

Noise Induced Hearing Loss in Glass Factory Workers in Delta State Nigeria: An 8 year follow up.

Original
Article

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ABSTRACT

Background: Noise induced hearing loss is a well known recognized hazard in factory workers. This is due to the fact that the level of noise in most factories exceed the WHO acceptable limits. This was an 8 year follow up study on glass factory workers to determine the effect of noise on their hearing status over that period.

Materials and Methods: Audiometry was carried out on the factory workers using a diagnostic audiometer. This was repeated after 8 years. All the workers had their ears examined prior to Audiometry which was done in a quiet area in the factory clinic. Thereafter data was collected and analysed.

Results: The subsequent screening showed that all the workers had increased threshold of hearing and the Prevalence rate of hearing impairment had increased from 9.1% to 40.8%. All workers admitted to intermittent use of personal protective devices (ear muffs/ear plugs) despite being counselled on their use 8 years earlier.

Conclusion: Hearing Conservation measures should be instituted in factories. Pre-employment screening should be mandatory as well as annual audiological screening and the labour laws should be strengthened to ensure adequate compliance by industries.

Key Words: Audiometry, Factory Workers, Hearing Impairment, Noise, Screening.

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INTRODUCTION

Auditory Noise induced hearing loss is a well known recognized hazard in factory workers. This is due to the fact that threshold levels of noise in most production factories exceed the WHO acceptable level of noise. Also due to poor resources in developing countries we find workers put in longer hours than the recommended maximum hours of 8 hours to make up for the shortfall in the number of staff.

It is also required of factory workers to do an annual audiological screening of their staff^[1,2] as this will be helpful in monitoring any changes in their hearing, however as found in this study, this was not done and thus early changes were not noticed.

METHODOLOGY:

This was a follow up study carried out on 22 factory workers in Delta State, Nigeria. Noise levels in the factory ranged from 85dBA to 116dBA at the location with the highest noise level, taken with the SPL meter (radio shack).

Exclusion criteria included anyone not present in the initial study done in 2011, ear diseases like chronic suppurative otitis media. Those with wax in the ears had the ears syringed and the test was repeated.

All workers admitted to irregular use of plugs/ear muffs. Audiometry was carried out using a clinical interacoustic audiometer. Thereafter data was analysed.

The pure tone average was calculated by adding the

thresholds obtained at 500, 1000 and 2000 Hz and dividing the result by 3.

RESULTS

Total number of workers recruited into the study were 22. All were Male within the 3rd and 5th decades of life. This gave a total number of 44 ears. Results obtained in 2011 showed that 20 workers had bilateral normal hearing and showed that 2 workers with a prevalence rate of 9.1% had bilateral hearing impairment.

In the follow up study done in 2019. 3 workers (13.6%) had bilateral hearing impairment whilst 3 (13.9%) had left hearing impairment, and another 3 worker had right hearing impairment. Thus the prevalence rate of those with hearing impairment had risen from 9.1% to 40.8% in 8 years.

The degree of hearing impairment all fell within the range of mild hearing impairment apart from one worker who had progressed from having bilateral mild hearing loss in 2011 to now having moderate hearing loss on the left and mild hearing loss on the right. It is important to note that all the factory workers including those that had normal hearing all had increased thresholds of hearing when compared with the results obtained 8 years earlier.

