Knowledge of Health Impacts of Noise Pollution on Adult in Owerri Municipal Council, Imo State, Nigeria

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Abstract:- This research work investigated the knowledge of health Impacts of noise pollution on adult in Owerri Municipal Imo State, Nigeria. Three (3) objectives, Three (3) research questions and two (2) null-hypothesis guided the study, descriptive survey research design was used for the study. The population for the study was estimated to be forty seven thousand, three hundred and sixty one (47,361) adults. random sampling technique was used to select four hundred (400) adults. Questionnaire was used as instrument of the study. Data collected were analyzed using descriptive statistics of frequency counts and percentages for the research questions while inferential statistic of chi-square was used to test the hypotheses at 0.05 level of significance. The result revealed that majority of adults in Owerri Municipal Council Imo State possessed good knowledge of physical health impacts(81.0%), psychological health impacts(76.1%) and social health impacts(85.1%) of noise pollution. Based on the findings and conclusions, recommendations were made that government should put in more action to ensure implementation of existing laws against noise pollution, improvement of power supply to reduce usage of generators. all appliances causing much noise should be turned off to be switched on at certain times, Avoid unnecessary noise like playing of music, video games, etc. in the background for long periods, Repair or replace old machines when necessary and use ear protection such as earplugs or earmuffs to reduce noise impacts.

Keywords:- Noise Pollution, Impacts, Owerri, Alvan, Population.

I. INTRODUCTION

➢ *Background to the Study*

Recently, noise pollution has been of increasing concern, particularly in urban areas in developed and developing countries such as Nigeria. In most cities, noise pollution is regarded as a hazardous form of pollution beside water and air pollution (Mbaegbu et al, 2021). A report by World Health Organization (WHO) revealed that 16% of the disabling hearing loss in adults is attributed to occupational noise.

Noise is unwanted sound considered unpleasant, loud or disruptive to hearing. Noise has been an environmental pollutant for thousands of years, examples are stories of loud music in the old testament and noisy delivery wagons in ancient times. Studies have been carried out that have demonstrated the potential impact of the noise on our mental and physical health, and there have been efforts to reduce some of the intrusive sounds e.g. air craft and road traffic noise but there is still too little attention paid to the deleterious effects of noise. Noise level is measured in decibels (dB). One decibel is a threshold of hearing. Approximately, 60dB is the level of normal talking (Godson et al, 2009). Then, the average noise level of 97.60dB obtained from a carried out research was exceeded the World Health Organization (WHO) value of 50dB allowed for residential areas. There are approximately 10,000 deaths per year as a result of noise in the European Union (Godwin, 2018). Noise complaints top the list of complaints in major cities worldwide and noise even threatens the natural sound system of our planet, there is no action globally to address the noise pollutant (Bronzaft, 2017).

Noise pollution is regarded as environmental noise and the propagation of noise may develop a harmful impact on the activity of human or animal life. According to Casey et al (2017), noise pollution is the highest in low income and racial minority neighborhood due to problems associated with urban environmental noise. Noise pollution is generally defined as regular exposure to elevated sound levels that may lead to adverse effects in humans or other living organisms. Noise pollution is associated with household electricity from generator source and it is an emerging environmental degradation in many developing nations that affect human both young and adults (Menkib & Agunwamba, 2015). World Health Organization (WHO, 2015) reported that most cities in Nigeria ranked noise pollution as the third hazardous form of pollution beside air and water pollution. Community noise is defined as noise emitted from all source except noise at industrial workplace. Main source of community noise include rail and air traffic, industries, construction and public work and their neighborhood. The common sources of environmental noise pollution include road transport system, railway, machines and air traffic, communication, neighborhood activities, religious activities, business

activities, construction and public works and manufacturing industries (Michael &Gary, 2013).

Adult is a person older than 19 years of age unless national law delimits an earlier age, and an adolescent someone aged 10 to 19. The point at which a person progresses from childhood into adulthood may vary according to different cultures and legal definition usually fluctuates between 16 and 21. This will be accompanied by rights and responsibilities of adulthood (World Health Organization (WHO, 2016). Most adults are prone to the negative health implications of noise pollution as a result of their place of work, where they live and body structure. According to World Health Organization (WHO, 2006), elderly people (55 years and above) may suffer from cardiac problems due to noise. Children (15 years and below) too suffer from it and can suffer permanent damage for life because children are vulnerable to noise. Noise poses a serious threat to both a child and adult physical and psychological health including learning and behavior (Rosen & Olin, 2016).

