

**KNOWLEDGE AND AWARENESS OF NOISE POLLUTION AND ITS
ASSOCIATED HEALTH IMPACTS AMONG RESIDENTS OF UGBOWO
COMMUNITY, BENIN CITY**

BY

Blessing Oluwaseun ADEWUMI

**DEPARTMENT OF HEALTH, SAFETY AND ENVIRONMENTAL EDUCATION,
FACULTY OF EDUCATION,
UNIVERSITY OF BENIN,
BENIN CITY.**

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**A RESEARCH PROJECT SUBMITTED TO THE DEPARTMENT OF HEALTH,
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CERTIFICATION

This is to certify that this study was carried out by Blessing Oluwaseun ADEWUMI with matriculation number EDU2102487 in the Department of Health Safety and Environmental Education, Faculty of Education, University of Benin in partial fulfillment of the award of Bachelor of Science Degree in Environmental Education.

Dr. S.O. OLIAKIABO
Project supervisor

Date

MRS. B.H. ENABULELE
Project Coordinator

Date

DR. (MRS) O.H. OBASUYI
Head Of Department

Date

DEDICATION

This project is dedicated to almighty God who saw me through my undergraduate programme in the University of Benin, by giving me the strength and grace to overcome.

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The researcher is appreciative of the effort of his supervisor, Dr. S.O. Olikiabo, a dedicated and highly respected lecture, who despite his busy schedule, provided a valuable guidance and support to ensure the research stays on the right track. The researcher also extends his gratitude to all lecturers in the Department of Health, Safety, and Environmental Education, UNIBEN, whose mentorship and dedication have been instrumental in shaping his academic journey from the first year to final year.

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ABSTRACT

This study, titled “Knowledge and Awareness of Noise Pollution and Its Associated Health Impacts among Residents of Ugbowo Community, Benin City,” aimed to assess the level of knowledge and awareness of noise pollution and its related health effects among residents of Ugbowo Community. The study objectivized that residents in the community possess varying levels of knowledge and awareness about noise pollution, its sources, and associated health risks, influenced by factors such as education, occupation, and exposure to public awareness campaigns.

A descriptive survey research design was adopted for the study, targeting a population of 552,005 residents of Ugbowo Community, projected from the 2006 national census. Using Taro Yamane’s formula, a sample size of 400 respondents was determined and selected through a multi-stage sampling technique to ensure fair representation across different sections of the community. The data was collected using a structured questionnaire titled “Knowledge and Awareness of Noise Pollution and Its Associated Health Impacts Questionnaire (KANPHAIQ),” which consisted of 30 items divided into sections on demographic data, sources of noise pollution, health effects, awareness of regulations, and existing noise reduction measures. The validity of the instrument was established by experts in the Department of Health, Safety, and Environmental Education, and its reliability was confirmed using the test–retest method, yielding a Cronbach’s Alpha value of 0.82. Data were analyzed using descriptive statistics such as frequency counts, percentages, means, and standard deviations.

The findings revealed that traffic noise, loud music or events, and noise from neighborhood activities such as generators were the major sources of noise pollution in Ugbowo Community. Residents demonstrated a relatively high level of knowledge about the health effects of noise pollution, including hearing loss, sleep disturbance, and stress-related conditions, while awareness of existing regulations and reporting procedures was also notable. However, the study identified a lack of effective noise reduction measures and weak enforcement of noise control policies in the community. The study recommended strengthening public sensitization programs, improving policy enforcement, and establishing community-based initiatives to promote effective noise management and health protection among residents.

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CHAPTER ONE

INTRODUCTION

Background of the Study

Noise pollution is an increasingly significant issue in urban environments around the world, with its detrimental effects on human health becoming more apparent as cities expand. The rapid urbanization, industrialization, and growth in vehicular traffic have intensified the challenges associated with noise pollution, leading to both physical and psychological consequences for residents. In particular, noise levels in urban centers such as Ugbowo in Benin City have risen dramatically in recent years, creating an environment where the health of the population may be at risk.

In Ugbowo Community, like many other rapidly developing urban areas, noise pollution has become an ever-present feature of daily life. Sources of noise pollution in this area are largely anthropogenic, primarily arising from traffic, industrial activities, construction work, and residential disturbances, such as the use of loudspeakers and other domestic appliances. The increasing density of the population and the growth of infrastructure to accommodate the expanding urban population have only amplified the problem. According to research, traffic noise from vehicles is one of the primary contributors to noise pollution in many urban locations, including Benin City (Hassan, 2024).

The health impacts of noise pollution are wide-ranging and affect multiple aspects of human well-being. Physical health issues such as hearing impairment, tinnitus, and

cardiovascular diseases have been extensively documented as a result of prolonged exposure to excessive noise (Peters, 2019). Furthermore, noise pollution also has significant psychological effects, contributing to heightened stress levels, anxiety, and depression. Children, the elderly, and individuals with preexisting health conditions are particularly vulnerable to these adverse effects, which can compromise their quality of life and overall health (Hassan, 2024).

In Ugbowo Community, while there is some awareness among residents about the harmful effects of noise, the extent of knowledge varies. A significant number of people are aware that exposure to loud noise can lead to hearing loss and stress-related disorders, yet many may not fully understand the broader health impacts, including cognitive impairment and cardiovascular risk (Palli et al., 2020). Studies from other urban areas show that even when residents are aware of noise pollution, they often fail to take actions to mitigate exposure, possibly due to a lack of effective noise control policies or a general underestimation of its health consequences. This gap in knowledge could be contributing to the persistence of high noise levels in Ugbowo Community.

Furthermore, studies have shown that public awareness and knowledge about noise pollution are crucial factors in reducing its impact. For instance, a study in a Nigerian market area found that while 89% of residents were aware of noise pollution's harmful effects, many still reported suffering from conditions like tinnitus, indicating that awareness alone may not be enough to mitigate the adverse effects of noise. The lack of

effective enforcement of noise control measures in urban environments is often a key challenge in addressing this issue (Elisha & Moses, 2024).

The health implications of noise pollution are not limited to hearing and cardiovascular disorders. Psychological issues such as anxiety, stress, and depression are also common outcomes, especially in areas with constant and pervasive noise. Long-term exposure to high noise levels can lead to chronic conditions such as hypertension, sleep disturbances, and even cognitive impairments in children (Hassan, 2024). These effects can lead to reduced productivity and quality of life, impacting not only individual well-being but also the broader community's health outcomes.

Addressing noise pollution in urban areas requires more than just awareness—it calls for the enforcement of noise regulations and the implementation of noise reduction strategies. Research suggests that noise levels often exceed legally established limits in many parts of the world, and this is no different in Benin City. To effectively mitigate noise pollution, it is necessary to implement measures such as traffic management, the use of noise barriers, and regulations on industrial noise (Shirzad et al., 2022).

The local government and relevant authorities in Benin City must develop effective strategies to control noise pollution, such as monitoring noise levels, enforcing existing noise control laws, and raising public awareness about the risks associated with noise exposure. Such measures would not only reduce the health risks but also improve the overall living conditions for the residents of Ugbowo Community. Educational programs aimed at both the general public and policymakers could play a crucial role in

raising awareness and encouraging actions that reduce noise pollution. In addition, creating noise maps, which identify high-noise areas, could be an effective tool for guiding urban planning decisions and prioritizing interventions in the most affected zones (Moscovici & Grecea, 2015).

Statement of the Problem

Noise pollution has become an increasingly critical concern in Ugbowo Community, Benin City, as urbanization and industrial activities continue to grow. Despite this escalating issue, there is limited understanding of the specific sources and health implications of noise pollution within the community. Ugbowo, like many other urban centers, faces challenges related to rising noise levels from traffic, construction, and industrial operations. However, the awareness of these sources and their health impacts among the residents remains insufficient.

One of the key issues is the lack of clear identification of the main sources of noise pollution in Ugbowo. While traffic noise is often identified as a major contributor to urban noise pollution (Elisha & Moses, 2024), other sources such as industrial activities, construction, and residential noise may also be contributing significantly to the problem. The current lack of detailed studies specifically focused on Ugbowo limits the ability to formulate effective noise management strategies.

The health impacts of noise pollution are well-documented and include a range of auditory and non-auditory effects. These effects include hearing loss, sleep disturbances, increased stress, cardiovascular problems, and even cognitive impairments in vulnerable

populations such as children and the elderly (Hassan, 2024). Despite widespread knowledge of these health risks, there is a significant gap in how residents of Ugbowo perceive the dangers posed by noise pollution. A study in a similar Nigerian context found that while most residents were aware of noise pollution, many did not link it to long-term health issues like hypertension or sleep disorders (Moscovici & Grecea, 2015). This gap in knowledge may prevent the implementation of proactive health measures or lifestyle changes to mitigate exposure to noise.

Furthermore, residents' knowledge about noise pollution often does not translate into meaningful action to address the problem. The lack of knowledge about the practical implications of noise pollution and available mitigation measures further compounds this issue. Despite regulations to curb noise levels, enforcement remains a challenge in many cities, and Ugbowo is no exception. Without sufficient awareness or strict law enforcement, residents are often unaware of the tools they can use to minimize their exposure to noise pollution (Barry, 2021).

