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Tinnitus: Its pattern among noise exposed workers

Bright Otoghile[1*], Omoregie Joseph Idugboe[2], Ebi Linda Totyen[3], Confidence Chioma Otoghile[4]
[1, 2, 3] Department of Otorhinolaryngology, Federal Medical Centre, Yenagoa, Nigeria
[4] Department of Psychology, Obafemi Awolowo University, Ile-Ife, Nigeria

Abstract
Background: Tinnitus is a phantom auditory Perception. It is a symptom and not a disease. It can affect males and females, young and elderly people. It occurs among people in different occupations and could be very distressing. A study of the pattern of tinnitus among people exposed to noise at work is therefore worthwhile.
Objectives: This study aimed to describe the pattern of tinnitus seen among saw mill workers.
Methods: A prospective study involving saw mill workers in Ile-Ife. A total of 420 saw mill workers who gave consent and met the inclusion criteria were selected for the study. Biodata and history of tinnitus were obtained. Tinnitus Handicap Inventory was subsequently administered. Data was presented in descriptive format.
Results: Forty one (9.8%) sawmill workers had tinnitus out of the 420 sawmill workers recruited for the study. Three (7.3%) of them were females and 38(92.7%) were males. Four (9.8%) of them had tinnitus on the right, 5 (12.2%) of them had it left sided and 32 (78.0%) had it bilateral.
Conclusion: Sawmill workers are predisposed to having tinnitus as they are exposed to significant occupational noise. The pattern of tinnitus is bilateral, having physical, emotional and catastrophic components.

Keywords: substituted Li ferrite, magnetostatic and spin waves, microstrip array antenna, X-band frequency range

Introduction

The term 'tinnitus' is derived from the latin word 'tinnire' which means ringing [1]. It is also described as buzzing, whistling or unpleasant sound (French, acouphenes) in the ears or head [2]. Tinnitus has also been described as a phantom auditory Perception or head noise [3]. Tinnitus is the perception of sound that is not related to an external acoustic source or electrical stimulation [4]. It is a symptom and not a disease. The knowledge of its pathophysiology is limited but several theories have been suggested. Tinnitus is believed to result from altered auditory firing rate, cochlea damage affecting the myelin insulation and a neurophysiologic model has also been suggested [5-7]. Conditions that can present with tinnitus include diseases affecting the external, middle and inner ear such as cerumen Auris, otitis media, acoustic neuroma e.t.c. Tinnitus can also occur as symptom of noise induced hearing loss [8]. Several aspects of tinnitus produce frustration for both the patient and treating physician. Hazell [9] reported that 17% of the population in the United Kingdom has chronic tinnitus, but only 14% of those people experiencing tinnitus said that it bothers them a great deal. Tinnitus could particularly disturb its sufferers so much as to affect their emotional state, sleep pattern and even physical activities, depending on its severity. It is a condition that is suffered by many and can potentially affect the quality of life. Little has been described about the pattern of tinnitus among those predisposed to noise induced hearing loss. This study describes the pattern of tinnitus seen among saw mill workers who are particularly exposed to occupational noise.

Method

Study design

This is a prospective, descriptive study involving sawmill workers in Ile-Ife

Study setting

Study was done in Ile-Ife in Osun state which is in the south western part of Nigeria.

Study protocol

A total of 420 sawmill workers who gave consent and met the inclusion criteria were selected for the study. Inclusion criteria included all adult sawmill workers including male and female in Ife East Local Government area from age of 18 to 60 years who gave consent for the study. This was to possibly exclude background presbyacusis which could also cause sensorineural hearing loss. Exclusion criteria included any history and examination suggestive of active ear disease at the time of recruitment, history suggestive of previous chronic ear diseases such as chronic otitis media, recurrent episode of vertigo, history of head injury, chronic medical ailments such as diabetes mellitus, sickle cell disease, chronic use of ototoxic medications such as Aminoglycoside antibiotics, loop diuretics, salicylates, cytotoxic drugs e.t.c. Participants were assisted to fill questionnaires which contained bio data, history of tinnitus and the Tinnitus Handicap Inventory developed by Newman was also administered.

