized.
g. Majority of patient complaints are related to the administrative efficiency in the hospital.

In light of the above there is an imperative need for computerization of hospital administration for optimum utilization of available resources and to improve the productivity of total heal care system. A health information system or hospital information system (HIS) is nothing but management information system (MIS) for health-related organizations. Computers are used in hospitals at three levels;

a) **Administrative data processing:** Administrative data processing resembles a business system, performing such routine functions as billing, accounts receivable, accounts payable, payroll, general ledger, census, admissions records, laboratory data, inventory of drugs, supplies, and equipment, and staff scheduling.

b) **Clinical data processing:** The clinical data processing system combines routine record-keeping functions with some actual partcipation in the health care process. Specific applications range from direct computerized monitoring of the vital functions of critically ill patients in intensive care, to records retrieval systems designed to aid the medical audit process in the hospital to ensure that quality standards are being maintained.

c) **Medical information systems:** Displays patient-related data at various terminals, and takes care of billing. Some corporate hospitals have placed computer terminals

in all patients' rooms, allowing the nurses to communicate with doctors, specialists, medical records, laboratories, and so on. Orders for tests, special diets, and medications are all entered from the patient's room. Also, information about the patient, such as nearest relative, can be found within seconds directly form the patient's room.

A few applications of Information Technology in hospitals are cited below:

1.Medical records:

- Software can be designed to capture medical records in a well standardised format;
- Appropriate authorities for entering information, editing, viewing can be assigned. Software can prevent tampering of any records already entered. All transactions done by the doctors in this matter can be logged in a non-temperable way; "Non cooking" can be ensured by the software;
- Copies can be made available to the patients by printing on a printer. Many times the laborious manual methods can be a deterrent to doing this;
- Confidentiality desired by the patient can be better guaranteed than by paper based file system, as software implements several levels of security;
- Legible and neat records can be created easily;
- Archival of the records for several years can be done cost-effectively on magnetic tape media; non-text data or records can be scanned in and stored; multiple copies can be made cost-effectively and stored in different strategic places to guard against loss, damage or tampering. Storage of such large amount of data is also quite space-effective when done on the computer media;
- Manageability is much better than mountains of paper-based documents / files.
- Indexing & retrieval by patient number, disease classification, demographic factors etc., is done easily

2. Implementation of procedures:

When a hospital devises elaborate procedures & assigns responsibilities for various procedures in order to ensure quality assurance plans, many of these schemes can be implemented and conformance to them can be monitored / ensured on a computerized system.

3. Resource monitoring:

Accurate and timely data can be gathered on the availability of equipment and their maintenance particulars. Similarly, accurate data can be collected on other resources such as doctors, nurses, beds, and medicines etc. to take informed decisions / provide justification on the extent to which the resources are being utilised / stretched. Such data can provide the necessary defense against poor quality service.

4. Billing details

It is much easier to store in a computer database the billing items, rates, brief explanations and could be provided these information a print-out, if demanded by the patient.

5. Information access

Today the world is being networked through mechanisms such as internet enables users to access large pools of data at very nominal costs. A vast database of properly classified technical / professional information on medical fields may already be available / can be made available on computers. The ability to selectively and hierarchically access such information can ensure that the doctor can utilise all resouces of the science; it will be much easier than searching through the books. Examples of such databases are drugs database containing medicines, dosages, effects etc., case histories form around the world classified by disease, symptoms, etc. The information, be it medical records or technical details can be accessed anywhere such as even in an operation theatre or a home clinic.

6. Access to professional help

With the capability of audio & video conferencing, a doctor can call for help when it is beyond his capacity. Necessary medical records can be displayed to the expert & his informed & quick guidance sought in giving medical help. Even in India, with the recent introduction of broad band by telecom companies, such facilities have become feasible. At its simplest but yet with considerable effectiveness E-mail can be used to seek expert opinion nationally or internationally.

7. Assistance in informed consent

For many of the routinely or frequently occurring treatments, special procedures or investigations, excellent presentations can be prepared using multimedia technique and certified centrally or by a suitable body and they can be made available to the hospital. The educated patient, at least, can have an interactive self-paced session about the procedures, consequences, risk statistics, success statistics of the hospital etc., before the consent is given. In India software / hardware solutions have been developed to support several regional languages on the computer and this can be exploited.

8. Compilation & distribution of medico-legal cases:

Today many of the courts are being computerised by classifying & storing legal cases & judgements. A separate collection of medico-legal cases can be made and distributed to hospitals / doctors for loading on their computers & studying them. As already stated creating such information, classifying, updating & distributing them is much easier on a computer or a computer network..

9. Database on other Hospitals / Doctors

Latest information about facilities available in other hospitals in the appropriate zone can be stored as a database and could be accessed when required to advise a patient about other alternatives.

It can thus be seen that deploying IT can help the medical profession in improving its quality of service and thus automatically increasing the preparedness & defensiveness. Of course it is of vital importance that the software must have the right type of modularity and openness so that it is manageable, maintainable and upgradable. The hardware should also be reliable, available and have the necessary performance capability. The

benefits of computerisation come from better management through informed decision making.

