UNIT 2 PUBLIC HEALTH*

Contents

Learning Objectives

After reading this Unit, you would be able to:

- Learn about Public Health;
- Discuss the historical development of public health; and
- Elucidate the issues of health with their social determinants.

2.0 INTRODUCTION

Human beings have a long history of searching the means for securing health and preventing diseases collectively as well as individually. Initially health was seen as a divine responsibility and illness as a supernatural phenomenon. Later on, these supernatural conceptions of health and disease were replaced by personal life habits and environmental factors. The efforts to improve the quality of life basically evolved through trial and error. It is said that with the development of community life, these efforts and interventions became more collective. Control

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of communicable diseases, provisioning of medical care, drinking water, and sanitation facilities are some of the examples of these organised efforts. The urbanisation and formation of nation states also influenced these interventions. Today, we know that the improvement in health requires a secure foundation in the basic requirements such as food, shelter, income, education, peace, a stable ecosystem and sustainable resources with the operating principles of equity and justice. In fact, the discipline of public health has played an important role in integrating all these aspects for achieving health.

We know that healthcare professionals help us deal with our health problems with the help of medicines and other measures. However, at times medical advice, when it is given at the individual level, is limited by circumstances outside doctors' control. There are causal factors beyond the purview of the medical practitioners. For example, tobacco use could be linked with cancer and that if we reduce the consumption of tobacco then we can reduce the cancer cases. However, a doctor has a limited role or no role in reducing the availability or banning of tobacco. Similarly, if we take the case of Covid-19, medical professionals have a limited role or no role in ensuring social/physical distancing in the community. In these kinds of situations, macro level policy interventions, such as banning of tobacco or implementation of national lockdown would be more desirable than other individual level interventions. Here, we would need to work at micro, meso and macro levels to introduce and implement social legislations and policy decisions. Many a times, we would also need to work both within and outside the health sector in order to deal with the health issues and problems. The point to be noted here is that there are domains of health which are beyond the purview of a doctor or medical professional and even an individual patient.

2.1 WHAT IS PUBLIC HEALTH?

The term "Public health" is coined from two different terms, "public" and "health." The term 'public' has several meanings and connotations such as "community", Civic, "Municipal", "Free", "Open", "Unrestricted". The term public is also understood as something "not private. "If we look at the other term "Health" it is one of the most difficult terms to define. Health being a multidimensional concept can mean different things to different people. It is conceptualised as "freedom from any sickness or disease," "harmonious functioning of all body systems," "a feeling of "wholeness" and a happy frame of mind" etc. Health is conceptualised in distinctive ways as given in box 2.1. Researchers have found that our ideas of health and illness have an impact on our health attitudes and behaviour.

Box 2.1: Various Conceptualisations of Health

- health as something to be had
- health as a state of doing
- health as a state of being
- health as not being ill
- health as inner strength
- health as a capacity to adjust adequately to their environment
- health as a functional capacity

- health as physical fitness, stamina
- health as leading a healthy lifestyle
- health as a psychological concept
- health as a reserve

In our normal life we use a trilogy of concepts — "illness," "disease," and "sickness" — interchangeably to refer to different aspects of ill health, however these terms have different connotations. Disease is defined as a condition/ pathological process that is diagnosed by a physician or other medical expert. Whereas, Illness is defined as the ill health the person identifies themselves with. Illness being a subjective phenomenon is often based on self reported mental or physical symptoms. Sickness, on the other hand, refers to social and cultural conceptions of the health condition. These include reactions such as fear or rejection, which influence how the patient reacts. According to Marshall Marinker (1975), disease is the pathological process, deviation from a biological norm. Illness is the patient's subjective experience of ill health, sometimes when no disease can be found. Sickness is the role negotiated by the patient with the society which is prepared to recognize and sustain the patient. A diagrammatic representation of trilogy is given in Figure 2.1.

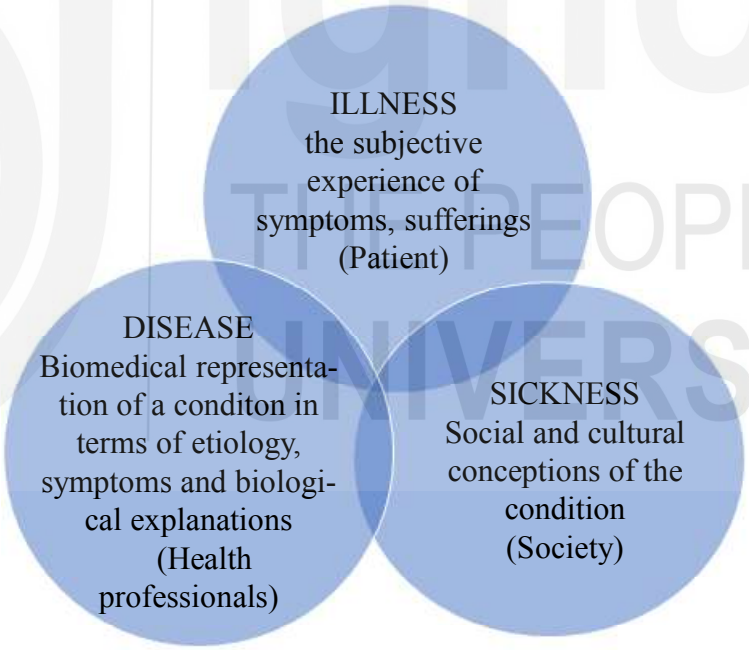

Fig. 2.1: Trilogy of "illness," "disease," and "sickness"

(**Source:** Based On Marshall Marinker's 'Three modes of unhealth', https://jme.bmj.com/content/medethics/1/2/81.full.pdf)

Here you can see that most of the conceptualisations about health and ill health revolve around individual's health. Taking from the above conceptualisations of health, there could also be ideas such as "functional capacity of larger communities/population" or "physical fitness of larger communities/population" etc. Just like there are conceptualisations to understand the health of the individuals, there are conceptualisations to understand the health of larger communities/ populations. There is enough body of knowledge and disciplinary specialisations to understand the health of the population at the macro level.