High level of noise is a risk factor to health implications of noise pollution such as cardiovascular effects in humans and an increased incidence of coronary artery disease. Noise pollution has several health implications which can be viewed in three dimensions of health which include physical, emotional and social health implication. The physical health implications include Noise Induced Hearing Loss (NIHL), Tinnitus, stroke, diabetes etc. The emotional health implications include stress, annoyance, psychiatric disorder etc. Research commission by Rockwool in Denmark, reveals that in UK one third (33%) of victims of domestic disturbance claim loud parties have left them unable to sleep or made stressed in the last two years. Around one in eleven (9%) of those affected by domestic disturbance claims it have left them continually disturbed and stressed (Clout & Laura, 2021). The social health implications include decreased performance in learning, social anxiety, absenteeism in the workplace etc. Miel et al, (2013) reported noise pollution as a primary cause of sleep deprivation and some certain noise level can alter staff stress, impact job performance, induce hearing loss at high noise levels create annoyance and cause an increased rate of burnout. Noise has adverse impact on physical, social and psychological wellbeing of man and can lead to either permanent or temporary hearing loss (Hessel, 2010).Acoustic trauma, tympanic membrane perforation and curricular chain disarticulations can result from excessively loud noise/blasts(Henderson et al,2105). A 2021 systematic review on the effect of occupational exposure to noise on Ischemic Heart Disease (IHD), stroke and hypertension, coordinated by the World Health Organization (WHO) and the International Labor Organization (ILO) located 17 studies that met the inclusion criteria, comprising a total of 534,688 participants (7.47% females) in 11 countries and in three WHO regions (the Americas, Europe and the Western Pacific). The knowledge of adults about noise pollution is less known than air pollution. Knowledge is the consciousness, identification and applied it for the development of mankind. It is created in the human minds and increases when people are involved in its acquisition and dissemination. Hence

previous knowledge enhances the formation of developed and advanced knowledge (Nasimi et al, 2013). Modern and industrialized societies have multiple activities and sources of noise that are produced by industrial and craft activities such as vehicle traffic, (road, railway and airport), leisure (discos, dance halls), churches, educational (school). Noise pollution is now getting recognized worldwide as a major problem for the quality of life in any urban area. In most developed countries, standard are based on expert judgment and do not take into account of peoples preference (Ubuoh et al, 2012). Efforts have been made by some individuals to reduce noise pollution such as closing the window to keep away annoying sound, wearing earplugs, turning off or reducing the volume of electronic devices, planting trees etc. Individuals who do not seek treatment for their loss are 50% more likely to have depression than their aided peers (American Association, 2018). However, noise reduction in the environment is often neglected not only by individuals but co-operate organizations. This results to negative effects on the health of the population. Everyone in both urban and sub-urban seem to adapt to environment with noise pollution in Nigeria. Noise pollution carries a lot of health implication. Therefore, the researcher set out to determine the knowledge of health implications of noise pollution among adults in Owerri Municipal Council, Imo State.

➢ *Purpose of the Study*
The purpose of the study was to determine the knowledge of health impacts of noise pollution among adults in Owerri Municipal Council, Imo State.

Specifically the study was to;
- Determine the knowledge of physical health impacts of noise pollution among adults in Owerri Muncipal Council.
- Ascertain the knowledge of psychological health impacts of noise pollution among adults in Owerri Municipal Council.
- Determine the knowledge of social health impacts of noise pollution among adults in Owerri Municipal Council.

➢ *Research Questions*
The following research question were formulated to guide the study;
- What is the knowledge of physical health impacts of noise pollution among adults in Owerri Municipal Council?
- What is the knowledge of psychological health impacts of noise pollution among adult in Owerri Municipal Council?
- What is the social health impacts of noise pollution among adults in Owerri Municipal Council?

➢ *Hypotheses*
The following hypotheses were postulated to guide the study;
- **Ho₁**: There will be no significant difference in the knowledge of health impacts of noise pollution among adults based on gender.

