

Knowledge, Attitude and Practice of People Working in Construction Sites Towards Noise Induced Hearing Loss

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ABSTRACT

Construction activities generate high levels of noise due to the equipment and machinery used and thus construction workers are exposed to exceedingly high levels of noise. The study aimed to assess the Knowledge, Attitude and Practice (KAP) among the people working in the construction industry towards Noise Induced Hearing Loss. The survey was conducted in 8 different construction sites in Delhi among 46 laborers and 52 civil engineers. The questionnaire consisted of a total of 42 questions comprising of 3 sections, with 12 questions examining Knowledge, 20 questions assessing Attitude and 10 questions examining practice. The results revealed that the knowledge was limited among people working in the construction field, and the engineers with higher education levels had better Knowledge, Attitude and practice towards noise induced hearing loss, when compared to laborers.

Key Words: Knowledge, Attitude and Practice (KAP), Noise Induced Hearing Loss (NIHL), Construction workers, Laborers, Engineers.

INTRODUCTION

Noise is defined as an unwanted sound. Excessive noise exposure at the work place can have several Auditory and non-auditory effects. Auditory effects include noise induced hearing loss, tinnitus, and hyperacusis. Non auditory effects of noise can include sleep disturbances, irritability,

stress and poor concentration, difficulties in speech comprehension, annoyance and cognitive impairments. It can also cause increased blood pressure, heart disease, and increased accident rate in the work place. [1-3] Similar to the OSHA Guidelines [4], the Indian Ministry of Forest and Environments recommends a maximum allowable noise exposure level of 90 dBA for 8 hours with a 5 dB exchange rate. [5]

Occupational noise has been studied in a wide variety of industries. Construction activities use heavy equipment like bulldozers and excavators, generating high levels of noise. And thus, construction workers are exposed to exceedingly high levels of noise. [6-10] The intensity and characteristics of noise at the site depends on the type of construction activity, the equipment and machinery employed, as well as their maintenance, location, and the mode of operation. [11] The level of noise in the construction site for the 8-hour TWA is found to be 97 dBA and can range between 80-120 dBA [12,13] which is much higher than the recommended maximum permissible levels.

The impact of noise on hearing depends on the duration, level of noise, and the characteristics of noise. For example, Impulse noise frequently encountered in construction can have a larger impact when

compared with continuous noise.^[14] Based on the pure tone findings, the majority of construction workers (74%) are found to have a hearing loss. ^[15,16] Older adults are particularly more susceptible to noise from construction noise.^[17]

Considering the effects of noise, it is important to take measures to control the noise. This may involve administrative or engineering modifications, which can be expensive and their effects may be questionable.^[18] On the other hand, changing workers' attitudes, and behavior as opposed to implementing new technologies, has been shown to have a major influence.^[19,20]

Unlike the large number of studies on the effects of noise in industrial workers, relatively fewer studies have examined the effect among construction workers, and none has been done in India. Considering the increasing urbanization and rapidly increasing number of construction activities in the city, it is important to understand the Knowledge, attitude and practice of the of the people working in the construction industry, as this in turn will have a direct impact on their health and well-being. Thus, the current study is aimed to understand the knowledge, attitude and practice of the people working in construction industry towards noise induced hearing loss.

MATERIALS AND METHODS

In order to assess the Knowledge, Attitude and Practice among the people working in the Construction industry, the current study adapted the KAP questionnaire developed for use among saw mill workers. ^[21] The questions were modified to the needs of the current study population, i.e., people working in the construction industry and to the Indian context. The adapted questionnaire was validated for content by 5 audiologists with over six years of experience. The pilot study was conducted so that the aspects of the study design and the questionnaire can be improved. For the pilot study, 10 participants were surveyed and the necessary modifications were

incorporated in the questionnaire. The final questionnaire consisted of demographic data and 42 questions comprising of 3 sections, with 12 questions examining Knowledge, 20 questions examining Attitude and 10 questions examining Practice.

