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PERCEIVED EFFECTS OF NOISE POLLUTION ON WELL-BEING OF WORKERS IN DANGOTE FLOUR MILL FACTORY, ILORIN, KWARA STATE, NIGERIA.

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Abstract

This study investigates the perceived effects of noise pollution on the well-being of workers in Dangote Flour Mill Factory, Ilorin, Kwara State. A descriptive research design of the survey type was used for the study. The population for the study comprised all Dangote Flour Mill factory workers, Ilorin, Kwara State. Multi-stage sampling technique was used to select 420 respondents. A researcher designed a questionnaire, which was validated by the supervisor and three other experts from the Departments of Health Promotion and Environmental Health Education, University of Ilorin was used. A reliability coefficient of r = .70 was obtained through a test-retest method using Pearson Product-Moment Correlation. Questionnaires were administered and collected by the researcher with three trained research assistants. Descriptive statistics of frequency counts and percentages were used to analyse the demographic data, while the inferential statistics of Pearson Product-Moment Correlation were used to test the null hypotheses set for the study at 0.05 alpha level. The findings of the study revealed that hearing loss with (calculated r value = 0.477> critical r value = 0.082 degree of freedom = 418), sleep pattern with (calculated r value = 0.521 > critical r value = 0.082 degree of freedom = 418) and mental health with (calculated r value = 0.618 > critical r value = 0.082 degree of freedom = 418). The study concluded that hearing loss, sleep patterns, and mental health are significant perceived effects of noise pollution on the well-being of workers in Dangote Flour Mill, Ilorin, Kwara State. Based on the conclusion, the following recommendations were made: The use of hearing pad to prevent hearing loss should be enforced among the factory workers, and those already suffering from hearing loss should go for proper medical care. Factory workers should not live near factory areas to have better and more restful sleeping patterns. Finally, factory workers should be given time to rest at intervals of hours to allow them to have mental alertness, and for workers already having mental health problems, job security and adequate mental health care should be provided for them.

Introduction

The basic working definition of well-being proposed by White (2020) includes doing well, a material dimension referring to standards of living; feeling good, the subjective perception; as well as a dimension of doing good and feeling well, incorporating the idea of living a good life, which emphasises the importance of people's relationships with others. The framework also considers three interdependent dimensions of well-being: material, relational, and subjective. Shargorodsky et al. (2020) reported that $1.3 billion in Veterans Administration tinnitus-related disability compensation was expended in 2010. Subjective tinnitus following noise-induced hearing loss is the most common form of chronic tinnitus. Temporary tinnitus was far more common than chronic tinnitus. Nearly everyone has experienced a temporary ringing in the ears after intense sound exposure, such as a loud concert or a gunshot. Although noise-induced temporary tinnitus does not pose the debilitating health concerns that chronic tinnitus does, it may share critical mechanisms with chronic tinnitus caused by noise-induced hearing loss. A second prominent field of noise study has been sleeping disturbance patterns. In part, this has been of interest because noise during sleep disrupts sleep and may produce increased annoyance through remembered awakenings (Basner et al., 2024). About 450 million people suffered from mental health disorders as a result of being exposed to excessive noise pollution, according to estimates given in the WHO's World Health Report (2020). One person in four will develop one or more mental or behavioural disorders during their lifetime (WHO, 2021).

In Nigeria, the problem of noise pollution is widespread because it is regarded as one of the major environmental pollutions that has direct effects on human performance (Debasish & Debasish, 2024). Thus, the survival and healthy existence of man, according to Otukong (2022), depend largely on the enabling environment where he/she resides, as disruption in the conducive environment may lead to dysfunction in his health status. Noise is derived from the Latin word "nausea," implying 'unwanted sound' or 'sound that is loud, unpleasant, or unexpected and it is considered as pollution because of the noxious and unwanted sound it emits into the environment (Singh & Davar, 2024). According to Berman et al. (2023), noise originates from human activities, especially the urbanisation and the development of transport and industry. Consequently, pollution, according to Yilmaz and Ozer (2021), is the introduction of contaminants into the natural environment that cause adverse change. They submitted that pollution can take the form of chemical substances or energy such as noise, heat, or light.

