CHAPTER IV

DISCUSSION

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The joint ILO and WLO committee on occupational health define occupational health as -

> *Occupational health should aim at the promotion and maintenance of the highest degree of physical, mental and social wellbeing of workers in all occupations, the prevention among workers of departure from health caused by their working conditions, the protection of workers in their employment from risks resulting from factors adverse to health, the placing and maintenance of the worker in an occupational environment adapted to his physiological and psychological equipment and to summarise the adaptation of work to man and each man to his job.*

Today this occupational health gets adversely affected. Industrialisation has placed workers in a highly complicated occupational environment. There are three types of interactions in an occupational environment:

1) Man and physical agents
2) Man and man
3) Man and machines.

Physical factors or agents are heat, cold, humidity, light, noise etc.. These factors act in different ways on the health and efficiency of the workers. Long time exposure, at least 8 hrs to

the polluted occupational environment causes ill effects on the workers' body. Occupational hazards in different industries has been, since long, a subject of research. From critical review of Chapter-I it will be clear that textile industry is the oldest industry in India. Export of cotton textile is the third highest (Upadhay and Pandey 1991). Most of the work on occupational health hazards in textile industry is carried out in foreign countries; whereas little work is carried out in India. In Maharashtra 27 spinning mills and 53 composite mills are present (Upadhay and Pandey 1991). In Kolhapur district about 80 per cent powerlooms and handlooms are working in the Ichalkaranji area (Hupare 1979). The business of weaving cotton textile yarn was started in 1904 at Ichalkaranji, which is an important town developed into a prosperous weaving centre. Ichalkaranji town is popularly known as 'Manchester of Maharashtra'. But in proper Ichalkaranji very little research work on this topic is carried out. Most of the work is done on noise-related deafness and little attention is paid to cardiovascular disorders. Noise is one of the adverse factors responsible for cardiovascular disorders, i.e., hypertension (Vaish 1973). The present work is carried out in one of the textile mills at Ichalkaranji. Three units are present in this textile mill, namely, A, B, C. In one of the shifts of 'B' unit total 294 male workers are present. From these, 171 workers are randomly selected for the present investigation. Eighteen office members are also randomly selected for the present investigation. Taking into consideration the fact that considerable number of workers are present in

the ringframe, highest sound pressure level and NEI is found in the ringframe, the ringframe section is selected for the present investigation. Office is a less noisy area. Therefore, for comparison the group of office members selected is used as a control group.

From the survey of occupational environment in the textile mill, in the carding unit, the recorded dry temperature is 31°c and wet bulb temperature is 24°c. In the speedframe dry temperature is 31.5°c and wet bulb temperature is 24.5°c. In the ringframe dry temperature is 37°c and wet bulb temperature 26°c. In the winding section, dry temperature is 32°c and wet bulb temperature is 22°c. Thus, in the ringframe section both dry and wet bulb temperatures are the highest. But these warm and humid conditions usually do not impost strain on workers' body because relationship between dry temperature and wet bulb temperature are within normal limit. According to the schedule (DGFASLI 1987) of the Model Rules under Factories Act 1948, when the dry temperature is in between 30 and 34°c wet bulb temperature should be 29°c. When the dry temperature is between 35-39°c, then wet bulb temperature should be 28.5°c (Pal & Mohan 1990). Comfortable warm and humid conditions are maintained in the 'B' unit of textile mill by controlling temperature, humidity and ventilation. Therefore, in the 'B' unit there is no problem of adverse effect of hot and humid conditions on the workers' body. In the cotton textile mill warm and humid conditions are maintained because such an environment is desirable for process.

Total subjects are categorised into the actual worker and

office members. Workers are included in 'exposed' group who have fixed type of duty and are always working in noisy environments near the machinery. Office members are included in 'non-exposed' group. Office members are always working in less noisy area in the office.

From the survey it is observed that considerable number of workers are found in the ringframe section. A majority of the workers are young and their age-group is 25 to 45 years. This is due to the fact that the workers start their career at an early age due to the lack of education, inadequate financial condition and larger number of dependents. Some times workers compel their family members towards this profession and are trained with them. For the present investigation Groups A and B (A: 25 to 35 years and B: 36 to 45 years) are selected. These age groups are selected because a majority of the workers are found in these age groups and another main reason is to avoid the risk of hearing loss due to presbycusis and increase in blood pressure due to the age factor. Because it is inherent property of human being to lose their hearing ability and develop blood pressure with the advancement of age. In the ringframe section higher number of workers are found in the age group of 36 to 45 years; they are more exposed to noisy environment for a longer period of time. There are major changes of noise-induced occupational hazards. Therefore, to achieve our aim, service experience is also taken into consideration. In this case, service experience of 4 years and above is considered.

