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STUDY OF NOISE INDUCED HEARING LOSS AMONG INDUSTRIAL WORKERS IN RAIPUR CHHATTISGARH

Community Medicine

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ABSTRACT

Exposure to excessive noise is the major avoidable cause of permanent hearing impairment. Worldwide, 16% of the disabling hearing loss in adults is attributed to occupational noise, ranging from 7 to 21% in the various sub regions. Noise-induced hearing loss (NIHL) is bilateral and symmetrical, usually affecting the higher frequencies (3k, 4k or 6k Hz) and then spreading to the lower frequencies (0.5k, 1k or 2k Hz). The major industries responsible for excessive noise and exposing workers to hazardous levels of noise are textile, printing, saw mills, mining, etc. In India, NIHL has been a compensable disease since 1948. Our objective of this study was to determine whether sound in the study areas was of sufficient intensity to cause hearing loss and if so whether those exposed have been affected and to determine whether workers/employees in the study areas were aware that sound can cause hearing loss and if so whether they knew that this can be prevented by ear protection. One hundred and fifty workers from area A and fifty two employees from area B were selected for the study. A questionnaire was filled and had their hearing thresholds measured by a pure tone audiometer machine.In both study areas the noise levels were above the safe limit of 85dB(A). In area A 28 workers and in area B eight employees had noise induced hearing loss. In area A 81.1% of the workers and in area B 85% of the employees knew that noise causes hearing loss. All workers/employees from both study areas knew that noise induced hearing loss could be prevented by some form of ear protection. Workers/Employees exposed to noise above 85dB(A) will eventually develop hearing loss.

KEYWORDS

Audiogram,Hearing protectors, noise-induced hearing loss, occupational noise, prevalence

INTRODUCTION

The prevalence of disabling hearing impairment is estimated to be 2.2%. Noisy environments are hazardous to the hearing. It is now well established that exposure to noise of sufficient intensity and duration damages the hearing of those exposed. Sound levels of less than 75dB(A) are unlikely to cause damage to hearing. However, sound levels of 85dB(A) and above for durations of eight hours per day causes damage to the hearing after many years of exposure. Audiological screening of industrial workers in a IRON AND STEEL factory in RAIPUR has shown that 25% of the employees exposed to the noise for eight hours of work daily for a period of over five years were found to have permanent threshold shift on pure tone audiometry. The noise level was persistently above 85dB(A)..

MATERIAL AND METHOD

Two study areas A and B were randomly selected from among the industries in RAIPUR CHHATTISGARH.

Study area A: This industrial area is situated in the center of the city. The area covered by this is approximately quarter of a square kilometer and the activities taking place in the open include metal fabrication, black smithery, carpentry and tailoring of motor vehicle accessories. The activities involve hammering metal, welding, wood joinery and saw milling as well as grinding of grain.

Study area B: This is situated in the industrial area URLA. Manufacturing takes place during the day and night in shifts of eight hours each. In both industrial settings noise was measured. This work was done by a technician well trained in industrial safety from the Ministry of Labour. At each of the sections, two measurements were made; one during the peak of activities and another when there were no activities taking place. The information sought included age, sex, occupation, duration of employment in the present job, number of continuous working hours per day, previous employment in a different factory or section, nature of work and duration of engagement. Medical history of the worker/employee focused on previous ear discharge, mumps, measles, use of ototoxic drug including streptomycin and quinine, exposure to explosions and discotheque music, previous head injury or involvement in motor traffic accident. Besides, the worker/employee was questioned regarding inability to hear clearly in a crowd, trouble in hearing the telephone, and need to ask people to repeat statements. All workers/employees had ear examination and the findings recorded. Pure tone audiometry was carried out on all the subjects in the morning before they stated work and having been out of the factory/ work place for sixteen hours or more. The data collected was then processed and the results computer analysed.

RESULTS

In area A,the minimum peak noise level was 87 dBA and the maximum was 116.5 dBA. The average noise level in this open area was 92.6dBA. In Area B, the minimum noise level recorded was 87dBA and the maximum was 11 MBA. While in all sections of the factory the noise levels recorded were significantly above the recommended safe noise levels. These results therefore have shown that in both industrial settings, the noise levels were higher than the safe limit of 85dBA and therefore hazardous to those exposed for prolonged periods of time. A total of 140 area A employees were investigated. Of these, complete data was available on 124. The remaining 16 could not be available for pure tone audiometry because they had changed their working place and could not be traced. These were not considered in the data analysis. Among those who had the investigation completed, 61 (49.2%) were found to have normal hearing. Sixty three (50.8%) were found to have audiogram patterns typical of noise induced hearing loss. Among the employees with noise induced hearing loss 35 (28.2%) had temporary threshold shift at 4000Hz. Their ages ranged from 19 to 68 years, had been exposed to the noise hazard for periods ranging from 1 to 31 years. The dip at 4000Hz ranged from 40 to 70 dB HL. The majority of those affected (80%) were engaged in metal fabrication activities while the rest (20%) were carpenters. There were 28 (22.5%) employees whose pure tone audiogram patterns were typical of permanent threshold shift. These were aged between 17 and 58 years, had been engaged on their respective jobs for 1 to 31 years, their hearing loss at 8000 Hz ranged from 50 to 80 dB HL of these 82% were involved in metal fabrication while the remaining 18% were carpenters. In area B employees, Fifty two employees were investigated. Among these, 43 (82%) completed the study and the remaining nine (18%) could not be available for audiometry because they had changed employers or had their services terminated. Among those who completed the study, 20 (46.5%) had noise induced hearing loss. The affected employees were aged from 28 to 60 years and had been exposed to the industrial noise for periods ranging from 8 to 29 years. Regarding those with noise induced hearing loss, 12 (27.9%) had audiograms with dips at 4000Hz ranging from 40 to 55dB HL consistent with temporary threshold shift. In this category of employees, seven (58%) were machine operators, two were technicians and the remaining were supervisors, feeders and line setters respectively. Permanent threshold shift was recorded in eight (18.6%) of the employees with noise induced hearing loss. In this category, three were machine operators, two filter turners, 21 were

engaged in printing and one was a line setter. Their ages ranged from 31 to 55 years and had been exposed to the noise hazard for periods ranging from 11 to 26 years. The hearing loss in this group was up to 70 dB HL at 8000 Hz at the time the examination was done.

DISCUSSION

Ideally, the noise in industries should be controlled within the safe limit of 85dBA and lower. In developing countries where the machines used are old and the economic situation is not permissive, replacement of the machines may not be possible. Therefore the most reasonable approach is to educate the workers on the need to protect themselves against noise in their respective work places.

CONCLUSION

The noise level in area A and area B factory is above the safe limit of 85dBA and therefore hazardous to those exposed. In both industrial setting the noise had caused irreversible damage to 22.5% and 18.6% of area A and area B work force respectively. There is therefore need to educate those exposed on how best to protect themselves from the noise hazard. We recommend that before employees are engaged into factories they should have ear examination and audiometry done as part of the medical examination. Education on the hazardous effects of noise and how to protect oneself should be given to all employees in noisy factories.

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