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AWARENESS LEVEL OF AUDITORY RELATED DISEASES AND MEASURES OF LESSENING THE HEALTH NOISE ISSUES AMONG INDUSTRIAL WORKERS IN OSUN EAST, OSUN STATE, NIGERIA

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Abstract:
This study specifically determined the types of auditory-related diseases and the mitigation measures of health noise issues that could be used to reduce the health issues among workers in Osun East. A descriptive survey design was adopted for this study. A multi-stage sampling technique was used for the study. Two hundred and fifty (250) workers (both male and female) were selected from the selected industries in the study area. A self-structured questionnaire was used to gather information for the study. The study was validated by experts in the area of speciality and found reliable with test re-test method and yielded 87 a significance level. Findings revealed that 64.6% respondents were aware of health-related diseases, and 62.4% indicated that there are measures that can lessen health-related diseases. At the same time, 60.8% of the respondents stated that they had experienced various auditory-related diseases. Lastly, there was a significant relationship between the auditory-related diseases and the measures of lessening health issues among industrial workers. The study concluded that industrial workers need to

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be more diligent and measures of health-related diseases should be adhered to in the study areas. It was recommended that provision for lessening measures, such as first-aid box and equipment, safety gadgets should be made available to the workers and siting of industries around the residential areas should be eradicated.

Keywords: awareness level, auditory-related diseases, lessening health measures, industries, industrial workers

1. Introduction

The health of individuals as regards auditory issues is more likely to be traced to noise from industries, and this has been a problem in most countries, particularly in developing countries like Nigeria. Noise is associated with industries using heavy machines, which can lead to increased accidents and loss of productivity in these industries. Globally, noise is a type of sound which is considered undesirable, irritating, aggressive and always very loud, which affects human health, and has been one of the public issues. It is also one of the numerous environmental pollutions throughout the world. It can be termed as the propagation of noise with an impact on the physiological and psychological lives of individuals or animals (World Health Organization, 2005). Noise pollution can be referred to as improper or excessive sound that can be disastrous to people's health. The interactions between humans and machinery in numerous manufacturing facilities, as well as different places of work, commonly result in the manufacture of industrial noise. The primary source of noise in any industrial setting is linked with the relationship of human beings and noise power, like industrial machines (Fidell *et al.* 2022).

Happy Ears Hearing Center (2023) emphasizes that occupational noise exposure is a significant health concern in industrial settings, leading to permanent hearing loss with devastating effects on workers' health and quality of life. In a study conducted by Zhou and Zhang (2024), it was reported that occupational noise-induced hearing loss (NIHL) had an important risk factor that could be influenced by gender, working age, enterprise industry category, smoking, and drinking. Achalu (2024) described hazard as anything that causes accident, injury or ill-health. Industrial hazards are occupationally induced injuries which occur as a result of human interaction with the industrial environment and in the handling of equipment and machinery at various stages of production, extraction, processing, manufacturing, storage, distribution and the disposal of the unneeded parts. According to Gedik *et al.* (2025), the adverse effects of industrial noise and prominent hearing thresholds at 2000, 4000, and 6000 Hz in workers result to higher noise levels. In the same vein, CDC (2024), stated that approximately 12% of workers in the U.S. have hearing difficulty, 8% suffer from tinnitus, while a significant 53% workers in the industries were reported not wearing hearing protection.

In a study conducted by Jo and Baek (2024), the effects of noise-induced hearing loss (NIHL) on sleep quality, daily life health conditions, and workplace problems among workers were found to have a significant effect on sleep quality, daily life health, and

workplace health problems. Carson (2023), in a submission, stated that manufacturing noise directly impacts workers' hearing abilities over time, which can lead to noise-induced hearing loss (NIHL), which may not immediately be noticed due to its gradual onset. Li *et al.* (2019) reported that occupational noise exposure on workers' individual health showed a significantly higher risk of hypertension and hearing loss compared to those with low exposure. The CDC (2024) stressed that occupational hearing loss can be a permanent condition but can also be preventable. It is often caused by exposure to loud noise, specifically in the workplace.

The NIDCD (2020) explained that noise-induced hearing loss (NIHL) can be immediate or gradual, and temporary or permanent, and can affect one or both ears from prolonged exposure to loud noise. Shi *et al.* (2021) conducted a methodical review on occupational hearing loss and found that there is a positive correlation between the prevalence of HFNIHL and age, cumulative noise exposure, and exposure duration. The WHO (2019), identified loud noise exposure as a significant factor contributing to deafness and hearing loss across the lifespan. According to CDC (2024), exposure to industrial noise can lead to a variety of health problems, characterized into auditory and non-auditory effects. The most commonly recognized auditory effect is Noise-Induced Hearing Loss (NIHL). Noise represents an important public health problem that can lead to hearing loss, sleep disruption, cardiovascular disease, social handicaps, reduced productivity, annoyance reaction, absenteeism and accidents (Musbah 2021).