- **Ho₂**: There is no significant difference in the knowledge of health impacts of noise pollution among adults based on age.

II. MATERIALS AND METHOD

Research design used was descriptive survey research design. Nworgu (2015) asserted that descriptive survey design permits the description of phenomena as they exist in their natural setting. The author further explained that this design facilitates the explanation of a situation in its current state and solicits information directly from the respondents. Descriptive survey design equally aims at collecting data and describing it in a systematic manner, the characteristic features or facts about a given population. The research design was also used by Pelumi (2019) on noise pollution measurement and possible effects on public health in Ota Metropolis, Nigeria. This justified the use of similar design for a study of similar nature.

➤ *Area of the Study*

The study was carried out in Owerri Municipal council, Imo State. Owerri Municipal is one of the twenty –seven (27) LGA that made up Imo State. It has a total population of 125,337 (60,882 males and 64,445 females) (National Population Commission, 2006) with annual growth rate of 3.2%. Owerri Municipal Council occupies an area of 58.5km^2 with a population density of about 2,134 people per square kilometer. Owerri Municipal Council is located in the lower part of Imo state and it lies between latitude 5.4850N and longitude 7.050E. it sits at the intersection of roads from Portharcourt, Onitsha, Aba, Orlu, Okigwe and Umuahia. It is surrounded by communities Oji, Naze, Amakohia, Irete and Umuguma. Owerri Municipal has an urban setting with one autonomous community made up of five (5) indigenous kindred (Owerrinchise vis: Umuororonjo, Amawom, Umuonye, Umuodu and Umuoyima). Owerri Municpal Council has more social amenities than rural areas and is usually inhabited by Businnessmen, Technocracts and Civil servants. The citizens of owerri Municipal Council of Imo State are predominately educated and enlighted since their chief industry is education which includes secondary schools, universities and polythechnics respectively.

Owerri Municipal is bounded at the North by Amakohia at the South by Umuoma/Nekede, at the East by Egbu, at the West by Naze. Natural and agricultural resources, solid mineral deposit abound all over the council area such as phosphate, limestone, varolin, galena, stones and granites, as well as silica sand. The council is also blessed with agricultural products like cassava, yam, maize, livestock, and fruits among others etc. These provide the raw materials for the agro-based industries, business and investment. Many business and investment opportunities exist in the municipal council because of the position the council occupies as the seat of government and therefore the epicenter of all economic, social, religious activities in the state. Banking and financial sectors, fast foods and eating centers, as well as livestock feeds processing, fishes are all areas of business and investment opportunities existing in the capital city of Owerri Municipal Council.

The council has about 54 Primary schools, 10 public Secondary Schools and 26 recognized Private Schools in the Area. The council boast of a tertiary healthcare centre, a general hospital, seven (6) primary health care facilities spread across the council and eleven (11) private health facilities. The rationale for choosing this area as a result of persistent noise pollution in the area, this caught the attention of the researcher to investigate if the residents in the area are knowledgeable of the health consequences.

➤ *Population of the Study*

The population for this study comprised all adults in Owerri Municipal Council. The estimated population of adults in Owerri Municipal Council of Imo State is 47,361 adults (National Population, Commission, 2016).

Table 1: Distribution of Population

S/N	Town/City	Population	
		Male	**Female**
1	Amawom	4,985	5105
2	Umuoronjo	3,878	5393
3	Umuonyeche	3,978	5768
4	Umuodu	3,802	4954
5	Umuoyima	3,767	5731
	Total	**20,410**	**26,948**
	Grand Total	**47,361**	

Source: (National Population Commission, 2016)

➤ *Sample and Sampling Techniques*

A sample size for the study consisted four hundred (400) adults living in Owerri Municipal Council. This is in line with Cohen, Manion and Morrison (2011), that when the sample size is 20,000 or above, the sample size should be 377 and above. Multi-stage sampling procedure was used to arrive at the sample size.

In the first stage, the council was clustered into five communities. Stage two involved the use of random sampling of balloting without replacement to select draw four communities out of the five existing communities in the council. Stage three involved the use of convenience sampling to draw out two wards from selected communities to arrive at 8 wards. Stage four involve the use of convenience sampling to draw out 50 adults from selected communities to arrive at 400 as the sample size.