Though many people have defined public health, there is a general agreement that 'Public health' is complex, multi-disciplinary and holistic. The term public health has various connotations. When we use the term 'public health' it can mean different things depending upon the context. Different terms are used to refer to the public health activities (Box 2.2). As shown in figure 2.2 Public health is used to refer: 1) a profession, 2) an academic discipline, 3) activities of the government and 4) health of the population.

Box 2.2: Some of the terms that have been used for public health activity over time

- Social medicine
- Community medicine
- Preventive Medicine
- Community Health
- State medicine
- Hygiene
- Public medicine
- Public health medicine
- Environmental health
- New public health
- Complete medical policing

Fig. 2.2: Concept of Public Health

2.2 DEFINING PUBLIC HEALTH

In this section we shall go through various definitions of public health. Though many have defined public health, Winslow's definition of public health (Box 2.3) is considered to be the most acknowledged one.

According to World Health Organisation (2018) Public health refers to "all organized measures (whether public or private) to prevent disease, promote health, and prolong life among the population as a whole. Its activities aim to provide conditions in which people can be healthy and focus on entire populations, not on individual patients or diseases. Thus, public health is concerned with the total system and not only the eradication of a particular disease".

Public health is defined as "the science and art of promoting and protecting health and well-being, preventing ill health and prolonging life through the organised efforts of society". (The UK Faculty of Public Health n.d.)

Public Health is defined as "the art and science of preventing disease, prolonging life and promoting health through the organized efforts of society" (Acheson Report, 1988; WHO)

Modeste (1996) defined public health as "the science and art of preventing disease, prolonging life, and promoting health and efficiency through organized community effort for the sanitation of the environment, control of communicable infections, education in personal hygiene, organization of medical and nursing services, and the development of the social machinery to ensure everyone a standard of living, adequate for the maintenance of health."

"Public health is the science of protecting and improving the health of people and their communities. This work is achieved by promoting healthy lifestyles, researching disease and injury prevention, and detecting, preventing and responding to infectious diseases." (The Centers for Disease Control and Prevention (CDC. n.d.).

Beaglehole and Bonita's book "Public Health at the Crossroads" (2004), defines public health as 'Collective action for sustained population-wide health improvement'. Broadly, Public health can be defined as the science of protecting the safety and improving the health of communities through education, policy making and research for disease and injury prevention.

The Institute of Medicine in its report titled "The future of Public Health" notes that "public health is a coalition of professions united by their shared mission" as well as (by "their focus on disease prevention and health promotion; their prospective approach in contrast to the reactive focus of therapeutic medicine, and their common science, epidemiology" (IOM, 1988).

Box 2.3: Winslow's Definition of Public Health

In 1920, C. E. A. Winslow, professor of public health at Yale University, defined public health as follows: *"Public health is the Science and Art of (1) preventing disease, (2) prolonging life, and (3) promoting health and efficiency through organized community effort for:*

a) the sanitation of the environment,

b) the control of communicable infections,

c) the education of the individual in personal hygiene,

d) the organization of medical and nursing services for the early diagnosis and preventive treatment of disease, and

e) the development of social machinery to ensure everyone a standard of living adequate for the maintenance of health, so organizing these benefits as to enable every citizen to enjoy his birth right of health and longevity."

Box 2.4: What is not Public Health?

It is,

- Not a single product or service provided by one type of health professional in one place
- Not a single specialty but inter/trans-disciplinary
- A web of relationships among many different people and organizations about a wide variety of topics – a dynamic system!

Check Your Progress

1) What is Public Health?

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2.3 PUBLIC HEALTH VS MEDICAL CARE

Public health and its functions can be better understood if we compare and contrast it with medical practice. Medical care/medicine focuses on healing patients who are ill or injured. Here individuals are the target of service delivery. On the other hand, the public health is a major governmental and social activity, multidisciplinary in nature, and extending into almost all aspects of society. Important point to be noted here is that the key word is "health," not "medicine. Key focus is on prevention and not cure. While the medical practitioners treat

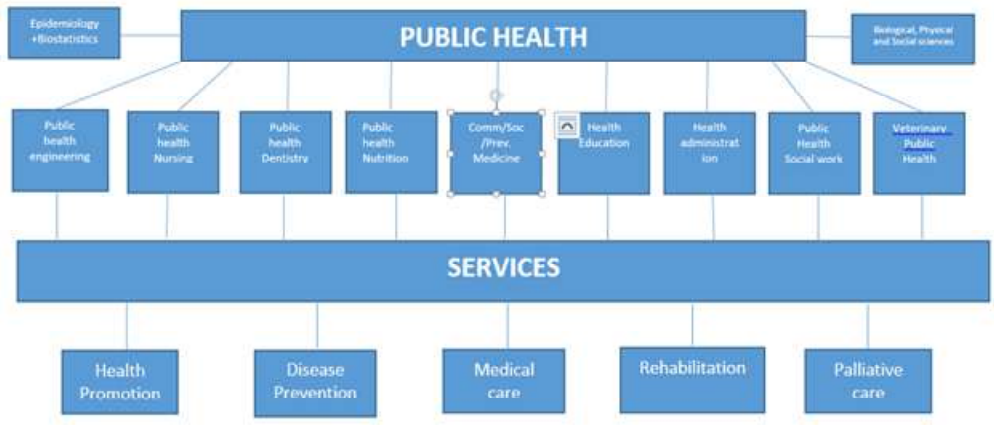

Fig. 2.3: The Public Health Concept

(**Source:** The Distinction between Public Health and Community/Social/Preventive Medicine. *J Public Health Pol* 6, 435–439 (1985). https://doi.org/10.2307/3342044)

people who are sick, public health professionals try to prevent people from getting sick or injured in the first place. Another point is that in public health, the universe of concern is the health of the public, not the discipline of medicine (Figure 2.3).