18.5 Uses of Computerization in Hospital Administration

Information Technology, primarily consisting of computers and computer communication networks have brought with them enormous new possibilities to many areas of human life. This constantly and rapidly advancing technology has become all encompassing. Its application to Health Care also throws up several interesting possibilities. The essential capabilities of this technology are;

- Storage of large amounts of information as data bases at very affordable cost.
- Selective and quick access to information, almost irrespective of size.
- Ease of updating the databases.
- Well researched and adequate security mechanisms for access of data.
- Ability to access databases over a network, be it a small hospital, a city, a country or even globally.
- Well established & proven methods of on-line transaction processing (OLTP) accompanied by audit trails and transaction trace of activities done on the computer & network.
- Ease of making copies or otherwise for dissemination of information across a wide network.
- Provides one of the easiest methods to implement standardization – be it as documents or procedures and 'business processes'.
- Variety of peripherals such as document scanners to capture data be it text or picture.
- Excellent presentation / communication capabilities with technologies like multimedia (integrating text, voice, picture & video with great ease).
- Excellent communication options with audio & video conferencing capabilities on a computer network.
- Excellent computational capabilities, particularly for data analysis, statistics generation, image manipulation etc.,

The falling investment requirements and viewed differently, increased performance for the some price, has made IT affordable as well as 'un-wise to ignore' solution. These capabilities of IT can play a significant role in increasing the productivity & effectiveness of the medical profession, increase patient satisfaction & also incidentally make it possible to have a better state of preparedness & defensiveness for the hospitals. However, effective information processing is not possible until most or all of the hospital's data is being processed by the computer.

18.6 Summary

Hospital information system (HIS) will provide health care professionals with quick, accurate, and appropriate access to patient's medical history information, which is important to providing patient care. Doctors, nurses, and other medical staff will have access to up-to-date patient information. It will also lessen the need for patients to repeat information over and over again, reduce wait times for test results, and provide more information for administrators to base their decisions on. There are several distictive benefits to such systems such as; a) reduction in personnel; b) reduction in

clerical work by professional staff; c) reduction in lost charges; d) instant recording and retrieval of clinical information from numerous remote sites; e) centralized patient care data; f) reduction in paper work; g) improved accountablity and accuracy of information; h) improved cost accounting and cost containment and i) poosible reduction in length of patient stay due to increased hospital efficiency.

18.7 Technical terms

System: A system is a collection of elements such as people, resources, concepts, and procedures intended to perform an identifiable function or serve a goal.

Data: Data items refer to an elementary description of things, events, activities, and transactions that are recorded, classified, and stored, but not organized to convey any specific meaning. Data items can be numeric, alphanumeric, figures, sounds, or images. A database consists of stored data items organized for retrieval.

Information: is data that have been organized so that they have meaning and value to the recipient. The recipient interprets the meaning and draws conclusions and implications. Data processed by an application program represent a more specific use and a higher value added than simple retrieval from a database.

Network: is connecting system that permits the sharing of resources by different computers.

Hardware is set of physical devices such as processor, monitor, keyboard and printer;

Software is set of programs that enable the hardware to function;

Database is a collection of related data stored at one place for multiple usage;

18.8 Self-assessment Questions

1. Define information system. What are the important components of information system?
2. What are the important benefits of computerization in hospital management?
3. How hospitals get benefit from having an integrated Hospital Information System? What re the important modules in HIS?
4. Illustrate with an example of a typical Hospital Information system.

18.9 Books for further reading

Ashok Sahni, Computer Applications To Hospitals, Medical, And Health Care – An Update, Indian Society of Health Administrators, Bangalore, 1997

Turban Efraim, McLean Ephraim, Wetherbe James, Information Technology For Management, John Wiley & Sons. Inc, Singapore,2003

Samuel Levey, Paul Loomba, Health Care Administration A Managerial Perspective, J B Lippincott Company, Philadelphia

Lesson 19

EVOLUTION OF HEALTH CARE MARKETING

19.0 OBJECTIVES

- Understanding the meaning of Marketing
- To know the elements of marketing mix in service sector
- To highlight the importance of marketing management in health sector
- To know the service- quality determinants
- To know the evolution of marketing in health care sector in India

STRUCTURE

19.1 Meaning of Marketing Management

According to American Marketing Association, "Marketing is an organizational function and a set of processes for creating, communicating, and delivering value to customers and for managing customer relationships in ways that benefit the organization and its stake holders". Marketing management is the art and science of choosing target markets and getting, keeping, and growing customers through creating, delivering, and communicating superior customer value. From a managerial point of view, marketing is the process of planning and executing the conception, pricing, promotion, and distribution of ideas, goods, and services to create exchanges that satisfy individual and organizational goals.

A social definition shows the role marketing plays in the society. One marketer said that marketing's role is to "deliver a higher standard of living". Here is a social definition that serves our purpose: Marketing is a societal process by which individuals and groups obtain what they need and want through creating, offering, and freely exchanging products and services of value with others.