Table 2: Distribution of Sample Size

S/N	Selected Town/City	Population		Sample size
		Male	Female	
1	**Amawom**	4,985	5105	
	Douglas			50
	Njiribeako			50
2	**Umuoronjo**	3,878	5,393	
	Aladinma I			50
	Aladinma II			50
3	**Umuonyeche**	3,978	5,768	
	Ikenegbu I			50
	Ikenegbu II			50

4	Umuoyima	3,767	5,731	
	Azuzu I			50
	Azuzi II			50
	Total			**400**

➤ *Instrument for Data Collection*

The instrument for data collection was self-structured questionnaire. The instrument was classified into four sections A, B,C and D. Section A elicited information on the respondents personal data of gender and age. Section B elicited information on physical health implications on noise pollution. Section C elicited information on the psychological/mental health implications on noise pollution and section D elicited information on the social health implications on noise pollution. The respondents were requested to tick against any option that best applies to them in terms of Yes and No.

➤ *Method of Data Collection*

In order to gain access to the respondents, a letter of introduction was obtained from the Head of Department of Health Education, Alvan Ikoku Federal College of Education, Owerri introducing the researcher and the purpose of the study was given to the leaders of each ward. The administration of instrument was be done by the researcher with the assistance of the leaders from each ward. The distribution and collection of the instruments were done on the spot to ensure a return rate.

➤ *Method of Data Analysis*

Data generated were checked for completeness of information. The research questions were answered using frequency counts and percentages while the null hypotheses were tested using Chi-square statistics at 0.05 level of significance.

➤ *Presentation and Analysis of Data*

The results of the data analysis are presented according to the research questions and hypotheses that guided the study.

Table 3: Demographic profile of the respondents

Variables	Frequency	Percent (%)
Gender		
Male	229	58.3
Female	164	41.7
Age		
18-25 years	167	42.5
26-35 years	154	39.2
36 years and above	72	18.3

Table 3 shows the demographic profile of the respondents. It revealed that 58.3% of the respondents are male while 41.7% are female. In terms of age 42.5% the respondents are within the age of 18-25 years, 26-35 years (39.2%) while 18.3% are within 36 years and above.

• *Research Question 1*

What is the knowledge of physical health implication of noise pollution among adults in Owerri Municipal Council?

Table 4: Knowledge of physical health implication of noise pollution among adults

S/N	Items	Yes (%)	No (%)
1	Disturbed sleep is one of the physical health effect of noise pollution	322 (81.9)	71 (18.1)
2	Noise pollution can lead to stress	338 (86.0)	55 (14.0)
3	Noise pollution may aggravate high blood pressure	339 (86.3)	54 (13.7)
4	Noise pollution is a risk to cardiovascular diseases	284 (72.3)	109(27.7)
5	Noise pollution can lead to deafness	309 (78.9)	84 (21.4)
	Total	**1592**	**373**
	Average (%)	**318 (81.0)**	**75 (19.0)**

Table 4 shows the knowledge of physical health implication of noise pollution among adults in Owerri Municipal Council. The result revealed that 81% of the respondents have knowledge of physical health implication of noise pollution while 19% do not. Therefore, majority of adults in Owerri Municipal Council are knowledgeable of physical health implication of noise pollution.

• *Research Question 2*

What is the knowledge of psychological health implication of noise pollution among adults in Owerri Municipal Council?

Table 5: Knowledge of psychological health implication of noise pollution among adults

S/N	Items	Yes (%)	No (%)
1	Anger is a psychological health implication of noise pollution	245 (62.3)	148 (37.7)
2	Sleeping disorders is one of the psychological health implications of noise pollution	332 (84.5)	61 (15.5)
3	Noise pollution can lead to annoyance	321 (81.7)	72 (18.3)
4	Noise pollution can stimulate aggression	292 (74.3)	101 (25.7)
5	Noise pollution can lead to iritablilty	305 (77.6)	88 (22.4)
	Total	**1495**	**470**
	Average (%)	**299 (76.1)**	**94 (23.9)**

Table 5 shows knowledge of psychological health implication of noise pollution among adults in Owerri Municipal Council. The result revealed that 76.1% of the respondents have knowledge of psychological health implication of noise pollution while 23.9% do not. The result indicates that majority of the adults in Owerri Municipal Council are knowledgeable of psychological health implication of noise pollution.