In summary, medicine is more concerned with individual patients, whereas public health regards the larger community/population as its patient. Medical care is mostly dominated by the curative care whereas public health uses a balanced approach of integrating preventive, curative, promotive, rehabilitative and palliative dimensions of care.

2.4 PUBLIC HEALTH – ORIGIN AND DEVELOPMENT

The history of public health is the history of interventions and efforts to secure health and preventing diseases at the population level. Our efforts to prevent deaths from epidemics have a long history, which goes back beyond the development of modern science. These efforts/interventions even include magico-religious ones. In ancient times people largely attributed their illnesses and deaths to supernatural forces and also performed rituals in order to appease these supernatural forces so that they withdraw their wrath and cure diseases. For example, in India, there is a practice of worshiping '*sitalamata*,' a Hindu goddess of pox diseases. It is believed that she has the power to inflict smallpox and to cure it. These beliefs and practices are even continued today. According to Dorothy Porter, mysticism dominated many ancient health and healing cultures across the world.

Population-based focus of actions has its roots from the times of Hippocrates (Figure 2.4) (460 BC-370 BC) a Greek physician, who is considered to be one of the most outstanding figures in the history of medicine. Hippocratic medicine distanced itself from the religious and mystical traditions of healing. Hippocrates had the understanding that disease was a natural event, not caused by supernatural forces. Hippocrates' "Airs, waters and Places," a treatise on social medicine and hygiene stressed the importance of nonmedical factors in understanding the health of the population. Until the new sciences of bacteriology and immunology emerged well into the 19th century, Hippocrates's ideas provided a theoretical basis for understanding diseases in Europe and the world. Similarly, practitioners of Chinese medicine and Ayurveda in India (400 BCE) were also aware of the influences of season, diet, the winds and lifestyle for individual/ people's health.

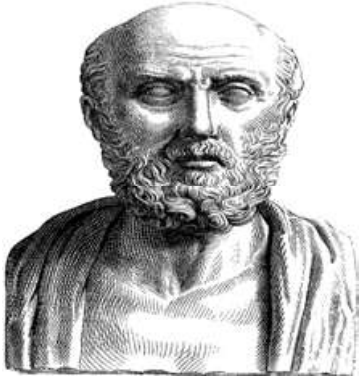

Fig. 2.4: Hippocrates

(**Source:** https://www.mdlinx.com/internal-medicine/article/1752)

Later on, in Europe two theories — Miasma Theory and Theory of Contagion- provided the framework for public health practice till late nineteenth century. Miasma theory was propounded by Galen of Pergamon (129 AD-210AD), a physician, surgeon and philosopher in the Roman Empire. Theory of '*miasma*' or bad air causing disease postulated that vapour, mist, or 'bad air', originating from decomposing material (called *miasmata*) with its foul smell, would enter the body and cause disease. Surprisingly, even bloodletting was practiced to take out the malodorous and poisonous particles entered into the human body. In medieval Europe, bloodletting was the standard treatment for various diseases such as plague, smallpox, epilepsy and gout.

On the contrary, Contagion theory originated from the ancient practice of isolating people with illnesses. The contagion theory is based on the assumption that illness is contagious. In fact, the governments even introduced Quarantine laws (Quarantine laws in Venice in 1348 with lazaretto in 1423) to prevent the contagious diseases. These quarantine laws in a way infringed the individual rights of patients to protect the public. The practice of Isolation of individuals with plague, leprosy, smallpox, etc. was also based on the contagion theory. In recent times, during SARS epidemic (2003), and COVID-19 Pandemic (2020), the quarantine as a strategy was widely used to protect the larger public.

Historians of health and medicine report that for hundreds of years the 'miasma' theory competed with the theory of contagion. Later on, the miasma theory of disease, though debatable, became central to the new convention in Public Health practice. It prompted scientists to focus their attention on environmental factors as causes of diseases. This was contrary to practice of focusing on personal health and infection. Obviously, this understanding of disease causation warranted environmental intervention. Such an understanding also called for enhanced role for government in the environmental interventions. As a result, medieval councils in the Europe started controlling cities, sewage, food and waste. Some of the health historians argue that with these efforts, "the seeds of Public Health were being sown."

Germ theory, in medicine, is the theory that certain diseases are caused by the invasion of the body by microorganisms. The French chemist and microbiologist Louis Pasteur (Figure 2.5), the English surgeon Joseph Lister, and the German physician Robert Koch (Figure 2.6) are considered to be the pioneers of germ theory. In the mid-19th century Pasteur proved that fermentation and putrefaction are caused by organisms in the air. Lister, in the 1860s revolutionized surgical practice by introducing sterilisation using carbolic acid (phenol) to exclude atmospheric germs. In the 1880s Koch identified the organisms that cause tuberculosis and cholera. The germ theory created a new understanding that certain microorganisms are the cause of a specific disease or disease process. Germ theory is considered to be a milestone towards the disease prevention in the history of public health.

Fig. 2.5: Louis Pasteur
(**Source:** https://en.wikiquote.org/wiki/Louis_Pasteur)

Fig. 2.6: Robert Koch
(**Source:** https://www.britannica.com/biography/Robert-Koch)

Vaccination is another medical intervention that affected the health of the population. In 1796 Edward Jenner (Figure 2.7) an English country doctor demonstrated vaccination against smallpox. Based on his experience in inoculation and related works, Jenner induced immunity against small pox via exposure to a harmless related disease, cowpox. Jenner speculated that a bout of cowpox produced immunity against smallpox as he knew that milkmaids never caught smallpox. Jenner inserted pus taken from Sarah Nelmes, a milkmaid with cowpox, into a cut made in the arm of James Phipps, the son of his gardener. Several days later, when Jenner exposed the boy to smallpox, he was found to be immune. Jenner called his new method 'vaccination' after the Latin word for cow (vacca).