Lie *et al.* (2016) conducted a systematic review on occupational noise exposure and found that occupational noise exposure causes between 7% and 21% of hearing loss among workers, with a lower incidence in industrialized countries due to preventive measures. Gannouni N. *et al.* (2023) stated that noise produces direct and cumulative adverse effects on human health, thereby contributing to hearing loss, tinnitus, changes in heart rate, and sleep disorders, and may also affect various physiological and psychological aspects of workers. The most effective control measure for the noise source from the workplace is the redesign processes of replacing the noise source with essentially quiet alternatives (CDC, 2024). Substituting noisy equipment with noiseless alternatives or opting for low-noise tools and machinery can significantly reduce overall noise levels.

Doshs (2022) stated that awareness among workers on the preventive measures on auditory health threats in the workplace is achieved through training of workers and organize seminars for the workers to help in identifying occupational auditory health threats and cases of ill health among workers at the workplace. Mitchel (2023) claimed that industrial hazards are threats to human safety and life support systems that result from the large production of goods and services. He emphasized that industrial hazards can be categorized into the following categories when the harm they pose surpasses human coping mechanisms or the capacity of the human body to absorb them. Mitchel (2021) stated that threats to human life and life support systems resulting from large-scale production of commodities and services, and that industrial disasters arise when the

danger (presented by hazards) surpasses human coping capabilities or the absorptive powers of environmental systems.

According to Abbat (2024), noise is a prevalent occurrence in contemporary society and a harmful component of all human activity. When evaluating noise's effects on human health, it is typically divided into two categories: occupational noise, or noise in the workplace, and environmental noise, or noise in all other settings, such as the community, homes, or other places. According to the study conducted by Owolawi (2021), it was revealed that there was a substantial difference in the hearing verge within the industries connected to the theory of excessive noise in a given environment, which affects people's and employees' hearing. It was also noted that appropriate hearing protection is not used for prolonged hours or times.

Von Gierke (2025) stated that high-level noise not only hinders communication between workers, but depending on the level, quality and exposure duration of noise, it may also result in different types of physical, physiological and psychological effects on the workers. The acceptable noise exposure standard in the workplace is 85 dB(A) averaged over an eight-hour period. This is not to imply that below 85 dB(A) a safe condition exists. It simply means that an eight-hour exposure of 85 dB(A) is considered to represent an acceptable level of risk to hearing health in the workplace. Industrial centers are supposed to be situated far from where humans reside to prevent industrial auditory health threats (Von Gierke, 2025).

2. Statement of the Problem

The establishment of industries provides services that require the employment of workers in the industries. But in the industries, there is always noise in the production of goods which is unavoidable; such noise is usually from the heavy machines, generators and other equipment and facilities, in use. This unwanted noise may have a perceived cause of auditory health hazards, which has the ability to damage the auditory nerve of workers in the industry. There is a dearth in the study of the auditory-related diseases and the lessening health measures among industrial workers in this study area; hence, this study.

2.1 Objectives of the Study

1) Examine the awareness level of auditory-related diseases among industrial workers in Osun East of Osun State;
2) Determine the awareness level of lessening measures of auditory-related diseases among industrial workers in the study area,
3) Identify the auditory health issues/diseases experienced among the industrial workers in the study area.

2.2 Research Questions

1) What is the awareness level of auditory-related diseases among industrial workers in Osun East of Osun State?
2) What is the awareness level of lessening measures of auditory-related diseases among industrial workers in the study area? and
3) What are the diseases/issues relating to auditory disorder experienced in the industries among the industrial workers in the study area?

2.3 Research Hypothesis

Hypothesis: There is no significant relationship between the auditory-related diseases and the lessening measures among industrial workers in Osun East of Osun State.

3. Methodology

The study adopted a descriptive survey research design. The population for the study consisted of all workers in the selected industries in Osun East of Osun State.. The sample size comprised two hundred and fifty respondents. A multistage sampling procedure was used to select the sample for the study. Five industries were selected from all the industries in the state using a simple random sampling technique. From the selected industries, 50 respondents were selected from each industry, making a total of 250 respondents using an accidental sampling technique. Stratified sampling was taken into consideration in selecting the gender. A self-structured instrument titled "Awareness Auditory-Related Diseases Lessening Health Measures" was used for this study. The instrument was validated by two experts related to the field of the research, and the reliability of the instrument was determined by a pilot study of test re-test method, which yielded a coefficient at 89 significant level. The data analyze was done with the help of 6 trained research assistants, and the data analysis was analyzed using both descriptive statistics of simple percentages and inferential statistics of (SPSS) (chi-square analysis.