Noise pollution in Nigerian cities is relatively high when compared to recommended levels by the World Health Organization (Oyedepo, 2022). Geetha and Ambika (2020) define noise pollution as a series or more noise that may damage activity or human life. They observed that construction equipment, jet planes, road traffic, garbage trucks, and manufacturing processes are some of the major sources of noise pollution. They opined that noise pollution is of two types: the first is noise hazards,

which leads to permanent hearing loss and neural stress, while the second type of noise pollution is noise nuisance, which encompasses mental stress, irritability, sleep interference, hearing loss, and loss of concentration. Meanwhile, noise-induced hearing loss is seen as the major source of concern to factory workers: Well-being due largely to its health for Noise Noise-induced hearing loss is defined as injury to the inner ear caused by prolonged exposure to loud noise (Bredenkamp & Schoenfield, 2024). Occupational noise-induced hearing loss develops slowly in response to frequent exposure to excessive noise and affects a considerable number of factory workers (Muhammed et al., 2025; Concha-Barrientos et al., 2024).

Nigerian cities are environmentally noise-polluted: Road traffic, industrial machinery, and generators are the major sources of noise pollution in the country (Oyedepo, 2012). Therefore, Hakeem (2024) affirmed that there is a need for proper implementation of rules and regulations, public enlightenment, education, and sensitisation on the hazards, dangers, and human health problems associated with noise pollution. Consequently, emphasised that the non-auditory effects of noise on humans are viewed as being generally stress-related, following observations that noise exposures endanger physiological reactions typical to those of stress. Noise seems to have a negative effect on performance, and it appears that the longer the exposure, the greater the effect (Goines & Hagler, 2023). It is well accepted that noise pollution has a negative effect on the physical, mental, and social health of individuals who are exposed to constant noise, which is because individuals do not make use of health information disseminated to them on the dangers of the harmful effects of noise on their health (Nicholsen & Smitherman, 2019: Sule et al., 2021).

According to Haines et al. (2022), permanent hearing loss, muscle tension, high blood pressure, increased aggression, headaches, migraine, irritability, insomnia, and psychological disorders are the health hazards caused by noise pollution. The effects of noise on conscious subjects are insidious and result in increased psychosocial stress that may influence subsequent stress among factory workers (Akorede et al., 2021; Babisch et al., 2023). The researchers, therefore, investigate the perceived effects of noise pollution on workers' well-being: A case study of Dangote factory, Ilorin, Kwara State, Nigeria. Studies have shown that noise levels in metropolitan cities exceed the standard limits (Miller et al., 2021). The equivalent environmental noise level of 70 dB(A) Laeq, 24h has been recommended by WHO for industrial, commercial, shopping, and traffic areas, indoors and outdoors areas to prevent impairments (Oyedepo, 2022). Defining well-being is especially challenging because of the different ways in which the concept is understood in different contexts and by different people. However, rather than being driven by a definition, researchers have focused on dimensions and descriptions (Dodge et al., 2022).

Statement of the Problem

Noise pollution is a slow and subtle killer. Noise pollution has become worrisome and a very serious concern because of its effects on workers' health it creating a public health problem that may lead to hearing impairment and low quality of life. Industrial employees are exposed to noise from a variety of sources, such as noise from industrial engines, stationary vehicles inside the industry, compressors and pneumatic tools in garages, workshops, and maintenance areas, hand-held power tools, heavy machinery and other equipment, ventilation systems operating at substandard levels, and human sources such as co-workers. Ahmed, Dennis, Badran, Ismail, Ballal, Ashoor & Jerwood (2023) affirmed that exposure to high occupational noise, which may result in health risks, is commonly encountered in a variety of industrial processes. Its effects depend not only on the intensity but also on exposure time, frequency, and the type of noise. Interaction with the factory workers reveals that noise pollution has negative effects on their well-being and auditory system, which has resulted in hearing loss, poor sleeping patterns, and mental health issues. Based on the above, the researcher embarks on the investigation on the perceived effect of noise pollution on the well-being of the workers in Dangote Flour Mill Factory Workers Ilorin, Kwara State, Nigeria.

Research Questions

The following Research Questions were raised to guide the study;

1. Will hearing loss be a perceived effect of noise pollution on the well-being of workers in Dangote Flour Mill, Ilorin, Kwara State, Nigeria?
2. Will sleep pattern be a perceived effect of noise pollution on the well-being of workers in Dangote Flour Mill, Ilorin, Kwara State, Nigeria?
3. Will mental health be a perceived effect of noise pollution on the well-being of workers in Dangote Flour Mill, Ilorin, Kwara State, Nigeria?

