Chapter-1

Introduction

General Introduction:

Tuberculosis (TB) is a worldwide, chronic, specific communicable disease. The etiological agent of this disease is usually *Mycobacterium tuberculosis* belonging to the Genus Mycobacteria. It was first isolated and shown to be the cause of tuberculosis by R. Koch in 1882. This bacteria is aerobic or microaerophillic non-motile, non-spore forming, high in lipid content; and acid and alcohol fast (Barks Dale and Kim, 1977).

It is one of the major public health problems in the developing countries. No other disease has so much sociological, economical and health impact on public life. It appears that the prevalence of TB is an index of the stage of social organization and standard of living of the community. Though it has declined in most of the developed countries, almost to the stage of control, it still continues to pose as a major health problem. Growth in population and consequent decline in living standards and nutritional status promotes and provides an ideal environment for growth of TB, concomitantly making it a social and medical disease. It is a disease of economically disadvantaged persons, crowded living conditions and poor nutrition being the predisposing factors.

In addition to these, there also seems to be racial or ethnic differences. Jews appear to have a high natural selection over the centuries in the crowded urban ghettos of Europe. Conversely, Blacks, Native Americans and Eskimos are particularly susceptible because crowded living conditions are relatively recent in their histories and they were spared the selective influence of extensive exposure to the organism. The resistance is also lowered by certain diseases, notably silicosis and diabetes mellitus; and by gastrectomy and corticosteroid therapy (Kissane, 1985).

A World Health Organization (WHO,1980) report informed that the distribution of TB patients in cold countries and warm just equal during 1955-1960. There was an increase in data of the patients of warm countries as compared to cold ones. Further, it
has been reported that 795 of the total tubercular patients were living in Asia, Africa and South America. In Europe, number of TB patients is going down very quickly. WHO has listed as many as 150 countries, where TB is highly prevalent it has been found that Greenland is exceptionally lacking TB infection. WHO (1994 and 1996) took the unique step of declaring TB to be a world emergency. It estimated that each year 8 million new cases of TB occur and approximately 3 million new people die from the disease. About 95% of the TB cases occur in the developing countries, where few resources are available to ensure proper treatment and where HIV infection may be common. It is estimated that between 19 and 43% of the world population is infected with Mycobacterium tuberculosis and between 2000 and 2020, nearly one billion people will be newly infected, 200 million people will get sick, and 35 million will die from TB, if control is not further strengthened.

There are various factors that may contribute for the increase in TB burden like population's increase, co-infection with HIV/AIDS, poverty and programme decline, multidrug resistant TB, overcrowding, immigration, negligence (inadequate case detection, diagnosis and cure), indifference etc. In India, TB is already a major health problem and the present situation is alarming. Approximately 3.5 million are infected with TB, about a quarter of who are infectious. 0.5 million die due to TB per annum that is more than 1000 per day (one every minute). One untreated sputum positive pulmonary TB patient can infect 10.15 per year (CIMS-74, 2001).

A new dimension has got added in the 1980s due to spread of HIV with high prevalence of tuberculosis and Mycobacterium Avium complex (MAC) infection among these patients. Emergence of 'multidrug resistant' (MDR) TB with a reported incidence of 0.6 to 19% is threatening the whole picture of current anti tubercular chemotherapy. Remarkable Progress has been made in the last 50 years since the introduction of streptomycin in 1947 for tubercular treatment.

Its full therapeutic potential could be utilized only after 1952 when isoniazid was produced to accompany it. The discovery of ethambutol in 1961. Rifampicin in 1962 and redefinition of the role of pyrazinamide has changed the strategies in the chemotherapy of tuberculosis. Since 1970 the efficacy of short course (6-9 months) and domiciliary regimens has been demonstrated. Fluoroquinolones, newer
macrolides and some rifampicin congeners are the additions to the anti-mycobacterial drugs.

