

Research Article



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FREQUENCY OF HEARING IMPAIRMENT IN WORKERS AT RAILWAY INTERSECTIONS AN OBSERVATIONAL STUDY

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ABSTRACT

Background: While a number of variables contribute to noise pollution, one of its main origins and causes is train noise. The people who live close to and work at railway stations are the ones who are most affected by railway noise because they are subjected to loud noises from locomotive engines in the diesel shed, rail yards, whistles, horns, and shunting activities.

Aim: The current study aims to evaluate the impact of noise on railway workers in relation to the rise in hearing loss rates and the decline in their productivity. The study also evaluated the impact of noise on routine everyday activities.

Method: A purposeful sampling strategy was used to identify 100 respondents who were employed at the railway junction for the current investigation. The current study used a premade structure proforma to measure the study respondents' fundamental knowledge regarding their well-being and productivity during working hours. The study was questionnaire-based. The responses to the questions were given in the yes/no manner on a scale of 0 to 5, with 0 representing not at all and 5 representing very lot.

Results: 65% (n=65) of research participants reported feeling any form of annoyance or mental stress during working hours as a result of noise. 60% (n=60) of study participants reported feeling strain over conversations involving two or more persons. Of the research participants, 12% (n=12) reported having frequent headaches, and 20% (n=20) reported having positive anxiety related to noise, whereas 80% (n=80) reported negative anxiety related to noise. Of the 35 research participants, only 35 (or 35%) were aware of any type of hearing aid. Of the interviewees, 32% (n=32) acknowledged that noise was interfering with their personal lives.

Conclusion: The current study comes to the conclusion that railway personnel are significantly impacted by noise, which also affects their personal lives. Railway personnel experience issues in both their personal and professional lives as a result of their extended exposure to loud noises.

Keywords: Hearing aid, hearing impairment, NIHL (noise-induced hearing loss), noise pollution, railway workers

INTRODUCTION

The world's noise levels have risen dramatically in recent years due to the world's rapid expansion, lack of quiet, and gradual advancement towards a noise-filled dead end. An unpleasant or loud sound that causes disruptions is referred to as noise. Noise throws life's balance and activities out of balance. One While there are many other variables that contribute to noise pollution, one of the main sources and causes is train noise. The people who live close to and work at railway stations are the ones who are most affected by railway noise because they are subjected to loud noises from locomotive engines in the diesel shed, rail yards, whistles, horns, and shunting activities.²

Prolonged noise exposure can have a number of negative impacts, some of which are brief and others of which are permanent, such as irritability and impaired attention. Hearing impairment is a clinical disorder that can affect one or both ears and is characterised by a complete or partial loss of hearing. Long-term exposure to loud noises can lead to a disease known as noise-induced hearing loss, or NIHL.³ Clinical signs of this might include restricted frequency range perception, ringing in the ears, and reduced cognitive sound perception. Occupational hearing loss is the term used to describe hearing loss linked to extended exposure to hazards such as noise at work.⁴

Hearing aids, which are battery-operated devices that produce loud sounds and are worn in or around the ear, are often used to correct hearing deficiencies. There are several varieties, sizes, and forms of these devices that are sold commercially. The four primary components of all hearing aids work in the same way: a speaker that projects sound into the ear, digital and analogue circuits, an amplifier that boosts sound, a microphone that captures sound, and an earphone or receiver that receives signals and transforms them into sounds.⁵ Analog/conventional hearing aid technology is the most affordable option; it is based on audiograms; analogue programmable technology, which is more costly but has a microchip and a longer lifespan; and digital programmable using digital sound signals has better fit and sound reduction.⁶

With regard to occupational health in India, it is observed that a variety of sectors have very high sound pressure levels, and many of these industries are very susceptible to noise-induced hearing loss (NIHL). Under the terms of the Employees State Insurance Act of 1948 and the Workmen's Compensation Act of 1923, NIHL has been recognised as a compensable illness in India since 1948. Nonetheless, there is a dearth of knowledge on non-industrial haemorrhage (NIHL) in India, where the first documented incidence of 250 people receiving compensation for NIHL occurred in 1996. The study sought to evaluate the adverse effects of noise pollution on railway junction workers, as noise-induced hearing loss (NIHL) is often observed in railway staff.⁷

The goal of this study was to evaluate how noise affects railway workers' ability to perform efficiently and their rate of hearing loss development. The study also evaluated the impact of noise on routine everyday activities.

MATERIALS AND METHODS

The current retrospective study was carried out to evaluate the impact of noise on railway workers in relation to the increasing rate of hearing loss and the decline in their productivity. The study also evaluated the impact of noise on routine everyday activities. After receiving the required approval from the relevant committee, the research was conducted at the railway junction. The individuals employed at the train station made up the study population. Following a thorough explanation of the study's methodology, each participant provided their informed permission.