19.2 Services Marketing – Introduction

As health care marketing comes under a broad area of services marketing an effort has been made in the following sections to discuss distinctive characteristics of services, elements of service marketing mix, and service – quality measurement. A service is any act or performance that one party can offer to another that is essentially intangible and does not result in the ownership of anything. It may or may not be tied to a physical product.

Distinctive characteristics of services:
Services have four distinctive characteristics that greatly affect the design of marketing programs:

a) **Intangibility:** Unlike physical products, services cannot be seen, tasted, felt, heard, or smelled before they are bought. The person getting a face-lift cannot see the results before the purchase, and the patient in the psychiatrist's office cannot know the exact outcome.

b) **Inseparability:** Services are typically produced and consumed simultaneously. This is not true of physical goods, which are manufactured, put into inventory, distributed through multiple resellers, and consumed later. If a person renders the service, then the provider is part of the service. Because the client is also present as the service is produced, provider-client interaction is a special feature of services marketing.

c) **Variability:** Because services depend on who provides them and when and where they are provided, they are highly variable.

d) **Perishability:** Services cannot be stored. Perishability is not a problem when demand is steady. When demand fluctuates, service firms have problems. Some doctors charge patients for missed appointments because the service value exists only at that point.

Each characteristic poses challenges and requires certain strategies. Marketers must find ways to give tangibility to intangibles; to increase the productivity of service providers; to increase and standardize the quality of the service provided; and to match the supply of services with market demand. That is why now a days hospitals are trying to give brochures, medical records in folders, and other merchandising material to patients. Branding of hospitals and hospital services is also going on in a big way. Hospitals are also collaborating with insurance companies to promote jointly their services. They are conducting awareness campaigns, distributing promotion material, and highlighting their infrastructural facilities, informing public about their nursing staff efficiency, and dietician services, etc. Round the clock medical care, supporting facilities like ambulance, yoga centres, meditation rooms are also used to position themselves as total health care solution providers.

Holistic Marketing for Services:
Because service encounters are complex interactions affected by multiple elements, adopting a holistic marketing perspective is especially important. The service outcome is influenced by a host of variables. Holistic marketing for services may help organizations to reduce the levels of customer dissatisfaction levels. This approach includes external, internal, and interactive marketing. External marketing describes the normal work of preparing, pricing, distributing, and promoting the service to customers. Internal marketing describes training and motivating employees to serve customers well. Interactive marketing describes the employees' skill in serving the client. Clients judge service not only by its technical quality (e.g., Was the surgery successful?), but also by its functional quality (e.g., Did the surgeon show concern and inspire confidence?). Technology has great power to make service workers more productive. Respiratory therapists at the University of California at San Diego Medical Center now carry miniature computers in their coat pockets so that they can call up patient records on handheld computers and therefore spend more time working directly with patients. Service providers must deliver "high-touch" as well as "high-tech".

19.3 Elements of Service Marketing Mix

The marketer's task is to devise marketing activities and assemble fully integrated marketing programs to create, communicate, and deliver value for consumers. The marketing program

consists of numerous decisions on value-enhancing marketing activities to use. Marketing activities come in all forms. One traditional depiction of marketing activities is in terms of the marketing mix, which has been defined as the set of marketing tools the firm uses to pursue its marketing objectives. McCarthy classified these tools into four broad groups, which he called the four Ps of marketing: product, price, place and promotion. The four Ps represent the seller's view of the marketing tools available for influencing buyers. From buyer's point of view, each marketing tool is designed to deliver a customer benefit. Robert Lauterborn suggested that the seller's four Ps correspond to the customer's four Cs.

Four Ps	Four Cs
Product	Customer solution
Price	Customer cost
Place	Convenience
Promotion	Communication

Service marketers have for a fairly long time been mentioning the need for additional Ps to take into account the special nature of services marketing. This demand has led to the emergence of various alternative Ps.

1) Process,
2) People, and
3) Physical evidence

The reason for their addition and acceptance is fairly obvious. Services are delivered by 'people' in many cases. People constitute an important dimension in the management of services in their role both as performers of service and as customers. Even when technology is used, people do form a very important part of the 'service experience', and technology is used only as an enabler for faster data recovery or entry. Similarly, the 'process' is an important way to look at any service situation. In service organisation the system by which you receive delivery of the service constitutes the process. 'Process' is a critical variable from the point of view of the customer, because it determines what he has to do to get a service. The other P off 'physical evidence' is necessitated by the fact that services are largely intangible in nature. Therefore, the tangible elements have to be separately accounted for. Sometimes, these serve to differentiate between service providers, like the logos or uniforms or décor.

19. 4 Evolution of healthcare marketing

Earlier hospitals and health organizations, however, have been relatively slow to consider the implementation of marketing strategies. Most hospitals were founded by religious, governmental, or other not-for-profit organizations who were not seriously concerned with bottom-line surpluses. In the 1950s and 1960s the number of hospitals rose significantly and the number of people demanding services increased. Medical aid facilitated access to healthcare services by the poor, and Medicare assisted the rapidly increasing elderly population. However, hospital occupancy rates, following the downturn in the general economy, began dropping as unemployed and uninsured workers deferred costly medical and surgical hospitalization. At the same time, government concern over cost led to an examination of the necessity for some services at many hospitals, and an increasingly sophisticated patient population requested more information about and more control over health services. Entry of private sector, huge investments made by the corporate sector in health care, increased awareness levels of patients, proliferation of media channels, increased budgetary spending on health care by government, forced the health care sector to give importance to marketing.