Fig. 2.7: Edward Jenner

(**Source:** 1749-1823) (https://circulatingnow.nlm.nih.gov/2018/08/07/edward-jenner-and-the-happy-immunity/)

In 1853, 30 years after Jenner's death, smallpox vaccination was made compulsory in England and Wales. Using vaccination, it took more than a century to eradicate the smallpox, a disease that killed millions of people. Vaccination has greatly reduced the burden of infectious diseases such as measles, whooping cough, tetanus, rubella, flu, polio, yellow fever, pneumococcal disease, and meningococcal disease.

Box 2.5: Vaccination Vs Immunization

Vaccination: The act of introducing a vaccine into the body to produce immunity to a specific disease.

Immunization: A process by which a person becomes protected against a disease through vaccination. This term is often used interchangeably with vaccination or inoculation.

Source: https://www.cdc.gov/vaccines/vac-gen/imz-basics.htm

The development of science and technology had its impact on health. For instance, the invention of microscope and consequent discovery of micro-organisms drastically changed the understanding of diseases and its causal agents. The newly emerged germ theory and existing contagion theory sowed the seeds of new paradigm for dealing with diseases. Germ theory, postulated by Louis Pasteur and Robert Koch, dominated the explanations of disease causations. It held the notion that microorganisms cause diseases and it is possible to control diseases using antibiotics and vaccines.

Emergence of Epidemiology as a new discipline also played an important role in the historical development of public health. Though, in 1662 John Graunt published "Natural and political observations …made upon bills of mortality" and established the field of epidemiology, it became a full-fledged science only in the 19th century. In the middle of the 18th century, James Lind's scurvy study; which hypothesised that scurvy was caused by lack of fruit intake, also contributed to the development of epidemiology. Though, Edward Jenner's inoculation with cowpox prevented smallpox in 1790s it did not give much insight into the causal factors of the disease.

However, the major push for epidemiological studies came with John Snow, a young surgeon-apothecary from Newcastle, who worked on Cholera. Snow's research on causes of cholera deaths led him to a water pump on the corner of Broad Street and Cambridge Street, at the epicentre of the epidemic. He found that nearly all the deaths had taken place within a short distance of the pump. Snow later used a dot map to illustrate the cluster of cholera cases around the pump. Snow also examined the sample water taken from these pumps under a microscope and found that it contained "white, flocculent particles." From this examination he theorised that the water from these pumps was the source of infection. Once Snow informed authorities about his findings regarding cholera deaths, they reluctantly agreed to remove the pump handle as an experiment and consequently, the spread of cholera dramatically stopped. Snow's intervention to combat cholera is seen as "a nail in the coffin of the miasma theory and a vindication of the new science of epidemiology." Later on, the science of epidemiology became an indispensable part of public health.

In 1842, Edwin Chadwick (Figure 2.8) published a report titled "The Sanitary Condition of the Labouring Population". Chadwick's report argued that impure water supplies, inefficient sewerage, and slum housing were causing the unnecessary and preventable deaths of about 60,000 people every year in the industrial towns. He felt that "the greatest proportion of the deaths of heads of families occurred from removable causes. The expense of public drainage, of

supplies of water laid on in houses, and the removal of all refuse... would be a financial gain, as it would reduce the cost of sickness and premature death." The increasing industrialization and urbanization, also lead to the development of urban slums and unsanitary conditions and unsafe work places. In this context, the removal of filth from towns and cities became a major focus in the struggle against infectious diseases. Chadwick also suggested that the government should take the responsibility of providing piped water and removing sewage. Chadwick's report in fact triggered 'the great sanitary awakening' in Europe. The sanitary movement that followed thereafter was an important milestone in the history of public health.

Fig. 2.8: Edwin Chadwick

(**Source:** 1800 –1890) (https://en.wikipedia.org/wiki/Edwin_Chadwick)

Following the Chadwickian model, Lemuel Shattuck, a Massachusetts bookseller and statistician, conducted a survey on sanitary conditions and published "Report of the Massachusetts Sanitary Commission" in 1850. Shattuck's Report recommended a "Plan for a Sanitary Survey of the State," and a comprehensive public health system for the state. Shattuck report also recommended new census schedules; regular surveys of local health conditions; supervision of water supplies and waste disposal; special studies on specific diseases (including tuberculosis and alcoholism); education of health providers in preventive medicine; local sanitary associations for collecting and distributing information; and the establishment of a state board of health and local boards of health to enforce sanitary regulations. Shattuck's report is considered as one of the most farsighted and influential documents in the history of the public health. Even now, many of the principles and activities proposed by Shattuck are considered fundamental to public health practice. Most importantly, Shattuck also established the fundamental usefulness of keeping records and vital statistics for addressing the public health issues.

According to the book 'The future of public health,' "sanitation changed the way society thought about health. Illness came to be seen as an indicator of poor social and environmental conditions, as well as poor moral and spiritual conditions. Cleanliness was embraced as a path both to physical and moral health. Cleanliness, piety, and isolation were seen to be compatible and mutually

reinforcing measures to help the public resist disease. At the same time, mental institutions became oriented toward "moral treatment" and cure" (IOM. 1988).

In the 20th Century the developments in anatomy, physiology, bacteriology and vaccination gave a new direction for managing the health of the population. This particular period in the history of medicine is known as "Bacteriological Era". The invention of penicillin and other antibiotics especially in the first half of the 20th century gave the medical profession a new direction (see figure 2.9 for the timeline of discovery of antibiotics).