Research Hypotheses

The following Research Hypotheses were tested.

1. Hearing loss will not significantly be a perceived effect of noise pollution on the well-being of Workers in Dangote Flour Mill, Ilorin, Kwara State, Nigeria.
2. Sleep pattern will not significantly be a perceived effect of noise pollution on the well-being of Workers in Dangote Flour Mill, Ilorin, Kwara State, Nigeria.
3. Mental health will not significantly be a perceived effect of noise pollution on the well-being of Workers in Dangote Flour Mill, Ilorin, Kwara State, Nigeria.

Methodology

The research design that was adopted for this study is descriptive research of a survey type. This method was chosen because the study required the researcher to collect personal and general information for the research. The population for the study was all factory workers at Dangote Flour Mill, Ilorin, Kwara State, with a total of four thousand two hundred and two (4,202)

(Dangote Flour Mill Bulletin, 2016). A multistage sampling technique was used for the study. A proportionate sampling technique of 10% was used to select four hundred and twenty (420) respondents. While simple random sampling technique was used to select the respondents. The research instrument used for this study was a structured questionnaire developed by the researcher. The instrument was validated by three experts and the researcher's supervisor in the Department of Health Promotion and Environmental Health Education, University of Ilorin, Kwara State. The reliability was carried out at Groove Food Processing Mill Factory, Ilorin, Kwara State, which has a similar geographical location to the place of research work, using test re-test method using twenty respondents. The result obtained was subjected to statistical analysis of Pearson Product-Moment Correlation, and a correlation coefficient of 0.70 was obtained. This was high enough to make the research instrument reliable enough for the study. The researcher, together with three trained research assistants, administered the instrument to the respondents. Their consents were sought for the study. The content of the questionnaire was explained in detail to the respondents to rule out ambiguity or lack of understanding of the questionnaire that was used for the study. The instrument was retrieved immediately to avoid loss. The data collected for this study were subjected to inferential statistics of Pearson Product-Moment Correlation to analyze the data collected for the study at 0.05 alpha level.

Results

Hypotheses Testing

Ho_1: Hearing loss will not significantly be a perceived effect of noise pollution on the well-being of Workers in Dangote Flour Mill, Ilorin, Kwara State, Nigeria.

Table 1: Pearson 'r' Correlation Analysis on the effect of Noise Pollution on Hearing Loss.

Variable	N	$\bar{X}$	S. D	df	Calculated r value	Critical r value	Remark
Noise Pollution and Hearing Loss.	420	26.51	3.612	418	0.477	0.082	Ho rejected
		19.11	2.301				

@ 0.05 alpha level

The result of the analysis shows the calculated r value of 0.477 is greater than the table r value of 0.082 with degrees of freedom 418 at 0.05 alpha level. Hence, the null hypothesis was rejected. This implies that hearing loss is a significant perceived effect of noise pollution on the well-being of workers in Dangote Flour Mill, Ilorin, Kwara State, Nigeria.

Ho_2: Sleep pattern will not significantly be a perceived effect of noise pollution on the well-being of Workers in Dangote Flour Mill, Ilorin, Kwara State, Nigeria.

Table 2: Pearson 'r' Correlation Analysis on the effect of Noise Pollution on Sleep Pattern.

Variable	N	$\bar{X}$	S. D	df	Calculated r value	Critical r value	Remark
Noise Pollution and Sleep Pattern.	420	12.01	2.612	418	0.521	0.082	Ho rejected
		10.17	2.141				

@ 0.05 alpha level

The result of the analysis shows the calculated r value of 0.521 is greater than the table r value of 0.082 with degree of freedom 418 at 0.05 alpha level. Hence, the null hypothesis was rejected. This implies that sleep pattern is a significant perceived effect of noise pollution on the well-being of workers in Dangote Flour Mill, Ilorin, Kwara State, Nigeria.

Ho_3: Mental Health will not significantly be a perceived effect of noise pollution on the well-being of Workers in Dangote Flour Mill, Ilorin, Kwara State, Nigeria.

Table 3: Pearson 'r' Correlation Analysis on the Effect of Noise Pollution on Mental Health.

