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Awareness on Hazardous Noise, Importance of Ear Protective Devices and Safety among Carpenters in Kerala

Febha Mary Chacko, Anjana Santhosh, Shikha Merin Philip, Dr. Sathish Kumaraswamy

Abstract
Noise is unwanted sound. Noise is classified either as occupational noise, environmental noise, community noise, residential noise or domestic level noise. Millions of employees with occupational hearing loss are working in noise exposed areas. The level of sound that enters the ear can be decreased by wearing ear protective devices. The current study examined the awareness of hazardous noise, importance of ear protective devices and safety among carpenters in Kerala. In order to thoroughly assess the awareness of hazardous noise, importance of ear protective devices and safety, the study used questionnaires consist of 15 closed set questionnaires administered on Carpenters. According to the statistical analysis, Carpenters are not well-informed on safety, the need for ear protective devices, and harmful noise. Carpenters require training on safety, ear protective devices, and hazardous noise in order to do their jobs effectively.

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I. Introduction

Noise is unwanted sound that is regarded loud, unpleasant, or disruptive to hearing. Loud music, transportation (traffic, rail, planes, etc.), lawn-care equipment, construction, electrical generators, wind turbines, explosions, and humans are a few of the main causes of noise in residential neighbourhoods.

Noise pollution is any disruptive sound that has an impact on the health and wellbeing of people and other living things. Noise pollution has an effect on millions of people every day. It most frequently results in noise-induced hearing loss (NIHL). Stress, high blood pressure, heart disease, and sleep difficulties can all be brought on by exposure to loud noise.

Noise pollution does not apply to all sound. Noise pollution is defined by the World Health Organization (WHO) as noise above 65 decibels (dB). To be accurate, noise becomes unpleasant over 120 decibels (dB) and damaging above 75 dB as a result, it is advised that noise levels be kept below 65 dB during the day and that comfortable sleep is difficult when ambient noise levels are above 30 dB at night.

Noise is classified either as occupational noise, environmental noise, community noise, residential noise or domestic level noise. An employee's auditory system is exposed to a certain level of acoustic energy while they are working, and this is known as occupational noise. Industrial noise, often known as occupational noise, is a word frequently used in occupational safety and health since prolonged exposure can result in chronic hearing loss. Workplace noise is regarded as an occupational hazard and is typically associated with noisy occupations including shipbuilding, mining, railroad work, welding, and construction, although it can occur in any setting where hazardous noise is present.

Noise exposure in the workplace is regulated by Occupational Safety and Health Administration (OSHA). These restrictions are based on the time-weighted average of a worker's performance over an 8-hour shift. OSHA's permissible exposure limit (PEL) for noise is 90 dBA for all workers during an 8-hour shift. Repeated loud noise exposure can cause hearing loss and/or permanent tinnitus. Loud noise can cause physical and mental stress, decrease productivity, obstruct communication and focus, and even contribute to workplace accidents and injuries by making it impossible to hear warning signals.

An ear protective devices worn in or over the ears while exposed to potentially harmful noise is known as a hearing protection device (HPD), and it provides hearing protection to assist prevent hearing loss due to noise. HPDs lower the amount of noise that enters the ear. Tinnitus and hyperacusis are two additional symptoms of noise exposure that HPDs help guard against. In addition to earmuffs, earplugs, electronic hearing protection devices, and semi-insert devices, there are other forms of HPDs that can be used.

The level of sound that enters the ear can be decreased by wearing ear protective devices. When

entering or working in an area where operations produce noise levels greater than 85dBA as an 8-hour time-weighted average and/or 120dB peak sound pressures level or greater, all employees should wear ear protection devices.

HPDs use a combination of electronic and structural elements to minimise the amount of sound that reaches the eardrum. Both custom earplugs and earmuffs are options for electronic HPDs. Active noise reduction, often known as noise-cancelling, is a function of electronic microphones, circuits, and receivers in which a signal 180 degrees out of phase with the noise is presented, theoretically cancelling the noise.