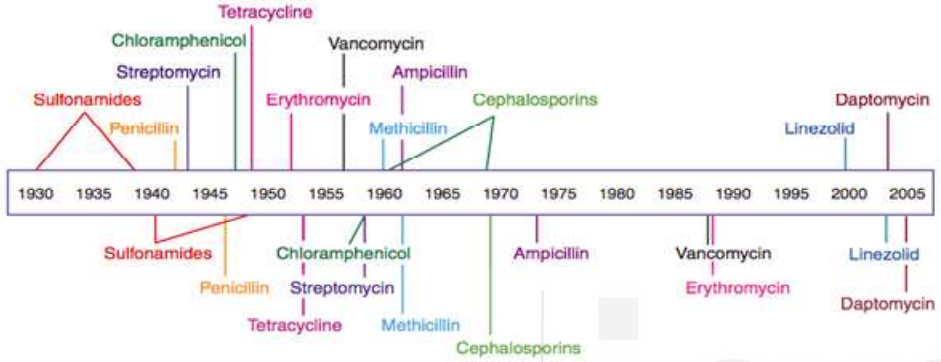

Fig. 2.9: Timeline of Discovery and Development of Antibiotics

(**Source:** https://evolutionmedicine.com)

Governments with and without the support of international organisations such as World Health Organisation (WHO; established in 7th April 1948) started launching national programmes to contain diseases such as Malaria and Tuberculosis. In the similar fashion, governments also launched immunisation programmes at a large scale. For Instance, with the support of vaccination campaigns, surveillance and prevention measures, small pox was eradicated by 1980 at the global level. According to Institute of Medicine (1988), "during the past 150 years, two factors have shaped the modern public health system: first, the growth of scientific knowledge about sources and means of controlling disease; second, the growth of public acceptance of disease control as both a possibility and a public responsibility."

The Alma-Ata Declaration of 1978 (Box 2.6) emerged as a major milestone of the 20th century in the field of public health. The declaration identified primary health care as the key to the attainment of the goal of Health for All by 2000AD.

Box 2.6: Alma Ata Declaration

The Declaration of Alma-Ata was adopted at the International Conference on Primary Health Care, Alma Ata, Kazakhstan, 6–12 September 1978. It expressed the need for urgent action by all governments, all health and development workers, and the world community to protect and promote the health of all people of the world. The declaration clearly stated that "health, which is a state of complete physical, mental and social wellbeing, and not merely the absence of disease or infirmity, is a fundamental human right and that the attainment of the highest possible level of health is a most important world-wide social goal whose realization requires the action of many other social and economic sectors in addition to the health sector".

It further stated that "Governments have a responsibility for the health of their people which can be fulfilled only by the provision of adequate health and social measures. A main social target of governments, international organizations and the whole world community in the coming decades should be the attainment by all peoples of the world by the year 2000 of a level of health that will permit them to lead a socially and economically productive life. Primary health care is the key to attaining this target as part of development in the spirit of social justice.

Source: https://www.who.int/publications/almaata_declaration_en.pdf

For many decades, the concept of public health was largely equated with the 'sanitary idea' of environmental reform. This idea also incorporated the methods of preventive medicine such as immunisation. Though, there have been considerable gains in terms of life expectancy and quality of life, many countries still faced the scourges of communicable diseases, as well as the pandemics of non-communicable diseases such as diabetes and cancer. In the changing context, new conceptualisation of health and disease also emerged. The realisation that health and disease is complex and they are rooted in social, physical, and cultural environment in which people lived, gave rise to the "social model of health." This model also advocated a multi-causal approach to health and illness. The social model of health considers a wide range of factors that influence health and wellbeing, such as environmental, economic, political, social and cultural. The current practice of public health is largely based on the social model of health. The contributions of Rene Dubos (distinguished American microbiologist and eminent medical historian), Thomas McKeown (British Medical Historian) and Ivan Illich (Croatian-Austrian philosopher and critic of the institutions of modern Western culture) in the 1960s and 70s also played also an important role in the development of social model of health. For instance, McKeown attributed the modern rise in the world population from the 1700s to broad economic and social changes rather than to medical interventions.

Box 2.7: Key Terms

Clinical Care: Prevention, treatment, and management of illness and the preservation of mental and physical well-being through the services offered by medical and allied health professions; also known as health care.

Public Health Systems: It refers to all public, private, and voluntary entities that contribute to the delivery of essential public health services within a jurisdiction. The public health system includes: 1) Public health agencies at state and local levels, 2) Healthcare providers, 3) Public safety agencies, 4) Human service and charity organizations, 5) Education and youth development organizations, 6) Recreation and arts-related organizations, 7) Economic and philanthropic organizations, and 8) Environmental agencies and organizations.

An Epidemic or Outbreak: Occurrence in a community or region of cases of an illness, specific health-related behaviour, or other health-related event clearly in excess of normal expectancy. Both terms are used interchangeably; however, epidemic usually refers to a larger geographic distribution of illness

or health-related events. An outbreak is a greater-than-anticipated increase in the number of endemic cases. The term outbreak also can be used to refer to even a single case in a new area. If it's not quickly controlled, an outbreak can become an epidemic. Therefore, an epidemic affects a large number of people within a community, population, or region.

A Pandemic: An epidemic of disease that has spread across a large region; for instance, multiple continents, or even worldwide. For example, In the beginning COVID-19 was limited to Wuhan, China, then it was an epidemic. However, the massive geographical spread turned covid-19 into a pandemic.

An Endemic: A disease that is constantly present in a region or population. Usually the term is used to refer to something that belongs to a particular people or country. For example, Malaria in Africa countries.

Check Your Progress

2) What are the old theories of disease causation?

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2.5 THE SCIENCES OF PUBLIC HEALTH

This section briefly introduces the sciences of public health. It is important to remember the aspect of multi/interdisciplinarity of public health is crucial to the concept. Health being multifactorial, multidimensional, and multifaceted requires a multidisciplinary team work to address the problems and issues at the population level. Many professional disciplines are involved in the public health practice. It also requires disciplinary knowledge of both physical and social sciences. Therefore, the scientific knowledge on which public health is based spans a broad range of professional disciplines. Today, public health involves the application of many different disciplines: Biology, Psychology, Computer science, Sociology, Medicine, Economics, Geography, Anthropology, Public Policy/Health Policy, Mathematics, Engineering, Business, Education.

