Chapter 1

INTRODUCTION

Importance of occupational medicine was recognised as early as the beginning of eighteenth century by Bernardino Ramazzini (Bouhys et al. 1969). Occupational health of industrial workers was first taken care of by a doctor in 1830, when John Wood Bradford, a mill owner employed him for this purpose. It appears that Bradford was aware that in the spinning department of a textile mill the health risk to a worker is very high due to a number of injurious factors.

Effect of 'cotton dust' on textile mill workers is highest in spinning department (i.e. blow, card, comber and ring sections) because of higher concentration of respirable dust compared to other departments of the mill (Simpson et al., 1968; Berry et al., 1973;
It has been reported by Sen, 1967; Kamat et al, 1981 and Parikh et al, 1986 that pulmonary functions are affected by cotton dust. Whenever the dust concentration is higher, the mean forced expiratory volume (FEV1) is lower in the exposed group (Zuskin and Valic, 1975; Majumdar et al, 1990; Venkatkrishna Bhatt, et al, 1990). Maximum expiratory flow rate i.e MEFR is significantly lower in blow, card,comber and ring sections (Bouhuys et al, 1969; Field and Owen, 1979; Shah and Rajgopal, 1984; Majumdar et al, 1990).

Mean weight values have also been reported to be significantly lower in the exposed group as compared to the control (Narsimha Rao et al, 1979; Majumdar et al,1990). Rao and Tandon (1979) reported a positive correlation of FEV1 and FVC with height. But Majumdar et al, 1990 did not find any significant difference in mean height between the control and the exposed group.

"It is important to realize that the substances emitted into the indoor air have much less opportunity to become diluted than those emitted outdoors, because of the less volume of air available to disperse pollutants." (Turiel, Issac, 1987). Blow and card rooms have been found to be more dustier than ring and comber rooms leading to lower percentage of FEV1 in the former than the latter group (Shah et al, 1984). Environmental allergens viz. dusts, gases, vapours and fumes can lead to allergic diseases.

The allergic diseases such as byssinosis, asthma (reversible lung disorder) and also irreversible impairment of the lung function because of the precipitating agent at work have been
recognised by Waldron and Harrington, 1980 and Davies, 1989. It has also been reported that exposure to cotton dust causes increase in blood histamine levels leading to broncho-constriction, which in turn leads to various lung ailments (Zuskin and Valic 1975; Shah et al, 1984; Venkatakrishna, Bhatt et al, 1990). Schilling's (1950 & 1955) investigations suggest that these symptoms are more frequent in blow and card rooms. B.B. Chatterjee (1989) has reported in his editorial the realisation by researchers in the past that "the tests for pulmonary functions are useful in early diagnosis of specific respiratory disorders, in periodic health surveillance of workers at risk and in the assessment of disabilities produced in compensable respiratory diseases".

Waldron and Harrington, 1980; Haublein et al, 1989; Funke et al, 1989 have emphasized that the health risk is dependent upon various factors viz. nature of dust, duration of exposure, dust concentration and individual factors like, general constitution, state of health of the person concerned including the functional state of upper respiratory system, lung function and its structure, the general immunological status and biochemical reactivity. All these factors play a part in onset of the disease.

According to Ffrench, G. (1973), "'Standard safe limit' of pollution in an industrial environment is known as the 'Threshold limit value' (TLV) which identifies a level under which all workers can be exposed day after day without known adverse effects and there is wide variation in individual susceptibility". Age too plays a major part in the degree of susceptibility of spinners. Ageing leads to the lowering of elasticity of lung tissues therefore exposure to cotton dust leads to broncho-constriction (Comroe et al, 1967; Zuskin and Valic, 1975).
Diseases like byssinosis are more common between 40 and 59 years age group (Siddhu et al, 1966). Knudson et al (1976) reported that there is hardly any change in mean maximal expiratory flow volume curve with respect to advancing age when the effects of diseases, insult or injury were excluded.

'Dust' is considered as a disperse system (aerosol) of heterogenous solid particles in a gas. Dust particles are carried into the lungs during inhalation and most of it is exhaled or eliminated by means of lung clearing mechanism. But a small number of these particles may be deposited in the lung depending on their size. Medical research has shown that particles of 0.1-5 μm size can remain in alveolar passages (respirable dust), while larger particles are retained by the mucous membrane of nose, throat, trachea and bronchi where they are eliminated by lung clearing mechanism (Haublien et al, 1989; Chandrasekhar, 1989). The excessive quantities of dust particles like the fine cotton dust particles in the spinning department of a textile mill can cancel the protective and scavenging mechanism and thus lead to respiratory diseases.

Temperature and humidity are other important factors in affecting or influencing the worker's efficiency, concentration and health (Hayward et al, 1986,Naik,1987). Cigarette smoking has an additive and synergistic action on pulmonary function leading to lower values of respiratory parameters in exposed as compared to unexposed group (Zuskin and Valic,1975; Waldron and Harrington, 1980; Venkatkrishna,Bhatt et al,1990). For lowest efficiency environmental conditions are characterised by overheating or overloading of the subject ( Suggs and Splinter, 1961). At all workloads the effect of temperature
decreases as the relative humidity is decreased. Temperature effect is largely controlled by workload also. That is, the mechanical efficiency is directly proportional to temperature, humidity and workload (Suggs and Splinter, 1966).