From the anthropometric measurements it is clear that height, weight and age of the subjects are not inter-related. The average height of the workers in the ringframe section of the age group 25 to 35 years is 162.30 cm and of the age group 36 to 45 years is 162.41 cm. While average height of the office members of the age group 25 to 35 years is 160 cm and of the age group 36 to 45 years is 161.11 cm. The average weight of the ringframe workers of the age group 25 to 35 years is 53.60 kg and of the age group 36 to 45 years it is 55.74 kg; while the average weight of the office members of the age group 25-35 years is 58.66 kg and of the age group 36-45 years it is 58.22 kg. Office members are more healthy than ringframe workers.

From the questionnaire it is revealed that most of the workers are non-vegetarian. But on the contrary from the anthropometric measurement it is clear that only a few workers are healthy and most of the workers are slim. Here diet does not contribute to the weight of the workers and indirectly diet is not responsible for increase in blood pressure. Therefore, in such a situation high blood pressure is not related with diet, but with other factors. Survey indicates that textile workers have a variety of vices, because their job involves working with noisy machinery for a period of 8 hours daily, monotonous work and work in different shifts. Workers smoke or chew tobacco, eat Pan to overcome boredom, to avoid sleep at night-shift and to have some recreation. Office members also have habits of Pan, tobacco, smoking and drinking, but their reasons are different. This is due

to their economic stability in life, company of friends, strenuousness of work and the need for recreation.

Health of workers is also taken into consideration. Only those workers are selected as subjects who did not have previous record of ear-related problems and previous history of hypertension. Workers were complaining about minor clinical problems such as leg-pain, back-pain, weakness and rarely dizziness. Leg-pain and back-pain are due to the standing posture of workers during work for a longer period of time. In cotton mill humid and warm conditions are maintained. Standing posture of workers for a longer period in hot environment causes dizziness. Because peripheral blood vessels are profoundly dilated, more blood goes to the skin and less is available for the internal organs. Sweating is due to the working in warm environment. Sweating and weakness may be due to the low weight of the workers.

I observed that major noise source existing in the textile mill is from the machine itself. 'B' unit of the mill is away from the road, located quite inside. There is no problem of traffic noise and neighbourhood noise, impining upon the different sections of 'B' unit of the textile mill. Table-1 shows the recorded noise level in the different sections of the 'B' unit along with Office. Table-2 gives an idea of recommended ambient noise level, according to which excess noise level of different sections is decided. Blow-room is worst hit by noise exceeding the recommended limit by 11 dB, carding Section by 11 dB, speedframe by 14 dB, ringframe by 17 dB, doubling

by 14 dB and winding by 11 dB at day time. At night time blowroom is worst hit by noise exceeding the recommended limit by 21 dB, carding by 21 dB, speedframe by 24 dB, ringframe by 27 dB, doubling by 24 dB and winding by 21 dB. These noise levels in different sections cross the recommended limit. Particularly, noise level of ringframe section crosses the recommended limit at higher rate. On the contrary, noise level of the office is quite below the recommended limit. Thus, in the ringframe section noise level is extremely high, while noise level of the office is quite normal. Table-3 gives an idea about NEI value of the different sections along with office. NEI value of the speedframe, ringframe, doubing and winding is greater than 1. NEI value of the ringframe is the highest among the rest. NEI value of the ringframe is 8 and of the office is '0'. Workers in the ringframe are over-exposed to the noise.

Problem of absenteeism was taken into consideration. From the available man-days report of the mill it is clear that CL, SL, PL, Paid days leave and unauthorised absenteeism are higher in the ringframe section. Mean value of unauthorised absneteeism in the ringframe section is 27.5 per cent. Thus severity of absenteeism is more in the ringframe. It is suspected that high level of noise may be responsible for higher rate of absenteeism in the ringframe section, because noise alters behaviour of worker. Labour absenteeism is one of the major labour problems in the Indian industries. According to the available information there is variation in percentage of absenteeism in certain important industries. In cotton mill industry the percentage

of absenteeism at Bombay is 19.6, Ahmedabad 14, Madras 15, Kanpur 16.8, Madurai 15.2, Solapur 21.9. In woollen mills percentage of absenteeism at Kanpur is 12.3. In jute mills percentage of absenteeism at West Bengal is 10.9 and U.P. 16.2. In engineering industry percentage of absenteeism at Bombay is 16.2 and U.P. 15.8. In cement industry percentage of absenteeism at Bihar is 17.8. In iron and steel industry percentage of absenteeism at Bihar is 12.5 (Patil 1979).