Lastly, there is little information on the measures that have been taken to reduce noise pollution in Ugbowo. Noise management strategies, such as the installation of noise barriers or traffic regulations, are common in many urban environments (Sahlathasneem & Deswal, 2023), but it is unclear whether such measures have been implemented effectively in Ugbowo. There is a need for more research into the effectiveness of noise reduction strategies and public policies in the area.

Research Questions

The following research questions guides this study

1. What are the main sources of noise pollution in Ugbowo Community, Benin City?
2. What is the level of knowledge among residents of Ugbowo Community about the health effects of noise pollution?
3. What is the level of awareness of residents in Ugbowo Community regarding the existing noise pollution regulations and policies in their community?
4. What are the noise reduction measures already in place in Ugbowo Community?

Purpose of the Study

The purpose of this study is to assess the knowledge and awareness of noise pollution and its associated health impacts among the residents of Ugbowo Community, Benin City.

Specifically, the study seeks to

1. To identify the main sources of noise pollution in Ugbowo Community, Benin City.
2. To assess the level of awareness among residents of Ugbowo Community about the health effects of noise pollution.
3. To evaluate the residents' knowledge of noise pollution, including their understanding of its sources, effects, and available mitigation measures.
4. To examine the noise reduction measures already in place in Ugbowo Community

Significance of the Study

This study is important because it provides clear insights into the knowledge and awareness of noise pollution and its health impacts in Ugbowo Community, Benin City. By examining this issue, the research will benefit several groups, including local government authorities, urban planners, public health professionals, residents, environmental groups, academic institutions, and the private sector.

Local government authorities will find this study useful as it helps them understand the sources and effects of noise pollution in their community. With this information, they can evaluate the effectiveness of existing noise regulations and adjust policies as needed. This study will guide them in taking appropriate steps to reduce noise pollution and protect public health.

Urban planners and policymakers will also benefit, as the findings will provide information on how noise pollution affects different areas of Ugbowo Community. This data will help in planning future urban developments to minimize noise exposure and improve the quality of life for residents.

Public health professionals will gain valuable insights into the specific health risks associated with noise pollution, such as hearing loss, cardiovascular problems, and mental health issues. With this knowledge, they can create health campaigns to raise awareness and help residents manage the impact of noise on their well-being.

Residents of Ugbowo Community will benefit directly by learning about the sources and effects of noise pollution in their community. With increased awareness, they can take steps to protect their health and advocate for stronger noise regulations.

Environmental advocacy groups will find the study useful in their efforts to push for stricter noise control measures. The research will provide data that can be used to support campaigns for better environmental policies and raise awareness about the long-term impacts of noise on health.

Academic and research institutions will benefit from this study by contributing to the body of knowledge on urban noise pollution. The findings can serve as a foundation for future research on the effects of noise and the effectiveness of noise reduction strategies in other cities.

Businesses and industries in Ugbowo Community will benefit from understanding the economic impact of noise pollution on worker health and productivity. The study can encourage businesses to adopt measures that reduce noise exposure and ensure compliance with local noise regulations.

Scope/Delimitation of the Study

This study will focus on the knowledge and awareness of noise pollution and its health impacts among residents of Ugbowo Community, Benin City, during the 2025 academic session. The study will adopt structured questionnaires, which will include multiple-choice questions for assessing knowledge and opinion-based questions for gathering responses on non-knowledge aspects. The scope of the research is limited to the

residents of Ugbowo Community, and the results will only reflect the views and knowledge of this specific population. The study will not cover other parts of Benin City or other regions, and it will focus solely on the effects of noise pollution as perceived by the community, without including other environmental factors.

Definition of Terms

Noise Pollution: The presence of unwanted or harmful sound in the environment, typically caused by human activity such as traffic, industry, and construction.

Health Effects: The physical and psychological impacts caused by exposure to noise pollution, including hearing loss, stress, and cardiovascular diseases.

Urbanization: The process by which an increasing number of people move into cities, leading to the growth and development of urban areas.

Awareness: The understanding and knowledge residents have regarding noise pollution and its health impacts.

Public Health: The field focused on protecting and improving the health of communities through education, policies, and health programs.

Noise Regulations: Laws or guidelines set to control and limit noise levels in urban environments to protect public health and well-being.

Noise Barriers: Physical structures or modifications designed to reduce the amount of noise reaching a specific area, typically used in urban planning.

Cognitive Effects: The influence of noise pollution on brain function, such as memory impairment, learning difficulties, and reduced concentration.

Noise Mitigation: Measures or actions taken to reduce the impact of noise pollution, such as soundproofing, traffic management, and regulations.

Community Engagement: The involvement of local residents in identifying, addressing, and managing noise pollution through collective actions and participation.

CHAPTER TWO

LITERATURE REVIEW

This chapter is reviewed the related literature under the following sub-headings

- Theoretical Framework
- Concept of Knowledge and Awareness
- Concept of Noise Pollution
- Concept of Health
- Sources of Noise Pollution
- Level of Awareness on the Health Effects of Noise Pollution
- Knowledge of Noise Pollution
- Health Impacts of Noise Pollution
- Measures in Reducing Noise Pollution
- Summary of Literature Reviewed

Theoretical Framework

The Health Belief Model (HBM) is a prominent psychological framework developed in the 1950s by social psychologists working within the U.S. Public Health Service, with early foundational work attributed to Hochbaum (1958) and Rosenstock (1974). The model was initially designed to explain why individuals fail to participate in disease prevention and screening programs despite the availability of services. At its core, the HBM posits that health-related behaviors are influenced by personal beliefs about health conditions, which can be targeted and modified to promote preventive actions. The

theory outlines key constructs such as perceived susceptibility to a health problem, perceived severity of the consequences, perceived benefits of taking preventive action, and perceived barriers to action. Later additions include cues to action and self-efficacy, reflecting the individual's confidence in their ability to execute behaviors (Abraham & Sheeran, 2005; Green & Murphy, 2014). The HBM has since become one of the most widely utilized models in health education, shaping interventions aimed at increasing adherence to medical regimens, vaccination uptake, and lifestyle changes.

Over the decades, numerous scholars have employed the HBM in diverse health-related research contexts, ranging from tuberculosis screening to mental health service utilization (Janz & Becker, 1984; Henshaw & Freedman-Doan, 2009). Despite its health-centric origins, some researchers have adapted HBM constructs to study behavior in other fields, including monetary policy, where perceptions of risk and benefits influence decision-making and compliance with financial regulations (Carpenter, 2010). For instance, in economic behavior, perceived susceptibility might translate to the perceived risk of financial loss, while perceived benefits and barriers affect willingness to adopt recommended financial practices. Although such applications are less common, they underscore the model's versatility in explaining decision-making processes involving risk assessment and behavior change. The HBM's sustained relevance is supported by meta-analytic evidence confirming the predictive power of its dimensions, particularly perceived benefits and barriers, in driving behavior change (Carpenter, 2010).

Linking the Health Belief Model to the study on "Knowledge and Awareness of Noise Pollution and Its Associated Health Impacts," the HBM provides a valuable theoretical lens for understanding why individuals may or may not engage in protective behaviors against noise pollution. Perceived susceptibility, or the individual's belief about their likelihood of experiencing adverse health effects from noise pollution, can determine the motivation to seek noise reduction measures. Similarly, perceived severity encompasses how seriously a person views the health consequences of noise pollution, such as hearing loss, cardiovascular disease, or psychological stress. If the perceived benefits of adopting noise-mitigating behaviors, like using ear protection or advocating for quieter environments, outweigh the perceived barriers such as cost or inconvenience, individuals are more likely to act (Tufanaru, Mocean, & Hațieganu, 2009). Previous research applying the HBM to environmental health risks has shown that higher awareness and knowledge correlate positively with preventive behaviors, indicating the model's suitability for studies on noise pollution awareness (Si-ya, 2013).

Furthermore, the HBM's emphasis on cues to action and self-efficacy is critical in the context of noise pollution. Cues to action, which can be internal (e.g., experiencing symptoms like tinnitus) or external (e.g., public health campaigns, media coverage), prompt individuals to recognize the threat noise pollution poses and consider behavioral change. Self-efficacy, or the confidence in one's ability to reduce exposure or advocate for change, influences whether knowledge translates into actual protective behavior. Studies in environmental health education reveal that interventions designed around

enhancing these components of the HBM improve outcomes by increasing engagement with noise control practices (Hassan, 2024). Thus, employing the HBM in this study enables the identification of psychological barriers and facilitators that affect individuals' responses to noise pollution risks, ultimately guiding effective health promotion strategies.

Concept of Knowledge and Awareness

Knowledge and awareness are interconnected but distinct concepts that are fundamental to human cognition and behavior. Knowledge generally refers to the information, facts, and skills acquired through experience or education. Song and Xiong (2022) discuss knowledge as a structured entity that can be implicit or explicit, often linked to awareness, which they describe as the potential for knowledge to be accessed or recognized. Awareness, on the other hand, is the state of being conscious of or attentive to something and often involves an active process of perception and understanding (Silva Jr & Siscoe, 2024). This distinction is important because knowledge represents what one possesses cognitively, while awareness involves the current attention or recognition of that knowledge in context.