REPORT OF AUDIOMETRIC SCREENING FOR EMPLOYEES OF GLASS PLANT IN DELTA STATE

FACTORY WORKERS SERIAL NUMBER	Pure Tone Average (dB) 2011		HEARING STATUS	Pure tone average (dB) 2019		HEARING STATUS
	Left	Right		Left	Right	
001	15dB	21.6 dB	Normal Hearing	21.2 dB	21.2 dB	Normal Hearing
002	11.6dB	11.6 dB	Normal Hearing	18.75 dB	21.25 dB	Normal Hearing
003	13.3dB	16.6 dB	Normal Hearing	30.0 dB	20.0 dB	Mild left hearing impairment
004	11.6dB	18.3 dB	Normal Hearing	15.0 dB	21.25 dB	Normal Hearing
005	10.0dB	15.0 dB	Normal Hearing	27.5 dB	18.75 dB	Mild left hearing impairment
006	26.6dB	30.0 dB	Moderate Left and mild right hearing impairment (Bilateral)	27.5 dB	31.5 dB	Mild bilateral hearing impairment
007	18.3 dB	18.3 dB	Normal Hearing	25.0 dB	27.5 dB	Mild right hearing impairment
008	18.3 dB	18.3 dB	Normal Hearing	18.75 dB	22.5 dB	Normal Hearing
009	16.6 dB	16.6 dB	Normal Hearing	15.0 dB	25.0 dB	Normal Hearing
010	13.3 dB	13.3 dB	Normal Hearing	21.5 dB	27.5 dB	Mild right hearing impairment
011	16.6 dB	10.0 dB	Normal Hearing	26.25 dB	23.75 dB	Mild left hearing impairment
012	21.6 dB	15.0 dB	Normal Hearing	22.5 dB	21.5 dB	Normal Hearing
013	15.0 dB	18.3 dB	Normal Hearing	23.75 dB	23.75 dB	Normal Hearing
014	16.6 dB	15.0 dB	Normal Hearing	17.5 dB	23.75 dB	Normal Hearing
015	13.3 dB	15.0 dB	Normal Hearing	20.0 dB	21.25 dB	Normal Hearing
016	18.3 dB	16.6 dB	Normal Hearing	21.5 dB	36.25 dB	Mild right hearing impairment
017	18.3 dB	16.6 dB	Normal Hearing	22.5 dB	23.7 dB	Normal Hearing
018	18.3 dB	18.3 dB	Normal Hearing	28.75 dB	28.75 dB	Mild bilateral hearing impairment
019	20.0 dB	21.6 dB	Normal Hearing	22.5 dB	23.75 dB	Normal Hearing
020	26.25 dB	26.25 dB	Mild Bilateral hearing impairment	41.6 dB	28.3 dB	Moderate Left and mild right hearing impairment (Bilateral)
021	7.5 dB	20.0 dB		20.0 dB	15.0 dB	Normal Hearing
022	15 dB	15.0 dB		18.3 dB	21.6 dB	Normal Hearing

KEY

WHO RANKING

Normal Hearing

Mild hearing loss

Moderate hearing loss

Moderately severe hearing loss

Severe hearing loss

Profound hearing loss

0-25dB

26-40dB

41-55dB

56-70dB

71-90dB

>90dB

STATUS REPORT FOR THE SCREENED EMPLOYEES OF GLASS PLANT IN DELTA STATE

HEARING STATUS	NUMBER OF EMPLOYEES			
	2011	PREVALENCE RATE (%)	2019	PREVALENCE RATE (%)
NORMAL HEARING	20	90.9	13	59.1
LEFT HEARING IMPAIRMENT	0	0	3	13.6
RIGHT HEARING IMPAIRMENT	0	0	3	13.6
BILATERAL HEARING IMPAIRMENT	2	9.1	3	13.6

