

# Evaluation of the Impact of Tinnitus on Health-Related Quality of Life amid Sawmill Workforces

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## Abstract

**Background:** Tinnitus is the phantom aural perception of sound lacking an exterior stimulus, a sub-type of auditory hallucination and it is a common sensation among noise-exposed employees. It is a symptom, not an illness. Tinnitus can be extremely perplexing for its subjects and it may perhaps disturb their health-related quality of life (HR-QoL) if exposed to extreme noises in many ways. **Objective:** This study is intended to discover the effects and pattern of tinnitus on health-related quality of life (HR-QoL) amid noise-exposed sawmill workforces. **Method:** This study was a prospective and public-centered cross-sectional study, including 510 sawmill personnel. 510 directorial staff was used as the control. Health-related quality of life (HR-QoL) of all subjects was assessed with the WHO Quality of Life brief questionnaire. Self-reported tinnitus morbidity was assessed by means of the Tinnitus Handicap Inventory. A correlation was established amid health-related quality of life scores and tinnitus severity scores. **Result:** There were 510 sawmill employees enlisted into the study, out of which 490 were men and 20 were women with control of the same age and sex. The mean age was  $36.85 \pm 7.68$  years for the sawmill workers and  $35.75 \pm 8.65$  years for the control group ( $t = 1.02$ ,  $P = 0.275$ ). The mean tinnitus score for the sawmill workers was  $20.80 \pm 2.56$ . Out of the 510 sawmill workers, 52 (10.2%) had tinnitus and one of the controls had tinnitus. The mean health-related quality of life scores were  $62.20 \pm 8.62$  and  $72.56 \pm 5.98$  for the sawmill workers and control group respectively. There was a substantial and remarkable difference between the health-related quality of life of the sawmill workers and the control group ( $P < 0.05$ ). Also, it was observed that there was a noteworthy drop in the overall physical and psy-

chological domains of the health-related quality of life scores with an increase in work environment noise level among sawmill employees and no major alteration was observed in the social and environmental aspects of the quality of life scores with change in occupational noise gains. **Conclusion:** The prevalence of tinnitus from this study was found to be 10.20% and an upsurge in tinnitus rigorousness was seen to be related with a substantial drop in physical, psychological and social domains of the health related quality of life. We highly endorse hearing conservation programmes and use of personal protective equipments for sawmills workers which will aid to decrease the effects of exposure to loud noise. Those sawmill labors already having tinnitus must attempt to go for treatment.

### Keywords

Tinnitus, Sawmill Workforces, Health-Related Quality of Life

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## 1. Introduction

The word “tinnitus” is derived from the Latin word “tinnire” which means ringing [1]. It is an anomalous awareness of sounds deprived of an exterior stimulus [2]. Tinnitus has also been described as a phantom auditory perception or head noise [3] [4]. It differs in frequency and in its loudness (amplitude) and is typically designated as ringing, hissing, buzzing, and clicking sensation [5]. Tinnitus differs from classical aural hallucinations which usually occur in subjects with central nervous system illnesses, psychiatric ailments and alcoholism [6]. This is because unlike aural hallucination there is lack of organization of its content. This disorder might be present with or without hearing damage [7]. Tinnitus is believed to result from altered auditory firing rate, and cochlear damage affecting the myelin insulation and a neurophysiologic model has also been suggested [3] [8] [9].

Tinnitus may possibly be objective or subjective [10]. Some reasons for subjective tinnitus comprise wax impaction, otitis media, ototoxic drugs, presbycusis, and tumors of the facial nerve (VII). Some reasons for objective tinnitus contain AV-malformations, palatal myoclonus, and glomus tumors. It is important to note that subjects of psychological tinnitus in which not at all a single organic origin is found have also been stated in the studies [11].

Researches have revealed that long-term exposure to loud sound could possibly be more vulnerable to tinnitus [12] [13]. Tinnitus frequently becomes a long-lasting and worrying symptom. Perceiving an abnormal sound moreover without an external stimulus could disturb sleep, the capability to concentrate on routine tasks, and performance and could possibly disturb the well-being of a person [14]. It could perhaps be as distressing as to the foundation of a range of psychosomatic ailments such as depression, mood glitches, emotional complications, and even suicidal endeavors. Hence, the objective of this study is to find

out the effects of tinnitus on health-related quality of life amid sawmill workforces as these employees are predominantly exposed to work-related occupational noise.

