CHAPTER II

SUBJECTS AND METHODS

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a) Selection of Subjects

Out of the workers in the morning shift (8.0 a.m. to 4.0 p.m.) fifty male textile worker's with normal health were randomly selected from a total of one hundred eleven, one hundred eightyfive, five hundred fifty and three hundred eighty workers in blow room - carding, speed frame, ring frame and winding sections of the Ichalkaranji textile industry. The age group of workers ranged from 20 to 50 years. Twentythree workers out of these from four different sections (5 from Blow room - carding, 6 from speed frame, 6 from ring frame and 6 from winding) were selected for detailed audiometric studies. A sociological questionnaire was used to obtain information concerning age, marital status, family size, monthly habits, sport activities and occupational history and experience.

b) Job Description

Most of the tasks in this industry are repeatative with idential cycles of operations recurring at regular intervals. In order to have overall assessment of the job carried out by these workers spot study was carried out by visiting the mill in various shifts regularly.

c) Sound measurement

Measurement of sound was done by basic measuring instrument called Sound Level Meter (SOUND LEVEL METER : Y.F.20 MODEL, made in Taiwan). This instrument has provided on overall

measurement of sound pressure level for all audible frequencies. The sound pressure level for all audible frequencies. The sound pressure levels in the various sections of the textile mill were measured and recorded.

d) Clinical examination and Laboratory investigations

Anthropometric measurements of body weight, height, pulse and blood pressure as well as a detailed medical and personal habits history including alcohol consumption and smoking patterns have been worked out. A detailed questionnaire was used to obtain occupational history and noisy hobbies.

Only the heart rate reaction of the subjects during work and recovery periods were recorded as per the time schedule given below.

TIME SCHEDULE FOR RECORDING HEART RATE DURING WORK AND RECOVERY PERIODS.

WORK DURATION (Min)	TIME OF RECORDING HEART RATE	
	DURING WORK	DURING RECOVERY PERIOD
15	Every minute	Every minute upto 10 mins., there after every 5 mins. till almost complete recovery.
30	Every minute upto 10 mins., thereafter every 5 mins. till 25 mins., thereafter every minute upto the end of work.	Every minute upto 10 mins. thereafter every 5 mins. till almost complete recovery.

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WORK DURATION (Min)	TIME OF RECORDING HEART RATE	
	DURING WORK	DURING RECOVERY PERIOD
45	Every minute upto 10 mins., thereafter every 5 mins. till 40 mins., thereafter every minute upto the end of work.	Every minute upto 10 mins., thereafter every 5 mins. till almost complete recovery.

Audiometry :

Audiometric testing was conducted prior to work, particularly in the men employed in the blow room and carding, speed frame, ring frame and winding sections of the textile mill. Standardized audiometric testing procedures were used and the technicians were supervised by a certified audiologist. The procedure used for conducting the pure tone audiogram was according to Morris et al. (1955).

Prior to the first quarter of the twentieth century, hearing tests were performed with percussion, string and wind instruments, among them tunning forks, monochord, Galton whistle and with the spoken and whispered voice. The precision of tests was limited. The audiometer is a tool which could be relied upon to emit acoustic signals at frequencies and intensities which could be selected and reproduced at will.

Advantages of the audiometer are : any frequency within the limitations of the audiometer can be reproduced as often as

needed for any one subject and from subject to subject. Any intensity within the limits of the audiometer can also be reproduced as frequently as necessary, within clinical tolerances, The signal can be emitted at an intensity for as long a duration as is desired. The signal can be interrupted and reproduced as frequently as need be. Records can be made of the findings of the test, which can be charted in symbolic language and numerical values. These are permanent records, and reasonally accurated comparisons with other similar tests can be made. The results of the audiometry test are no better than the compelency of the person performing the test.

Generally the most satisfactory signal on the subject's part is to let him respond with "yes" each time he hears the stimulus. There are several advantages to this. He participates more actively and naturally when he replies to a sound with a verbal response. He is less isolated if he is permitted to speak, which relaxes him. He may demonstrate changes in his voice volume as the tone intensity becomes greater or less, which is a good indication to the tester of the subject's subconscious reactions to the changes of loudness. This is particularly important when testing patients with deafness of non-organic origin.

Some subjects co-operate well when tested. They accepted the situation with equanility and can tolerate being scrutinized, Other subject were apathetic, tense and frightened some were passive.

Air conduction Audiometry was started with the intensity of each tone at about the suspected threshold of the subjects hearing. Some subjects which were first introduced to a loud sound found to be unresponsive to softer ones that followed. When they were learnt to listen to and for soft sounds at the beginning of the test, their threshold was obtained more easily and rapidly.

Masking procedures was also followed during audiometry of textile workers. The purpose of masking was to eliminate temporarily the hearing of the ear which was not being tested.

Bone conduction audiometry was also performed in textile workers. Bone conduction audiometry was obligatory, because the functional diagnosis was predicated on a comparison of the air conduction thresholds and the bone conduction thresholds. This is fundamental. Functional diagnosis is generally impossible unless both procedures are performed.

The technique of bone conduction audiometry was identical with that of air conduction audiometry. The bone conductor was placed firmly against the mastoid process. Occasionally a particular point on the skull in the region of the mastoid process was to be found out where the tone was heard better than in the immediate vicinity. This point where the subject reports that, he hears least was selected for placement of bone conduction.

The following frequencies were tested with workers for both air and bone conduction audiometry : 125, 250, 500, 750,

1100, 1500, 2000, 3000, 4000, 6000 and 8000 Hz. All audiometric testing was performed in testing booths. Electric operated pure tone air conduction and bone conduction audiometer was used for the audiometric evaluation. The audiometer was initially calibrated and periodically checked thereafter.

One of the approach to noise control is to isolate the receiver of means of barriers of using hearing protection. Ear protector or defenders have been recommended by several investigators. The objective of an ear protector is to limit the amount of sound reaching the ear drum and thus lessen the possibility of hearing loss. In the present investigation the possible effects of use of ear plugs has been worked out by studing the pulse rate and systolic and diastolic blood pressure of workers working in different section of mill. The pulse rate and systolic and diastolic blood pressure has been recorded after using ear plugs during working and recovery phase of work.