At present improvement in the health status of the population is a major thrust area for the government under the social development programmes. The expenditure on health care constitutes 5.2 per cent of GDP. The department of health formulated the National Health Policy 2002 with an objective of achieving an acceptable standard of good health in the country. The 10^{th} plan focussed on re-organisation and restructuring of the health care infrastructure at all levels. Private sector Corporate hospitals offer quality services with state-of-the-art technology. The entry of the corporate sector has brought in a dynamic shift in health care services. Having an assured growth in demand due to the increasing population, rise in pollution levels, emergence of communicable diseases, epidemics and falling living conditions, the health care sector has prospects of high level growth. Medical insurance companies are also promoting health consciousness in general. There is a huge potential for health care organizations in India for growth.

19. 5 Measuring Service-Quality

Customer form service expectations from many sources, such as past experiences, word of mouth, and advertising. In general, customers compare the perceived service with the expected service. If the perceived service falls below the expected service, customers are disappointed. If the perceived service meets or exceeds their expectations, they are apt to use the provider again. Successful companies add benefits to their offering that not only satisfy customers but surprise and delight them. Delighting the customers is a matter of exceeding expectations. Based on service-quality model the following five were identified as determinants of service quality, in order of importance.

a) **Reliability:** The ability to perform the promised service dependbly and accurately.
b) **Responsiveness:** The willingness to help customers and to provide prompt service.
c) **Assurance:** The knowledge and courtesy of employees and their ability to convert trust and confidence.
d) **Empathy:** The provision of caring individualized attention to customers.

e) **Tangibles:** The appearance of physical facilities, equipment, personnel, and communication materials.

Health care companies must give importance to the above factors for getting user acceptability and to enhance their share of business.

19. 6 Marketing of health service – An Indian Perspective

Application of marketing principles in the health care sector is justified because this would help keeping users satisfied, time honoured services would be made available to the patients, mass awareness would be created, thrust areas would be identified, vulnerable segment would be detected, behavioural dimension would be given due weightage, cost-effectiveness would be made possible, a rational fee structure can be introduced and hospital personnel can be motivated.

The health care market has grown substantially in India. The increased life expectancy is the result of the consciousness of people regarding health issue. The growth of health centres, fitness clubs, diagnostic centres, medical counselling, psychological counselling, health-related information sites are the reflections of the growing demand for health care services. The government as well as social organizations have taken up mass campaigns through different media to create awareness among illiterate persons and rural population on health care.

Immunization campaigns, childcare campaigns, campaigns on preventive medicine and family planning are some of the programmes intended to promote health care in rural India. However, only a few Indians go for periodic or preventive check ups. Generally they go to doctor when they have problem. Because of the low income the consumer expenditure on health in India is too low. There is still lack of awareness on deadly disease like AIDS, Cancer etc.

NHP 2002 - Information, Education and Communication (IEC) Initiative:

As per the National Health Policy 2002, substantial component of primary health care consists of initiatives for disseminating to the citizenry, public health-related information. Information, education, and communication initiatives are adopted not only for disseminating curative guidelines (for the TB, Malaria, Leprosy, Cataract Blindness Programmes), but also as part of the effort to bring about a behavioural change to prevent HIV / AIDS and other life-style diseases. Public health programmes, particularly, need high visibility at the decentralized level in order to have an impact. This task is difficult, as 35 percent of our country's population is illiterate.

The present IEC strategy is too fragmented relies too heavily on the mass media and does not address the needs of this segment of the population. It is often felt that the effectiveness of IEC programmes is difficult to judge; and consequently it is often asserted that accountability, in regard to the productive use of such funds, is doubtful. The NHP, while projecting an IEC strategy, will fully address the inherent problems encountered in any IEC programme designed for improving awareness and bringing about a behavioural change in the general population. It is widely accepted that school and college students are the most impressionable targets for imparting information relating to the basic principles of preventive health care. The policy will attempt to target this group to improve the general level of awareness in regard to 'health-promoting' behaviour.

Promotion Mix:

The promotional activities of hospitals are limited because they have to follow strict code of conduct. The promotional goals of hospital marketing can be listed as follows:

1. Organising personal and formal meetings to discuss the services.
2. Informing and educating the public about the various services available particularly in preventive health.
3. Persuading new consumers to use the services of the hospital.
4. Informing the consumers on how to obtain the services easily and conveniently.

One of the latest promotional programmes of Apollo Hospitals has been cardiac screening programme where the emphasis is on preventive medicine and the services are offered at 50% of the usual cost. This has been one of the more obvious high profile campaigns, but every month at least three or four programmes on public education are being conducted.

It is extremely important that government hospitals should take up promotional measures about some the sophisticated services which they are offering, so that more people will have a chance to use them. Some of the most sophisticated services in the country are available in government hospitals but due to lack of promotion, people do not avail these facilities, since they are not aware of them. These public institutions should work along with private hospitals towards attaining the goal of 'Health for all'.