Some electronic HPDs, often referred to as Hearing Enhancement Protection Systems, protect the ears from high-level sounds while still enabling the transmission of other sounds, such as speech. Others have the capacity to magnify weak noises. Users that need access to low-level sounds but are in noisy situations may find this category useful.

Ear muffs and Ear plugs are the two types of EPD's are mainly used in industries to reduce the level of sound entering the ear. Approximate values for attenuation wearers of both plugs and muffs are between 40 to 60 dB depending on the frequency bands.

Millions of employees with occupational hearing loss are working in noise exposed areas. Sensorineural hearing loss is a common problem, which is realized hardly among the noise exposed workers. It is a gradual onset of hearing loss, primarily involving the high frequencies by excluding the speech frequencies and experiences frequent hearing difficulty at work place, may explain this low rate of awareness.

Worker's awareness on hazardous noise, importance of ear protective devices and safety measures is questionable. Because the hazardous noise is not a new problem in the workplace, so the workers are enriched with the attitudes and habits towards this. Even the methods of influencing attitudes towards noise hazards and prevention of hearing loss as results are poor.

Hence, there is a need to find out the awareness on hazardous noise, importance on ear protective devices and safety among the Carpenter's workers so as to create awareness among them and hence to prevent hazardous effect of noise exposure.

One of the oldest and most popular construction trades is Carpentry. Wooden fixtures and fittings are installed by Carpenters. Working on a construction site may be quite noisy. Regular exposure to 85 dBA for eight hours can harm the hearing. Hearing damage may result from using a jackhammer for 1 hour each day. The rate of hearing loss increases with noise level.

Carpenters and other construction workers are exposed to noises loud enough to cause permanent noise- induced hearing loss. Due to their difficulty communicating with others, workers who have had hearing loss frequently experience social isolation. Hearing loss that is permanent and irreversible can result from prolonged exposure to loud noises that harm inner ear nerves.

The current study examined the awareness of hazardous noise, importance of ear protective devices and safety among Carpenters in Kerala.

Axelsson (1978) suggested that they are not aware of the noise intensity level above the injury risk level present in the environment they worked.

Arezes (2002) investigated the hearing protector's acceptability in noisy environment results suggested that there are significant differences between catalogued and effective attenuation.

Arezes (2005) investigated the role of risk perception in hearing protection use in industry results do suggest that risk perception should be considered as an essential issue in the design and implementation of any Hearing Conservation Program.

Omokhodion (2007) did a study on hearing imapirement among mill workers and found that there was no association between age and hearin impairement but prevalence of hearing impairment was highest among those who had been engaged in the trade for more than 20 years.

Ologe (2008) reported the deterioration of noise-induced hearing loss among bottling factory workers and found that there was a high prevalence of mild sensorineural hearing loss and significant hearing deterioration among workers.

Nandi (2008) suggested that awareness should be created among workers about the harmful effects of noise on hearing and other body systems by implementing education and training programs.

Sen (2010) conducted a comparison of the noise dose on workers in a small scale industry in West Bengal, India. And suggested that the Noise Induced Hearing Loss is a highly environmental pollution which causes the leading occupational disease and for the development of age related hearing loss, it creates a major contribution.

Ramziya (2019) knowledge, attitude, and practice of printing press workers towards noise- induced hearing loss and concluded that the awareness of people working in such a setup is generally less towards the hazards that is caused by noise exposure.

Maqbool (2022) did a study on profile of hyperacusis and tinnitus among traffic police exposed to noise and concluded that four of the participants had mild level of Hyperacusis and one had moderate Hyperacusis and another participant with severe level Hyperacusis

Pawan (2022) conducted a study on prevalence of hearing impairment in employees working in ratlam railway junction and concludes that noise has marked effects on the workers of the railway with an impact on their personal life. Qwing to the prolonged exposure to the loud noise the railway workers, face problems in their professional and personal life.