Recent philosophical and cognitive studies delve deeper into the gradations of awareness, suggesting that awareness can come in degrees and plays a critical role in how knowledge is processed and utilized (Silva Jr & Siscoe, 2024). Alicke, Zhang, and Stephenson (2020) further elaborate on self-awareness as a pathway to self-knowledge, emphasizing that awareness involves reflective cognition, which can be explicit or

implicit. These nuances show that awareness is more dynamic and situational compared to knowledge, which can be static and stored. This conceptual layering has been applied in various domains, including artificial intelligence, logic, and epistemology, to model how agents acquire, retain, and act upon knowledge and awareness (Fernández-Fernández, 2019; Ditmarsch & French, 2014).

In practical settings such as public health, education, and environmental management, understanding the difference and relationship between knowledge and awareness is vital for designing effective interventions. Trevethan (2017) highlights that knowledge involves factual and detailed information, whereas awareness refers to information that is personally relevant and salient to individuals. Studies indicate that raising awareness can increase the practical use of knowledge by making it more meaningful and actionable (Xiao, 2011). This has implications for communication strategies, as awareness acts as a motivator for behavior change when knowledge alone does not suffice (Chaudhuri, Narula, & Tripathi, 2021). Thus, awareness bridges the gap between possessing information and applying it meaningfully in real-world contexts.

The epistemic logic literature sheds light on the structural relationship between knowledge and awareness, distinguishing “awareness of” from “awareness that” (Fernández-Fernández & Velázquez-Quesada, 2020). “Awareness of” involves the attention to information, while “awareness that” implies acknowledgment of its truth. Fernández (2019) proposes the concept of Explicit Aware Knowledge, where knowledge is formed by combining these types of awareness, reflecting a complex cognitive state

necessary for explicit knowledge acquisition and application. This framework explains how people dynamically shift between implicit and explicit cognitive states depending on their awareness, which has practical relevance for fields requiring decision-making under uncertainty.

Technological and organizational research also recognizes the importance of knowledge awareness for collaborative work and decision-making. Xiao (2011) empirically showed that awareness of others' knowledge and reasoning enhances group collaboration and knowledge sharing, which is critical for effective learning and innovation. Similarly, Peacock and Chai (2012) discuss knowledge awareness as a fuzzy, context-dependent concept, emphasizing the variability and flexibility of human awareness in operational environments. These findings suggest that awareness not only involves individual cognition but also social and contextual factors that influence how knowledge is communicated and acted upon.

Concept of Noise Pollution

Noise pollution is most commonly defined as any unwanted or disturbing sound that negatively impacts humans, animals, or the environment (Bragdon, 2016). It involves the transmission of sounds that exceed normal levels of environmental noise, leading to a disturbance in natural and social settings (Dashek, 2019). Several scholars emphasize that noise pollution is not merely loud sound but encompasses sounds that disrupt normal living conditions, often being intrusive and detrimental to wellbeing (Sharma, Rawal, &

Batra, 2021; Peters, 2019). It is widely accepted that noise pollution is an environmental nuisance and stressor, distinguished from other pollutants because it is invisible, odorless, and does not leave lasting physical traces (González, 2014).

In technical terms, noise pollution is characterized as the propagation of acoustic energy that interferes with normal activities and quality of life (Verma, Kanwar, & John, 2022). It disrupts the acoustic environment and alters soundscapes, thereby affecting human perception and behavior (Chandrappa & Das, 2021). The key feature distinguishing noise pollution from ordinary sound is its undesirability or harmfulness to human or animal receptors, which makes it a specific category within environmental pollutants (Barry, 2021). This conceptualization helps to clarify that noise pollution's core issue is its negative impact rather than sound intensity alone.

Noise pollution is increasingly recognized as a complex phenomenon involving subjective human experiences alongside objective physical measurements (Jhanwar, 2016). Definitions also highlight that noise pollution results from both anthropogenic sources and, occasionally, natural events exceeding ambient noise levels (Bragdon, 2016). This broad understanding acknowledges that noise pollution is context-dependent, influenced by individual sensitivity and cultural perceptions of sound, making it a multi-dimensional environmental problem (Rajak, 2019). The perception aspect is critical because it differentiates noise pollution from benign sound, thus grounding the definition in human and ecological impact.

Furthermore, noise pollution is classified as a form of environmental pollution that influences social behavior and interferes with normal activities, marking it as a significant stressor in both urban and rural environments (Dashek, 2019; Barry, 2021). Scholars emphasize that it acts as a barrier to communication and concentration, which underpins its definition as an environmental problem that transcends mere physical disturbance (Peters, 2019). The annoyance and irritation caused by noise pollution form an important component of its conceptualization, highlighting the psychosocial dimension of the phenomenon (Sharma et al., 2021).

Noise pollution also differs from other types of pollution because it dissipates quickly once the source is removed or silenced, yet its effects can persist, complicating its definition (González, 2014). This ephemeral nature poses challenges for regulatory definitions and control measures, making continuous monitoring essential to understanding and managing noise pollution (Verma et al., 2022). As a consequence, noise pollution is often measured by levels of decibels (dB) exceeding specified thresholds, but definitions consistently emphasize the subjective nature of what constitutes “unwanted” noise (Chandrappa & Das, 2021).

Concept of Health

Health is a complex and multi-dimensional concept that has evolved significantly over time, encompassing more than just the absence of disease. The World Health Organization (WHO) famously defines health as "a state of complete physical, mental, and social well-being and not merely the absence of disease or infirmity" (Guidotti, 2011).

This definition emphasizes that health is holistic, involving the overall quality of life rather than only physical condition. However, ongoing debate and research suggest that health is a dynamic state, involving the capacity to adapt and manage life's challenges, rather than a fixed state of perfection (Bohn Stafleu van Loghum, 2013).

Philosophical approaches to health emphasize its normative and subjective dimensions, suggesting that health relates to an organism's capacity to function optimally within its environment. Werkhoven (2014) argues that health involves the ability to perform species-specific activities to the fullest extent, linking health to both biological potential and autonomy. This view sees health as a set of capacities rather than merely the absence of illness, framing health as an enabling condition for individuals to pursue their goals. Similarly, contemporary theories propose health as an ongoing process of balance and equilibrium among physical, psychological, and social factors (Vysotska & Romanenko, 2022).

Health is also conceptualized through metaphorical and cultural lenses. Scott (2023) explains that health can be seen as a valuable commodity or resource, which people manage actively to maintain or improve their well-being. This cultural model reflects how societal views influence individual health behaviors and perceptions. Mallee (2017) expands on this by examining health as a metaphor within ecological and social contexts, highlighting the interplay between individual health and environmental sustainability. These perspectives underline the fluidity and contextual nature of health as experienced and understood by people in different societies.

In healthcare and education, the concept of health integrates physical, mental, emotional, and social well-being, reflecting the multidimensionality stressed in the WHO framework. Guretia (2018) articulates health as a quality enabling individuals to meet daily demands with energy and satisfaction, linking health with functionality and vitality. This broad understanding supports a person-centered approach in health promotion, recognizing that individuals' perceptions of health influence their capacity for self-care and well-being (Cross, 2020). Such approaches foster health as a positive and dynamic resource essential for a fulfilling life.

Emerging definitions of health also consider its relational and contextual aspects. Bradley, Goetz, and Viswanathan (2018) argue that health involves a dynamic interplay of body, mind, and spirit, emphasizing the quality of life and the capacity to flourish despite disease or disability. This view reflects the evolving consensus that health is not merely a static condition but a process of engagement and resilience. Similarly, the recognition of spiritual health as a dimension further broadens the conceptualization, linking health with meaning, purpose, and connection (Hoseini et al., 2019).

Sources of Noise Pollution

Noise pollution refers to unwanted or harmful sounds that disrupt the normal balance of the environment and adversely affect human health and well-being. Unlike other forms of pollution, noise pollution is invisible yet pervasive, impacting millions of people worldwide, especially in urban areas (Jhanwar, 2016). It is caused by a variety of human activities and technological developments that produce excessive sound levels,

which can interfere with communication, disturb sleep, increase stress, and even lead to long-term health issues such as hearing loss and cardiovascular diseases (Hassan, 2024; Geravandi et al., 2015).

Among the key contributors to noise pollution are three primary sources: Transportation Noise, Industrial and Construction Noise, and Domestic and Recreational Noise. Transportation noise, which includes sounds from road vehicles, trains, airplanes, and ships, is the most widespread and persistent source, affecting both urban and rural communities (Sharma et al., 2021; Peters, 2019). Industrial and construction noise arises from machinery, manufacturing processes, and building activities, often creating intense and localized sound disturbances (Chandrappa & Das, 2021; Urikhibam et al., 2022). Finally, domestic and recreational noise, such as loud household appliances, music, public events, and social gatherings, also contribute significantly to ambient noise levels, especially in densely populated neighborhoods (Rajak, 2019; Jaware et al., 2017).

Transportation Noise

Transportation is widely recognized as the primary contributor to environmental noise pollution worldwide. This includes noise generated from road traffic, railways, air traffic, and waterways, each contributing differently to ambient noise levels depending on the area and volume of activity. Road traffic noise, in particular, is the most pervasive source in urban and suburban settings. Vehicles such as cars, buses, trucks, and motorcycles produce noise from engines, exhaust systems, tire friction on pavement, and braking mechanisms. The constant movement and increasing density of vehicles in

growing urban centers exacerbate this problem (Jhanwar, 2016; Sharma et al., 2021). Studies show that road traffic noise can often exceed recommended safety limits, causing significant disturbances to both residential and occupational environments (Geravandi et al., 2015).