2.6 CORE DISCIPLINES WITHIN PUBLIC HEALTH

The goal of public health is the biological, physical, and mental well-being of all members of society. To achieve this broad challenging goal, public health professionals need to have a wide range of disciplinary understanding. This multi/ interdisciplinary/ understanding is required to anticipate, identify and prevent problems, identify strategies to resolve these problems, implement these strategies, and finally, evaluate their effectiveness. The details of core disciplines of public health are given below:

2.6.1 Epidemiology

It is the study of frequency, distribution, and determinants of health-related states or events in specified populations, and the application of this study to the control of health problems. Epidemiologists examine the 5 W's: diagnosis or health event (what), person (who), place (where), time (when), and causes, risk factors, and modes of transmission (why/how).

2.6.2 Nutrition

It is the science of food, the nutrients and other substances therein, their action, interaction and balance in relation to health and disease. Nutrition science also includes the study of behaviour and social factors related to food choices.

2.6.3 Environmental Health

This core discipline of public health draws strongly on the natural sciences. Environmental health scientists monitor the levels of contaminants in the environment and seek to understand the impact of environmental factors on health.

2.6.4 Health Education

Health education is a social science that draws from the biological, environmental, psychological, physical and medical sciences to promote health and prevent disease, disability and premature death through education-driven voluntary behaviour change activities. Health education is any combination of learning experiences designed to help individuals and communities improve their health, by increasing their knowledge or influencing their attitudes.

2.6.5 Behavioural Science

It is a branch of science (such as psychology, sociology, or anthropology) that deals primarily with human action and often seeks to generalize about human behaviour in society. With the knowledge about human interaction, decision making, and group processes public health professionals persuade people to make healthy choices. Both in the theory and practice, health education and behavioural sciences are closely interrelated.

2.6.6 Health Services Administration/Management

This discipline is all about getting people to work harmoniously together and to make efficient use of resources in order to achieve objectives. Health Services Administration involves planning, directing, and coordinating medical and health services. The business of health care is the domain of health service managers.

2.6.7 Biostatistics

It is the application of statistics to biological and medical problems. Statistical methodologies are among the most important tools used by researchers in any fields especially when you are dealing with problems of the larger population.

2.6.8 Health Economics

It is concerned with the alternative uses of resources in the health services sector and with the efficient utilization of economic resources such as human resource, material and financial resources.

2.6.9 Demography

It is the study of population, especially with reference to size and density, fertility, mortality, growth, age distribution, migration, and the interaction of all those with social and economic conditions.

2.7 PUBLIC HEALTH APPROACHS

As opposed to clinical approach; which focuses on the diagnoses and treatments of illness in individuals, the public health approach involves: 1) defining and measuring the problem, 2) determining the cause or risk factors for the problem, 3) determining how to prevent or ameliorate the problem, and 4) implementing effective strategies on a larger scale and evaluating the impact. The public health approach starts with a problem ends with a response or intervention. The figure 2.10 provides a diagrammatic representation of the public health approach.

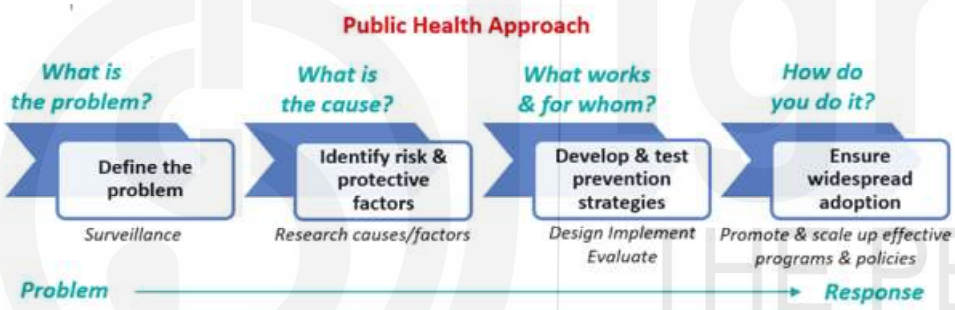

Fig. 2.10: Public Health Approaches

(**Source:** https://www.nasbla.org/advocacy/public-health)

As discussed earlier, public health shapes the context within which people and communities can be safe and healthy. For this purpose, you may have noticed from the above discussions that public health practitioners use different approaches. Firstly, it uses a Population-based approach in which groups of people or larger community becomes the "target/audience". Active surveillance is used as an approach to monitor communities for patterns of diseases and health conditions. For example, during covid-19 pandemic active surveillance was used with the help of health service system as well as community networks. At times, medical policing is also used as an approach in which individual rights are curbed in order to keep the public healthy. Banning of tobacco smoking in public places by law is an example of medical policing. Using a social justice approach, public health advocates equity for all and reaches out to vulnerable populations.

2.8 FUNCTIONS OF PUBLIC HEALTH

In this section we will try to learn about the question "What do public health professionals do?" Public health involves "both activities undertaken within the formal structure of government and the associated efforts of private and voluntary organizations and individuals." The three core functions of public health are: (1)

Assessment; (2) Policy development; and (3) Assurance. Based on this, public health professionals deliver the essential services (refer Box 2.8 for details). According to Griffiths, S; Jewell, T and Donnelley, P. (2005), the practice of public health falls within the three domains – Health Protection, Health improvement and Health Service improvement (please refer figure 2.11 for more details).

Box 2.8: Public Health: Core Functions and Essential Services

Assessment

- Surveillance of disease/injury.
- Monitoring trends; analyzing causes; and identifying needs.

Policy Development

- Inform, educate, and empower people about health issues.
- Mobilize community partnerships and actions to identify and solve health problems.
- Develop comprehensive public health policies and plans that support individual and community health efforts.
- Promote scientific basis of decision-making.
- Develop and implement strategic approach.

