

PREVALENCE OF OCCUPATIONAL NOISE-INDUCED HEARING LOSS AMONG WORKERS IN THE STEEL INDUSTRY

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INTRODUCTION

Occupational Noise induced hearing loss (NIHL), is defined as a partial or complete hearing loss in one or both ears occurring during worker's employment because of workplace exposure to noise.

Occupational NIHL is the most prevalent occupational disease in the world. It is estimated that occupational exposure to noise is responsible for 16 % of disability resulting from hearing loss globally.

In less developed countries, like Egypt, little is known about the prevalence of occupational NIHL in the steel industry. Since occupational NIHL is a complex and preventable disease, understanding the distribution of affected workers is crucial for policymakers and stakeholders who plan for preventive services.

Occupational NIHL among exposed individuals is dependent upon several factors including individual susceptibility, sound intensity and type, the length of time an employee is exposed to the noise, sociodemographic factors, combined exposure to non-occupational sources of noise and ototoxic chemicals. ONIHL is an irreversible disease with no effective treatment. Prevention remains the best option for limiting the deteriorations of hearing power.

AIM OF THE WORK

Measure the prevalence of occupational noise induced hearing loss among workers engaged in steel industry in Alexandria, Egypt.

Identify factors associated with occupational noise induced hearing loss in the selected factories. Compare the hearing thresholds at different frequencies between workers exposed to hazardous noise and unexposed workers in the same factories.

SUBJECTS AND METHODS

Subjects: 709 workers at two selected steel factories in Egypt. Eligible workers (n=606) were distributed into two groups:

Exposed workers (n=396): workers exposed to hazardous occupational noise where workplace noise level was ≥ 85 dB. Unexposed workers (n=210): workers employed at non-manufacturing departments at the same factories, and not exposed to hazardous occupational noise.

Methods: A retrospective design was adopted for this study. Medical records of the periodic medical examination of workers at the two selected steel factories were reviewed in November 2021. Factory records and the medical records of the latest periodic medical examination conducted between July and September in the same year were reviewed for data collection. The medical records represent the health status of workers in that year.