Demographic data consisted of age of the participant, gender, occupation, and the years of experience. In the knowledge section, the questions assessed how aware those in the construction industry were regarding the risks associated with noise-induced hearing loss. On the other hand, the questions in the Attitude section evaluated workers' perspectives on the noise hazards at work that can result in noise-induced hearing loss, and the practice section evaluated the ability of the workers to put their knowledge of noise-induced hearing loss into practice.

The current study surveyed two groups of subjects. The first category included the engineers who typically work on construction projects for long periods. Both skilled and manual laborers were included in the second category. The skilled laborers are those with specialized knowledge and skills, such as plumbers and carpenters. The unskilled laborers, on the other hand, didn't have any specific training in construction and carried out a variety of jobs, including tile and pipe laying, scaffolding, dumping cement and also operated different equipment and machinery in different stages of construction of a building including dump trucks, mixers, excavators, bulldozers, and cab and non-cab machines. Construction sites in different locations in Delhi were identified. The survey was conducted in 8 different construction sites in Delhi. The buildings were in different phases of construction. Delhi was chosen considering the significant number of housing and industrial construction activities in the city. The participants were chosen at random for the survey. The survey was conducted among 46 laborers and 52 engineers. Exclusion criteria included those with psychiatric disorders. The engineers completed the self-administered

questionnaire. On the other hand, the laborers were interviewed by the primary researcher and the questionnaire was completed. Data collection took place over 3 weeks. A written informed consent was obtained from the participants before the commencement of the survey.

The respondents had the option to choose either “Yes” or “No” or “I don’t know” to the questions in knowledge section in the survey. Each correct score in the knowledge section was assigned a score of one. The participants rated the attitude and practice questions on a 4-point Likert scale: strongly disagree, disagree, agree, strongly agree and never, rarely, often, always respectively. The results of the two groups were compared on independent sample T-test and chi-square test. The Likert scores were converted into percentages and the overall scores for the KAP were calculated for each of the two groups.

RESULTS

A total of 98 participants took part in the survey. The age of the participants ranged from 21 years to 54 years with 60% in the

age range of 23-29 years. 90% of the participants were males, given the nature of the profession. There were 46 laborers and 52 Civil engineers. The years of experience of the participants ranged from 4-26 years.

Knowledge

The results from the Knowledge subsection of the questionnaire (Table 1) revealed that both groups were aware that noise is a common problem (Q 1.1) and noise can cause hearing loss among people working in the construction industry (Q 1.2). The Engineers believed that Noise induced hearing loss could be treated with medications (Q 1.8), on the other hand, laborers believed that the hearing would return to normal following a period of no exposure (Q 1.9). Unfortunately, the laborers were not aware of the laws in India that protects workers (Q 1.10) and were not aware that it is the responsibility of the employer to provide ear plugs (Q 1.11) and employees to wear earplugs (Q 1.12). Knowledge scores significantly differed across two groups ($P < 0.05$).

Table 1. Responses of the participants in the areas of Knowledge

QNo.	Questions on Knowledge	% Of correct response	
		Engineer No. (%)	LabourerNo. (%)
1.1	Deafness due to noise is a common problem among people working in construction industry as compared to office workers	44(84.6)	40(86.9)
1.2	Loud noise from machines used for construction can cause hearing loss.	48(92.3)	36(78.2)
1.3	"Hearing deteriorates when people working in construction industry are exposed to hazardous noise."	52(100)	38(82.6)
1.4	Deafness can occur even if a people working in construction industry are exposed to intermittent noise for a long period.	46(88.4)	34(73.9)
1.5	Hobbies like listening to loud music can cause deafness	42(80.7)	34(73.9)
1.6	If people are exposed to noise, men are at a higher risk than women.	36(69.2)	28(60.8)
1.7	Pus discharge from the ear is an early sign of deafness due to exposure to loud noise.	16(30.7)	22(47.8)
1.8	Deafness due to noise can be treated by taking medicines.	22(39.2)	36(78.2)
1.9	Deafness due to noise will recover to normal if a person is no longer exposed to excessive noise.	24(46.1)	14(30.43)
1.10	There is law in India that protects workers who are exposed to noise in the work place.	42(80.7)	16(34.7)
1.11	It is the responsibility of the employer to provide ear plugs.	44(84.6)	22(47.8)
1.12	It is the responsibility of the employees to wear ear plugs while working.	46(88.4)	30(65.2)
	Mean Knowledge score%	73.74%	63.37%