One hundred employees at the railway junction were chosen for this study using a purposeful sampling technique. Study participants had to meet three requirements in order to be included: they had to be working-age individuals, employees at Railway Junction, and regularly exposed to loud noises. people using ototoxic medicines, mentally unstable people, patients with congenital problems, and those experiencing active ear discharge were all excluded from the research.

Every one of the 100 research participants had a thorough medical history documented following their final inclusion in accordance with the inclusion and exclusion criteria. In order to gather fundamental information regarding the study subjects' well-being and productivity during working hours, a premade structure proforma was used in this questionnaire-based investigation. On a scale of 0 to 5, the answers to the questions were either yes or no, with 0 representing not at all and 5 representing very lot.

An audiogram, an electronic instrument that produces pure tones with intensity adjustments in 5dB increments, was used to perform audiometry on each research participant. The assessment of hearing impairment at a certain frequency was used to determine the degree of intensity that deviates from normal. An audiogram was deemed to be the outcome of the graphed results. The audiogram's graph showed the lowest sound levels that people can tolerate at different frequencies. Audiograms determine the kind and extent of hearing loss by measuring the hearing threshold through air and bone conduction. For medicolegal purposes, the audiogram is necessary in order to prescribe hearing aids and aids in determining the degree of impairment. Due to audiometry's non-invasive nature, there was no danger associated with the study.

RESULT

The current retrospective study was carried out to evaluate the impact of noise on railway workers in relation to the increasing rate of hearing loss and the decline in their productivity. The study also evaluated the impact of noise on

routine everyday activities. One hundred employees at the railway junction were chosen for this study using a purposeful sampling technique.

The current study used a premade structure proforma to measure the study respondents' fundamental knowledge regarding their well-being and productivity during working hours. The study was questionnaire-based. When the stress levels were evaluated, it was discovered that 65% (n=65) of the research participants reported feeling any form of annoyance or mental tension as a result of noise during work hours. As indicated by Table 1, 60% (n = 60) of the subjects reported feeling strain during conversations with two or more people. 50% (n = 50) of the subjects reported feeling stress overhearing in noisy backgrounds. 36% (n = 36) of the subjects reported feeling buzzing or ringing in their ears. In contrast, 64% (n = 64) of the subjects reported not feeling any buzzing or ringing in their ears.

The responses to the study's questions were given in a yes-or-no style on a scale of 0 to 5, with 0 representing not at all and 5 representing very lot. When it came to feeling any form of annoyance or mental strain at work because of noise, 45%, 25%, 13%, 8%, 7%, and 2% of individuals reported having a score of 0, 1, 2, 3, 4, and 5. 40, 37, 13, 6, 3, and 1 participant, respectively, rated 0, 1, 2, 3, 4, and 5 for stress overhearing in the loud background. 50, 18, 14, 13, 5, and 0 subjects, respectively, assigned scores of 0, 1, 2, 3, 4, and 5 for stress overhearing in the loud background, and As shown in Table 2, the subjects 64, 22, 6, 6, 2, and 0 had the same level of ringing/buzzing, with ratings of 0, 1, 2, 3, 4, and 5.

The remaining factors were evaluated on a yes-or-no scale using a questionnaire completed by the study participants. Of these, 20% (n=20) reported using earplugs of any kind, while 80% (n=80) reported not knowing about earplug use, 12% (n=12) reported frequent earaches, and 20% (n=20) reported positive anxiety due to noise, and 80% (n=80) reported negative anxiety. about the research participants, only 35 percent (n = 35) knew about any form of hearing aid, while 65 percent (n = 65) did not know about any kind of hearing aid at all.

Of the individuals, 32% (n = 32) acknowledged that noise was having an impact on their personal lives, whereas 68% (n = 68) said noise had no such effect. The study participants' ability to hear clear voice was also evaluated using the research questionnaire. As Table 3 illustrates, clear voice was heard from the right ear in 35% of the subjects (n = 35), from the left ear in 44% of the subjects (n = 44), and from both ears in 21% of the subjects (n = 21).

The goal of the current retrospective study was to evaluate the impact of noise on railway workers' ability to function efficiently and the rate at which hearing loss is increasing. The study also evaluated the impact of noise on ordinary daily living. The research had 100 participants who were employed at the railway junction and were chosen using a purposeful selection technique.