## 2. Materials and Methods

This is a prospective, population-based cross-sectional descriptive study involving sawmill workers in Ilorin. The data collection was done in October 2018 over a period of 15 days at the sawmill market, sawmill road and sawmill market at ASA Dam road in Ilorin, Kwara State. A sum of 510 sawmills workforces who agreed and matched the inclusion criteria was considered for the study. Inclusion criteria comprised all adult sawmill employees counting male and female from the age of 18 to 60 years who gave approval for the study. This was to conceivably eliminate background presbycusis which could also cause sensorineural hearing loss (SNHL). Exclusion criteria counted in any history and examination indicative of active ear ailment at the time of enrolment, history indicative of earlier chronic ear diseases such as chronic suppurative otitis media, recurring episode of vertigo, history of head injury, chronic medical disorders such as diabetes mellitus, sickle cell disease, chronic use of ototoxic drugs such as Aminoglycoside antibiotics, loop diuretics, salicylates, cytotoxic drugs.

The health-related quality of life of all subjects was assessed with the World Health Organization Health-Related Quality of Life (WHO-HRQoL) brief questionnaire and a preformed noise exposure evaluation questionnaire. The WHO-QoL brief questionnaire adheres to the WHO's definition of health as "a state of the whole physical, mental and social well-being and not merely the absence of disease or infirmity". It assumes a multi-centric outline of health-related quality of life (HR-QoL), dividing it into four important domains: Physical health (7 items), psychological well-being (6 items), social relationships (3 items), and environmental factors (8 items). Two further things assess overall quality-of-life and self-rated health which is classified as terribly poor, poor, neither well nor poor, well and very well. Each item is scored on a 5-point scale, where an increase in the score corresponds to a better quality of life evaluation.

The sound gain at each sawmill region was recorded with a sound level meter (Pulsar model 14 type 2, meets the accuracy of IEC 61672-1 standard for sound pressure level—SPL) when the machines were in working mode. A pure tone audiometry (PTA) was performed with a screening audiometer (Ambco Model 1000 + P) and the hearing threshold was assessed using the pure tone average of the better ear.

Ethical approval was sought from our institutional committee. Data were analyzed using Statistical Package for Social Sciences version 20.0 and a "P" value of <0.05 was acknowledged as statistically substantial. Results were displayed in expressive format.

## 3. Results

There were 510 sawmill employees enlisted into the study out of which 490 were

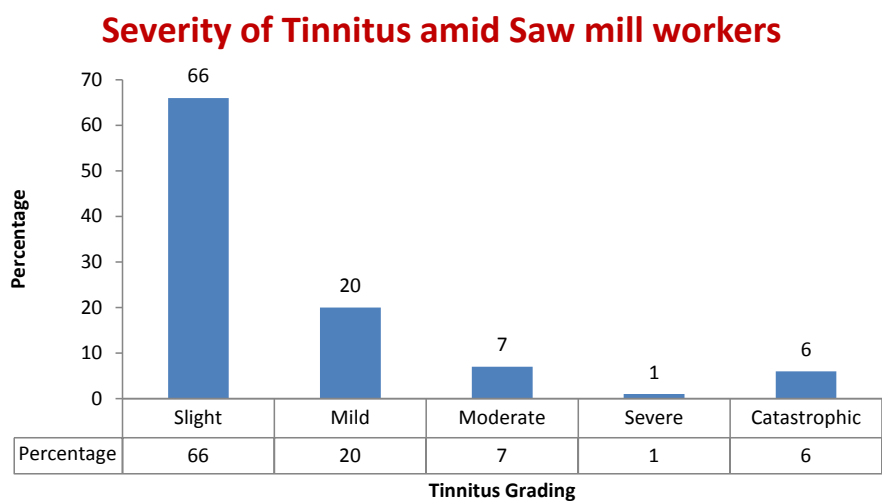
men and 20 were women with control of same age and sex. The mean age was  $36.85 \pm 7.68$  years for the sawmill workers and  $35.75 \pm 8.65$  years for the control group ( $t = 1.02, P = 0.275$ ). The mean tinnitus score for the sawmill workers was  $20.80 \pm 2.56$ . The severity of tinnitus is shown in **Figure 1**. The prevalence of tinnitus among the sawmill workers is 10.2% (**Figure 2**). Out of the 510 sawmill workers, 52 (10.2%) had tinnitus and one of the controls had tinnitus (**Figure 3**).