Assurance

- Enforce laws and regulations that protect health and ensure safety.
- Link people to necessary health services and assure the provision of health services when otherwise unavailable.
- Assure a competent health workforce.
- Evaluate effectiveness, accessibility, and quality of personal and population-based health services.
- Research for new insights and innovative solutions to health problems.

(**Source:** https://www.cdc.gov/nceh/ehs/ephli/core_ess.htm)

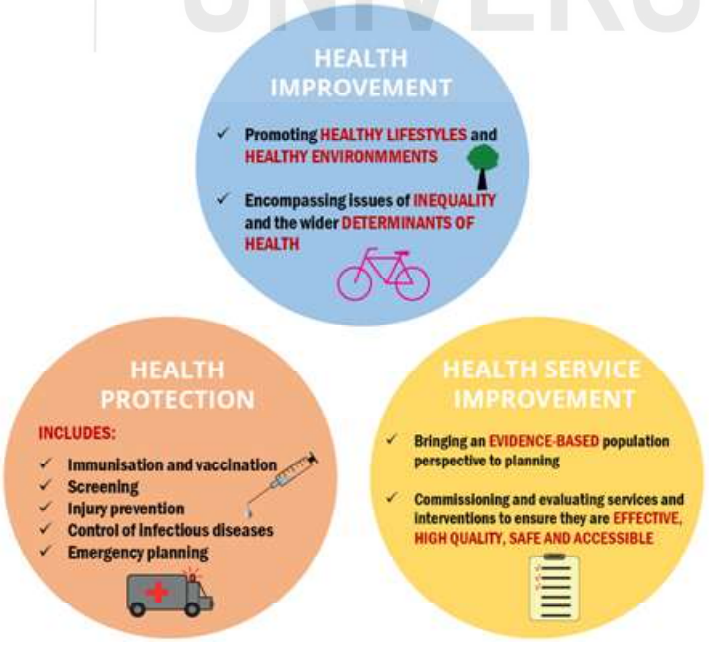

Fig. 2.11: Three Domains of Public Health

(**Source:** Griffiths, S; Jewell, T and Donnelley, P. (2005) 'Public health in practice: the three domains of public health', Public Health, 119(10):907–13).

Check Your Progress

3) What are the various core disciplines of Public Health?

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2.9 PUBLIC HEALTH INFRASTRUCTURE IN INDIA

We all know that health infrastructure is an important factor in the provisioning of health care services and other related welfare services in a country. Thus, infrastructure is seen as the basic support for the delivery of public health activities. In India, health service infrastructure includes details of allopathic hospitals, hospital beds, Indian System of Medicine & Homeopathy hospitals, sub-centres (SCs), Primary Health Centres (PHC), Community Health Centres (CHC), blood banks, eye banks, and mental hospitals. Public health care infrastructure in India is organised in multiple levels as depicted in the figure 2.12. At top of the structure, we have tertiary care institutions like medical colleges and at the bottom we have primary health centres and Sub-centres to cater to the health needs of the people.

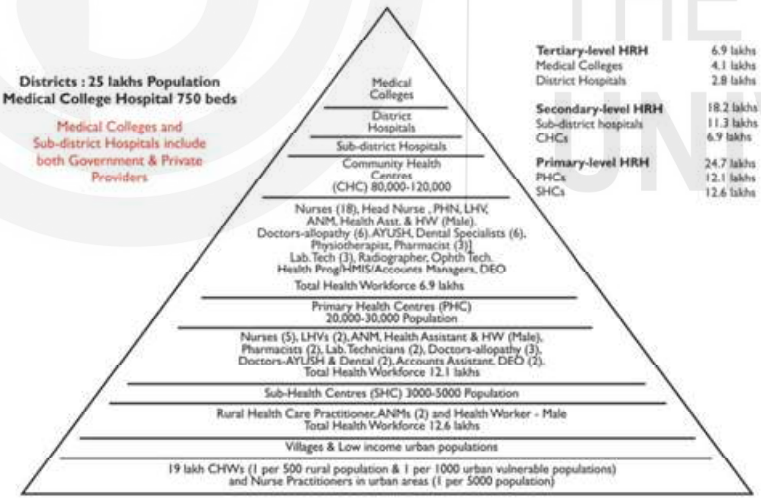

Fig. 2.12: Public Health Care Infrastructure in India

(**Source:** NHM as reproduced by Chokshi M. et.al. (2016) – Public health-care infrastructure in India).

2.10 PUBLIC HEALTH IN INDIA: AN OVERVIEW

At the time of independence, India's health status was one of the worst in the world. The life expectancy at birth was estimated at 36.7 years in 1951. The infant mortality rate was as high as 146 per 1,000 in 1951. Poor socio-economic development opportunities coupled with deadly diseases kept mortality rates

very high. However, the improved access to healthcare services along with improved living conditions such as food supply, housing facilities, sanitation and hygiene, led to a gradual decline in deaths from infectious diseases such as smallpox, malaria, pneumonia, tuberculosis, diarrhoea, poliomyelitis, typhoid, cholera, and plague in the post independent India. Over a period of time both the life expectancy and other mortality indicators showed significant improvement. According to the latest reports the life expectancy has crossed to 67 years. Though Infant mortality rate (33 per 1000) and maternal mortality ratio (122 per one lakh live births) have come down significantly since independence it is still unacceptably high. Many diseases, such as polio, guinea worm disease, yaws, and tetanus, have been eradicated. If we look at the recent history, there have been significant improvements in the overall health status especially in the last twenty years. The recent improvements in healthcare services can partly be attributed to the National Health Mission (For details please see the box 2.9).

Box 2.9: National Health Mission (NHM)

The National Health Mission (NHM) encompasses its two Sub-Missions, the National Rural Health Mission (NRHM) and the National Urban Health Mission (NUHM). The main programmatic components include Health System Strengthening, Reproductive-Maternal- Neonatal-Child and Adolescent Health (RMNCH+A), and Communicable and Non-Communicable Diseases. The NHM envisages achievement of universal access to equitable, affordable and quality health care services that are accountable and responsive to people's needs.

