Awareness of Occupational Noise Hazard Among Industry Workers

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Abstract **- AIM: The study's objective was to examine how noise at work affected those who worked for an oil production firm.**

METHODOLOGY: The current investigation was conducted in two stages. A variety of scholarly sources were used to design the questionnaire. Experienced speech-language pathologists validated the developed questionnaire. When creating the questionnaire, the errors and comments were taken into consideration. With ages ranging from 25 to 56 and no prior history of hearing issues, the present study included 40 individuals from various businesses, including bakeries, cement, and oil production plants.

RESULTS: It can be seen that 87.5% were aware of danger due to exposure to noise, 95% are aware about if loud noise obstruct the sense of hearing, 82.5% belief that noise might cause psychological issues, 40% belief that atmospheric pressure results hearing loss, 80% are aware that long time of exposure to noise leads in changes in memory and personality, 47.5% belief that noise pollution leads to visual problem's,90% people find difficulty in understanding speech due to long time exposure , 50% have ringing sound in the ear due to noise.

CONCLUSION: According to a study, 77.46 percent of industrial workers were exposed to noise hazards, while only 70.55 percent of them were aware of EPD management. It explains that additional information about the use of EPDS should be given to industrial personnel. It is necessary to demonstrate to them how to use EPDs. Since EPDs lower the amount of noise that enters the ear, it is crucial to protect the ear with the proper earmuffs. The industrial worker can gain more understanding about using ear protection equipment in this way.

INTRODUCTION

Noise is a highly complex sound produced by erratic, intermittent or statistically random oscillations (Willard and zemlin, speech and hearing science, 1981). Different kinds of noise exist, and they might be impulsive, fluctuating, steady-state, or intermittent. Broad band noise, sometimes known as white noise, has an infinite range of frequencies and nearly equal strength per cycle. Its band width is lowered as it passes through a transducer due to the frequency response of the transducer's restriction. Board band noise is the term for the transducer-shaped white noise (BBN). A wide range of noise below 2KHZ that has almost equal energy each octave is called pink noise. White noise is processed through a band pass filter to produce narrow band noise. By passing white noise through a band pass filter, narrow band noise is produced. It has bands with a wider range of frequencies than BBN. Speech noise has a restricted frequency range, ranging from at least 250 hertz to 4 hertz, and is a broad band noise.

Martin (1975) defined hearing loss as any loss of sound sensitivity, partial or complete, produced by abnormality anywhere in the auditory system. hearing is the special sensation produced by stimulation of the auditory nerve, the stimulus acting not directly on the delicate epithelial cells, constituting the peripheral termination of nerve. hearing is the act of perceiving sound. this sound can be of different types, some that are pleasing to our ears and some that annoys our ears and course hazardous effects.

It is thought that at least one in ten people has a hearing loss in adults are generally accepted as being:

1. The effects of ageing
2. Noise induced hearing loss (exposure of excessive noise)

Noise induced hearing loss is totally prevalence but cannot be reserved. occupational noise is the most common cause of noise induced hearing loss.it is estimated that 1.1 million people are exposed to excessive noise at work and of these 170000 will suffer significant ear damage as a direct result of the noise. A constant barrage of noise from machinery will impair hearing over time, the degree of loss

depending on the intensity of the noise, the hours per day and number of years of exposure. A single episode of exposure can create hearing damage and may also perforate the eardrum and possibly dislocate the bones in the middle ear.

EFFECTS OF NOISE ON HUMAN

Auditory effects of noise

Noise can have a variety of effects on the auditory system, the most common of which is hearing loss. Damage brought on by exposure to noise often affects two areas bilaterally. Hearing loss is brought on by:

1.The conductive mechanism underwent one structural change.
2. Cortical organ structural modifications
3. Cochlea structural alterations
4. Reisner's membrane damage
5. Stereocilia damage
6.intracellular gap on the apical end of stria vascularis thickening and structure.
7. Lack of auxiliary cells.
8. Rectoral membrane damage.

Non auditory effects of noise

Noise has indirect effects on the other systems from physiological point of view.

1. Annoyance and changes in social behavior
2. Reduced efficiency
3. Reduced safety
4. Physiological response
5. Poor health
6. Hormonal changes during pregnancy can affect cochlea functions
7. Sleep disturbance

Industrial workers throughout the day are subjected to loud noises in the workplace, which can have both auditory and non-auditory effects on workers. Individuals are surrounded by a plethora of noise emanating from sources both indoors and outdoors as industrialization and technology advance. People may be unaware of it because its negative effects are not immediately apparent. Noise pollution is increasing at a faster rate than population growth. Due to a combination of industrialization, urbanization, and population growth, urban noise continues to increase rapidly.