Attitude

The attitude of the laborers was markedly poorer from that of the engineers ($P < 0.05$). The engineers were concerned about their hearing (Q 2.2), and they firmly agreed that wearing earplugs (Q 2.11), getting periodic

hearing checks (Q 2.14), and alerting their employer if the machines become noisier were all necessary (Q 2.15). The majority of laborers strongly agreed that they did not care about hearing loss (Q 2.2) or hearing loss that was worsening (Q 2.6), and they

also strongly agreed that they would still develop hearing loss despite taking preventive measures (Q 2.1), but that the loss would only be temporary (Q 2.4). The great majority of laborers disliked wearing earplugs (Q 2.12), and reported it to be easier to close the ears with fingers rather

than ear plugs (Q 2.20). They disagreed on the necessity of routine hearing assessments (Q 2.14) and training for self-protection towards noise. They also disagreed on the importance of alerting employers when equipment becomes noisier (Q 2.16).

Table 2. Responses of the participants in the areas of Attitude

Q.No.	Questions on Attitude	% of agreement	
		Engineer No. (%)	Labourer No. (%)
2.1	People working in Construction industry will have deafness despite whatever preventive measure they use.	24(46.15)	38(82.6)
2.2	I am not bothered about the noise in the workplace.	16(30.7)	38(82.6)
2.3	Exposure to noise while working in the construction field would not make me deaf.	16(30.7)	20(43.4)
2.4	I am not worried if I cannot hear properly after working in noisy places because it is only temporary.	12(23.07)	34(73.9)
2.5	Excessive exposure to noise can cause permanent deafness.	46(88.4)	44(95.6)
2.6	I am not worried if my hearing starts to deteriorate.	12(23.07)	30(65.2)
2.7	I will seek traditional medicine if I have deafness in the early stage.	26(50)	28(60.8)
2.8	I do not have to get early treatment if I suspect in the early stage because it is self-limiting.	26(50)	24(52.17)
2.9	"I do not have to inform my employer if I have hearing loss."	14(26.9)	24(52.17)
2.10	Preventive measures towards deafness due to noise in the construction area is important.	50(96.1)	28(60.8)
2.11	We should use the ear plug to avoid becoming deaf due to noise.	46(88.4)	32(69.5)
2.12	I like to use ear plugs.	44(84.6)	14(30.4)
2.13	People working in the constructions site must accept whatever type of ear plugs are given to them.	26(50)	20(43.4)
2.14	Periodic audiometry assessment can detect deafness due to noise in the workplace.	46(88.4)	16(34.7)
2.15	We should inform the employers if the machines are noisier than before.	48(92.3)	30(65.2)
2.16	Training and health education for people working in construction industry regarding methods on self-protection towards noise should be done from time to time.	46(88.4)	18(39.1)
2.17	Discussion with the employer regarding noise in the workplace will not reduce the occurrence of deafness due to noise.	30(57.6)	24(52.1)
2.18	Only employers need to know in detail about the occupational safety and health act.	14(26.9)	14(30.4)
2.19	Noise in the workplace is a usual thing for me.	30(57.6)	36(78.2)
2.20	It is easier to close the ear using the finger/hand rather than wearing an ear plug.	16(30.76)	30(65.2)
	Mean Attitude Score%	56.5%	58.87%

Practice

In the Practice section though neither group consistently wore earplugs (Q 3.3), the Engineers stated that they tried to minimize noise as much as possible (Q 3.4). Both groups reported to have rarely been examined by doctor to detect deafness (Q

3.2), and to have undergone auditory assessment (Q 3.7).

On the other hand, the Laborers had never attended seminars on deafness due to noise (Q 3.9) and the employer rarely for them to have organized training on health and safety or medical examination (Q 3.8).