RESULTS

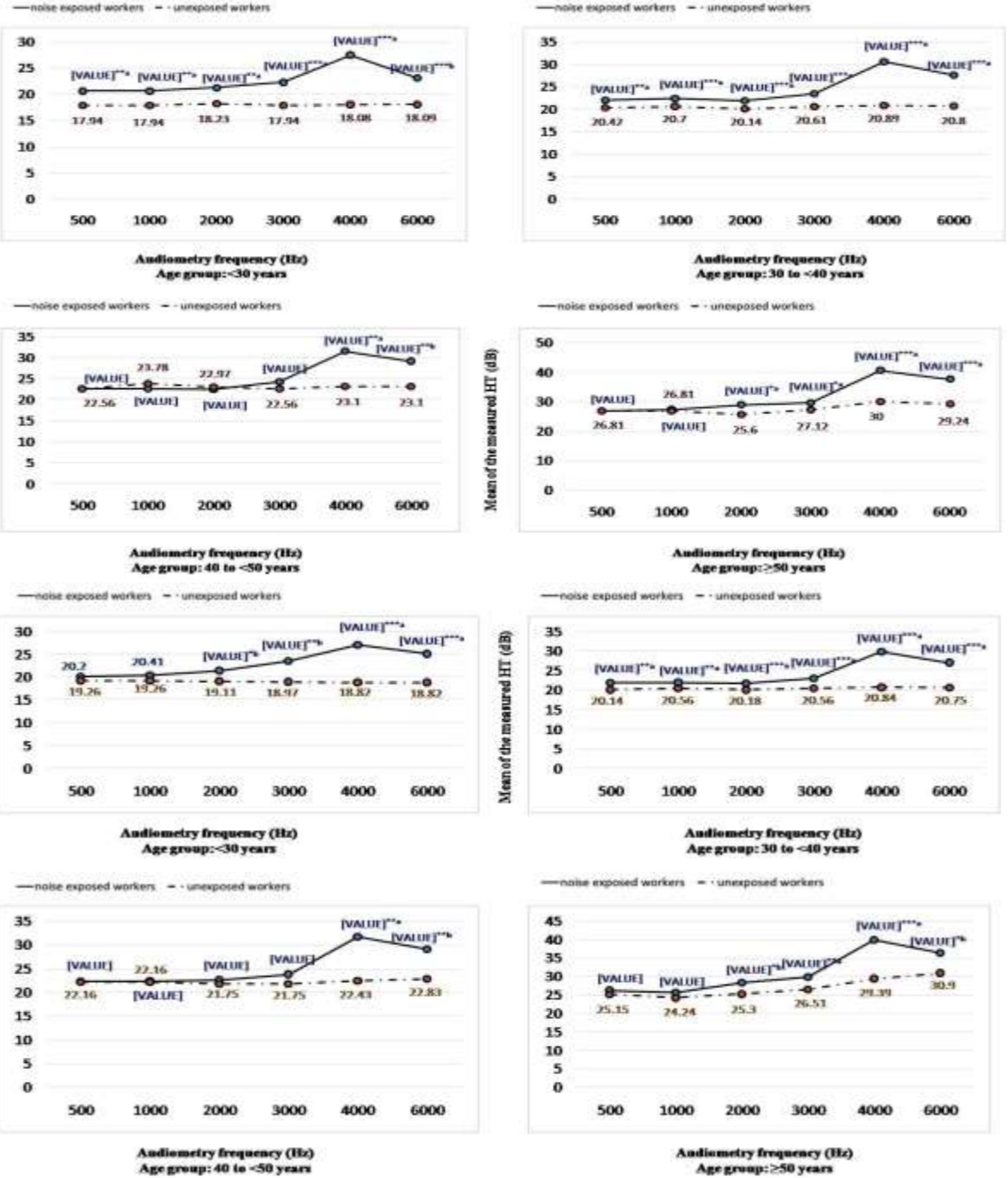


Figure 1.(Right ear): Mean of the measured hearing threshold (dB) at specified audiometry frequencies (Hz) among noise-exposed (n=396) and unexposed workers (n=210) stratified by age groups. Abbreviations: dB: Decibel; Hz: Hertz. (Left ear): Mean of the measured hearing threshold (dB) at specified audiometry frequencies (Hz) among noise-exposed (n=396) and unexposed workers (n=210) stratified by age groups. Abbreviations: dB: Decibel; Hz: Hertz. *: Mann Whitney U test; *: P <0.05; **: p<0.01; ***: p<0.001

Table: Characteristics of noise-exposed (n=396) and unexposed workers (n=210)

Characteristics	Noise-exposed workers (n=396)		Unexposed workers (n=210)		P value
	No.	%	No.	%	
Job duration (years)					
<10	277	69.9	159	75.7	0.240 ^a
10-<20	76	19.2	29	13.8	
≥20	43	10.9	22	10.5	
Smoking status					
never been smoker	128	32.3	78	37.1	0.061 ^a
ex-smoker	37	9.3	29	13.8	
current smoker	231	58.3	103	49.0	
Ear related medical condition					
no	362	91.4	194	92.4	0.681 ^b
yes	34	8.6	16	7.6	
Tinnitus					
no	356	89.9	198	94.3	0.067 ^b
yes	40	10.1	12	5.7	
Age (years)					
<40	252	63.6	140	66.7	0.458 ^b
≥40	144	36.4	70	33.3	
Mean±SD (Min-Max)	38.41 ± 7.24 (25 - 62)		38.05 ± 8.88 (24 - 63)		0.594 ^c

CONCLUSION

High prevalence of hearing impairment and NIHL were reported among steel workers exposed to hazardous occupational noise (71.2% and 47% respectively) compared with unexposed workers (45.7% and 11.9% respectively).

Tinnitus was found to be an independent predictor of NIHL among steel workers exposed to hazardous occupational noise, after adjustment of the effect of age and service duration.

By comparing hearing thresholds between workers exposed to hazardous occupational noise (≥ 85 dBA) and unexposed workers, at all tested frequencies (0.5, 1, 2, 3, 4, and 6 kHz), noise-exposed workers had significantly higher mean hearing threshold compared with unexposed workers. In all age groups, noise-exposed workers had significantly higher high-frequency threshold values and ISO values than unexposed workers.