The mean health-related quality of life scores were  $62.20 \pm 8.62$  and  $72.56 \pm 5.98$  for the sawmill workers and control group respectively. There was a substantial and remarkable difference between the health-related quality of life of the sawmill workers and the control group ( $P < 0.05$ ) as shown in **Figure 3**.

**Table 1** shows that there was a noteworthy drop in the overall, physical and psychological domains of the health-related quality of life scores with an increase in work environment noise level among sawmill employees and no major alteration was observed in the social and environmental aspects of the quality of life scores with a change in occupational noise gains.

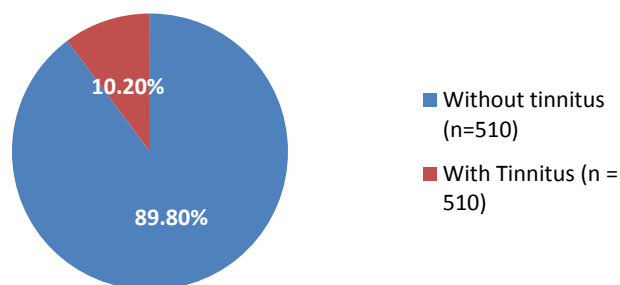
#### 4. Discussion

The auditory awareness of sounds in the lack of a real outside sound can be



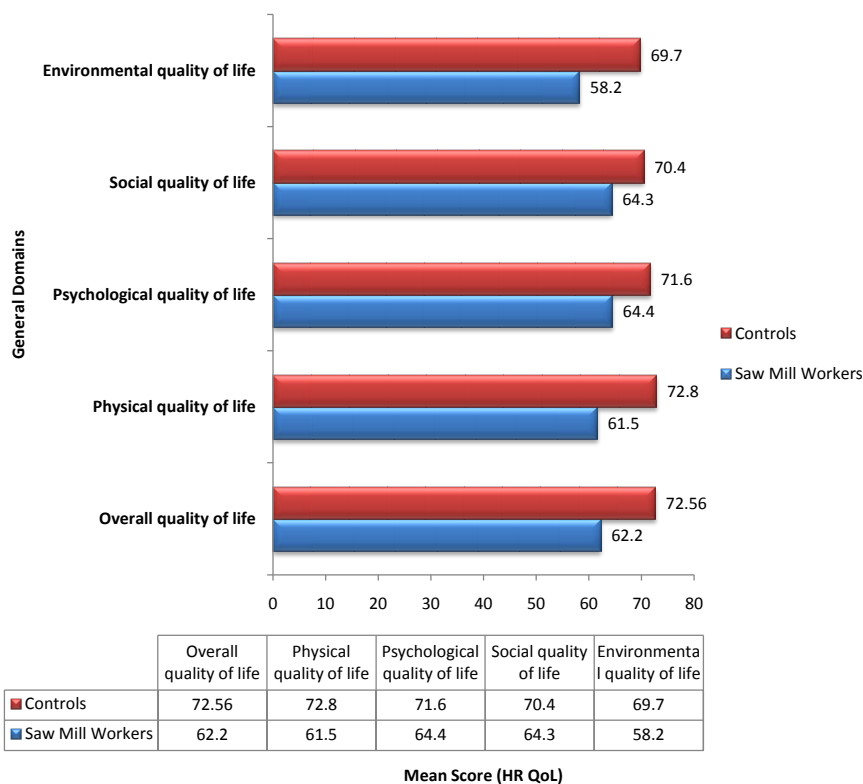
**Figure 1.** Severity of tinnitus amid sawmill workers.

#### Prevalence of tinnitus



**Figure 2.** Showing prevalence of tinnitus.

### Comparison of Health-related quality of Life amid sawmill workers and control group



**Figure 3.** Comparison of health-related quality of life amid sawmill workers and control group.

**Table 1.** P-values of the quality of life.

Variables	N	r	P Value
Overall quality of life and occupational noise	510	-0.181	0.012
Physical quality of life and occupational noise	510	-0.110	0.033
Psychological quality of life and occupational noise	510	-0.109	0.024
Social quality of life and occupational noise	510	-0.005	0.94
Environmental quality of life and occupational noise	510	-0.005	0.86

extremely upsetting to those who experience. It may be seen by others as a form of auditory hallucination which is, in reality, a different term as there is the absence of organization of its content [6]. Sawmill labors are predominantly susceptible as they are exposed to loud occupational noise for a lengthy period of the stretch. Majority of the workers are men as seen in this study. This may be due to the nature of the occupation which necessitates a lot of physical effort.