- *Research Question 3*
   What is the knowledge of social health implication of noise pollution among adults in Owerri Municipal Council?

Table 6: Knowledge of social health implication of noise pollution among adults

S/N	Items	Yes (%)	No (%)
1	Noise pollution interferes with spoken communication between individuals	385 (98.0)	8 (2.0)
2	Noise pollution can lead to low productivity at work	322 (81.9)	71 (18.1)
3	Distraction is a social health effect of noise pollution	324 (82.4)	69 (17.6)
4	Poor concentration can result from noise pollution	324 (82.4)	69 (17.6)
5	Noise pollution can reduce the quality of living environment	317 (80.7)	76 (19.3)
	Total	**1672**	**293**
	Average (%)	**334 (85.1)**	**59 (14.9)**

Table 6 shows the knowledge of social health implication of noise pollution among adults in Owerri Municipal Council. The result revealed that 85.1% of the respondents have knowledge of social health implication of noise pollution while 14.9% do not. The result indicates that majority of adults in Owerri Municipal Council are knowledgeable of social health implication of noise pollution.

- *Test of Hypotheses*

- **H_{01}:** There is no significant difference in the knowledge of health implication of noise pollution among adults in Owerri Municipal Council based on gender.

Table 9: Chi-square analysis on the knowledge of health implication of noise pollution among adults based on gender

Gender	Yes	No	Total	χ^2	Df	Sig.	Dec.
Male	179	50	229	10.751	1	.001	Significant
Female	139	25	164				
Total	318	75	393				

From the Chi-square analysis in Table 9, the statement of hypothesis 1 is rejected; implying that there is a significant difference in the knowledge of health implication of noise pollution among adults in Owerri Municipal Council based on gender. This is because, the p-value (Sig. = 0.001) is less than 0.05 alpha level.

- **H_{02}:** There is no significant difference in the knowledge of health implication of noise pollution among adults in Owerri Municipal Council based on age.

Table 10: Chi-square analysis on the knowledge of health implication of noise pollution among adults based on age

Age	Yes	No	Total	χ^2	Df	Sig.	Dec.
18-25 years	137	30	167	40.504	2	.000	Significant
26-35 years	113	31	154				
36 years and above	59	13	72				
Total	309	74	393				

From the Chi-square analysis in Table 10, the statement of hypothesis 2 is rejected; implying that there is a significant difference in the knowledge of health implication of noise pollution among adults in Owerri Municipal Council based on age. This is because, the p-value (Sig. = 0.000) is less than 0.05 alpha level.

III.   SUMMARY OF THE FINDINGS

- Majority of adults (81.0%) in Owerri Municipal Council are highly knowledgeable of physical health impacts of noise pollution.
- More than two-thirds of adults (76.15) in Owerri Municipal Council are highly knowledgeable of psychological health impacts of noise pollution.
- More than two-thirds of adults (85.1%) in Owerri Municipal Council are highly knowledgeable of social health impacts of noise pollution.
- Both male and female adults in Owerri Municipal Council have high knowledge of health impacts of noise pollution.
- Adults in Owerri Municipal Council have high knowledge of health impacts of noise pollution irrespective of their age.

IV. DISCUSSION OF FINDINGS

The study generated information on the knowledge of health implications of noise pollution among adults in Owerri Municipal Council. The findings are discussed below:

The findings in table 4 revealed responses on the knowledge of physical health implications of noise pollution among adults in Owerri Municipal Council. The table revealed that 81% of the respondents had good knowledge of physical health implications of noise pollution. Therefore, more than two-thirds of the respondents possessed good knowledge of physical health implications of noise pollution which include disturbed sleep, stress, aggravate high blood pressure, a risk to cardiovascular diseases and deafness. The findings were expected and not surprising. The reason for high knowledge could be attributed to the experience of respondents who may experience noise pollution everyday. The findings of this study agree with Akugbe and Ayodele (2019) who revealed majority attesting to the physical health implications of noise pollution such as interferes with sleep, aggravate high blood pressure and stroke. These findings corroborate with that obtained by Aremu et al., (2015) in Ilorin among sawmill workers, where the commonest complaints were "tinnitus (96.6%), headache (86.6%) and hearing loss (71.9%). This disparity may be explained by the difference in the composition of the study groups as the former was conducted among factory workers, and therefore more likely to be exposed to constant high level of noise compared to other community members, and thus more likely to developed more adverse effects.

