

Noise-induced Hearing Impairment and Health Problems of the Industrial Workers

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"If noise is allowed to increase at the steady rate, as it has been for the past 20 years, we can expect that no one over the age of 10 will have normal hearing by the year 2000. A rising proportion of the population will lose the gift of hearing due to man made cause noise".

Richard Carmen

Noise can disturb man's work, rest, sleep, and communication. It can damage his hearing and evoke other psychological, physiological and possibly pathological reactions. The most important issue is industrial noise problem. Noise can cause permanent disability in such an insidious manner that often it goes unnoticed until it is too late. Road traffic is one of the main sources of community noise that disturbs a large segment of the urban population. Also of world-wide concern is aircraft noise which can significantly affect the mode of life especially for people living in the vicinity of airports.

Normal conversation measures approximately 35 to 40 decibels (dB), while a typewriter at work, measures around 60 decibels. It may be noted that since sound is measured in decibels, even small differences in decibel values connote large differences in the sound pressure impinging on the ear drum.

Industrial noise exposure limit recommended by the World Health Organisation (WHO) is 75 dB. According to the Indian Standard Institution (ISI), the acceptable noise level in an industrial area is between 50

and 60 dB. The normal limits of noise level or the Threshold Limit Value (TLV), universally accepted under the occupational safety and health act are:

90 dB for 8 hours
95 dB for 4 hours
100 dB for 2 hours
105 dB for 1 hour
110 dB for 1/2 hour
115 dB for 1/4 hour

Nothing beyond 155 dB should be allowed, for it crosses the pain threshold level. The importance of a healthy work force in any country cannot be over-emphasized. Primary health care calls for the extension of services to people where they live and work, and the worldwide goal for "Health for All By 2000 AD", demands a socially and economically productive life.

India is considerably industrialized. About 70 percent of its workers' population is employed in small scale and household industries with no hearing protection.

Review of Literature

Although noise induced hearing loss is widely prevalent among industrial workers, very few studies have been done in this field, and preventive aspects of hearing impairment was a dimension that was hardly considered in the research conducted so far.

According to Kameswaran (1982), the sources of noise in developing countries can be divided into three major categories: (i) Industrial and machinery, (ii) Transportation, and (iii) Community activities, entertainment and construction work. A project undertaken to study

the problem of noise-induced hearing loss in an engineering plant revealed that out of 320 workers, 79 workers (25%) were suffering from noise induced hearing loss. The nature of hearing loss was moderate, and level of implement was between 41 and 55 decibels. The other conditions identified were diseases of the digestive system, mental inefficiency, fatigue, nervousness, injury to the ear which caused deafness, communication and speech problem.

According to Panchal (1989), a survey on school children and teachers revealed that a large number of school children and teachers became deaf due to prolonged exposure to intense noise. This was because the schools were located in a noisy area. Further, these children were educationally and emotionally maladjusted and had lower ability to concentrate. Teachers also showed signs of irritability, high blood pressure, ulcers, mental illness, and a high degree of anxiety. Their performance was also adversely affected. In another study on 239 workers in a manufacturing plant in Kerala, Reddy, Shenoy and Chacko assessed hearing status by audiometric tests using an "Arphi Audiometer" in a sound proof room. In this study, the normal level was taken as 25 decibels in all frequencies. Among the sample, 75 percent workers were in the age group of 30-49 years, 20 percent in age group of 20-29 years and 5 percent were above 50 years. Results revealed that, in the age group 20-29 years, normal hearing was found only among 27 percent, whereas 75 percent had hearing impairment. In the age group of 30-49 years, 36 percent had normal hearing, whereas 64 percent had severe hearing impairment. In the group above 50

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years of age, normal hearing was found to be among 28 percent and 72 percent had severe hearing impairment.

According to Lepping, noise induced hearing loss and its prevention can be achieved through nurses. Nurses should be trained to carry out large scale audiometric screening in industries to find out the hearing impairment among employees and to take preventive measures. Frequent training programmes could help them to update their knowledge and develop new skills of interviewing and audiometry testing. The occupational nurse was found to be an ideal person to carry out audio-metric screening and surveillance programme with assistance and guidance from consulting physicians.

Methodology

The sample consisted of a total of 100 employees from a selected chemical and fertilizer factory in Kerala. There were 18 plants and an office in this factory. The entire plant was observed to be a noisy area due to machinery and production work round the clock. There were 8,216 employees who were either directly or indirectly involved in the production process. Hundred subjects from the high noise level and low noise level areas were selected to represent two shifts of duty. A systematic, stratified proportionate random sampling technique was adopted to select the sample subjects. Data were collected over a period of 6 days. The interview schedule was initially administered, followed by height, weight, blood pressure measurement and finally audiometric testing was done. Otological examination was done only for those subjects who had very severe hearing impairment in audiometric testing.

Results

It was observed that the majority (69%) of employees were in the '40 years and above' age category and a large majority (89%) had an income

above Rs.2000/-. All the employees were from the skilled group; 64 percent had education upto degree level. The data revealed that 62 percent of employees had more than 20 years of exposure to a noisy environment. Chi-square test showed the significant relationships between noise level in the environment; subjective and objective well-being of the individual, duration of exposure to noise and hearing impairment of subjects from higher and lower noise level area.

There was a relationship between duration of exposure to noise and hearing impairment of workers of both higher noise area and lower noise area. Chi-square values were found to be significant at 0.05 level and 0.01 level for high noise area as well as for lower noise area. Co-efficient of association was .73 to .74 for high and low areas which indicated a strong relationship.

Conclusion

The findings of this study have some important implications in Occupational Nursing. Health and hearing surveillance programme of this kind must be undertaken by nurses periodically in the factories to assess the workers' health problems and hearing impairment. Identification of noise level in the environment and its effect on health can guide the occupational health nurse in planning and implementing health and safety programme for workers. Workers must be encouraged to use earmuffs or earplugs and a sufficient quantity of protective devices must be made available to them. It would be appropriate in the present set-up of industries to encourage appointment of industrial nurses and give importance to Industrial Nursing in order to help workers to lead socially and economically productive life. This could be one of the ways to attain the goal of "Health for All by 2000 AD".

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