From a glance over this information it is clear that percentage of hypertension is higher in the cotton mill.

Detailed study of absenteeism in the industrial worker is essential because it is not only important from the point of cost aspect but also from the point of morale of the employees. Eventhough the effect of high morale of employees may not be calculated in terms of costs, it is more important than cost.

Hypertensive cases were selected from the ringframe section. Audiometric test of these workers was carried out. Average of hearing level at 500, 1000 and 2000 Hz frequencies was considered as a per cent hearing loss of the subjects. Because these are main speech frequencies. Using this index, it defines a 'fence' of 27 dB as the beginning of hearing impairment. Losses between 27 dB and 40 dB are considered as 'mild' and those between 41 dB and 55 dB are considered as 'moderate' hearing loss. Per cent hearing loss is higher in the ringframe workers than of the office members. Indepth analysis reveals that about 26.66 per cent of the ringframe workers

of both the age-groups (25 to 35 years and 36 to 45 years) are having mild hearing impairment in the right ear, 30 per cent workers are having moderate hearing impairment in the right ear and the remaining 53.33 per cent workers are having normal hearing level of the right ear. About 33 per cent of the ringframe workers of both the age groups are having mild hearing impairment in the left ear and the remaining 66.66 per cent are having normal hearing level of the left ear. On the contrary, only 40 per cent office members are having mild hearing impairment in the right ear and the remaining 60 per cent members are having normal hearing level of the right ear. Hearing level of left ear is normal in all office members. Mild type of hearing impairment is predominant in the workers. Per cent hearing loss is higher in the age group-A (25 to 35 years) than the age group-B (36 to 45 years) of the ringframe workers. Here, hearing loss not related with age and workers of the age group-A are more susceptible to the industrial noise. Hearing loss is higher in the right ear than in the left ear of the worker. It may be due to the working position. Generally workers are right-handers and right side of the body is directly exposed to the machine.

From the study of cardiovascular responses it is observed that, in the ringframe section 65.28 per cent workers of the age group-A (25 to 35 years) are having high heart beat and pulse rate. The highest recorded heart rate and pulse rate is 88 beats/min. About 61.53 per cent workers are having high systolic blood pressure and 30.72 per cent workers are having high diastolic blood pressure.

From the same section 66.66 per cent workers of the age group-B (36 to 45 years) are having high pulse rate and heart beat. The highest recorded pulse rate and heart rate is 88 beats/min. About 70.84 per cent workers are having high systolic blood pressure and 57.96 per cent are having high diastolic blood pressure. In the office, 88.88 per cent members of the age group-A are having high pulse rate and heart rate. The highest recorded pulse rate and heart rate is 85 beats/min. About 66.66 per cent members are having high systolic blood pressure and 11.11 per cent members are having high diastolic blood pressure. In the office, 55.55 per cent members of the age group-B are having high pulse rate and heart rate. The highest recorded value is 88 beats/min. About 66.66 per cent members are having high systolic blood pressure and 55.55 per cent are having high diastolic blood pressure. Thus, hypertensive cases are higher in the ringframe section as compared to the office.

From the overall discussion it is clear that in 'B' occupational environment pertaining to temperature, humidity and ventilation is always found normal which does not affect worker's health, efficiency and performance. Because prolonged exposure to heat along with high humidity and restricted air movement affects worker's health, efficiency and productivity (Dr. S.K. Sensarma 1989). Rentzsch et al (1986) studied the combined effect of temperature and noise on performance. They observed that such environmental factor causes an increase in the impairment of performance.

Diet, smoking, drinking, genetics, noise etc. are different

factors responsible for high blood pressure. In the ringframe workers there is no previous record of cardiovascular defects and family history of hypertension. Most of the workers are non-vegetarian but they are slim. Thus, along with quality of diet, quantity of diet is also responsible for the increase in weight. Therefore, diet does not play role in creation of hypertension. Workers have a variety of vices. So that we cannot deny the fact that smoking and drinking are causative factors of high blood pressure. Lang et al. (1987) studied the relationship between alcohol consumption and hypertension. According to them alcohol consumption is positively associated with occupational noise exposure. This statement indirectly proves that, there is relationship between occupational noise exposure and hypertension. Thus there is link between habits, occupational noise and hypertension.