Ethical consideration

Ethical approval was obtained from the ethics committee of

the Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife and Permission was obtained from the Ife-East Local Government Area where the study was done.

Results

There were 420 sawmill workers recruited into the study. There were 410 males and 10 females. The mean age was 33.53±8.59 years.

Out of the 420 sawmill subjects, 41(9.8%) had tinnitus as shown in Figure 1. Three (7.3%) of them were females and 38(92.7%) were males. Four (9.8%) of them had tinnitus on the right, 5 (12.2%) of them had it left sided and 32 (78.0%) had it bilateral as shown in Figure 2. The grading of tinnitus according to the Tinnitus Handicap Inventory (THI) is as shown in Figure 3. The average tinnitus score was 19.8. The pattern of the tinnitus from the THI was classified as functional, emotional and catastrophic and the results showed the functional component of the tinnitus was 100%, emotional component was 68.3% and catastrophic component was 56.1%. This is shown in Figure 4.

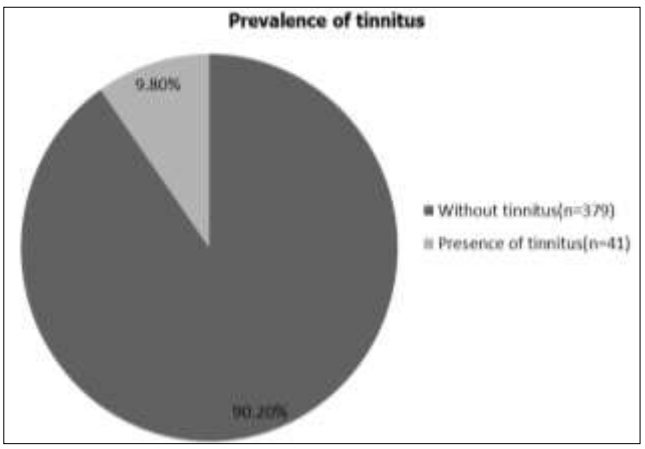

Fig 1: Showing the Prevalence of tinnitus

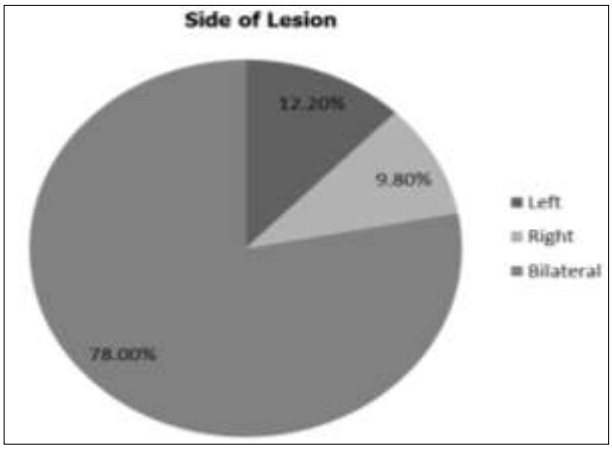

Fig 2: Showing the Percentage according to the side of lesion

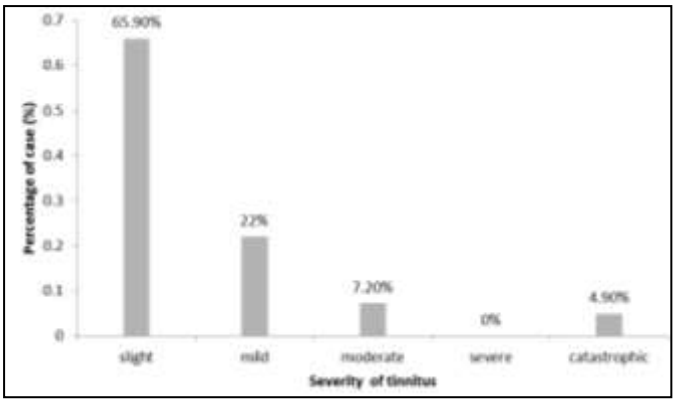

Fig 3: Showing Severity of tinnitus

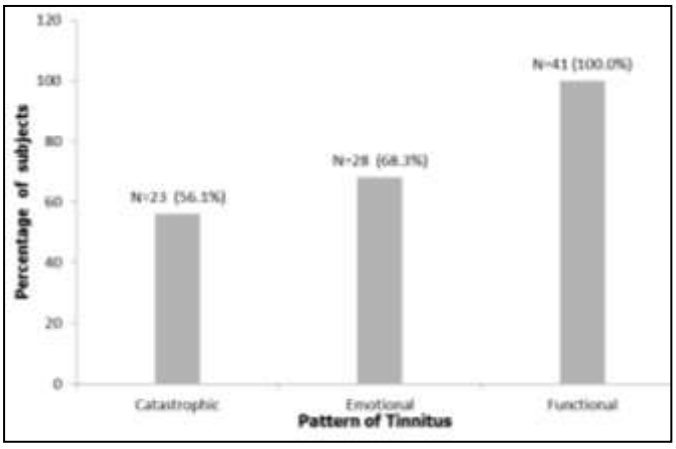

Fig 4: Showing the Pattern of Tinnitus

Discussion

The perception of sounds in the absence of a real external sound can be very disturbing to those who experience such. It may be seen by others as a form of auditory hallucination which is in reality a different term as there is absence of organization of its content [8]. Sawmill workers are particularly predisposed as they are exposed to loud occupational noise for prolonged period of time. Majority of the workers are males as seen in this study. This may be because of the nature of the job which requires a lot of physical strength.

The prevalence of tinnitus in the general population in Ile-Ife has been found to be 6.1% according to Adegbenro *et al.* [10]. In this study however, the prevalence was found to be 9.8%. This higher value may be because of the study population as the sawmill workers may be more predisposed due to significant noise exposure. The prevalence of tinnitus from this study was lower when compared with another local study by Osisanya *et al.