Variable	N	$\bar{X}$	S. D	df	Calculated r value	Critical r value	Remark
Noise Pollution and Mental Health	420	26.01	1.212	418	0.618	0.082	Ho rejected
		24.11	1.101				

@ 0.05 alpha level

The result of the analysis shows the calculated r value of 0.618 is greater than the table r value of 0.082 with degree of freedom 418 at 0.05 alpha level. Hence, the null hypothesis was rejected. This implies that mental health is a significant perceived effect of noise pollution on the well-being of workers in Dangote Flour Mill, Ilorin, Kwara State, Nigeria.

Discussion of Findings

The finding in hypothesis 1 revealed that hearing loss is a significant perceived effect of noise pollution on the well-being of workers in Dangote Flour Mill in Ilorin, Kwara State, Nigeria. This finding is in line with Nondahl et al. (2022) and Shargorodsky et al. (2020), who reported that $1.3 billion in Veterans Administration tinnitus-related disability compensation was expended in 2010. Subjective hearing loss following noise-induced hearing loss is the most common form of chronic hearing loss. Temporary deafness is far more common than chronic deafness. Nearly everyone has experienced a temporary ringing in the ears after intense sound exposure, such as a loud concert or a gunshot.

Although noise-induced temporary deafness does not pose the debilitating health concerns that chronic tinnitus does, it may share critical mechanisms with chronic hearing loss caused by noise-induced hearing loss. The reversibility of temporary deafness offers practical experimental advantages, such as the ability to compare brain activity. Although noise-induced

temporary hearing loss does not pose the debilitating health concerns that chronic hearing loss does, it may share critical mechanisms with chronic deafness caused by noise-induced hearing loss. The reversibility of temporary hearing loss offers practical experimental advantages, such as the ability to compare brain activity when the animal is or is not experiencing hearing loss. For example, temporary hearing loss produced by high doses of salicylate alters both driven and spontaneous activity levels and inhibitory function at multiple levels of the auditory system, including the cochlear nucleus, inferior colliculus, and auditory cortex (Holt et al., 2020).

Hypothesis 2 revealed that sleep pattern is a significant perceived effect of noise pollution on the well-being of workers in Dangote Flour Mill, Ilorin, Kwara State, Nigeria. This finding is in line with Prematunga (2022), who suggested that for most people, sound is an important and meaningful contributor to the experience of their environment and their daily activities. However, unwanted sound may interrupt sleep patterns where quiet is desirable, distract concentration, reduce the quality of communication, and contribute to the stress of individuals (Berglund, 2020). Much research has focused on addressing the fairly clear quality-of-life effects associated with annoyance by intrusive noises during sleep. A second prominent field of noise study has been the sleeping disturbance pattern. In part, this has been of interest because noise during sleep disrupts sleep and may produce increased annoyance through remembered awakenings (Basner et al., 2024).

Hypothesis 3 revealed that hearing loss is a significant perceived effect of noise pollution on the well-being of workers in Dangote Flour Mill, Ilorin, Kwara State, Nigeria. This finding is in line with WHO (2023), which reported that mental and behavioural disorders are not exclusive to any special group: they are found in people of all regions, all countries, and all societies. About 450 million people suffer from mental health disorders as a result of being exposed to excessive noise pollution. According to estimates given in the WHO's World Health Report (2021). One person in four will develop one or more mental or behavioural disorders during their lifetime (WHO, 2023). Mental and behavioural disorders are present at any point in time in about 10% of the adult population worldwide, especially those working in the factory.

Conclusions

Based on the findings of this study, it was concluded that;

1. Hearing loss is a significant perceived effect of noise pollution on the well-being of workers in Dangote Flour Mill, Ilorin, Kwara State, Nigeria.
2. Sleep pattern is a significant perceived effect of noise pollution on the well-being of workers in Dangote Flour Mill, Ilorin, Kwara State, Nigeria.
3. Mental health is a significant perceived effect of noise pollution on the well-being of workers in Dangote Flour Mill, Ilorin, Kwara State, Nigeria.

Recommendations

The following recommendations were made based on the findings of the study;

1. The use of hearing pads to prevent hearing loss should be enforced among factory workers, and those already suffering from hearing loss should go for proper medical care.
2. Factory workers should not live near factory areas to have better sleeping patterns.
3. Factory workers should be given time to rest at intervals of hours to allow them to have mental alertness, and for workers already having mental health problems, job security and adequate mental health care should be provided for them.

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