OSHA(occupational safety and health administration) recommended 85dB for 8 hours as DRC, while ISO(international organization for standardization) recommended 90dB for 8 hours as DRC, indicating that continuous exposure above this level results in hearing loss. Excessive noise can cause temporary threshold shift, permanent threshold shift, and acoustic trauma in the ears.

RESPONSIBILITY OF THE EMPLOYER TO PROVIDE

1. A safe working environment
2. A safe plant, machinery, tools, and equipment
3. Personal protective equipment
4. A safe work system
5. Adequate supervisions
6. Hazard information
7. Job instructions
8. Employee training
9. Entry and exit points
10. Safe handling of hazardous substances
11. Measures to protect the general public from pollution and operational hazards.

Audiologists are vital in the prevention and early detection of hearing loss. The audiological test will discuss the threshold shift that occurred, and periodic testing will determine whether the loss is temporary or permanent. Audiologists are also important in hearing conservation programmers. Individuals should be made aware of personal hearing protection devices/ear protective devices by audiologist (EPD). The appropriate ear protection must be chosen for the task at hand. A variety of factors will influence the decision, including:

- The amount of attenuation needed
- Interoperability with other safety equipment
- The requirement for communication
- Costs include maintenance and replacement.
- Personal preference and comfort
- Comfort and personal preference

Earplugs

Earplugs fit into the ear canal. There are several types of earplugs available, including disposable, reusable, and permanent. Earplugs are available with a cord or trace. When not in use, they can be hung around the neck.

Personalized permanent earplugs

Individually molded earplugs are made to fit the workers' ears and are typically made of silicone. They are similar to an ear mound for a hearing aid and should fit comfortably but snugly in the ear. The degree of sound attenuation varies, but the maximum is typically 25-30dB.

Semi -inserts

Semi-inserts are earplugs or caps that are inserted again or into the ear canal and are attached to a small handle or a rigid headband that is usually worn under the chin but can also be worn around the back of the neck. Semi inserts are simple to insert and remove, making them ideal for workers who are exposed to noise for brief periods of time. The degree of sound attenuation is likely to be between 20 and 25 decibels.

Earmuffs

Earmuffs resemble headphones in appearance, with soft ear cushions that form a seal around the ears and hard outer cups joined by a headband. The cushions should be large enough to cover the ears completely. They are the most effective type of hearing protection for individuals, and some may provide about 50db of attenuation in certain frequencies.

REVIEW OF LITERATURE

Fuente, Hickson 2011, the aim of the study is to summarize the current scenarios encompassing noise exposure in the workplace and the risk of noise-induced hearing loss(NIHL) in Asia and they conclude that lack of awareness about NIHL among employees, employers and health care professionals is one of the main barrier for the prevention of NIHL in Asia.

Reis, vaz 2018 , the aim of the study was to synthesize the state of the art in what concerns occupational noise exposure in police forces and for this purpose PRISMA statement methodology were applied and the survey revealed that in police activity, the influence of noise is directly related to a variety of sources that can cause hearing loss.

Doutres, sgard, terroir, perrin, jolly, Gauvin, negrini 2019 viewed of past works addressing hearing protection devices comfort and to put them into perspective regarding a proposed holistic multidimensional construct of HPD comfort and conclude that lack of consensus on the definition of HPD comfort in the scientific community makes it difficult to priorities that importance of comfort attributes yet necessary for future design of comfortable earplugs.

Chen, su, chen 2020 did study on epidemiology, pathogenesis & preventive measures of occupational noise induced hearing loss among workers and also they reviewed articles from 2000 to 2020 and they concluded that noise exposure may contribute to temporary or permanent threshold shift so they say noise prevention programs are an important preventive measure in reducing the morbidity of OHIHL among workers.

Bohora 2020 studied in the construction sites and says that it affects the productivity, efficiency, quality of industries so identification of hazards which minimizes the accident is important and he concludes that to provide safety and health in the construction site is important to provide a better policy level and monitoring system in the construction site in Nepal.

Shi, zhiu, huang, hu, zhou, shao, zhang 2021 studied on characteristics of occupational noise-induced hearing loss associated with non-gaussian noise and they concluded that workers exposed to non-gaussian noise suffered from greater NIHL than those exposed to gaussian noise.