4. Results and Findings

Research question 1: What is the awareness level of auditory-related diseases among industrial workers in Osun East of Osun State?

Table 1: Respondents' responses to the awareness level of auditory-related diseases among industrial workers in the study areas

S/N	Items	Highly Aware	Aware	Not Aware	Undecided
1	Are you aware that an ear infection is an auditory-related disease?	100 (40%)	75 (30%)	50 (20%)	25 (10%)
2	Are you aware that deafness is an auditory-related disease?	88 (35%)	58 (23.2%)	54 (21.8%)	50 (20%)
3	Are you aware that conductive hearing loss is an auditory-related disease?	90 (36%)	50 (20%)	48 (19.2%)	62 (24.8%)
4	Are you aware that mixed hearing loss is an auditory-related disease?	50 (20%)	60 (24%)	76 (30.4 %)	64 (25.6%)
5	Are you aware that tinnitus (a sensation of noise in the head) is an auditory related disease?	50 (20%)	54 (21.8%)	88 (35%)	58 (23.2%)
6	Are you aware that stress is an auditory-related disease?	50 (20%)	78 (31.2%)	70 (28%)	52 (20.8%)
7	Are you aware that a headache is an auditory-related disease?	100 (40%)	75 (30%)	50 (20%)	25 (10%)
8	Are you aware that hypersensitivity is an auditory-related disease?	50 (20%)	25 (10%)	100 (40%)	75 (30%)
9	Are you aware that memory loss is an auditory-related disease?	58 (23.2%)	78 (31.2%)	64 (25.6%)	50 (20%)
10	Are you aware that brain damage is an auditory-related disease?	70 (28%)	64 (25.6%)	58 (23.2%)	58 (23.2%)

The table showed that 100(40%) respondents were highly aware and 75(30%) respondents were aware that ear infection is an auditory-related disease. In the same vein, a total of 100(40%) respondents were highly aware, and 75(30%) respondents were aware that headache is an auditory-related disease. In respect of being aware that deafness is an auditory-related disease, a total of 88(35%) respondents and 58(23.2%) respondents were highly aware and aware, respectively. Likewise, respondents just above the average number were aware of auditory-related diseases in the industries among industrial workers, as stated in items 3, 6, 9 and item 10. Generally, a total of 70.6% respondents were highly aware of the diseases/issues relating to auditory disorders. This might be because many of the workers had been sensitized or educated about the diseases that were related to auditory disorders.

Research question 2: What is the awareness level of health measures to lessen the auditory-related diseases among industrial workers in Osun East of Osun State?

Table 2: Respondents' responses to the awareness level of health measures to lessen the auditory-related diseases among industrial workers in the study area

S/N	Items	Highly Aware	Aware	Not Aware	Undecided
1	I am aware that using hearing protection can help lessen auditory-related diseases	74 (29.6%)	82 (32.8%)	44 (17.6%)	50 (20%)
2	I am aware that using medications properly as directed can help reduce//lessen the risk of auditory-related diseases	88 (35.2%)	68 (27.2%)	50 (20%)	44 (17.6%)
3	I am aware that understanding the warning signs of hearing damage can help reduce/lessen the risk of auditory-related diseases.	50 (20%)	60 (24%)	52 (20.8%)	88 (35.2%)
4	I am aware that regular visits to your doctor for regular health check-ups can help lessen auditory-related disease.	90 (36%)	54 (21.6%)	56 (22.4%)	50 (20%)
5	I am aware that implementing engineering and administrative controls can help reduce/lessen the risk of auditory-related diseases.	74 (29.6%)	72 (28.8%)	54 (21.6%)	50 (20%)
6	I am aware that regular training and organize seminars in the industries can help to lessen/reduce auditory-related diseases in the workplace.	100 (40%)	88 (35.2%)	37 (14.8%)	25 (10%)

Table 2 above showed that many respondents identified that they were aware of health measures to lessen the auditory-related diseases among industrial workers, with all the items on the table except for only three who stated that they were not aware, and they were not sure about this statement. Some respondents did not even decide on what it meant to decrease/lessen auditory-related diseases. This implied that some of these respondents, despite working in the industries, still could not understand how to lessen the measures of auditory-related diseases. This might be because the management did not give the industrial workers training so that they could comprehend and flow smoothly with the industrial system.

Research question 3: What are the diseases/issues relating to auditory disorder experienced in the industries among the industrial workers in the study area?

Table 3: Respondents' responses on the diseases/issues relating to auditory disorders experienced among the industrial workers in the study area?