The current study used a premade structure proforma to measure the study respondents' fundamental knowledge regarding their well-being and productivity during working hours. The study was questionnaire-based. When the stress levels were evaluated, it was discovered that 65% (n=65) of the research participants reported feeling any form of annoyance or mental tension as a result of noise during work hours. Sixty-four percent of the subjects said they did not feel any buzzing or ringing sounds in their ears, while sixty percent of the subjects said they felt strain when two or more people were talking, fifty percent said they felt stress overhearing in a noisy background, and thirty-six percent said they felt a buzzing or ringing sound in their ears.

These results aligned with those of Basner M et al. (2014) and Mirza R et al. (2018), whose authors noted comparable levels of stress and strain in those exposed to loud noise at work, as did the participants in our study. The replies to the questions in the current study were either in the yes or no format, with grading scores ranging from 0 for not at all to 5 for very lot. When it came to experiencing any form of annoyance or mental strain at work because of noise, 45%, 25%, 13%, 8%, 7%, and 2% of the individuals, respectively, received ratings of 0, 1, 2, 3, 4, and 5.

In the loud backdrop, stress overhearing was rated as 0, 1, 2, 3, 4, and 5 by 40, 37, 13, 6, 3, and 1 subject, in that order. 50, 18, 14, 13, 5, and 0 subjects scored stress overhearing in the noisy background as 0, 1, 2, 3, 4, and 5, while 64, 22, 6, 6, 2, and 0 subjects scored the sensation of ringing or buzzing as 0, 1, 2, 3, 4, and 5. These findings were consistent with research conducted in 2017 by Wada T et al. and in 2015 by Pelegrin AC et al., both of whom reported similar levels of stress and strain to those seen in the current study.

Regarding the other factors evaluated on the study questionnaire, participants answered yes or no questions. Twenty percent of subjects (20) reported using earplugs of any kind, while eighty percent of subjects (eighty) reported not

knowing that they should be wearing them. Twelve percent of study participants (12) reported having frequent headaches, and twenty percent of subjects (20) reported feeling anxious around noise, while eighty percent of subjects (eighty) reported feeling anxious about noise. About the research participants, only 35 percent (n = 35) knew about any form of hearing aid, while 65 percent (n = 65) did not know about any kind of hearing aid at all. Of the individuals, 32% (n = 32) acknowledged that noise was having an impact on their personal lives, whereas 68% (n = 68) said noise had no such effect.

The research participants' ability to hear clear voices was also evaluated by the study questionnaire. Results showed that 35% (n=35) of the individuals could hear clear voices from their right ear, 44% (n=44) from their left ear, and 21% (n=21) from both ears, respectively. These results were consistent with those of studies conducted by Chadambuka A et al. (2012) and Kitcher ED et al. (2014), whose authors noted that participants in the current research who had been exposed to noise exhibited comparable awareness of hearing aids, headaches, anxiety, and the impact of noise on their daily lives.

CONCLUSION

Within the constraints of the study, the results indicate that railway personnel are significantly impacted by noise, which in turn affects their personal lives. Railway personnel experience issues in both their personal and professional lives as a result of their extended exposure to loud noises. A few drawbacks of the current study included biases related to geographic areas, a limited sample size, and a short monitoring time. Therefore, further long-term research with bigger sample sizes and longer observation periods will aid in coming to a conclusive result.

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TABLES

S. No	Questionnaire and response	Percentage (%)	Number (n=100)
1.	Feeling any kind of irritation/mental stress during working hours due to noise		
a)	Yes	55	55
b)	No	45	45
2.	Strain over the conversation when 2 or more people are talking		
a)	Yes	60	60
b)	No	40	40
3.	Stress overhearing in noisy background		
a)	Yes	50	50
b)	No	50	50
4.	Feel ringing/buzzing in the ear		
a)	Yes	36	36
b)	No	64	64

Table 1: Stress and strain in the study subjects

Questionnaire and response	Grades					
	0	1	2	3	4	5
Feeling any kind of irritation/mental stress during working hours due to noise	45	25	13	8	7	2
Strain over the conversation when 2 or more people are talking	40	37	13	6	3	1
Stress overhearing in noisy background	50	18	14	13	5	0
Feel ringing/buzzing in the ear	64	22	6	6	2	0

Table 2: Gradings of Stress and strain in the study subjects

S. No	Parameters	Percentage (%)	Number (n=100)
1.	Clear voice audibility		
a)	Right	35	35
b)	Left	44	44
c)	Both	21	21
2.	Earplug use		
a)	Yes	20	20
b)	No	80	80
3.	Frequent earaches		
a)	Yes	12	12
b)	No	88	88
4.	Anxiety due to noise		
a)	Yes	20	20
b)	No	80	80
5.	Awareness about hearing aid		
a)	Yes	35	35
b)	No	65	65
6.	Noise affecting personal life		
a)	Yes	32	32
b)	No	68	68

Table 3: Assessment of voice effects on the personal life of the study subjects