It has also been recognised that smoking acts as an enhancing factor in causing byssinosis (Zuskin and Valic, 1975; Haublein et al, 1989; Venkatkrishna, Bhatt et al, 1990). But it has been reported by Knudson et al, 1984, that there is no significant difference between smokers and non-smokers in response to broncho-dilation. Greater decrease in MEFR with age in smokers compared to non-smokers has been reported by Black et al, 1974. Parikh et al (1990) reported the effect of cotton dust on the exposed, affected or ill subjects is more than the effect of smoking. Raymond Parkes (1985) suggested that smoking effects loss of ventilatory function at all levels of dust exposure.

Apart from the above mentioned factors shift system also affects the FEV1 values of workers in the card and blow rooms (Seibt, A, 1989; Majumdar et al, 1990).

Since efficiency has direct link with health comfort and productivity of a worker, it is important to find out the conditions which affect the efficiency of a textile mill worker. Good lighting, ventilation, sanitation, artistic structure of the building and calm, quiet and bright atmosphere have a psychological effect because in such a atmosphere, a worker can concentrate better, work satisfactorily and produce more. Efficiency also depends on the number of hours that the workers are called upon to put in. Long hours with no suitable pauses for relaxation and recreation can impair worker's efficiency. Accident rate as high as 25.16 in India compared to only 4.4 in the U.K.
(Captain, H.S., 1970) is attributable to absence of proper attitude which is compounded by unsafe working, poor layout of machinery and indifference to the need of safety.

Factories act, 1948 amendment was first enacted keeping in view the problems of textile workers but on the basis of physical working conditions only (Kulkarni, Raja, 1975). Mental and physical health of the worker are directly related to his family’s well being. It has been reported that, lack of concentration due to domestic problems leads to accidents (Krishna, Usha, 1975; Karmik, 1975; Waldron and Harrington, 1980). Therefore worker’s health involving his emotional and psychological status, which in turn is dependent upon the quality of his personal life and problems related to it, is very important for higher production (Walters and Haines, 1989; Dales, Robert, E, 1989).

Pressures at work and home lead to social evils viz. alcoholism, drug addiction, gambling etc. (Ffrench, G, 1973; Walters and Harris, 1989).

Influence of psychological status on respiratory symptoms viz. cough, phlegm, wheeze and dyspnea (breathlessness) and psychiatric symptoms like anxiety, anger depression and cognitive disturbances has been reported by authors Cassem, E, H, 1987; Brashear, R, E, 1987 and Dales, Robert, E, 1989. However, Guza, Rosser, R, 1981, suggest that “the psychiatric problems are a myth, rather than the cause of dyspnea”.

Unhygienic conditions in the work room, cloak room and canteen of the factory has a direct bearing on the health of the worker (Karmik, 1975; Kilbom and Broberg, 1989). “Textile industry is the most accident prone industry and 60% of the accidents are due to poor house keeping and improper supervision” (Naik, et al, 1987). Cotton textile industry is one of the oldest industries in our country but less is said
about health hazards and safety. In 1881, the factory act was passed but least references were made about safety. The reason was, that hours of work was given much emphasis from 1934 onwards, the thought of safety and health hazards in industry provoked the person's concern. In 1948, the earlier Factory legislation was amended giving some consideration to health and safety. International Labour Organisation (ILO) also expressed great concern about health and safety since its inception.

Productivity stands for composite effect of all the factors contributing to the production. As a ratio, productivity relates output to input and as such it is an indicator of overall efficiency of business firm or industry. It is intriguing to note that our textile industry, inspite of about a hundred and forty years of existence has extremely low productivity level. Sickness of any industry causes major economic and social evils. It is therefore essential to analyse its root causes and suggest remedial measures. The textile industry is in bad state for a long time and its profitability is amongst the lowest in major industries. In all the factors contributing to higher productivity, the basic inherent factor is undoubtedly the" human element".
AIMS AND OBJECTIVES:

It is evident from the above description that few studies have been conducted on health hazards of textile mill spinners. Textile spinner is exposed to the health damage caused by fine cotton fibre inhalation, apart from the other hazardous factors viz. high temperature and humidity, which he shares with workers employed in other industries. Whatever investigations have been carried out there are very few in which all these factors affecting health of the spinners are considered under one umbrella.

In view of the above discussion, the present study aims to see how far the health of class IV employees in spinning section of a textile mill is affected. And as such the objectives of the study would be:

1. To find out the effect of fine cotton dust on the health of the cotton spinners.
2. To what extent socio-economic factors affect the health of cotton spinners.
3. To what extent work conditions affect the health of cotton spinners.
4. To what extent their habits and attitude affect their health.
5. And to find out about the accidents, their nature and the possible causes which have direct bearing on occupational hazards.