* [11] who found a prevalence of 45% among 100 participants from the sawmill and a manufacturing firm in Ibadan and the tinnitus evaluated in this study could be as a result of a temporary threshold shift as the time of assessment after noise exposure was not specified in the study and this could account for the increase in prevalence of tinnitus among these workers. Tinnitus affects both males and females, young and the elderly. Tinnitus was found in both sexes in this study but most of the subjects with tinnitus were males, similar to what was found by Adegbenro *et al.* [10] in a study at same location. There were however more males than females in this study.

Tinnitus has also been noted as a preceding symptom of noise induced hearing loss [12]. According to Monley [13], the prevalence of tinnitus in those with noise induced hearing loss is twice that of the general population. Majority of participants

with tinnitus in this study had bilateral condition. This is typical of occupational noise induced hearing loss in which the condition is usually bilateral [14].

Out of the 41 participants that had tinnitus in this study, only 7.2% and 4.9% of them had moderate and catastrophic tinnitus respectively and these are more likely to have a change in their quality of life as they may also have associated sleep disturbance and hearing impairment respectively. There was a functional component for all that had tinnitus. This was followed by emotional component and then catastrophic component of the tinnitus. Tinnitus could cause insomnia [15]. Adequate sleep has been identified as very important to maintain day time alertness which is necessary for good performance [16]. This could account for why all the participants who had tinnitus in this study had a functional component of tinnitus. Tinnitus severity has been found to positively correlate with measures of anxiety and depression and this tend to have effect on emotional state and causing psychological stress1 [7, 18].

Consequently, tinnitus is prevalent among sawmill workers exposed to occupational noise affects both males and females, mostly bilateral among saw mill workers and has functional, emotional and catastrophic components. Those with catastrophic component may have associated disabling hearing loss.

Conclusion

Sawmill workers are predisposed to having tinnitus as they are exposed to significant occupational noise. The pattern of tinnitus is mainly bilateral, having physical, emotional and catastrophic components. We recommend further study to find how tinnitus affect the quality of life of sawmill workers.

Compliance with Ethical Standards

All authors declare that there is no conflict of interest. The study was done in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

The consent of the participants taking part in the study was obtained.

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