Basu (2022) did a study on occupational noise induced hearing loss in india and concluded that NIHL is a major neglected public health occupational health challenge in India linked with adverse social determinants of health. Sustained advocacy for implementation of legislative and behavior change communication for protecting the hearing of workers is warranted.

Rahul (2022) did a crosssectional study on prevalence of noise induced hearing loss in bus drivers and concluded that bus drivers (test group) who were exposed to louder noise had more sensorineural hearing loss than the office workers (control group).

Method

Aim : The aim of the study was to analyse the awareness of hazardous noise, importance of ear protective devices and safety among Carpenters in Kerala.

The study was carried out in two phases.

Phase 1 : Developing questionnaire

In order to determine the level of awareness of the hazardous noise, importance of ear protentive devices and safety of 15 closed-set (yes/no) questions were created. All of these questions were validated by speech-language pathologists with more than three years of experience in the area. The correction and suggestion advised by SLP's were incorporate and final questionnaire was ready to administer.

The final questionnaire is as follows.

1. Do you know the hazardous effects of noise on hearing? (yes/no)
2. Do you know the signs and symptoms of hearing loss? (yes/no)
3. Do you know that continuous exposure of noise can lead to reduction in hearing? (yes/no)
4. Do you know the possible remedies of hearing related problems? (yes/no)
5. Do you know excessive noise exposure more than 8 hours may lead to problem in ear? (yes/no)
6. Do the workers have flexible time schedules to limit the excessive noise exposure? (yes/no)
7. Do you know an auditory has to educate regarding the hearing protection fron hazardous noise in the workplace? (yes/no)
8. Do you know about Ear Protective Devices? (yes/no)
9. Are the workers wearing hearing protection, tested and ensured good fit? (yes/no)
10. Do your workpeople provide EPD's? (yes/no)
11. Do you use EPD's in workplace? (yes/no)
12. Does your working place provide training on selection, proper use and care of your EPD's? (yes/no)
13. Does the industrial audiologist visit your work site and perform the audiological test procedure often? (yes/no)
14. Are you aware of the rights and the legislative requirements regarding hearing protection at work? (yes/no)
15. Did the checklist help you in providing any information regarding hearing associative problems and rehabilitation? Yes/no)

Phase 11: Participants

Twenty Carpenters of various age groups participated in the present study.

Subjects with hearing loss and other otological issues were excluded from the study.

Stimulus used: A closed- ended (yes/no) questionnaire which developed and validated was used.

Procedure: The participants were supposed to read and comprehend the questions and correctly respond either with Yes or No.

Analysis: The responses elicited from the participants were further examined and graded as "1" for "Yes" and "0" for "No". Statistical analysis was carried out to for frequency and percentage.