The findings in table 5 revealed responses on knowledge of psychological health impacts of noise pollution among adults in Owerri Municipal Council. The table revealed that 76.1% of the respondents had good knowledge of psychological health implications of noise pollution. Therefore, more than two-thirds of the respondents possessed good knowledge of psychological health implications of noise pollution which include anger, sleeping disorders, annoyance, aggression and irritability. The findings were expected and not surprising. The reason for the poor knowledge of emotional health implications of gender-based violence in this study could be attributed to the fact that the respondents are not informed about the disease as a result of relations who could have been affected by the disease. The findings agrees with findings of Mu¨nzelet al. (2014), Shepherd et al. (2014), Jariwalaet al. (2017) and Oviasogieand Ikudayisi, 2019)) also confirmed psychological disorders such as hyperactivity in children, annoyance reaction, learning difficulties, stress reaction, mood changes, cognitive performance, negative social behaviour and emotional symptoms are caused by noise pollution.

The findings in table 6 revealed responses on knowledge of social health impacts of noise pollution among adults in Owerri Municipal Council. The table revealed that 85.1% of the respondents had good knowledge of social health implications of noise pollution. Therefore, more than half of the respondents possessed good knowledge of social health implications which include pollution interferes with spoken communication between individuals, lead to low productivity at work, distraction, poor concentration and it can reduce quality of living environment. The findings were expected and not surprising. The result suggest that an average number of the respondents are conversant with the social health impacts. The findings supports the finding of Mbaegbu et al, (2021) who reported that less than half perceived social health implications of noise pollution. This result is similar to the results of the study conducted by Kamp and Davies (2013) and Jariwala et al., (2017) that noise pollution is a significant cause of lack of concentration in children and reduced productivity.

V. CONCLUSION

On the basis of the findings the following conclusions were drawn:
- Majority of the respondent (81.0%) had good knowledge of physical health implications of noise pollution.
- More than two-thirds of the respondent (76.1%) had good knowledge of psychological health implications of noise pollution.
- Majority of the respondent (85.1%) had good knowledge of social health implications of noise pollution.
- There was a significant difference in the level of knowledge of health implications of noise pollution among adults in Owerri Municipal Council, Imo State based on gender.
- There was a significant difference in the level of knowledge of health implications of noise pollution among adults in Owerri Municipal Council, Imo State based on age.

RECOMMENDATIONS

Based on the results and findings, the following recommendations were drawn:
- There is need for more enlightenment campaign to improve awareness on the adverse effect of noise pollution. There should also be enlightenment on measures to reduce noise pollution exposure both at individual and community level.
- The government should put in more action to ensure implementation of existing laws against noise pollution, improvement of power supply to reduce usage of generators. There should also be construction of better road network to ease traffic congestion.
- There should be increased enlightenment of the public on the danger of noise pollution on their health and the strict implementation and enforcement of noise pollution control laws.

SUMMARY

The study was carried out to determine the knowledge of health implications of noise pollution among adults in Owerri Municipal Council. To direct the study, the researcher formulated five (5) objectives, five (5) research questions and two (2) hypotheses. Appropriate literature were reviewed and presented under four (4) headings which include conceptual framework, theoretical framework, empirical framework and

summary of literature review. Descriptive survey design was employed. The population of the study was 47,361 adults. The sample size of 400 adults were selected using multi stage sampling technique. The instrument for data collection was the researchers' developed valid and reliable structured questionnaire. Data collected were presented into contingency tables and analyzed using descriptive statistics of frequency counts and percentages as well as inferential statistics of Chi-square (χ^2) at 0.05 level of significance. The result revealed that majority of adults in Owerri Municipal Council, Imo State possessed good knowledge of physical health implications (81.0%), psychological health implications (76.1%) and social health implications (85.1%) of noise pollution. Results also revealed that the hypotheses postulated for the study was significant. Conclusions were drawn and recommendation made based on the findings of the study.

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