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Original Research Article

A retrospective study of noise induced hearing loss in a tertiary care hospital of Jharkhand - an alarming but ignorant truth

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ABSTRACT

Background: Noise induced hearing loss (NIHL) is hearing impairment resulting from exposure to loud sound. People may have a loss of perception of a narrow range of frequencies, impaired cognitive perception of sound, or other impairment, including sensitivity to sound or ringing in the ears. NIHL is 2nd most common cause of hearing loss, next to presbycusis. Most of the population of developing countries is ignorant of the hazards of excessive noise exposure. 1) To describe the socio-demograpic profile of patients in the young age group (18-35 years) with noise induced hearing loss in Rajendra Institute of Medical Sciences (RIMS), Ranchi during June 2015- November 2016. 2) To study the major presenting complaints. 3) To categorize the patients on the basis of degree of hearing loss.
Methods: Data for study was collected from RIMS Out Patient Department (OPD) register during period June 2015 – November 2016 (18 months).Total sample size for this period was 50. Templates were generated in MS excel sheet and data analysis was done using SPSS software (version 20).
Results: Study showed NIHL was more common in urban (82%) and male (72%) population. More than half (54%) patients presented with hearing loss and 24% with tinnitus. Most of the patients had bilateral mild hearing loss (70%).
Conclusions: NIHL is more common in urban males, mostly in age group (26-35 years). More than 2/3rd (68%) of patients had history of exposure to loud noise.

Keywords: Noise induced hearing loss, Tinnitus

INTRODUCTION

Incidence of hearing loss has traditionally been attributed to occupational or firearm-related exposure, however, more recent research suggests that the trend is shifting as prevalence rates amongst children and adolescents is increasing.[1] According to a recent review, "Hearing loss due to recreational exposure to loud sounds" by the world health organization (WHO), an estimated 1.1 billion young people may be at risk for hearing loss caused by unsafe listening practices.[2] Noise Induced Temporary Threshold Shift (NITTS) is due to exposure to moderately intense sounds , with short term elevation of hearing thresholds. The amount of temporary threshold shift (TTS) is directly proportional to the intensity of sound and duration of exposure. Noise induced permanent threshold shift (NIPTS) is permanent elevation of hearing threshold due to chronic exposure to moderately intense noise and permanent structural damage to the critical elements of the cochlea.[3] A noise of 90 dB (A) SPL, 8 h a day for 5 days per week is the maximum safe limit as recommended by Ministry of Labour, Govt. of India.

The damage caused by noise trauma depends on several factors -frequency of noise, intensity and duration of noise, continuos vs interrupted noise, susceptibility of the individual and pre-existing ear disease.

Degree of hearing loss - mild (26–40 dB), moderate (41–55 dB), moderately severe (56–70 dB), severe (71–91 dB), profound (> 91 dB).

Pathophysiology of NIHL

Mechanical and structural damage ranging from disturbance of the delicate stereocilia to tearing of the organ of corti and eventually permanent hair cell loss, caused by severe motion of basilar membrane due to excessive noise. Exposure to extremely intense noise (130 dB) results in necrotic-cell death process.[4] Metabolic exhaustion (overstimulation) of hair cells may lead to excessive release of glutamate, which may contribute to NIHL by causing swelling of auditory nerve terminals.[5] Severe vascular narrowing and ischemia of cochlear microvasculature due to excessive noise exposure. Ionic imbalance and cellular damage due to disruption of ionic gradients of cochlear structures.

The present study was done to describe the socio-demographic profile of patients in the young age group (18-35 years) with noise induced hearing loss in RIMS, Ranchi during June 2015- November 2016 , to study their major presenting complaints and to categorize them on the basis of degree of hearing loss.

METHODS

This retrospective study included 50 cases of age group 18 -35 years presenting in ENT OPD, RIMS Ranchi with complaints of hearing loss or tinnitus or both, during the period of 18 months (June 2015 – November 2016). Patients beyond this age group (18-35 years) and those with other causes of hearing loss (HL) and tinnitus identified upon clinical examination and investigations were excluded. Data was analysed using SSPS software (version 20).

RESULTS

Table 1 shows socio- demographic profile of patients with NIHL. During June 2015- November 2016, out of 50 patients of age group 18-35 years, urban (82%), males (72%) and 26-35 years age group (66%) had hearing loss. 54% presented with hearing loss and 24% presented with tinnitus whereas 22% had both hearing loss and tinnitus a shown in Table 2.

Table 1: Categorization on the basis of Socio-demographic profile.

Criteria	Groups	Frequency(n=50)	%
Age (years)	18-25	17	34
	26-35	33	66
Sex	Male	36	72
	Female	14	28
Residence	Urban	41	82
	Rural	9	18

Table 2: Categorization on the basis of presenting complaints.

Presenting complaints	Frequency(n=50)	%
Hearing loss	27	54
Tinnitus	12	24
Hearingloss + tinnitus	11	22

Table 3: Categorization on the basis of degree of hearing loss.

Degree of hearing loss(hl)	Frequency(n=50)	%
Minimal hl	2	4
Mild hl unilateral	10	20
Mild hl bilateral	35	70
Moderate hl unilateral	1	2
Moderate hl in one ear and mild hl in other ear.	2	4

Table 4: Exposure to loud noise.

Criteria (history)	Frequency (n=50)	%
Exposure to loud noise	34	68
Without exposure	16	32

70% patients had bilateral mild hearing loss followed by unilateral mild hearing loss (20%). 4% had moderate hearing loss in one ear and mild hearing loss in other ear as shown in Table3. More than 2/3rd (68%) patients had history of exposure to loud noise such as machinery, firearm related exposures, and noise around residence, listening to loud volume music, excessive use of ear phones as shown in Table 4.

DISCUSSION

More than 2/3rd (68%) of patients had history of exposure to loud noise, either machinery, firearm related exposures or noise around residence, listening to loud volume music, excessive use of ear phones. In our study, 70% had mild HL bilateral, mostly urban male in the age group of 26-35 years. An Indian council of medical research (ICMR) report in 1983 found the proportion of hearing impairment to be 10.7%.[6] A study by Kacker (1989) found hearing impairment to range from 13.5% to 18.5% .[7] A study of 430 patients conducted by Srivastava at Bokaro steel plant found a 37% incidence of mild to severe sensorineural hearing loss. Prevention of NIHL must be appropriate, adequate, acceptable and affordable. Most of the population of developing countries is ignorant of the hazards of excessive noise exposure.[8] Awareness must be increased about the harmful effects of noise and about the prevention and control of NIHL. When you feel the need to shout in order to be heard 3 feet away, the noise levels are probably 85 dB or more and hearing protectors are recommended.[9] Educating people about adverse effects of noise and its prevention

and the use of personal hearing protective devices are the major strategies against NIHL.[10] NIHL is the single most important cause of preventable hearing loss in this world today. There is an urgent need to hasten research on the fundamental mechanisms involved in NIHL so that preventive and curative measures to reduce or mitigate the permanent hearing damage due to noise are evolved.

CONCLUSIONS

In our study, urban males most commonly in the age group (26-35 years) have features of NIHL, mainly bilateral mild hearing loss.

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