19.7 Summary

A social definition shows the role marketing plays in the society. One marketer said that marketing's role is to "deliver a higher standard of living". Here is a social definition that serves our purpose: Marketing is a societal process by which individuals and groups obtain what they need and want through creating, offering, and freely exchanging products and services of value with others. Health care sector has gradually opened with entry of corporate hospitals and the competition has increased tremendously among hospitals. On the other hand, National governments across the world trying to create awareness regarding diseases and wants to change the life styles of public. At this juncture marketing of health services assumes paramount importance. In the past service industries lagged behind manufacturing firms in adopting and using marketing concepts and tools, but the situation has now changed. Customers' expectations play a critical role in their service experiences and evaluations. Companies must mange service quality by understanding the effects of each service encounter. Service marketing must be done holistically; It calls not only for external marketing but also for internal marketing to motivate employees, and interactive marketing to emphasize the importance of both "high-tech" an "high-touch."

19.8 Technical terms

Service: is any act or performance that one party can offer to another that is essentially intangible and does not result in the ownership of anything. It may or may not be tied to a physical product.

Marketing: Marketing is a societal process by which individuals and groups obtain what they need and want through creating, offering, and freely exchanging products and services of value with others.

7Ps of Service Marketing Mix: Product, Price, Promotion, Place, People, Process, and Physical evidence

Service-Quality Determinants: Reliability, Responsiveness, Assurance, Empathy, and Tangibles.

19.9 Self-assessment Questions

1. Define Marketing and also highlight its importance in social context.
2. Define Service. What are the distinctive characteristics of services?
3. Explain the evolution of marketing of health care in India.
4. What are the important determinants of service quality?

19.10 Books for further reading

Philip Kotler, Kevin Keller, Marketing Management, Pearson Education (Singapore) Pte. Ltd, Indian Branch, Delhi, 2006
Rajendra Nargundkar, Services Marketing Text & Cases, Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2004
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Lesson 20

PRODUCTIVITY IN HEALTH CARE

20.0 OBJECTIVES

- Understanding the meaning of Productivity
- Knowing the process of Health Care Delivery System
- To know the components of Health care input
- To know the components of Health care output
- Evaluating the Productivity

STRUCTURE

20.1 Meaning of Productivity

Productivity has become such a buzzword these days as every one talks of improving productivity. Productivity is defined as the "Quotient obtained by dividing the output by one of the factors of production.". In this way it is possible to speak of productivity of capital, investment, productivity of labour etc., depending on the consumption of a particular resource by the product manufactured.

The term productivity is often confused with the term production. Many may think that greater the production, greater will be the productivity. This is not necessarily true. Production is concerned with the activity of producing goods are service or both. Productivity is concerned with efficient utilization of resources available in producing the product or service. Depending on the situation or the person who defines productivity, whether it is an economist, accountant, manager, politician, union leader or an industrial engineer, one can get a slightly different definition of the term productivity. We can easily recognize three basic types of productivity and they are;

a) **Partial productivity:** Partial productivity is the ratio of output to one class of input among various factors of production. For example, labour productivity, is the partial productivity measure, which measures the productivity of labour class. Similarly we can define other partial productivity as material productivity, capital productivity and so on.

b) **Total factor productivity:** Total factor productivity is the ratio of net output to the sum of associated labour and capital (factor) inputs. By net output mean that output minus intermediate goods and services purchased. The denominator of this ratio is made up of only the labour and capital input factors.

c) Total productivity: Total productivity is the ratio of total output to the sum of all input factors. Thus, a total productivity measure reflects the joint impact of all the inputs in procuring the output.

20.2 Factors Affecting Productivity

There are various factors that affect productivity, they are:

(a) Investment,
(b) Capital / labour ratio,
(c) Extent of research and development in the country,
(d) Capacity utilisation,
(e) Regulations imposed by the Government,
(f) Age of the plant and equipment,
(g) Energy costs,
(h) Workforce mix,
(i) Work ethic,
(j) Worker's fear of losing the job,
(k) Union influence, and
(l) Attitude of management.

The factors mentioned above may have individually contributed effect or combined effect on productivity.

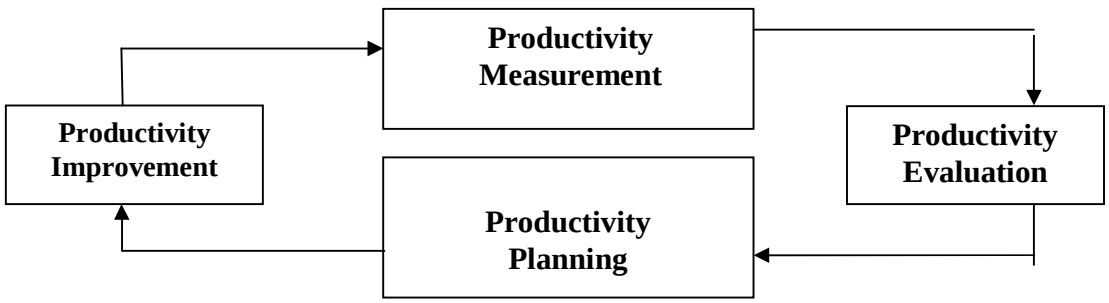
20.3 Productivity cycle

For every organization, which is interested in introducing the productivity improvement has to follow productivity cycle. The productivity cycle includes:

(a) Productivity Measurement,
(b) Productivity Evaluation,
(c) Productivity Planning, and
(d) Productivity Improvement.