METHODOLOGY

Aim:

The aim of the study was to analysis the awareness about effect of noise on occupational workers employed in the oil production company.

Method: The present study was carried out into two phases.

Phase -1: preparation of questionnaire

The questionnaire was develop using a range of supporting literature. The prepared questionnaire was validated by speech language pathologists with experience the correction and suggestions are incorporated in the preparation of questionnaire.

YES/NO

1.Are you aware of danger due to exposure to noise?

2.Can loud noise obstruct the sense of hearing?

3.Do you believe that noise might cause psychological issues?

4.Can atmospheric pressure results hearing loss?

5.Can long time of exposure to noise leads in changes in your memory and personality?
6.Can noise pollution leads to visual problems?
7.Do you wear ear protective devices?
8.Do you know the importance of ear protective devices?
9. Do you think audiological testing is required before getting ear protective device?
10.Shifts in workplace are better for health?
11.Do you find difficulty in understanding speech due to long time exposure to sounds?
12.Do you have ringing sound in the ear due to noise?
13.Does government provides ear protective devices?
14.Can all ages of people can use ear protective device?
15.Are hearing aids and ear protective devices similar?
16.Are ear protective devices cost effective?

Phase-2. participant

A total of 40 workers from different industries like oil production factory, cement production factory, bakery factory from bara district of Nepal with Age range of 25-56 were participated in the present study with no past history of any hearing problems.

Stimulus used:

The questionnaire list above was administrated on industrial occupational workers.it consists of 16 yes/ no questions.

Procedure:

All the prepared questionnaires were distributed to each individual who were working in the industry. they were instructed to read the questions carefully and tick in yes/no.

Analysis:

The obtained data was subjected to statistical analysis and standard deviation and test was done to find out the significance.

Result

The statistically analyzed data are discussed below

Table 1 : Shows percentage score of awareness

	Yes		No	
	Frequency	%	Frequency	%
Are you aware of danger due to exposure to noise?	35	87.5	5	12.5
Can loud noise obstruct the sense of hearing?	38	95	2	5
Do you believe that noise might cause psychological issues?	33	82.5	7	17.5
Can atmospheric pressure results hearing loss?	16	40	24	60
Can long time of exposure to noise leads in changes in your memory and personality?	32	80	8	20
Can noise pollution leads to visual problems?	19	47.5	21	52.5
Do you find difficulty in understanding speech due to long time exposure to sounds?	36	90	4	10
Do you have ringing sound in the ear due to noise?	20	50	20	50

Table 1: It can be seen that 87.5% were aware of danger due to exposure to noise, 95% are aware about if loud noise obstruct the sense of hearing, 82.5% belief that noise might cause psychological issues, 40% belief that atmospheric pressure results hearing loss, 80% are aware that long time of exposure to noise leads in changes in memory and personality, 47.5% belief that noise pollution leads to visual problem's,90% people find difficulty in understanding speech due to long time exposure , 50% have ringing sound in the ear due to noise.

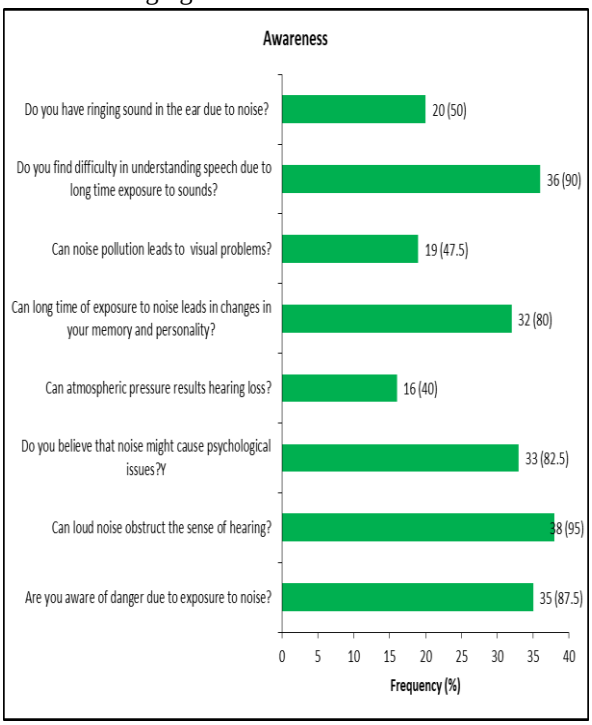

Figure 1 :Shows awareness of noise hazard

Table 2: Shows overall awareness percentage score

Table 3: Overall awareness

Awareness	%
Yes	77.46
No	22.54

Tables 3 shows 77.46% workers aware of the noise hazard and 22.54% are not aware of the impact of noise hazard.