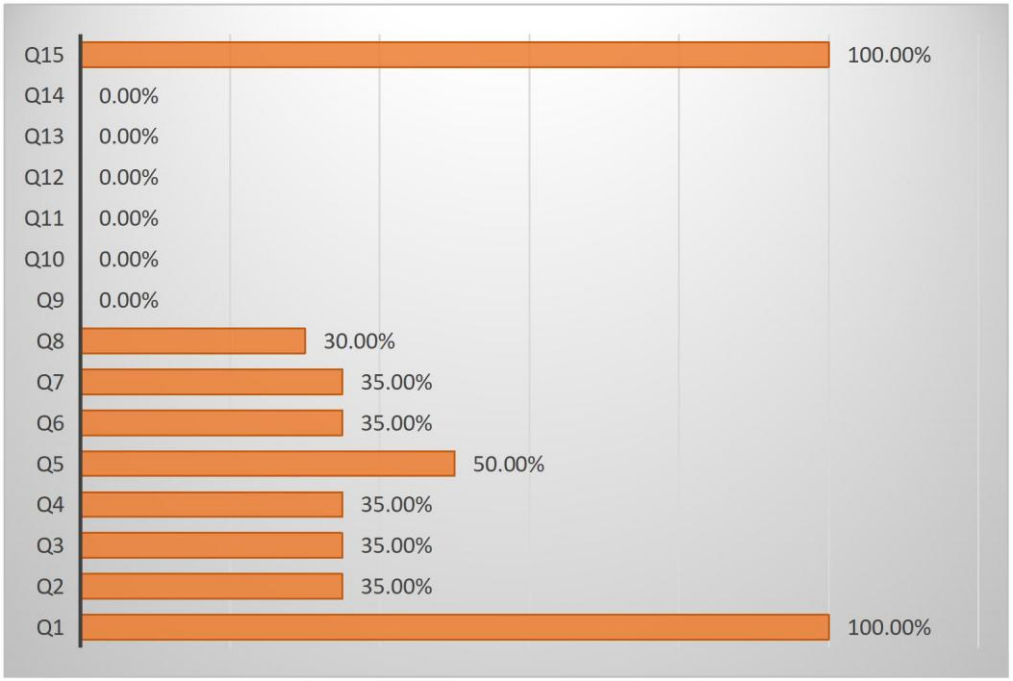
Result and Discussions

The aim of the present study was to to analyse the awareness of hazardous noise, importance of ear protective devices and safety among Carpenters in Kerala. The obtained results are discussed below.

Table 1:
Showing the response of the Carpenters regarding the awareness of hazardous noise, importance of ear protective devices and safety.

	No		Yes	
	Count	Row N %	Count	Row N %
Q1	0	0.0%	20	100.0%
Q2	13	65.0%	7	35.0%
Q3	13	65.0%	7	35.0%
Q4	13	65.0%	7	35.0%
Q5	10	50.0%	10	50.0%
Q6	13	65.0%	7	35.0%
Q7	13	65.0%	7	35.0%
Q8	14	70.0%	6	30.0%
Q9	20	100.0%	0	0.0%
Q10	20	100.0%	0	0.0%
Q11	20	100.0%	0	0.0%
Q12	20	100.0%	0	0.0%
Q13	20	100.0%	0	0.0%
Q14	20	100.0%	0	0.0%
Q15	0	0.0%	20	100.0%

Figure I:
Showing the response of Carpenters for questionnaire.



From the table 1 and figure 1 it can be seen that Carpenters have poor awareness on hazardous noise, importance of ear protective devices and safety.

According to the percentage data for awareness of hazardous noise, importance of ear protective devices and safety among Carpenters in Kerala, there were three questions with scores above 50% (50-100) and twelve questions with scores below 50% (35-0).

Table 2:

Shows the standard deviation of awareness of hazardous noise, importance of ear protective devices and safety among Carpenters in Kerala.

	N	Minimum	Maximum	Mean	Std. Deviation
Over all Awareness on Hazardous Noise	20	2	9	4.55	3.268

Table 3:

shows the overall knowledge of Carpenters about the awareness of hazardous noise, importance of ear protective devices and safety.

Overall Awareness on Hazardous Noise		
	Frequency	Percent
0 - 7(poor)	13	65.0
8 - 15(Good)	7	35.0
Total	20	100.0

II. Discussion

The current study's objective was to assess Kerala Carpenters' awareness of hazardous noise, importance of ear protective devices and safety. According to the percentage, 65% of individuals have poor awareness while 35% have good awareness. 20% of carpenters are aware of hazardous noise, importance of ear protective devices and safety. The results show that Carpenters are not well-informed on safety, the need for ear protective devices, and harmful noise. Carpenters require training on safety, ear protective devices, and hazardous noise in order to do their jobs effectively.

III. Conclusion

The purpose of our study was to raise awareness of hazardous noise, importance of ear protective devices, and safety issues among Kerala Carpenters. The majority of Kerala Carpenters are not aware of these difficulties. According to the widely accessible information, more training is necessary for Carpenters in order to maintain their profession.

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