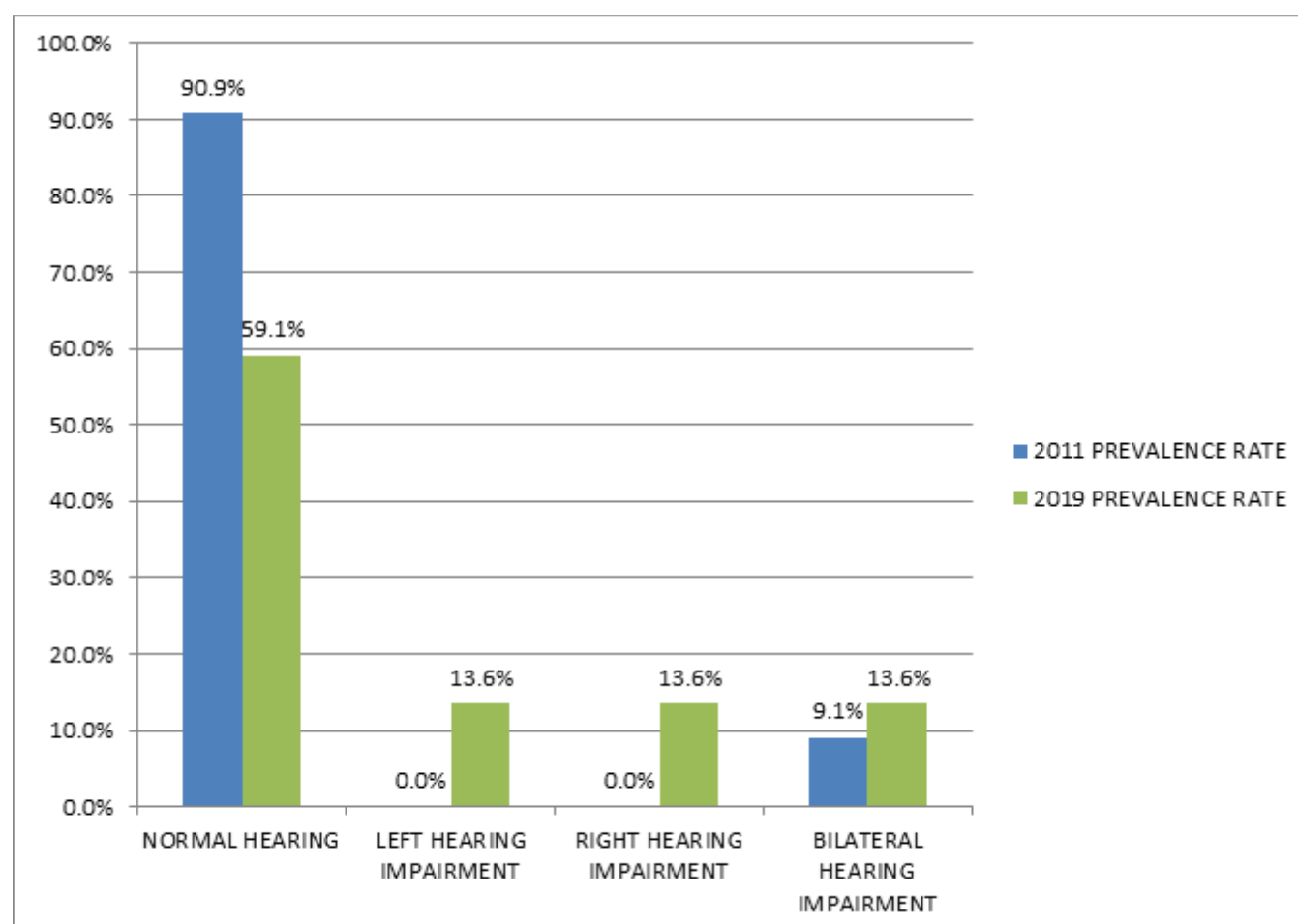


Fig 1: a chart showing the prevalence rate of hearing loss amongst employees of Glass plant in Delta State in the year 2011 and 2019.

SUMMARY

Total : 44 ears
Ears with hearing impairment 12 ears in 2019 as against 2 ears in 2011
Bilateral Hearing Loss 3 workers (6 ears)
Left SNHL 3 ears
Right SNHL 3 ears
13 employees have bilateral normal hearing in the year 2019 as against 20 employees in year 2011

DISCUSSION

The Noise induced hearing loss is the most common health problem arising from exposure to excessive noise^[1,2]. This is quite a preventable disorder^[3,4]. Thus in low resource economies where the cost of hearing aids are not within reach of most of the persons there,

it is imperative that hearing conservation programs are put in place especially in factories where the workers are exposed to usually noises outside the WHO acceptable range. It is estimated that 10 million workers suffer from NIHL in USA^[5].

Occupational safety and health administration laws sets the limits of permissible exposure limit (PEL) workers at 90dBA. For all workers for an 8 hours period and also requires that all workers exposed to noise levels more than 85dB be screened annually.² This will help detect increases in threshold of hearing annually and interventions could be made before irreversible damage is done^[6].

However as in the case of the case this factory there was an 8year gap in the screening of its staff which is highly unacceptable, it is important to note that noise induced hearing loss is poorly studied in Africa and Nigeria^[7,8].

The prevalence of hearing loss amongst the 22 staff recruited into the follow-up study after 8 years was found to be 40.9% which was quite high compared to 9.1% 8years earlier. All workers who had been given hearing conservation lectures by the researcher 8 years prior to the follow up study admitted to inconsistent use of personal protective devices (ear muffs/ear plugs) which would have assisted in preventing noise induced hearing loss.

In the follow up study, there was no predeliction to any ear. There was a prevalence rate of 13.6% of hearing loss for the right ear and 13.6% of hearing loss for the left ear.

Also very significantly all the workers had increased threshold rates noted across all the frequency ranges. This implies that a follow up study in a few years will likely get a much higher prevalence rate of hearing impairment and also an increase in its severity. Most workers with mild hearing loss are not aware of this^[9,10] This is most commonly detected by audiometric screening and thus should be imperative in factory workers. All the workers in this study with hearing impairment were noted to be in the range of mild hearing loss except one of the workers who had indeed progressed from mild hearing loss eight years earlier to moderate hearing loss.

It is also quite important to note that none of these workers had pre-employment screening before they joined the company which would have helped in hearing a baseline for their hearing threshold/status noted.

CONCLUSION

Hearing conservation programs should be instituted as a matter of urgency in our factories so that workers are diligent in the use of their personal protective devices, also annual audiometric screening should

be mandatory as well as pre-employment screening. This will help in detecting early stages of noise induced hearing loss and would make room for better management.

CONFLICT OF INTEREST

There are no conflicts of interest.

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