As the mighty blessed the earth with the flower of life concomitantly erupted the troublesome thorn of diseases just beneath. Since diseases, decay and death have always coexisted with life. The study of disease and their treatment must also have been contemporaneous with the dawn of human intellect. The primitive man must have used therapeutical agents and remedial measures, those things, which he was able to procure more easily (Kirtikar and Basu, 1975). Plants are one of such easily procurable natural resources, which have been gifted to us by God. The plants, known and unknown which yield the medicines or drugs of the use to man are known as the 'medicinal' or 'drug' plants. As the art of writing was unknown, the mode of treatment practiced in old days is also not known. It is believed that Indians were pioneers for application of drug plants in the treatment of human diseases.

The preparation of Ayurvedic drugs from the plants was done mostly by simple pharmaceutical methods consisting of powdering, simple extraction, infusion, decoction, distillation, hot extraction, fermentation. Medicines from plants are obtained either from single part or whole plant (root, stem bark, leaves, seeds and fruits) collectively called "panchang". These drugs have been used in the form of decoction, arista, asava (Liquor), avelaha, tail (oil), metals and minerals extensively processed with herbs etc. Therapeutic properties of drug plant is of carbon, hydrogen oxygen and nitrogen, glycosides, essential oils, fatty acids, resin, mucilage's, gums and tannins etc. Each chemical compound has its own property to check the growth of microbes of different kinds by producing definite physiological changes in human body.

In the middle age of an Ayurvedic chronology herbo-mineral metallic mercurial preparations were invented. Some elements like mercury, lead etc are poisonous but their insoluble salts or complexes are useful for the body. "Rasa Yoga’s" as Ayurvedic preparations of such poisonous elements, mostly "Rasa-Sindura" a red sulphide of mercury is used as a medicine in the Ayurvedic system of therapy and it has gained chief importance as a remedy of infectious and non-infectious bacterial diseases including tuberculosis, leprosy, typhoid, smallpox etc. The potential of Rasa-
Sindura (to achieve the inhibition of microbial growth) may be enhanced and altered by adding different medicinally used plants extracts and parts of root, bark and leaf extracts. It also acts as a digestive agent and as a nerve tonic, thus it is also known as "Sarva Rog Hara" (removal of all disease).

Dr. Christian Friedrich Samuel Hannemann was the founder of Homeopathic system of medicine. From Homeopathic point of view, the inhibited latent disease status results from three basic causes-'Psora', 'Sycosis' and 'Syphilis' or a combination of two or all of them. Thus the constituents may be divided into four groups namely psoric, sycotic, syphilitic and mixed miasmatic. In Homeopathy these are considered as the fundamental causes of all the non-infectious diseases.

**Relevancy of this work:**

Saharanpur being the border city of Uttar Pradesh state and surrounds many holy places therefore the people not only from different parts of the country but also from abroad come over here to perform various socio-religious rituals and for pilgrimage almost throughout the year. The flow of people causes overcrowding, scarcity of nutritious food and water and poor sanitation leading to unhygienic conditions. This may result in the spread of various infectious microbial diseases.

Diseases like pulmonary tuberculosis demand great attention because of their ill effects on the health of humans. The standard antibiotics/allopathic drugs used in the modern medicine system cause adverse side effects on human health. Thus, alternative medicine i.e. Ayurvedic and Homeopathic drugs, should also be tried against pulmonary tuberculosis which do not have any side effects. Today, the emphasis in the medical approach to disease i.e. increasingly on its prevention rather than its treatment and knowledge of the epidemiology and pathology is essential in understanding as to how it is caused and in developing soundly based preventive measures, required for planning and execution of their control operations.

**Aims and objectives of this study:**

Keeping above in view, the present study was undertaken to find out the epidemiological and pathological aspects of pulmonary tuberculosis infections affecting the population of Saharanpur and its adjoining areas; and in vitro efficacy of
certain Allopathic, Ayurvedic and Homeopathic drugs against Mycobacterium sp. The involvement and co-relation of the social, abiotic as well as clinical factors involved in tuberculosis infection have been studied. The study shell help in understanding etiological, epidemiological, pathological, and control measures of this dreadful pulmonary disease-Pulmonary Tuberculosis (PTB).