Table 3. Responses of the participants in the areas of Practice

Q.No.	Questions	Frequency of practice	
		Engineer No. (%)	Labourer No. (%)
3.1	I use ear plugs to protect my ears	32(61.5)	10(21.7)
3.2	I undergo ear examination by a doctor to detect deafness due to noise.	28(53.8)	14(30.4)
3.3	I always use ear plugs while working.	20(38.4)	6(13.04)
3.4	I try to avoid noise as much as possible when I am working.	42(80.7)	20(43.4)
3.5	When ear plugs are not available, I use whatever is available (e.g., cotton to protect my ears from noise).	26(50)	16(34.7)
3.6	I discuss with my employer if the ear plugs are broken.	38(73.07)	14(30.4)
3.7	Have you ever undergone an audiometry assessment?	22(42.3)	16(34.7)
3.8	Has the employer arranged for their employees to undergo medical examination from time to time?	32(61.5)	12(26.0)
3.9	Have you attended any seminar or course on deafness due to noise?	16(30.7)	6(13.0)
3.10	Has your company conducted training on health and safety?	32(61.5)	8(17.3)
	Mean Practice Score%	55.35%	26.46%

DISCUSSION

The construction sector is one among the industries to have the highest noise induced hearing loss.^[19] Hence occupational hearing safety is very crucial as most of the workers who are exposed to loud noise are at high risk for early onset hearing loss.

The current study revealed that the engineers in the construction field had fair knowledge about noise induced hearing loss, a more positive attitude and better practice towards hearing conservation when compared to laborers. Thus, higher level of education was associated with greater knowledge, better attitude and practice.^[22]

The engineers reported using the earplugs inconsistently despite being concerned about their hearing. The laborers, on the other hand, were less concerned about the effects of noise on hearing and believed that they would still develop hearing loss regardless of the precautions they took, hence they seldom or infrequently used HPDs. Similar to the findings of earlier study,^[23] poor knowledge among low socio-economic groups was associated with inconsistent use of personal protective devices. The findings are in line with that of past studies.^[22,24,25] The causes cited include a lack of concern for hearing and the discomfort of HPDs. Additionally, they placed less importance on hearing but were more concerned about the major accidents and thus wore helmets and eye glasses.^[9]

Similar to the past studies the participants from both groups believed that pus discharge is a sign of NIHL,^[21, 24] and also engineers believed that hearing loss due to deafness can be treated with medication. On the other hand, pus discharge may indicate infection of the ear and deafness due to noise cannot be treated with medication.

Unfortunately, the vast majority of laborers reported to have never attended seminars on deafness and their employer to have rarely conducted medical examination, and training for health and safety. The results are similar to those of previous studies.^[21]

The laborers in the current study, reported to be not bothered by noise and believed that they will have hearing loss regardless of the preventive measures taken. They also did not understand the importance of periodic audiometric assessments, and training for self-protection. These indicate poor practice towards prevention among laborers. Though both the groups need to be educated on the effects of noise, the laborers must be provided with more intensive sessions, to bring in a change in attitude and thus a change in practice.

In order to control the noise at the construction sites, the employers should undertake engineering and administrative controls. But more importantly, modifying the attitudes and practice of the construction workers can result in changes in the action among the workers.^[26] The less educated and more vulnerable laborers must be targeted and must be provided with specific information regarding hearing conservation by conducting awareness camps and providing opportunities to learn about the advantages of using HPDs. Seminars should be held to educate the workers about the deafness caused due to noise, the noise and duration levels that can cause hearing loss and how to protect themselves. Periodic audiological evaluation should be provided so that employees' hearing health and job satisfaction can be improved.

It is the legal and moral responsibility of the construction companies to control the noise at the construction site and create hearing health awareness among the employees and thus protect the employees. This in turn can help enhance the performance among the employees and reduce accidents. Considering the rapid urbanization and the large number of constructions being undertaken in the city, it is important that the employees are protected and are aware of the impact of noise. Similar to industrial noise guidelines, specific guidelines need to be developed for the construction sites.

CONCLUSION

Given the limited knowledge, and poor attitude and practice among people working in the construction industry, particularly laborers, it is crucial to conduct periodic training and education programs to create more awareness, and thus change their attitude and practice. The employer must also provide HPDs and conduct periodic hearing assessments, for the benefit of the employees.

Conflict of Interest: None

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