Railway noise, while often less continuous than road traffic, can produce intense noise peaks due to the mechanical sounds of engines, wheel-rail friction, and braking. Airports contribute notably through aircraft noise during takeoff, landing, and taxiing operations. Aircraft noise is typically of higher intensity and can affect larger geographic areas due to the height and speed at which aircraft operate (Peters, 2019; Verma et al., 2022). Waterway noise, although less studied, arises from ship engines and port activities, and its impact is more localized to coastal and riverine communities.

Transportation noise is particularly problematic due to its near-constant presence in populated areas and its influence on sleep quality, cardiovascular health, and cognitive function (Hassan, 2024; Tsalogliodu et al., 2015). The growing trend of urbanization combined with increased motorization has made transportation noise a persistent environmental health challenge.

Industrial and Construction Noise

Industrial activities are a major source of noise pollution, especially in urban and semi-urban industrial zones. Manufacturing plants, factories, mills, and processing facilities use heavy machinery, compressors, motors, and generators that generate high-decibel noise continuously or intermittently (Chandrappa & Das, 2021). Noise from

industrial sources is often characterized by high intensity and wide frequency ranges, which can contribute to auditory damage and physiological stress for workers and nearby residents.

Construction activities contribute substantially to noise pollution due to the use of heavy equipment like jackhammers, bulldozers, cranes, concrete mixers, and drills. Unlike industrial noise, construction noise tends to be episodic but can reach extremely high levels during peak work hours, causing acute disturbances. The rapid pace of urban development globally has intensified noise levels from construction sites, affecting nearby residential, commercial, and institutional areas (Urikhinbam et al., 2022).

Both industrial and construction noise sources often exceed permissible noise limits, and their impact extends beyond occupational settings to affect the surrounding communities. Chronic exposure to such noise can lead to hearing impairment, increased stress, and cardiovascular diseases (Patel & Solanki, 2021). Regulations exist in many countries to control noise from these sources, but enforcement and compliance often vary, leading to continued exposure risks (Chauhan & Butola, 2015).

Domestic and Recreational Noise

Noise pollution is not only the result of large-scale industrial or transportation activities but also arises significantly from domestic and recreational sources. Household appliances such as vacuum cleaners, washing machines, air conditioners, and kitchen gadgets contribute to indoor noise pollution, which can seep into the external environment, particularly in dense residential areas (Rajak, 2019).

Recreational noise comes from loud music at social events, parties, concerts, and the use of personal audio devices at high volumes. Public events such as political rallies, religious ceremonies, and festivals often use loudspeakers and sound systems that generate noise beyond safe levels, disturbing neighborhoods and public spaces (Jaware et al., 2017). These noise sources tend to be intermittent but can cause significant annoyance, stress, and sleep disturbances in affected populations.

Additionally, noise from urban commercial activities, including bars, restaurants, and markets, contributes to the overall ambient noise load, especially during evenings and weekends (Barry, 2021). The proliferation of personal and communal entertainment technologies, combined with increasing urban density, has intensified exposure to these noise sources.

Level of Awareness on the Health Effects of Noise Pollution

People's awareness of the health effects of noise pollution varies widely across different populations and regions, but in many areas, it remains limited despite the growing evidence of its harmful impacts. Noise pollution is not just an annoyance; it has been scientifically linked to serious health outcomes such as hearing loss, cardiovascular diseases, sleep disturbances, and mental health issues. However, public understanding of these risks often lags behind scientific knowledge, with many individuals unaware of the full range of potential health consequences or the sources contributing to noise exposure (Bala & Verma, 2020; Hassan, 2024). Studies show that this lack of awareness can be a major barrier to effective noise pollution control and prevention efforts.

Research conducted in urban populations indicates that while people generally recognize noise as a nuisance, fewer are fully aware of how chronic exposure can affect physical and mental health (Patel & Solanki, 2021; Gandhi et al., 2019). A survey among university students in Delhi found that although most participants were aware of noise pollution and its immediate annoyance effects, a significant portion underestimated its impact on cardiovascular health and cognitive performance (Ismail & Ahmed, 2018). Similar patterns have been observed globally, where urban residents recognize traffic and industrial noise as sources but are less knowledgeable about the silent, long-term dangers noise poses, including hypertension, stress-related illnesses, and reduced work efficiency (Patel & Solanki, 2021). This gap in understanding is especially prominent in populations with lower education levels or limited access to public health information.

Gender and age also influence awareness levels about noise pollution and its health effects. Some studies suggest women tend to report higher sensitivity and awareness of noise pollution impacts compared to men, possibly due to differing social roles and health perceptions (Ismail & Ahmed, 2018). Likewise, younger populations, such as university students, show variable levels of knowledge; many are aware of immediate noise annoyances but lack comprehensive awareness about chronic effects like hearing impairment or psychological stress (Bala & Verma, 2020). This limited knowledge among youth is concerning because early exposure and lack of preventive behavior can lead to cumulative health risks later in life (Vaidya, 2020).

The influence of education and public information campaigns is critical in shaping awareness about noise pollution health effects. Communities with active environmental health programs and noise reduction policies tend to have higher public knowledge and better noise management outcomes. Conversely, in many regions, the absence of coordinated awareness efforts leaves residents ill-equipped to protect themselves or advocate for noise regulations. Research highlights the role of governmental agencies, schools, and healthcare providers in disseminating accurate information about noise pollution and its health consequences (Bala & Verma, 2020; Gandhi et al., 2019). Effective public education can empower individuals to adopt behaviors such as using hearing protection, advocating for quieter environments, and supporting stricter noise controls.

The economic and social costs of noise pollution, including its effects on healthcare and productivity, are rarely understood by the general public. Many people perceive noise merely as an irritant rather than a serious public health threat that contributes to long-term medical costs and loss of quality of life. Studies emphasize the need for raising awareness about the broader implications of noise pollution, such as its link to increased cardiovascular risk and mental health disorders, which place strain on health systems (Hassan, 2024; Tsalogliodu et al., 2020). Highlighting these connections could foster greater public support for noise reduction initiatives and stricter environmental regulations.

Knowledge of Noise Pollution

The level of awareness on the health effects of noise pollution remains a critical subject, given the growing evidence of its harmful impacts on both physical and psychological health across various populations. Noise pollution, defined as unwanted or harmful sound, is recognized not only as a nuisance but as a significant environmental stressor that affects auditory and non-auditory systems of the human body. Studies indicate that despite widespread exposure to noise, public understanding of its health risks varies widely, often depending on demographic factors such as age, gender, and education level. In a study conducted in an urban Indian setting, for example, it was found that while male participants demonstrated higher awareness of noise pollution compared to females, overall knowledge about its socio-economic and health consequences remained limited and insufficient to drive effective noise control measures (Bala & Verma, 2020). This suggests that a large portion of the population underestimates or is unaware of the severity of noise pollution, hampering efforts to mitigate its health impacts.

Research reveals that noise pollution contributes to a wide array of adverse health outcomes, including hearing impairment, cardiovascular diseases, sleep disturbances, cognitive impairment, and increased stress levels (Tsalogliodu et al., 2015; Hassan, 2024). The auditory effects, such as hearing loss and tinnitus, are often more readily recognized by the public than non-auditory effects like hypertension or psychological stress. However, these non-auditory effects are equally severe, with noise triggering endocrine and autonomic nervous system responses that contribute to increased cardiovascular risk.

Sleep disturbance, in particular, has been noted as one of the most severe non-auditory effects of noise exposure, with subsequent impacts on heart rate, blood pressure, and overall cardiovascular health (Tsalogliodu et al., 2015; Hassan, 2024). Despite this, awareness campaigns rarely emphasize these broader health implications, resulting in an incomplete public understanding of noise pollution's full threat to health.

Moreover, the knowledge gap extends to vulnerable groups such as children, pregnant women, and the elderly, who are more susceptible to the deleterious effects of noise pollution. Studies focusing on children have highlighted that noise exposure interferes with cognitive development, learning abilities, and emotional well-being (Gupta et al., 2018). These groups are often less informed about noise hazards, and public health messaging does not always target them adequately. Awareness about the need for protective measures such as earplugs, soundproofing, and regulatory enforcement in environments like schools and residential areas remains poor (Aiman, 2021). This lack of awareness in sensitive populations further perpetuates health inequalities and underscores the urgent need for tailored educational interventions and stricter policy enforcement.

The sources of noise pollution that the public commonly associates with health risks tend to be urban traffic, industrial activity, and loud recreational sounds like music and public events. Studies have consistently found that vehicular traffic is the predominant source recognized by most people as causing noise pollution, followed by construction and loudspeakers (Ismail & Ahmed, 2018). However, despite identifying these sources, many individuals fail to perceive noise pollution as a significant

environmental health challenge. Many view it merely as an annoyance rather than a serious health hazard, which negatively influences the prioritization of noise mitigation policies in urban planning and public health programs (Gandhi, Raghatate, & Pande, 2019). This underappreciation of noise pollution's gravity in the general populace hinders meaningful public engagement and compliance with noise control regulations.

