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Occupational related hearing impairment in Basrah

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Abstract

Noise induced hearing loss NIHL is irreversible sensory neural deafness in one or both ears which develops gradually due to chronic exposure to injurious noise. In this study there were 92 workers chosen under exclusion and inclusion criteria, most of the samples study were male due to hard handling working, 40% of the samples studied were complaining of SNHL (sensory neural hearing loss) are variable from mild to sever one. Although they have normal otoscopic finding, the longer the duration of noise exposure the more damaging effect with SNHL result. There are no preventive measures used in our sample study. NIHL is preventable disease which needs the role of social media in education of peoples.

Keywords: *NIHL, SNHL etc.*

Introduction

The inner ear is responsible for both hearing and balance functions. It is composed from membranous surrounded by bonny labyrinth (which means mazes of tunnels). Within the membranous labyrinth, the organ of *Corti* consists of series of neuroepithelial structures arranged along the inner edge of the basilar membrane; It is composed of two rows (rods of *Corti*) and forming triangle with the basilar membrane, on the inner side of the inner rod, there is a single row of hair cell (IHCs); and on the outer side of the outer rod there are three or four rows of hair cell (OHCs).[1,2] It has the ability to perceive sound by detecting vibrations through the ear.[1] Noise induced hearing loss (NIHL) is irreversible sensorineural deafness in one or both ears which develops gradually due to chronic exposure to injurious noise in employment5. Shearing forces caused by any sound have an impact on the stereocilia of the hair cells of the basilar membrane of the cochlea; when excessive, the forces can cause cell death[1,2]. Long-term exposure to a noisy environment may cause dizziness and tinnitus before clinically detectable hearing loss[1,2]. Irreversible sensorineural hearing loss can occur with long-term exposure to continuous noise levels exceeding 85 dB for 8 h a day.[3] Therefore, noise-induced hearing loss represents excessive "wear and tear" on the delicate inner ear structures. Individual susceptibility to noise-induced hearing loss varies greatly, but the reason that some persons is more resistant to it while others are less susceptible is not well understood.[1,2]

Patients and method

This is a descriptive cross-sectional study from 12/3/2016 to 30/4/2017.The total number of the examined workers was 92(184 ears). Proportionally selected to represent all the departments or working areas. We measured noise levels at various station sites to observe noise related worker practices and conducted audiometric testing.

They voluntarily participated from Basrah oil company (north Rumelia) and Al-Nagibeyia power station. We used sound level meter, Pure tone audiometer [Bell *invents audiometer model* 270–Diagnostic audiometer, calibrated till 2018], and Otoscope (as shown in pictures below).

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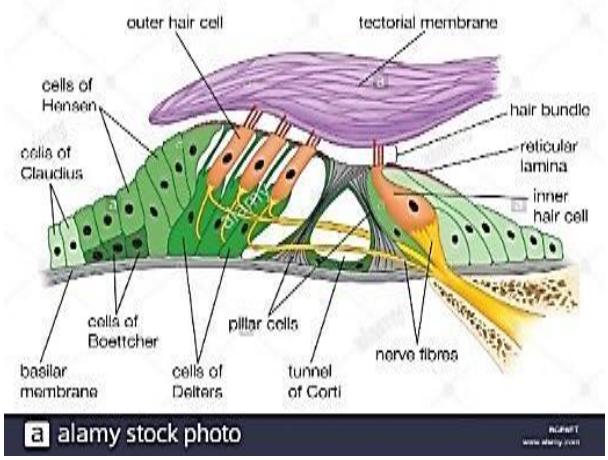

Using a face-to-face questionnaire was collected. The examination was carried in isolated room (quiet). For each worker who was subjected to the study, an air conduction hearing threshold was measured from 0.5 to 8 kHz, and pure-tone averages (PTA) (i.e., means of 1, 2, and 4 kHz) were calculated. We include workers aged 20-60 years only. Cases with wax were cleaned in Basrah teaching hospital and re-examined again. Workers with presbycusis, perforation and other diseased ears were excluded from our research.

Results

Table 1 shows that 77.2% of our sample were male, while 22.8% are female.

Table 1 Sex distribution

Sex	No.	%
Male	71	77.2
Female	21	22.8
Total	92	100.0

Table 2 shows that 37% of the candidate are general workers male, While the lowest % among Lab workers (2.2%)

Table 2 Type of job distribution

Job	No.	%
Worker(general)	34	37.0
office management	19	20.7
tech. worker	13	14.1
maintenance	7	7.6
engineer	4	4.3
clack	3	3.3
mechanic	3	3.3
laboratory	2	2.2
Others	7	7.6
Cleaner	1	
elect. Work	1	
Environment inspector	1	
lawyer	1	
safety dept.	1	
turbine	1	
water treat	1	
Total	92	100

Table 3 clear that, the majority of sample taken were outdoor in percentage of 53% while the rest were indoor forming 15.6%only

Table 3 Place of job

Location	No.	%	NIHL	%
Indoor	32	34.8	5	15.6
Outdoor	60	65.2	32	53.3
Total	92	100.0		

Table 4 display 40% of our sample study complaining of hearing loss in addition to other constitutional symptoms likes tinnitus and vertigo, (18.5%, 7.6%) while 30.4% are normal.

Table 4 Symptoms

Tinnitus	17	18.5
Vertigo	7	7.6
Pain	3	3.3
Ear Discharge	0	0.0
Total	92	100.0

Table 5 defines the otoscopic result, showing that the highest percent (90.2%) were normal otoscopic finding, and the lowest percent refer to wax with (5.4%) only.