This is represent by M.E.P.I (Measurement, Evaluation, Planning and Improvement). Figure 1 depicts the productivity cycle.

Figure 1
Productivity Cycle



An ongoing organisation may start at any one stage and a new unit has to start from the measurement and proceed further. An organisation that begins a formal productivity programme

for the first time can begin with productivity measurement. Once the productivity levels re measured, they have to be evaluated or compared against the planned targets. Based on this evaluation, target levels or productivity are planned on the both short term and long term bases. To achieve the planned targets, productivity improvement takes place in formal manner. In order to assess the degree to which the improvement will take place next period, productivity level are to be measured again. This cycle thus continues for as long as the productivity programme operates in the organisation.

20.4 Productivity in Health Care model

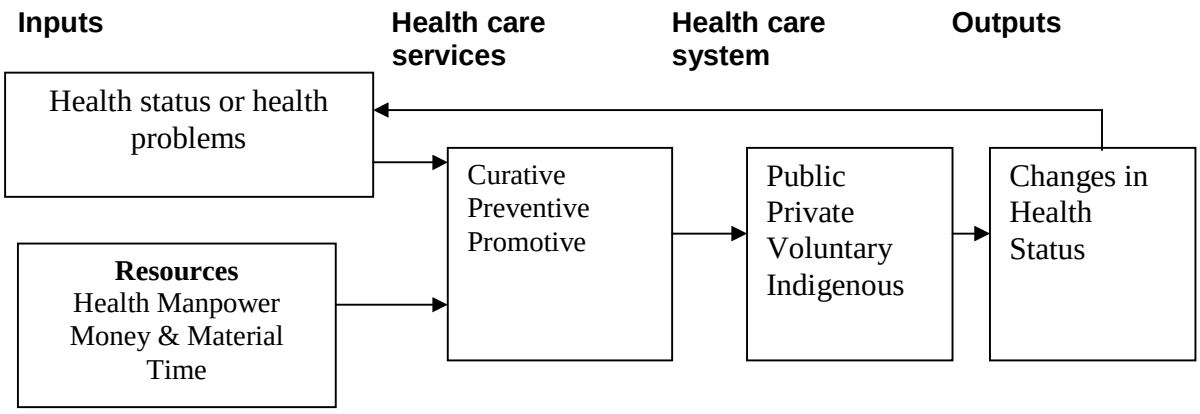
The challenge that exists today in many countries is to reach the whole population with adequate health care services and to ensure their utilization. The "large hospital" which was chosen hitherto for the delivery of health services has failed in the sense that it serves only a small part of the population, that too, living within a small radius of the building and the services rendered are mostly curative in nature. Therefore it has been aptly said that these large hospitals are more ivory towers of diseases than Centres for the delivery of comprehensive health care services.

Rising costs in the maintenance of these large hospitals and their failure to meet the total health needs of the community have led many countries to seek 'alternative' models of health care delivery with a view to provide health care services that are reasonably inexpensive, and have the basic essentials required by rural population.

THE MODEL:

A number of models have been developed for the delivery of health care services. One of the simplest models is shown in **Figure 2.** In actual practice the model is more detailed and complex. The **INPUTS** are the health status of health problem of the community; they represent the health needs and health demands of the community. Since resources are always limited to meet the many health needs, priorities have to be set. This envisages proper planning so that resources are not wasted. The **HEALTH CARE SERVICES** are designed to meet the health needs of the community through the use of available knowledge and resources. The services provided should be comprehensive and community-based. The resources must be distributed according to the needs of the community. The **HEALTH CARE SYSTE**M is intended to deliver the health care services; in other words, it constitutes the management sector, and involves organisational matter. The final outcome or the **OUTPUT** is the changed health status or improved health status of the community which is expressed in terms of lives saved, deaths averted, diseases prevented, cases treated, expectation of life prolonged, etc. Models such as these are being employed for improving health care services.

Fig 2
Model of health care system



20.5 Health Care Inputs

As it is evident from the model of health care system discussed above data about health status or health problems and resources forms the inputs. An assessment of the health status and health problems is the first requisite for any planned effort to develop health care services. This is also known as Community Diagnosis. The data required for analysing the health situation and for defining the health problems comprise the following:

1. Morbidity and mortality statistics.
2. Demographic conditions of the population.
3. Environmental conditions which have a bearing on health.
4. Socio-economic factors which have a direct effect on health.
5. Cultural background, attitudes, beliefs, and practices which affect health.
6. Medical and health services available.
7. Other services available.