Efforts to improve awareness have shown some promise, especially when public education is coupled with community involvement and enforcement of noise regulations. Public awareness campaigns, educational programs in schools, and media coverage can effectively increase knowledge about noise pollution and its health impacts. Studies stress that the governmental role is crucial in this regard, including the development of stringent noise standards, monitoring, and penalizing offenders to achieve sustainable noise reduction (Bala & Verma, 2020; Verma, Kanwar, & John, 2022). Additionally, technological solutions like sound barriers, quieter machinery, and urban design modifications can reduce exposure, but their success depends largely on public acceptance and understanding of noise risks.

Health Impacts of Noise Pollution

Noise pollution is a significant environmental health hazard, with numerous studies demonstrating its broad and harmful impacts on human health. Exposure to excessive noise, typically defined as unwanted or disturbing sound, affects not only hearing but also non-auditory physiological and psychological functions. Noise pollution primarily arises from anthropogenic sources such as traffic, industrial activities,

construction, and urban development, often exceeding acceptable regulatory limits. The auditory health consequences, especially hearing loss and tinnitus, are the most obvious and immediate effects of prolonged noise exposure (Bragdon, 2016). However, recent evidence highlights that the non-auditory effects—including stress, cardiovascular disease, sleep disturbance, and impaired cognitive function—are equally critical to consider in public health policies (Dashek, 2019).

Among the non-auditory effects, cardiovascular diseases have been strongly linked to chronic noise exposure. Noise acts as a stressor that triggers endocrine and autonomic nervous system responses, leading to increased heart rate, hypertension, vasoconstriction, and elevated peripheral vascular resistance. These physiological changes raise the risk of cardiovascular disorders such as ischemic heart disease and stroke (Tsalogliodu et al., 2020). Meta-analyses and systematic reviews indicate that populations exposed to traffic and industrial noise have higher incidences of hypertension and other cardiovascular events, with sleep disturbance identified as a key mediating factor (Al-Taai, 2021). Despite some inconclusive results, the consensus in recent literature supports that noise pollution is an independent cardiovascular risk factor requiring urgent public health interventions (Geravandi et al., 2015).

Sleep disturbance caused by noise pollution significantly deteriorates quality of life and overall health. Noise disrupts sleep architecture by causing frequent awakenings and reducing slow-wave and REM sleep, which are critical for physical and mental restoration. Chronic noise-induced sleep deprivation leads to increased daytime fatigue,

cognitive impairment, mood disorders, and decreased work productivity (Sharma, Rawal, & Batra, 2021). Research further shows that even low levels of nocturnal noise can induce physiological stress responses, exacerbating the risk for metabolic and cardiovascular disorders (Verma, Kanwar, & John, 2022). Vulnerable groups such as children, the elderly, and shift workers suffer disproportionately from sleep-related noise effects, emphasizing the need for tailored noise control measures in residential and occupational settings (Patel & Solanki, 2021).

Cognitive and psychological impacts of noise pollution extend beyond sleep and cardiovascular issues. Studies report that sustained noise exposure impairs attention, memory, learning, and overall cognitive performance, especially among children attending schools near high traffic areas. Noise pollution has been associated with increased anxiety, depression, and irritability, all of which reduce social well-being and individual functioning (Gupta et al., 2018). Children's cognitive development is particularly sensitive to noise, with long-term exposure linked to poorer academic performance and behavioral problems (Peters, 2019). Furthermore, noise exacerbates stress responses by activating the hypothalamic-pituitary-adrenal axis, contributing to chronic mental health problems (Jhanwar, 2016). The psychological burden of noise pollution underscores the importance of incorporating mental health considerations into noise regulation policies.

Occupational noise exposure, common in construction, manufacturing, and transport industries, adds another layer of health risks. Workers frequently encounter

noise levels exceeding safety standards, leading to accelerated hearing loss and increased risk of cardiovascular and psychological disorders (Chandrappa & Das, 2021). Noise-related fatigue and impaired concentration contribute to reduced productivity and higher accident rates. Preventive strategies such as use of personal protective equipment, engineering controls, and regulatory enforcement have proven effective but require wider adoption and worker education (Jaware et al., 2017). Workplace noise management remains a critical challenge for occupational health and safety globally.

In addition to direct human health effects, noise pollution indirectly impacts health by reducing community cohesion and quality of life. Noise acts as a chronic irritant, fostering annoyance and social withdrawal, which can weaken neighborhood ties and increase social stress (Urikhinbam, Shijagurumayum, & Thokchom, 2022). Economic costs associated with healthcare for noise-induced illnesses and lost productivity are substantial. Effective management of noise pollution involves integrating urban planning, stringent noise regulations, public education, and technological innovations like noise barriers and quieter machinery. These multidisciplinary approaches are essential to mitigate the pervasive health consequences of noise and promote healthier living environments (Masud et al., 2020; Hassan, 2024).

Measures in Reducing Noise Pollution

Measures to reduce noise pollution require a multifaceted approach combining engineering controls, administrative regulations, urban planning, and public education. Engineering interventions are central to noise mitigation and include the use of sound-

absorbing materials, noise barriers, and quieter machinery. Materials such as fibrous and porous absorbers are effective at dampening sound waves by converting acoustic energy into heat, thus reducing noise propagation within environments like offices, factories, and residential areas (Chauhan & Butola, 2015). Additionally, noise barriers, often constructed alongside highways or industrial zones, serve to block and reflect sound, effectively reducing community exposure to traffic or machinery noise (Bragdon, 2016). Advances in machinery design also contribute to noise reduction, with manufacturers engineering quieter engines and using vibration dampeners to minimize sound emissions at the source (Verma, Kanwar, & John, 2022).

Administrative and policy measures form another critical layer of noise pollution control. Governments worldwide have established noise standards and legal limits for different environments and activities, including construction, transportation, and industrial operations (Jhanwar, 2016). Enforcement of these regulations is essential but often challenging due to resource limitations and public non-compliance. Effective noise control policies involve monitoring noise levels regularly, licensing noisy activities, and imposing fines or penalties on violators to ensure adherence (Kumar & Kumar, 2018). Moreover, urban planning strategies, such as zoning, can separate residential areas from high-noise industrial or transportation hubs, thereby limiting human exposure (Sharma, Rawal, & Batra, 2021). Integrating noise considerations into city planning can promote quieter neighborhoods and workplaces, improving population health.

Community awareness and behavioral changes are indispensable in reducing noise pollution. Public education campaigns can inform citizens about the sources and adverse effects of noise, encouraging voluntary noise reduction behaviors such as limiting the use of loudspeakers, managing traffic speeds, and respecting quiet zones near hospitals and schools (Dashek, 2019). In residential areas, simple practices like maintaining vehicles and appliances, using carpets and curtains to absorb sound, and avoiding noisy activities during nighttime can make substantial differences (Barry, 2021). Additionally, encouraging the use of personal protective equipment, especially for workers in noisy environments, reduces individual health risks and contributes to overall noise control (Chandrappa & Das, 2021).

Technological innovation plays a growing role in noise pollution reduction. Recent developments include active noise control systems, which use sound wave interference to cancel unwanted noise in real time, applied in headphones, vehicles, and industrial machinery (Peters, 2019). Noise mapping and Geographic Information Systems (GIS) allow precise identification of noise hotspots and guide targeted interventions (Al-Taai, 2021). There is also promising research into converting noise energy into usable electrical energy through piezoelectric devices, which not only reduce noise but harness it as a resource (Jaware et al., 2017). These innovative approaches complement traditional noise control methods and provide scalable solutions for urban environments.

Transportation noise remains one of the most significant contributors to noise pollution, necessitating specific reduction measures. Strategies include promoting public

transportation, electric vehicles, and improved road surfaces that generate less tire noise (Ugay et al., 2013). Speed restrictions and traffic flow management reduce noise levels and improve safety. Noise barriers and vegetation buffers along highways help mitigate the impact on adjacent communities (Masud et al., 2020). Airport noise can be reduced through operational restrictions, flight path adjustments, and sound insulation of nearby buildings (Hassan, 2024). Implementing these measures requires cooperation among government agencies, industry, and the public.

Integrating noise pollution reduction into sustainable development frameworks is essential. Noise should be addressed alongside air and water pollution to create healthier, more livable environments (González, 2014). Investment in noise research, noise-resistant infrastructure, and community participation ensures lasting impact. Multi-sectoral collaboration across urban planning, health, transportation, and industry is vital to develop coherent policies that balance economic growth with environmental quality (Kumar & Kumar, 2018). Holistic noise management strategies will not only protect human health but also improve ecosystem integrity and social well-being in rapidly urbanizing societies (Hassan, 2024).

Summary of Literature Reviewed

This chapter reviewed existing literature on knowledge and awareness of noise pollution and its associated health impacts. Knowledge is defined as structured information gained through learning or experience, whereas awareness is the active perception or recognition of this knowledge in a given context. Scholars distinguish between implicit and explicit forms of awareness and suggest that awareness plays a dynamic role in how individuals apply knowledge in real-life scenarios.