S/N	Items	Respondents 250 (100%)	
		Yes	No
1	I do experience headaches as an auditory-related issues/disease.	220 (88%)	30 (12%)
2	I do experience memory loss as an auditory-related issues/disease.	150 (60%)	100 (40%)
3	I do experience mental health issues, such as auditory-related issues/diseases.	30 (12%)	220 (88%)

4	I do experience partial hearing loss as an auditory-related issues/disease.	150 (60%)	90 (40%)
5	I do experience ear infection as an auditory-related issues/disease.	158 (63.2%)	92 (36.8%)
6	I do experience cardiovascular issues as auditory-related issues/diseases.	150 (60%)	100 (40%)
7	I do experience deafness as an auditory-related issue or diseases.	15 (6%)	235 (94%)
8	I do experience tinnitus (a sensation of noise in the head as an auditory-related issue/disease	186 (74.4%)	64 (25.6%)
9	I do experience hypertension as an auditory-related issues/disease.	158 (63.2%)	92 (36.8%)
10	I do experience sleep disturbance as an auditory-related issues/disease.	200 (80%)	50 (20%)
11	I do experience nervousness/tension as an auditory-related issues/disease.	158 (63.2%)	92 (36.8%)
12	I do experience stress/emotional reaction as auditory-related issues/diseases.	220 (88%)	30 (12%)

From Table 3 above, a substantial number of respondents identified that they have experienced a number of diseases or issues relating to auditory disorders in the industries with items 1, 2, 4, 5, 6, 8, 9, 10, 11, and 12. But some of the respondents did not experience many identified items 3, and 7 as the diseases/issues relating to auditory disorders experienced by them. This showed that the respondents did experience many diseases/issues relating to auditory disorders.

Hypothesis Testing: There is no significant relationship between the auditory-related diseases and the lessening health measures among industrial workers in Osun East of Osun State, Nigeria.

Table 4: X^2 Calculation of a significant relationship in the auditory-related diseases and the lessening health measures among industrial workers in Osun East of Osun State

Variables	Tab x^2 Value	Level of Significance	Df	Cal x^2 Value	Decision
Auditory-related diseases Lessening health measures	8.026	0.05	3	22.541	Rejected.

The above table showed a higher table value of 8.026 while the calculated value was 22.541, degrees of freedom = 6, at a 0.05 level of significance. The stated hypothesis was therefore rejected, meaning that there was a significant relationship which existed between the auditory-related diseases and lessening measures among industrial workers in Osun East of Osun State, Nigeria.

5. Discussion of Findings

This section discusses the major findings of this study based on the research objectives and hypothesis.

One of the findings stated that a total of 64.6% respondents were highly aware of the diseases/issues relating to auditory disorders. Further findings revealed that the respondents were aware that regular training and organize seminars in the industries can help to lessen/reduce auditory-related diseases with 62.4% responses. This is in line with the findings of Doshs (2022), who stated that awareness among workers on the preventive measures for auditory health threats in the workplace is achieved through training of workers and organize seminars for the workers to help in identifying occupational auditory health threats.

Another finding showed that the respondents experienced diseases/issues relating to auditory disorders in the industries, with 158(63.2%). This correlates with Li *et al.* (2019), who reported that occupational noise exposure on workers' individual health showed a significantly higher risk of hypertension and hearing loss compared to those with low exposure.

Another finding revealed that the respondents experienced sleep disturbance as an auditory-related issues/diseases with 200(80%) respondents. This is in line with the study conducted by Jo and Baek (2024), which found that the effects of noise-induced hearing loss (NIHL) have a significant impact on sleep quality, daily life health and workplace health problems. Gannouni N. *et al.* (2023) stated that noise has direct and cumulative adverse effects on human health, thereby contributing to sleep disorders. Further findings showed that the respondents experienced tinnitus (a sensation of noise in the head as an auditory-related issues/diseases with 186 (74.4%). This relates to Gannouni N. *et al.* (2023), who stated that noise produces direct and cumulative adverse effects on human health, thereby contributing to hearing loss, tinnitus,

Lastly, another finding showed that there was a significant relationship between the auditory-related diseases and the lessening measures among industrial workers in the study area.

6. Conclusion

Based on the findings, the following were drawn:

There were fairly above-average responses from the respondents in the three research questions. Despite this, there is still a need to create awareness for the industrial workers to be more equipped with more information.

6.1 Recommendations

The following recommendations were made:

1) Seminars, workshops, and conferences should be organized for workers by the industrial management to create awareness to enable them to understand that auditory-related diseases are a result of noise from the industries.
2) The management of the selected industries should make provision for measures such as first aid boxes and equipment, safety gadgets for the workers to reduce/prevent auditory diseases that might be contracted through the industrial noise.
3) The management of the selected industries should make provision for medical check-ups and possibly provide a health centre in the industry.
4) The governmental and non-governmental health agencies should create more awareness of the consequences of noise pollution on the health of an individual.
5) The government should also create laws that will eradicate the siting of industries around residential areas because of the general populace.

Conflict of Interest Statement

The authors declare no conflicts of interest.

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