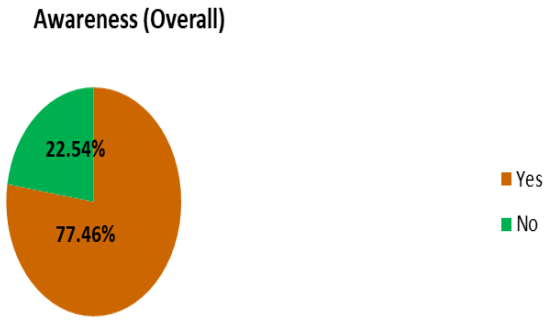

Figure 2: Shows overall awareness

Table 3 : Shows percentage score of management

	Yes		No	
	Frequency	%	Frequency	%
Do you wear ear protective devices?	6	15	34	85
Do you know the importance of ear protective devices?	14	35	26	65
Do you think audiological testing is required before getting ear protective device?	33	82.5	7	17.5
Shifts in workplace are better for health?	36	90	4	10
Does government provides ear protective devices?	4	10	36	90
Can all ages of people can use ear protective device?	27	67.5	13	32.5
Are hearing aids and ear protective devices similar?	6	15	34	85
Are ear protective devices cost effective?	33	82.5	7	17.5

From Table:2 it can be seen that 35% people knows the importance of ear protective devices but only 15% wear ear protective devices, 82.5 %think audiological testing is required before getting EPD'S , 90% thinks that shifts in workplace are better for health, 10% population knows that government provide ear protective devices,67.5% are aware that all ages of people can use ear protective devices, 15% people thinks that hearing aids & ear protective devices are similar and 82.5% belief that ear protective devices are cost effective.

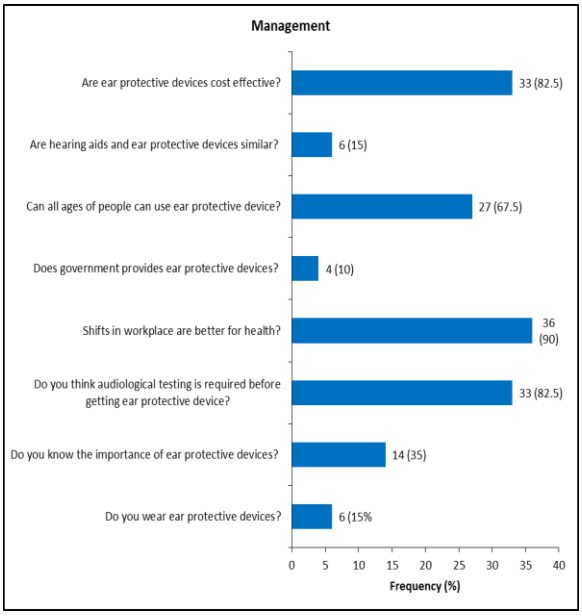

Figure 3 Shows management score of noise hazard

Table 4 Shows overall percentage score of management

Table 4:

Management	%
Yes	70.55
No	29.45

Tables 4 shows 70.55% workers aware and 29.45% are not aware of the management of noise hazard and ear protective devices.

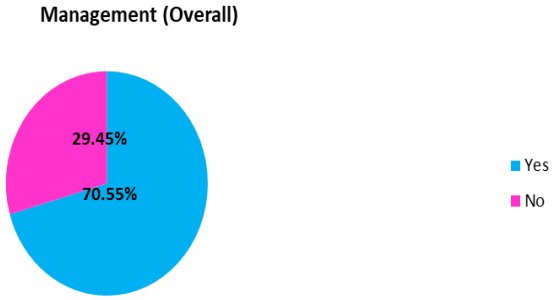

Figure 4 Shows overall management

CONCLUSION

A result shows that the industrial workers have moderate awareness about noise hazard and low to moderate knowledge about managements on EPDs. It explains that the industrial workers should be provided with more information regarding the use of EPDS. They must be shown the mechanism of how to use EPD'S.as we know EPD'S reduce the level of noise entering the ear, it is important to protect the ear with appropriate earmuffs. appropriate guidance should be given on how to replace the ear cushions that are no longer pliable. This way the industrial worker can increased the knowledge on handling the ear protection devices.

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