Noise pollution is conceptualised as unwanted or harmful sound that disrupts environmental and human wellbeing. Its sources include transportation, industrial activities, and domestic or recreational noise. The literature establishes that noise pollution, while often invisible, has profound implications for health, including hearing loss, sleep disruption, cardiovascular diseases, and psychological stress.

Public knowledge about these effects varies, and many populations underestimate the dangers due to limited awareness. Research reveals that demographic factors such as age, gender, and education affect noise perception and response. Measures to reduce noise pollution span policy enforcement, engineering solutions, public awareness, and urban planning.

The Health Belief Model provides a theoretical lens, explaining how perceptions of risk, benefits, and self-efficacy influence protective behaviours. Overall, the literature affirms the need for multidisciplinary approaches to mitigate noise pollution and its health effects, especially through awareness-driven behavioural change.

CHAPTER THREE

RESEARCH METHODOLOGY

This chapter presents the research methodology employed to assess the knowledge and awareness of noise pollution and its associated health impacts among residents of Ugbowo Community, Benin City. The methodology is organized under the following subheadings:

- Design of the Study
- Population of the Study
- Sample Size and Sampling Techniques
- Research Instrument
- Validity of Instrument
- Reliability of Instrument
- Method of Data Collection
- Method of Data Analysis

Design of the Study

This study adopts a descriptive survey research design, appropriate for assessing the knowledge and awareness of noise pollution and its associated health impacts among residents of Ugbowo Community, Benin City. This design facilitates the collection of detailed information from the target population, enabling an in-depth examination of their understanding, perceptions, and attitudes regarding noise pollution, its health effects, existing regulations, and noise reduction measures in their community. The descriptive

survey approach effectively captures the current state of knowledge and awareness within Ugbowo Community, providing valuable insights into gaps and opportunities for improving noise pollution management and public health interventions.

Population of the Study

The estimated population of Ugbowo community in 2024 is approximately 552,005. This figure was derived using the compound population growth formula: $P = P_0 \times (1 + r)^t$. According to the 2006 national census, Ugbowo had a population of 339,899. Using Nigeria's average annual growth rate of 2.6% ($r = 0.026$) over 18 years ($t = 18$), the projection becomes $P = 339,899 \times (1.026)^{18} \approx 552,005$. This estimate serves as the basis for determining the sample size and scope of this study, which investigates the level of knowledge and awareness of noise pollution and its health effects among residents of the Ugbowo community.:

Sample Size and Sampling Technique

The sample size for this study was determined to be 400 respondents, calculated using the Taro Yamane formula with a population size of 552,005 residents and a margin of error of 0.05 for a 95% confidence level.

The formula is expressed as:

Where:

n = Sample size

N = Population size (552,005 residents)

e = Margin of error (0.05 for a 95% confidence level)

Substituting the values into the formula:

Thus, the required sample size is approximately 400 respondents

The study utilized a multi-stage sampling technique, employing a systematic approach to ensure a representative selection of respondents from the Ugbowo Community population. The process began with dividing the community into clusters based on streets, from which every third street was systematically selected to provide broad geographic representation. Within these selected streets, households were further sampled using a systematic interval of every third household. This structured approach minimized selection bias and ensured proportional representation of the community. The method was designed to uphold the principles of randomization and inclusivity, which are critical to the reliability and validity of the study's findings.

To complete the sampling process, five individuals were randomly selected from each sampled household. This random selection ensured that all eligible participants within the household had an equal opportunity to be included in the study. The combination of systematic and random sampling techniques was instrumental in achieving the required sample size of 400 respondents, as determined for adequately assessing the knowledge and awareness of noise pollution and its health impacts among residents of Ugbowo Community.

Research Instrument

The research instrument used in this study is a structured questionnaire specifically developed to collect data on residents' knowledge and awareness of noise pollution and its associated health impacts. The questionnaire is divided into two main sections aligned with the study variables:

- **Section A:** Demographic data of respondents, including age, gender, education level, and occupation.
- **Section B:** Thirty (30) structured questions covering key areas such as knowledge of noise pollution sources, awareness of health effects, familiarity with existing noise regulations, and attitudes toward noise reduction measures in Ugbowo Community.

For knowledge-based questions, a two-point response format is used, with options labeled Correct (C) and Wrong (W), serving as the decision benchmark. Items with a mean score above 0.5 indicate a high level of knowledge, while those below 0.5 indicate a low level. Opinion-based questions employ a four-point Likert scale ranging from Strongly Agree (SA), Agree (A), Disagree (D), to Strongly Disagree (SD). A cut-off mean of 2.5 is applied, where scores of 2.5 and above denote positive attitudes or awareness, and scores below 2.5 denote negative indicators.

Validity of the Research Instrument

The instrument was studied and appraised by the project supervisor and two other experts in the Department of Health Safety and Environmental Education, Faculty of

Education to ensure that the items adequately measured the purpose of the study. The final instrument was prepared taking into consideration the corrections made.

Reliability of the Research Instrument

The reliability of the study was assessed using the test-retest method. A separate group of 20 respondents, who were not part of the sample used in the main study, was selected for the reliability testing. The respondents were administered the same instrument at two different points in time to measure the stability and consistency of the responses. The data collected from the test-retest procedure were then analyzed using Cronbach's Alpha, which yielded a reliability score of 0.82. This score indicated a satisfactory level of consistency in the instrument, suggesting that the study's findings could be reliably reproduced over time.

Method of Data Collection

The researcher administered the questionnaire directly to residents of Ugbowo to collect their perceptions and views on the subject matter. The questionnaires were retrieved on the spot after completion to ensure a high response rate and data accuracy. Additionally, the researcher was available to address any questions or provide clarification on the items in the questionnaire, ensuring that respondents fully understood and accurately completed the survey.

Method of Data Analysis

The study employed descriptive statistics, including frequency, percentages, mean, and standard deviation, to summarize demographic data and questionnaire responses. For opinion-based questions, a criterion mean of 2.50 was set, where items scoring above 2.50 were accepted as positive indicators of awareness or attitude, and those below 2.50 were rejected. The results were presented using tables and charts for clarity and ease of interpretation. Findings were discussed in relation to the study objectives and existing literature, identifying knowledge gaps and offering recommendations to enhance awareness and promote effective noise pollution management within Ugbowo Community. The analysis highlighted trends and patterns relevant to addressing noise pollution challenges in the community.

CHAPTER FOUR

PRESENTATION, INTERPRETATION, AND DISCUSSION OF RESULTS

Introduction

This chapter presents the analysis of data from questionnaires completed by residents of Ugbowo Community on noise pollution and related health impacts. The results are organised to show response rate, data presentation, and interpretation, providing a clear view of the study's findings.

Data Presentation and Analysis

Four hundred questionnaires were distributed to residents of Ugbowo Community and all were completed and returned. Respondents represented diverse occupations, ages, and educational levels. Data were summarised in tables showing frequencies and percentages, with decisions on high or low levels of knowledge and awareness based on set criteria. Results covered awareness of regulations, reporting channels, enforcement measures, and public campaigns, as well as knowledge of health effects such as hearing loss, poor sleep quality, and mental health issues. These findings present a clear view of the community's understanding of noise pollution and its impact on health.

Table 4.1: Analysis of Demographic Characteristics of Respondents

Items	Options	Frequency	% of Response
Gender	Male	263	65.8
	Female	137	34.2
	Total	400	100.0
Age Group	18-27 years	101	25.2
	28-37 years	172	43.0
	38-47 years	84	21.0
	47 and above	43	10.8
	Total	400	100.0

Source: Researcher, 2025

Table 4.1 presents the demographic profile of respondents in terms of gender and age. The gender distribution shows that males formed the larger group, representing 65.8 percent of the total, while females accounted for 34.2 percent. This distribution indicates a stronger male participation in the study, which is consistent with earlier findings where certain community-based surveys recorded higher male response rates compared with females.

The age distribution reveals that respondents between 28 and 37 years formed the largest group with 43.0 percent. This was followed by those aged 18 to 27 years, who accounted for 25.2 percent. Respondents aged between 38 and 47 years made up 21.0 percent, while those aged 47 years and above formed the smallest group at 10.8 percent. This pattern reflects the presence of more active working-age adults in the sample, which aligns with

previous studies in urban Nigerian communities where younger and middle-aged adults are often more represented in environmental health surveys.

Presentation and Analysis of Results

Research Question 4.2: What are the main sources of noise pollution in Ugbowo Community, Benin City?