Table 5 Otoscopic finding task

Type of Finding	No.	%
Perforation	0	0.0
Discharge	0	0.0
mild retraction on Lt.	1	1.1
nasal obstruction	1	1.1
old healed cent perf	1	1.1
ret.TM	1	1.1
wax	5	5.4
Normal	83	90.2
Total	92	100

Table 6 shows 51 workers (55.4%) has SNHL which varies from mild, moderate and sever.

Table 6 Audiological finding

Audiological Findings	No.	%
B. normal	29	31.5
B. mild SNHL	23	25.0
B. moderate SN	21	22.8
B. sever SNH	7	7.6
mild CHL Lt	2	2.2
Lt mild CHL	1	1.1
Lt sever mixed	1	1.1
Lt. moderate	1	1.1
mild CH	1	1.1
mild Lt SNHL at high frequency	1	1.1
mod-sever mixed	1	1.1
R. sever	1	1.1
R. sever mixed	1	1.1
Rt. Mild, Lt. moderate	1	1.1
sever mixed	1	1.1
	92	100.0

B. stand for bilateral, SNHL= sensory neural hearing loss, CHL = conductive hearing loss

Table 7 display the number of employees facing the noise for 12 hr. were 31 (33.7%) and from them 58% having SNHL.

Table 7 Duration of noise exposure (hours)

Duration	No.	%	SNHL(No)	%
0 hr.	1	1.1		
5 hr.	1	1.1		
8 hr.	5	5.4	1	20
3 hr.	10	10.9		
10 hr.	10	10.9		
4 hr.	12	13.0	6	50
6 hr.	22	23.9	12	54.5
12 hr.	31	33.7	18	58
Total	92	100.0		

Table 8 shows that 100% of our sample did not using preventive measures.

Table 8 Preventive measures

Preventive measures	No.	%
Ear Plug	0	0.0
Ear muff	0	0.0
Nil	92	100
Total	92	100.0

Discussion

Table 1shows that male: female ratio is (3:1) this due to nature and type of the job, it is hard one and some cultural point of view. This is going with result of study done in Nigeria.[4] and Iraq,[3,8]While in study done at US they more defect among female .[10]

Table 2 illustrates that majority of our samples are the general worker and this may be due to type power station need more worker than other category of employee. This is going with research done at Malaysia and Thailand .[5,6]

Table3 concentrates on the distribution of our sample weather they are outside the office worker (65.2%)with close contact with noise source or they are the reverse (34%)and the impact of this on hearing acuity of the candidates. Again, this was proved by other articles done at Malaysia and Nigeria .[4,5]It looks like that it is relating to style of work of the power station, goes with study of Thailand.[6]Also, it shows that part of the indoor workers has SNHL (15.6%), while these in outdoor are (53.3%), this means that the closer to the noise source, the higher risk of SNHL. Same result proved by study was done in Pakistan by Asad Jamil.[7]Same thing proved by study done in Wasit .[8]In our study ,we find that most of the sampled workers suffer from hearing loss in a percent of 40.2%, which is shown in table 4 while the other symptoms (tinnitus, vertigo and pain) constitute only (27%), in study done in Wasit -Iraq discover a varying degree of noise-induced hearing loss, there was a progressive elevation in number of hearing loss patients over the five years of study in street electric generator. There was a significant correlation with duration to noise exposure.[8,10]**N**ear all chosen sample having normal otoscopic finding which is clear in table 5 probably due strict exclusion/inclusion criteria which is applied in our research. Table 5 shows, although they have normal otoscopic finding, this does not exclude sensory neural hearing loss, this is going with most of compared and related article weather inside or outside Iraq.[5,6,7,8]Table **6** clears that near half of the candidate suffering from SNHL regardless of their age or duration of employment. While in study was done at Wasit, Iraq, there was a significant correlation with duration to noise exposure, saying that the longer the duration of exposure to noise in a high intensity more than 85 dB, the more the damaging effect.[9]

In our study as in table 7, appears that the longer the duration of exposure to injurious noisy environment (12hr. in percentage of 33.7%)the highest risk of gating sensory deafness in those peoples. While in a study was done at Malaysia saying that it is more related to the intensity of sound exposure. [5] In Thailand, the findings were confirmed that noise exposure levels of 86-90 dB and exceeding 90 dB significantly increased the risk of hearing loss in either ear.[6]

In Zimbabwe, the noise exposure level exceeding 90 dB significantly increased the prevalence of hearing loss in both ears.[9]

Table 8 shows that all of workers in our study does not use a preventive measure like earplugs or ear muff during exposure to noise and that was identical with the result of study done in Iraq, (Wasit).[8]

Recommendations

Most of workers have not used a hearing protection device. The engineering control or personal control by wearing hearing protection devices should be used, to

decrease noise exposure levels lower than 85 dB for 8 hr. Moreover, if the exposure level reaches 85 dB for 8 hr., the employer needs to implement a hearing conservation program in the workplace. The national institute for occupational safety and health (NIOSH) recommends that the recommended exposure limit (REL) for noise be 85 dB for 8 hr. a day in 5 days work a week [4]. We can also conclude that exposure to high sound pressure levels can cause irreversible hearing loss, which has serious consequences for individuals' health and quality of life. Therefore, occupational health professionals must emphasize the importance of corporate hearing conservation programs and audiometric management of workers. Finally, the effect of social media in education can play an important role in preventing NIHL of peoples working noisy environment.[7]

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