According to Axelsson and Prasher [15], noise contact is the most frequent causative factor of tinnitus. Tinnitus can cause a wide range of psychosomatic suffering which has the capability to subsequently affect health-related quality of life in numerous ways. The effects of symptom may well be psychosomatic, so-

cietal or corporal. This makes the WHO brief health-related quality of life questionnaire appropriate for this study. The health-related quality of life response of the participants was evaluated as psychological, social, physical and environmental according to the definition of health. Tinnitus being a subjective spectacle is very tough to measure and quantify objectively, hence its calculation in this study was done with a questionnaire to obtain values based on the response and description from the participants. The average tinnitus score among the sawmill workers was 20.8. This shows most of the workers had mild tinnitus. This level of tinnitus can affect sleep adversely which is a significant part of daily activity.

Though there is scarceness of comparative data on the level or grade of tinnitus amid sawmill labors, tinnitus is still known to affect physical happenings such as sleep, alertness, performance [16]. This study found that surge in tinnitus severity is associated with a reduction in the physical domain of the quality of life. Folmer and Griest [9] also stated that tinnitus could also be a reason for insomnia. Satisfactory sleep has been recognized as the key to sustaining daytime alertness which is essential for good performance [17]. This is predominantly important in the sawmill since the work is physically challenging. Meager performance has negative effects on health-related quality of life. Reduction in the physical aspect of quality of life which could possibly be in form of poor performance, sleep, alertness and this is very significant in the sawmill for good productivity. The upsurge inefficiency in the sawmills workers might pay to the nation-wide budget. Good performance and alertness in the sawmill workers could also help to reduce injuries among the workers as some of the possible injuries could be life-threatening.

Tinnitus rigorousness unfavorably affects the psychological and social domains of the health-related quality of life as perceived in this study. Awareness of abnormal sounds as in cases of tinnitus could affect some psychological variables such as depression, anxiety, and general well-being. Adoga [18] found that tinnitus could result in anxiety and depression. Also, Folmer *et al.* [19] found out that tinnitus severity positively correlated with measures of anxiety and depression. Sawmill workers need to be extremely stable psychologically to prevent unnecessary errors at work since they use heavy duty machines that require being careful to prevent physical casualties. Hence, the psychological consequence of tinnitus should never be overlooked. The effects of tinnitus also range on social life. This could possibly impact interactions within the workplace which is significant in preserving industrial harmony. Nevertheless, there was no significant connection between tinnitus severity and the environmental domain of health-related quality of life. There was additionally no noteworthy association amid tinnitus symptom rigorousness and overall health-related quality of life during this study. Teixeira *et al.* [20] and Roggerone [21] also observed no significant change in the quality of life among subjects with tinnitus. However, higher levels of health-related quality of life (good and very well) were reduced among sawmill workers when compared to the control. Tinnitus has therefore been shown to variously affect health-related quality of life adversely.

The limitations of the study are in the sample population and the fact that it is only two sawmill regions in the state that was used for the study.

## 5. Conclusions

The prevalence of tinnitus from this study was found to be 10.20% and an upsurge in tinnitus rigorousness was seen to be related with a substantial drop in physical, psychological and social domains of the health-related quality of life.

We endorse hearing conservation programmes and use of personal protective equipment for sawmills workers which will aid to decrease the effects of exposure to loud noise. Those sawmill labors already having tinnitus must attempt to go for treatment.

## Acknowledgements

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## Ethical Consideration

The study was done in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki declaration. The subjects gave their full consents for the study. The study protocol has been approved by the research institute's ethical and research committee of our institution.

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The research received no grants and was sponsored by the authors.

## Author Contributions

Shuaib K. Aremu designed the study, obtained and analyzed the data and did the write-up. Waheed A. Adegbiyi assisted in administering the questioner and literature review.

## Conflicts of Interest

There are no conflicts of interest among the authors.

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