Table 4.2: Response of respondents on sources of noise pollution in Ugbowo Community, Benin City

S/N	Statement	SA (%)	A (%)	D (%)	SD (%)	Mean	Std. Dev.	Decision
1	Traffic noise from vehicles is a major source of noise pollution.	217 (54.2%)	120 (30.0%)	31 (7.8%)	32 (8.0%)	3.30	0.92	Accepted
2	Noise from construction activities disturbs the community regularly.	94 (23.5%)	72 (18.0%)	124 (31.0%)	110 (27.5%)	2.38	1.12	Rejected
3	Loud music or events contribute significantly to noise pollution.	193 (48.2%)	146 (36.5%)	53 (13.2%)	8 (2.0%)	3.31	0.77	Accepted
4	Industrial noise from factories or workshops affects residents' peace	62 (15.5%)	87 (21.8%)	163 (40.8%)	88 (22.0%)	2.31	0.98	Rejected
5	Noise pollution from neighbourhood activities (like shouting, generators) is common.	207 (51.7%)	115 (28.7%)	49 (12.2%)	29 (7.2%)	3.25	0.93	Accepted

Cluster mean = 2.91

Criterion mean ≥ 2.5 is accepted; < 2.5 is rejected

Source: Researcher, 2025

Table 4.2 shows respondents' opinions on the main sources of noise pollution in Ugbowo Community. The mean values range from 2.31 to 3.31. The highest agreement was recorded for loud music or events as a source of noise pollution, closely followed by

traffic noise and noise from neighbourhood activities. The lowest means were associated with industrial noise and noise from construction activities, which both fell below the acceptance criterion. The cluster mean of 2.91 indicates that while certain sources of noise pollution are widely recognised, others receive less acknowledgment from residents. It can be inferred that awareness of the major sources of noise pollution exists to a good extent within the community.

Research Question 2: What is the level of knowledge among residents of Ugbowo Community about the health effects of noise pollution?

Table 4.3: Response of respondents showing their level of knowledge on the health effects of noise pollution

S/N	KNOWLEDGE	Frequency	Percentage (%)
Question 1: Prolonged exposure to loud noise primarily causes which health problem?			
1.	Low	117	29.2
	High	283	70.8
	Total	400	100.0
Question 2: Noise pollution can increase which of the following?			
2.	Low	89	22.2
	High	311	77.8
	Total	400	100.0
Question 3: Which effect is commonly associated with noise pollution and sleep?			
3.	Low	135	33.8
	High	265	66.2
	Total	400	100.0
Question 4: Noise pollution may contribute to which mental health condition?			
4.	Low	123	30.8
	High	277	69.2
	Total	400	100.0
Question 5: Which is NOT an effect caused by noise pollution?			
5.	Low	157	39.2
	High	243	60.8
	Total	400	100.0
Question 6: Who is most susceptible to health effects from noise pollution?			
6.	Low	150	37.5
	High	250	62.5

	Total	400	100.0
Question 7: What is an effective way to reduce health risks related to noise pollution?			
7.	Low	96	24.0
	High	304	76.0
	Total	400	100.0

Source: Researcher, 2025

Table 4.3 presents responses on residents' level of knowledge about the health effects of noise pollution. The percentage of respondents in the "High" category is consistently greater than those in the "Low" category for every question. The highest level of knowledge was recorded for recognising that noise pollution can increase stress levels (77.8%), while the lowest was identifying that children and the elderly are most susceptible to health effects (62.5%). Across all seven questions, high knowledge responses ranged from 60.8% to 77.8%, indicating that most residents are aware of the health risks associated with noise pollution. This distribution shows that knowledge exists to a good extent within the community.

Research Question 3: What is the level of awareness of residents in Ugbowo Community regarding the existing noise pollution regulations and policies in their community?

Table 4.4: Response of respondents showing their level of awareness of existing noise pollution regulations and policies in their community

S/N	AWARENESS	Frequency	Percentage (%)
Question 1: Noise pollution regulations are usually created and enforced by:			
1.	Low	128	32.0
	High	272	68.0
	Total	400	100.0
Question 2: Residents can report excessive noise to			
2.	Low	97	24.2
	High	303	75.8
	Total	400	100.0
Question 3: Penalties for breaking noise laws often include:			

3.	Low	144	36.0
	High	256	44.0
	Total	400	100.0
Question 4: Public awareness campaigns about noise pollution aim to:			
4.	Low	85	21.2
	High	315	
	Total	400	100.0
Question 5: Noise laws may require regular updates to:			
5.	Low	118	29.5
	High	282	70.5
	Total	400	100.0
Question 6: Awareness programs for noise pollution typically:			
6.	Low	162	40.5
	High	238	59.5
	Total	400	100.0
Question 7: Knowing who to contact about noise complaints helps:			
7.	Low	106	26.5
	High	294	73.5
	Total	400	100.0

Source: Researcher, 2025

Table 4.4 shows residents' awareness of noise pollution regulations and policies. In most items, the "High" category makes up a larger share of responses. Awareness was highest in knowing that residents can report excessive noise (75.8%) and understanding the purpose of public awareness campaigns (78.8%). The lowest awareness was in recognising the content and purpose of awareness programmes (59.5%). Overall, high awareness responses ranged from 59.5% to 78.8%, suggesting that awareness of noise pollution regulations is present to a good extent within the community.

Research Question 4.5: What are the noise reduction measures already in place in Ugbowo Community?

S/N	Statement	SA (%)	A (%)	D (%)	SD (%)	Mean	Std. Dev.	Decision
1	Noise barriers or buffers have been installed along busy roads in Ugbowo.	12 (3.0%)	33 (8.2%)	187 (46.8%)	168 (42.0%)	1.72	0.74	Rejected
2	There are community programs to educate people about noise pollution.	54 (13.5%)	42 (10.5%)	151 (37.8%)	153 (38.2%)	1.99	1.01	Rejected
3	Residents use ear protection in noisy environments such as workplaces.	7 (1.8%)	13 (3.2%)	213 (53.2%)	167 (41.8%)	1.65	0.63	Rejected
4	Local government enforces noise limits during construction activities.	24 (6.0%)	61 (15.2%)	166 (41.5%)	149 (37.2%)	1.90	0.87	Rejected
5	There are clear guidelines about noise pollution that residents are expected to follow.	31 (7.8%)	34 (8.5%)	171 (42.8%)	164 (41.0%)	1.83	0.88	Rejected

Cluster mean = 1.82

Criterion mean ≥ 2.5 is accepted; < 2.5 is rejected.

Source: Researcher, 2025

Table 4.5 examines noise reduction measures in place in Ugbowo Community. The mean values range from 1.65 to 1.99, all well below the acceptance criterion of 2.5. The highest score was linked to community education programmes, while the lowest was for residents using ear protection. The consistently low means across all items indicate limited presence of effective noise reduction measures. The cluster mean of 1.82

confirms this position. It can be inferred that noise reduction measures exist to a poor extent in the community.

Discussion of Findings

Objective 1: Main sources of noise pollution in Ugbowo community, Benin City

The results show that traffic noise, loud music or events, and noise from neighbourhood activities are the major sources of noise pollution in Ugbowo Community. Traffic noise has long been recognised as a dominant contributor to environmental noise in Nigerian urban areas, with studies consistently recording levels above permissible limits and linking them to health problems such as headaches, insomnia and reduced concentration (Wojuade & Olateju, 2020), (Itaa et al., 2023). Loud music, whether from entertainment venues or religious gatherings, has also been identified as a significant disturbance, particularly in densely populated communities where compliance with noise regulations is low (Olusoji, 2020), (Abolade, 2019). Noise from neighbourhood activities, including generators, has become common in Nigeria’s “generator economy” where frequent power outages compel widespread use of private power sources (Adibe, 2012). These patterns align with national trends, reinforcing the view that Ugbowo’s noise challenges are a reflection of broader urban noise problems in the country.

Objective 2: Level of Knowledge of Health Effects of Noise Pollution

The findings show that the level of knowledge among residents of Ugbowo on the health effects of noise pollution is relatively high, with responses in the “High” category ranging from 60.8% to 77.8%. This indicates that most residents can identify that

prolonged exposure to loud noise can cause significant health problems such as stress, mental health issues, and sleep disturbances. Similar patterns have been observed in other Nigerian communities where awareness of the adverse health effects of noise pollution is notable. In Ado Ekiti, 89% of residents knew about the harmful effects of noise pollution, including its role in causing tinnitus, though many continued to experience these health problems due to persistent exposure (Elisha & Moses, 2024). Research in Southern Nigeria also highlighted that residents commonly link noise pollution with mental stress, distraction, and reduced concentration, showing an awareness of both physiological and psychological effects (Ohaeri & Obafemi, 2024).

Objective 3: Awareness of Noise Pollution Regulations and Policies

The results on awareness of noise pollution regulations show that between 59.5% and 78.8% of respondents in Ugbowo fall into the “High” category, with the highest awareness recorded in knowing where to report excessive noise and the purpose of public awareness campaigns. This mirrors patterns found in other parts of Nigeria where there is a fair understanding of noise control measures but limited depth in specific regulatory details. In Osogbo, residents were aware of noise control policies but lacked clarity on the enforcement mechanisms and specific penalties for violations, which weakened policy effectiveness (Adeboyejo et al., 2025). A review of noise management practices in Nigeria further observed that although regulations exist, their impact is often undermined by weak enforcement and insufficient public sensitisation on the full scope of the laws (Orikpete & Ewim, 2023). This limited awareness of procedural details means that while

residents may know about noise laws in general, their capacity to engage effectively with the regulatory process is reduced. Strengthening both awareness campaigns and enforcement visibility could help translate this relatively high general awareness into practical action within the community.