An analysis of the health situation in the light of the above data will bring out the health problems and health needs of the community. These problems are then ranked according to priority or urgency for allocation of resources. As resources are scarce and wants are unlimited it is prudent to use appropriate health care model depending on the situation. Productivity in health care system can be improved either by decreasing the inputs or increasing the outputs. By optimizing the resources, the productivity of the system may be improved substantially.

20.5.1 RESOURCES

Resources are needed to meet the vast health needs of a community. No nation, however rich, has enough resources to meet all the needs for all health care. Therefore an assessment of the available resources, their proper allocation and efficient utilization are important considerations for providing efficient health care services. The basic resources for providing health care are:

(i) Health manpower
(ii) Money and material; and
(iii) Time

Health manpower

The term “health manpower” includes both professional and auxiliary health personnel who are needed to provide the health care. An auxiliary is defined by WHO as “technical worker in a certain field with less than full professional training”. Health manpower requirements of a country are based on (i) health needs and demands of the population; and (ii) desired outputs. The health needs in turn are based on the health situation and health problems and aspirations of the people. Health manpower planning is an important aspect of community health planning. It is based on a series of accepted ratios such as doctor-population ratio, nurse-population ratio, bed-population ratio, etc. They are given in **Table 1.** The country is producing annually, on an average 12,000 allopathic doctors; 9,250 Ayurvedic graduates; 1505 Unani graduates; 320 Siddha graduates and 12260 Homoeopathic graduates.

Although the averages are satisfactory on a national basis, they vary widely within the county. There is also maldistribution of health manpower between rural and urban areas. Studies in India have shown that there is a concentration of doctors (up to 73.6 per cent) in urban areas where only 26.4 per cent of population live. This maldistribution is attributed to absence of amenities in rural areas, lack of job satisfaction, professional isolation, lack of rural experience and inability to adjust to rural life.

Health manpower requirements are subject to change, both qualitatively and quantitatively, as new programmes, projects and philosophies are introduced into the health care system. For example, there has been a change form unipurpose to multipurpose strategy in recent years. Then came the goal of Health for All. In addition, national health programmes such as tuberculosis control, leprosy eradication and control of blindness needed more trained workers and technicians.

TABLE 1
Suggested norms for health personnel

S.No	Category of personnel	Norms Suggested
1	Doctors	1 per 3,500 population
2	Nurses	1 per 5,000 population
3	Health worker Female and male	1 per 5,000 population in plain area and 3000 population in tribal and hilly areas.
4	Trained dai	One for each village
5	Health assistant (male and female)	1 per 30,000 population in plain area and 20000 population in tribal and hilly areas.
6	Health assistant (male and female)	Provides supportive supervision to 6 health workers (male/female)
7	Pharmacists	1 per 10,000 population
8	Lab Technicians	1 per 10,000 population

Source: Govt. of India Bulletin on Rural Health Statistics in India, DGHS, New Delhi

Thus during the past decade many new categories of health manpower have been introduced. They include village health guides, multipurpose workers, technicians, ophthalmic assistants, etc.

Money and material:
Money is an important resource for providing health services. Scarcity of money affects all parts of the health delivery system. In most developed counties, government expenditure for health lies between 6 to 12 per cent of GNP. In underdeveloped countries it is less than 1 per cent of the GNP and it seldom exceeds 2 per cent of the GNP. This translates into an average of a few dollars per person per year in the underdeveloped counties as compared to several hundred dollars in developed ones. To make matters worse, much of the spending is for services that reach only a small fraction of the population. To achieve Health for All, WHO has set as a goal the expenditure of 5 per cent of each country's GNP on health care. At present India is spending about 3 per cent of GNP on health and family welfare development. Since money and material are always scarce resources they must be put to the most effective use, with an eye on maximum output of results for investment. Since deaths from preventable disease such as whooping cough, measles, tuberculosis, tetanus, diphtheria, malnutrition frequently occur in developing countries, the case is strong for investing resources on preventing these diseases rather than spending money on establishments which absorb a large portion of the national health budget. Management techniques such as cost-effectiveness and cost-benefit analysis are now being used for allocation of resources in the field of community health.

Time:
Time is money, someone said. It is an important dimension of health care services. Administrative delays in sanctioning health projects imply loss of time. Proper use of man-hours is also an important time factor. For example, a survey by WHO has shown that an Auxiliary Nurse Midwife spends 45 per cent of her time in giving medical care; 40 per cent in traveling; 5 per cent on paper work; and only 10 per cent in performing duties for which she has been trained. Such studies may be extended to other categories of health personnel with a view to promote better utilization of the time resource.

To summarise, resources are needed to meet the many health needs of a community. But resources are desperately short in the health sector in all poor countries. What is important is to employ suitable strategies to get the best out of limited resources.

20.6 Health Care Services

The scope of health services varies widely from country to country and influenced by general and ever changing national, state and local health problems, needs and attitudes as well as the available resources to provide these services. There is now broad agreement that health services should be;

(a) comprehensive;
(b) accessible;
(c) acceptable;
(d) provide scope for community participation, and
(e) available at a cost the community and country can afford.

These are the essential ingredients of primary health care, which forms an integral part of the country's health system, of which it is the central function and main agent for delivering health care.