Noise level and NEI value of the ringframe section are higher. Workers are working in such type of noisy environment for continuously 8 hours. Therefore, there is noise-induced deafness. This finding is supported by similar studies done by Evans and Huiyat (1982), Raja and Ganguly (1987), Sugiuchi et al (1987), Han et al. (1987), Zusha et al. (1987), Bergstron et al. (1986) etc. on noise-induced deafness.

It has been shown by Life Insurance statistical data that there are millions of lives with blood pressure higher than 120 mm Hg/80 mm Hg which increases the chances of morbidity and mortality. Therefore, in the persons ideal blood pressure be 120 mm Hg/80 mm Hg (Dr. Datey and Dr. Hingorani 1983). Taking this figure into consideration

hypertensive cases are decided. Hypertensive cases are found higher in the ringframe than in the office. There is no relationship between hearing loss and high blood pressure. But there may be relationship between noise and high blood pressure. The probable mechanism behind noise-induced hypertension is, exposure to the excess noise level of the ringframe section increases adrenalin secretion, which affects working of heart and releases free fatty acids in the blood. This reason is supported by Shastri and Trivedi (1988). According to them, this effect occurs in the noise of 60-70 dB in short-time exposure. Whitworth et al. (1987) postulate that the hypothalamo pituitary adrenal axis plays a role in blood pressure regulation in normal and hypertensive man. They observed that in normal and hypertensive subjects many stimuli which increase ACTH secretion also increase blood pressure and drugs which decrease ACTH secretion also decrease blood pressure. In the ringframe workers are exposed to 92 dB(A) noise for continously 8 hours. A continuous loud noise increases the peripheral circulatory resistance which in turn increases blood pressure (Shastri and Trivedi 1988). Thus noise is responsibles for high blood pressure. This finding is supported by Wu et al (1987). They observed that workers in the noisy environment had higher systolic and diastolic blood pressure. Loud noise causes vasoconstriction and increased tone in small arteries. If noise stimulus is strong and repeated for a long time, it might cause structural change in the resistance vessels and permanent arterial hypertension in humans (Eggersteen et al. 1987).

Our ear, like our hearts, is working for 24 hours a day. Noise is damaging to both these organs. As our hearing cannot be switched off at our will, we are continuously aware of the unavoidable noise and its exposure. Workers are working in the noisy environment for 8 hours daily. Therefore, to avoid noise-induced ill effects like deafness and hypertension, to improve worker's efficiency and to increase productivity, industrial noise control is essential. Industrial noise control involves the following different series of actions:

(1) Prevention is better than cure. In dealing with noise and its control, the first priority goes to the reduction in the noise itself by machineries. Therefore, regular maintenance of machinery is essential.

(2) Control of Transmission: This is done by covering the wall with sound absorbing material.

(3) Use of ear muffs or ear plugs should be strictly enforced amongst workers of noisy areas.

(4) Hearing conservation programme should also be adopted in textile mills for assessing and preventing hearing impairment of the workers.

(5) Most of the workers are illiterate as regards the occupational hazards at their work-place. Therefore, the workers should be adequately trained in this aspect by the employers.

CONCLUSION:

The above survey indicates that -

(1) The present textile industry is the oldest and largest textile industry in Ichalkaranji.

(2) Comfortable occupational conditions are provided in the 'B' unit of the textile mill by controlling temperature, humidity and ventillation.

(3) The existing noise level has crossed the prescribed noise limits given by the Central Pollution Control Board.

(4) In various sections NEI is greater than one.

(5) Subjects did not have previous ear-related problems and cardiovascular-related defects. Subjects did not have previous family history of high blood pressure.

(6) Labour absenteeism is higher in the ringframe.

(7) Per cent hearing loss is higher in the ringframe workers than the office members. Per cent hearing loss is higher in the right ear than the left ear of the worker.

(8) Percentage of hypertension is higher in the ringframe workers than the office members.

(9) Management of noise is essential to avoid noise-induced deafness and hypertension, to increase efficiency and productivity.

Thus, noise is a major risk factor of hearing loss and hypertension.

Though the number of subjects covered in the present investigations is not enough to draw any firm conclusion, this problem and the fact which is proved to some extent, really alarm us. Thus, further detailed research of noise pollution is essential. It should include effect of noise pollution on different systems of the body, and its management. Therefore, the textile industry - the grandfather of modern industry - will remain an interesting and lucrative field of activity.