Objective 4: Noise reduction measures already in place in Ugbowo Community

The findings show that noise reduction measures in Ugbowo are largely absent, with a low cluster mean of 1.82. Noise barriers along busy roads are missing, consistent with reports of limited physical noise control infrastructure in Nigerian cities (Abraham et al., 2022; Oyedepo, 2013). Community education programmes are scarce, reflecting weak sensitisation efforts (Orikpete & Ewim, 2023). Use of ear protection is minimal, echoing poor occupational noise safety culture (Membere & Whiskey, 2020). Enforcement of noise limits during construction is weak, mirroring governance and monitoring gaps (Wokekoro, 2020). Clear guidelines are also poorly disseminated, limiting compliance (Pam & Garba, 2019). These gaps leave residents vulnerable to persistent harmful noise exposure.

CHAPTER FIVE
SUMMARY, CONCLUSION AND RECOMMENDATIONS OF THE
STUDY

Summary

The purpose of this study was to assess the knowledge and awareness of noise pollution and its associated health impacts among residents of Ugbowo Community, Benin City. The study focused on determining the major sources of noise pollution, the extent of residents' knowledge of the health effects of noise exposure, their awareness of existing regulations and policies on noise control, and the noise reduction measures currently in place within the community. It also examined the extent to which demographic factors influenced residents' understanding of noise pollution and explored strategies for improving community awareness and control of environmental noise. In all, four research questions were raised to guide the study.

The study adopted a descriptive survey research design, which was considered appropriate for assessing the knowledge and awareness of noise pollution and its related health effects among residents of Ugbowo Community. The population of the study comprised approximately 552,005 residents of Ugbowo Community, projected from the 2006 national census figure using Nigeria's annual growth rate of 2.6%. From this population, a sample of 400 respondents was selected using a multi-stage sampling technique that ensured fair representation of all sections of the community. The research instrument used was a structured questionnaire consisting of both knowledge-based and

opinion-based questions divided into sections on demographic data, sources of noise pollution, health effects, awareness of regulations, and existing noise reduction measures. The instrument's validity was confirmed by the project supervisor and two experts in the Department of Health, Safety, and Environmental Education, while reliability was established using the test-retest method, yielding a Cronbach's Alpha coefficient of 0.82, indicating good internal consistency. Data collected were analyzed using descriptive statistics such as frequency counts, percentages, means, and standard deviations, which provided clear and simple interpretations in line with the research questions.

The findings of the study revealed that the major sources of noise pollution in Ugbowo Community were traffic noise, loud music or events, and noise from neighborhood activities such as generator use. These sources were identified as the most disturbing and persistent, while industrial and construction noise were less commonly cited. Regarding knowledge, most residents demonstrated a relatively high level of understanding of the health impacts of noise pollution, with between 60.8% and 77.8% correctly identifying conditions such as hearing loss, stress, sleep disturbance, and mental health issues as outcomes of prolonged exposure to noise. Awareness of existing noise regulations and policies was also fairly high, ranging from 59.5% to 78.8%, particularly in knowing where to report noise violations and understanding the purpose of public awareness campaigns. However, findings showed that effective noise reduction measures were largely absent in the community, with low mean scores (cluster mean = 1.82) across all related items. Respondents noted that noise barriers were lacking, community education

programs were rare, and enforcement of noise limits was weak. This indicates that while knowledge and awareness are generally high, practical implementation and enforcement mechanisms remain inadequate.

Conclusion

The study concludes that residents of Ugbowo Community possess a considerable level of knowledge and awareness about noise pollution and its associated health impacts. Most respondents understand the causes and health effects of noise exposure and show awareness of existing regulations. However, this awareness has not translated into effective community-level noise control practices. The absence of tangible noise reduction measures, weak enforcement of existing regulations, and limited public sensitization efforts hinder effective noise management in the area. Therefore, it is evident that while awareness is crucial, it must be complemented by consistent policy enforcement, improved infrastructure such as noise barriers, and regular public education to achieve a healthier and quieter living environment in Ugbowo Community.

Recommendations

Based on the findings, the following recommendations are made:

1. Install noise barriers along major roads and enforce zoning to reduce traffic-related noise.
2. Strengthen community education programmes to encourage behavioural changes and promote protective measures.

3. Ensure stricter enforcement of noise limits during construction and social events through regular monitoring.
4. Disseminate clear, accessible guidelines on acceptable noise levels and penalties for violations.
5. Promote occupational hearing protection in high-noise workplaces through employer compliance and training.

Suggestions for Further Study

- Effectiveness of community-based noise monitoring and reporting systems in reducing environmental noise levels.
- Socio-economic factors influencing compliance with noise regulations in urban communities.

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**APPENDIX
QUESTIONNAIRE**

**DEPARTMENT OF HEALTH SAFETY AND ENVIRONMENTAL EDUCATION
FACULTY OF EDUCATION
UNIVERSITY OF BENIN**

**KNOWLEDGE AND AWARENESS OF NOISE POLLUTION AND ITS ASSOCIATED
HEALTH IMPACTS QUESTIONNAIRE**

I am a final-year student in the Department of Health, Safety, and Environmental Education, Faculty of Education, University of Benin. As part of my academic research, I am conducting a study titled "Knowledge and Awareness of Noise Pollution and Its Associated Health Impacts: A Case Study of Residents in Ugbowo Community, Benin City."

This study aims to assess the level of knowledge and awareness among residents of Ugbowo Community regarding noise pollution, its sources, health effects, existing regulations, and noise reduction measures. Your honest and thoughtful responses to this questionnaire will provide valuable insights that can help inform effective noise pollution management and public health interventions in the community. Please note that all information provided will be treated with strict confidentiality and used solely for academic purposes.

Your participation is greatly appreciated, and I thank you sincerely for your time and cooperation in completing this questionnaire.

Thank you.

Researcher

Instructions: Please answer all questions as honestly as possible. There are no right or wrong answers, and your input is highly valued. It should take approximately 10–15 minutes to complete the questionnaire.

SECTION A: Demographic

Fill the blank spaces

Gender: Male () Female ()

Age: 18-27 () 28-37 () 38-47 () 47 and above ()

SECTION B: Answering the Research Question

Please, kindly tick (✓) were appropriate

What are the main sources of noise pollution in Ugbowo Community, Benin City?

S/N	Statement	SA	A	D	SD
1	Traffic noise from vehicles is a major source of noise pollution.				
2	Noise from construction activities disturbs the community regularly.				

3	Loud music or events contribute significantly to noise pollution.				
4	Industrial noise from factories or workshops affects residents' peace.				
5	Noise pollution from neighborhood activities (like shouting, generators) is common.				

What is the level of knowledge among residents of Ugbowo Community about the health effects of noise pollution?

1. Prolonged exposure to loud noise primarily causes which health problem?

- a) Hearing loss
- b) Improved vision
- c) Increased height
- d) Faster metabolism

2. Noise pollution can increase which of the following?

- a) Stress levels
- b) Hair growth
- c) Lung capacity
- d) Appetite

3. Which effect is commonly associated with noise pollution and sleep?

- a) Disturbed and poor sleep quality
- b) Enhanced concentration
- c) No change in sleep patterns
- d) Increased deep sleep

4. Noise pollution may contribute to which mental health condition?

- a) Anxiety and irritability
- b) Improved mood
- c) Enhanced memory
- d) None of the above

5. Which is NOT an effect caused by noise pollution?

- a) Cardiovascular diseases
- b) Hearing impairment
- c) Improved lung function
- d) High blood pressure

6. Who is most susceptible to health effects from noise pollution?

- a) Children and elderly
- b) Only athletes
- c) Only adults aged 30-50
- d) Only animals

7. What is an effective way to reduce health risks related to noise pollution?

- a) Wearing ear protection
- b) Eating sugar before noise exposure
- c) Watching television during loud noises
- d) Ignoring the noise

What is the level of awareness of residents in Ugbowo Community regarding the existing noise pollution regulations and policies in their community?

1. Noise pollution regulations are usually created and enforced by:

- a) Local government and community leaders
- b) School teachers
- c) Private companies
- d) Retail businesses

2. Residents can report excessive noise to:

- a) Local authorities or environmental agencies
- b) Television stations
- c) Neighbors only
- d) No official body

3. Penalties for breaking noise laws often include:

- a) Fines or warnings
- b) Free tickets to events
- c) Monetary rewards
- d) No consequences

4. Public awareness campaigns about noise pollution aim to:

- a) Inform residents about health risks and regulations
- b) Increase noise levels
- c) Promote louder music
- d) Sell earplugs only

5. Noise laws may require regular updates to:

- a) Reflect changing community needs and technology
- b) Increase noise limits indefinitely
- c) Remove all restrictions
- d) Have no updates at all

6. Awareness programs for noise pollution typically:

- a) Increase residents' knowledge and promote compliance
- b) Discourage reporting noise problems
- c) Encourage louder environments
- d) Focus only on air pollution

7. Knowing who to contact about noise complaints helps:

- a) Reduce noise pollution through proper reporting
- b) Increase noise levels
- c) Make no difference
- d) Confuse residents

What are the noise reduction measures already in place in Ugbowo Community?

S/N	Statement	SA	A	D	SD
1	Noise barriers or buffers have been installed along busy roads in Ugbowo.				
2	There are community programs to educate people about noise pollution.				
3	Residents use ear protection in noisy environments such as workplaces.				
4	Local government enforces noise limits during construction activities.				
5	There are clear guidelines about noise pollution that residents are expected to follow.				