National Rural Health Mission

The National Rural Health Mission (NRHM) was launched by the Hon'ble Prime Minister on 12th April 2005, to provide accessible, affordable and quality health care to the rural population, especially the vulnerable groups. The Union Cabinet vide its decision dated 1st May 2013, has approved the launch of National Urban Health Mission (NUHM) as a Sub-mission of an over-arching National Health Mission (NHM), with National Rural Health Mission (NRHM) being the other Sub-mission of National Health Mission.

NRHM seeks to provide equitable, affordable and quality health care to the rural population, especially the vulnerable groups. Under the NRHM, the Empowered Action Group (EAG) States as well as North Eastern States, Jammu and Kashmir and Himachal Pradesh have been given special focus. The thrust of the mission is on establishing a fully functional, community owned, decentralized health delivery system with inter-sectoral convergence at all levels, to ensure simultaneous action on a wide range of determinants of health such as water, sanitation, education, nutrition, social and gender equality. Institutional integration within the fragmented health sector was expected to provide a focus on outcomes, measured against Indian Public Health Standards for all health facilities.

National Urban Health Mission

The National Urban Health Mission (NUHM) as a sub-mission of National Health Mission (NHM) has been approved by the Cabinet on 1st May 2013.

NUHM envisages to meet health care needs of the urban population with the focus on urban poor, by making available to them essential primary health care services and reducing their out of pocket expenses for treatment. This will be achieved by strengthening the existing health care service delivery system, targeting the people living in slums and converging with various schemes relating to wider determinants of health like drinking water, sanitation, school education, etc. implemented by the Ministries of Urban Development, Housing and Urban Poverty Alleviation, Human Resource Development and Women and Child Development.

Source: https://nhm.gov.in/index4.php?lang=1&level=0&linkid=445&lid=38

Presently, India is undergoing a health transition; demographically as well as epidemiologically. Demographic transition is characterised by mortality decline, natural increase in population size, fertility decline, urbanization and population aging. Whereas, epidemiological transition can be characterized by low mortality, high morbidity, and by the double burden of communicable diseases and non-communicable diseases (NCDs). Though India still has heavy burden of communicable diseases such as TB and Malaria, NCDs such as heart disease, cancer, diabetes, and chronic pulmonary diseases are now the leading cause of death in India, contributing to nearly 60% of deaths. Experts have argued that presently India suffers from the triple burden of disease-communicable diseases; non-communicable diseases (NCDs) and malnutrition. The recent reports show that more than one third of the world's malnourished children live in India. In spite of government's efforts to address the malnutrition issues through massive national level programmes such as POSHAN Abhiyan, malnutrition still remains as one of the biggest developmental challenges in India.

Inadequate water, sanitation and hygiene (WASH) services have a ripple effect on almost everyone's life. According to UNICEF "Just a few years ago, in 2015, nearly half of India's population of around 568 million people suffered the indignity of defecating in fields, forests, bodies of water, or other public spaces due to lack of access to toilets. India alone accounted for 90 per cent of the people in South Asia and half of the 1.2 billion people in the world that defecated in the open. By 2019, according to the latest estimates, the number of people without access to toilets has reduced significantly by an estimated 450 million people. A tremendous achievement, only possible because of the Swaccha Bharat Mission (SBM) (Clean India Campaign)," Though the SBM is seen as a big success by international organisations such as UNICEF, its real impact on infant and child health is yet to be fully understood.

Health and nutritional statistics in India and elsewhere reflect social and economic inequities. Therefore, it is important to bear in mind that the health and nutritional inequities in India are further exacerbated by the social inequities arising out of class, caste, religion and regional disparities. Many researchers have pointed out the evident association of appallingly low health status with poor, female gender, rural place of residence, tribal ethnicity, scheduled castes (SC) and specific minority groups.

2.11 SUMMARY

Public health practice comprises of organised efforts to improve health of the communities. Public health intervention strategies are targeted to populations rather than to individuals. Therefore, public health practice is population-based. Throughout the history, public health efforts had been directed to control of communicable diseases, reduction of environmental hazards, and provision of safe drinking water to prolong human life. As it emphasises collective responsibility for health protection and disease prevention, it also recognises the key role of the state. Another important point to be kept in mind is that the epidemiological understanding is crucial to the practice of public health. Relying on the social model of health, public health professionals approach the health with the understanding that socio-economic, environmental and biologic factors interact to determine health. Therefore, a multidisciplinary/interdisciplinary understanding of health and disease is important in the practice of public health. The recent public health interventions to combat covid-19 pandemic clearly show us the importance of recognising the interlinkages between various underlying factors that influence health and disease.

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2.13 ANSWERS TO CHECK YOUR PROGRESS

1) Public health is the science of protecting and improving the health of people and their communities. Public health can be defined as the science of protecting the safety and improving the health of communities through education, policy making and research for disease and injury prevention.

2) There are two theories for disease causation namely Miasma theory and theory of Contagion. Miasma theory was created by Galen. The theory of 'miasma' or bad air causing disease postulated that vapour, mist, or 'bad air', originating from decomposing material (called miasmata) with its foul smell, would enter the body and cause disease. Surprisingly, even bloodletting was practiced to take out the malodorous and poisonous particles entered into the human body. The other one Contagion theory originated from the ancient practice of isolating ill people. The contagion theory is based on the assumption that illness is contagious. In fact, the governments even introduced Quarantine laws (Quarantine laws in Venice in 1348 with lazaretto in 1423) that in a way infringed the individual rights to protect public. The practice of Isolation of individuals with plague, leprosy, smallpox, etc. was also based on the contagion theory.

3) The core disciplines of public health are:

1) Epidemiology, 2) Nutrition, 3) Environmental Health, 4) Health Education, 5) Behavioural Sciences, 6) Health Services Administration/Management, 7) Biostatistics, 8) Health Economics and 9) Demography.