20.7 Health Care Systems

The health care system is intended to deliver the health care services. It constitutes the management sector and involves organisational matters. It operates in the context of the socioeconomic and political framework of the country. In India, it is represented by five major sectors or agencies, which differ from each other by the heath technology applied, and by the source of funds for operation. These are;

1. Public Health Sector:
   a) Primary Health Care
      - Primary health centres
      - Sub-centres
      -
   b) Hospitals/Health Centres
      - Community health centres
      - Rural hospitals
      - District hospital/health centre
      - Specialist hospitals
      - Teaching hospitals
      -
   c) Health Insurance Schemes
      - Employee State Insurance
      - Central Govt. Health Scheme

d) Other Agencies
   - Defence services
   - Railways

2. Private Sector
   a) Private hospitals, polyclincs, nursing homes, and dispensaries
   b) General practitioners and clinics
3. Indigenous System of Medicine
   - Ayurveda and Siddha
   - Unani and Tibbi
   - Homeopathy
   - Unregistered practitioners
4. Voluntary Health Agencies
5. National Health Programmes

20.8 Health Care output

The purpose of health care services is to improve the health status of the population. In the light of Health for All by 2000 AD, the goals to be achieved have been fixed in terms of mortality and morbidity reduction, increase in expectation of life, decrease in population growth rate, improvements in nutritional status, provision of basic sanitation, health manpower requirements and resources development and certain other parameters such as food production, literacy rate, reduced levels of poverty, etc. National governments all over the world are striving to expand and improve their health care services. The main purpose of Health care system is attainment of a level of health that will enable every individual to lead a socially and economically productive life.

20.9 Evaluation - Productivity

The evaluation of productivity is done normally through observation of certain ratios, such as total factor productivity, partial productivity, etc. The use of a productivity measure is situation-dependent. The measure is to help the manager in monitoring and controlling the usage of relevant inputs. As there are different views on productivity evaluation is also more complex. It is right to say that the productivity measure should represent or reflect the overall capability and not focus on only one set of costs. Hence, a multifactor view of productivity would be better. The Total Factor Productivity (TFP) measure could be:

$$\frac{\text{Production at standard price}}{\text{Labour + material + overhead + k (capita invested)}}$$

Where, labour, materials overhead and capital constitute all the input factors. ‘k’ is a fraction taking values below 1.0.

While TFP is comprehensive, the partial measures of productivity definitely have their place. These are easy to comprehend and when performance is up for review, people can generally explain what happened easily. The manager selects a measure or measures that capture something that he / she feels is important to the competitiveness of the organization. It is not always necessary to have the stereo type measures of productivity. For instance, in the service sector, it is not always possible to judge the employees actions based upon the output. In the service sector, the quality of the service is more important than the quantity.

The United Nations Millennium Declaration spells out goals in the area of development and poverty eradication popularly known as “Millennium Development Goals” place health at the heart of development and represent commitments by governments throughout the world to do more to reduce poverty and hunger and to tackle ill-health; gender inequality; lack of education; access to clean water; and environmental degradation. Three of the 8 goals, 8 of the 18 targets required to achieve them, and 18 of the 48 indicators of progress, are health related. Such policy declarations help in monitoring the performance of health care system. Improved productivity levels certainly helps in achieving health goals.

20.10 Summary

As governments around the world attempt to reconcile the public’s desire for more and better health care benefits with the need to control spending, they must reevaluate their health systems. Resources are needed to meet the many health needs of a community. But resources are desperately short in the health sector in all poor countries. What is important is to employ suitable strategies to get the best out of limited resources. The explosion of knowledge during the 20th century has made medicine more complex, and treatment more costly, but the benefits of modern medicine have not yet penetrated the social periphery in many countries. The goal of modern medicine is no longer merely treatment of sickness. The other and more important goals which have emerged are prevention of disease, promotion of health and improvement of the quality of life of individuals and groups or communities. This expansion of the scope of medicine has required a reformulation of its goals and objectives. Systems should integrate health promotion and disease prevention on the one hand, and treatment for acute illness and chronic care on the other. This should be done across all levels of the health care system, with the aim of delivering quality services equitably and efficiently to the whole population.

20.11Technical terms

Productivity: Quotient obtained by dividing the output by input

Productivity Cycle: Productivity Measurement, Productivity Evaluation, Productivity Planning and Productivity Improvement phases are collectively known as productivity cycle.

Partial productivity: Partial productivity is the ratio of output to one class of input among various factors of production.

20.12 Self-assessment Questions

1. Define the term productivity and list out various classifications of prodcutivity.
2. What is productivity cycle? Explain each phases of the productivity cycle.
3. What are the important factors affecting productivity levels in organizations?
4. Discuss the importance of health care model. What are the important constituents of health care model.
5. What are the benefits of productivity improvement programmes in organizations?

20.13 Books for further reading

S N Chary, Production and Operations Management, Tata McGraw Hill Publishing Company Limited, New Delhi, 2000.

P Rama Murthy, Production and Operations Management, New Age International (P) Limited, Publishers, New Delhi, 2005

Park K, Preventive and Social Medicine, M/s Banarsidas Bhanot publishers, Jabalpur, 2005