

TRAFFIC NOISE POLLUTION AND ITS IMPACTS ON HUMAN HEALTH IN THE CITY OF AZIZIYAH

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Abstract

This research is summarised in studying the temporal and spatial variation of the levels of noise pollution by defining a group of sites (5 sites) to measure noise levels using a device (SMART SENSOR) (Digital Sound Level Meter), which were randomly distributed to the neighbourhoods of Aziziyah city. A GIS programme was used to locate the samples, and by analysing the maps of noise pollution levels, it was found that traffic noise in the study area had a significant impact on human health. Noise levels were concentrated in the city centre, which is the most severe. The highest level of noise was detected during the morning observation (93 db) near Markaz Street, while the highest level was detected during the afternoon observation. It reached (79 db) near the Gulf Intersection, and the lowest noise level It was recorded during the morning observation, and it reached 69db near Doctors Street, and the lowest noise level was detected during the afternoon observation (63db) near Hospital Street. In addition, we find that the noise levels vary within the city where the highest levels of noise are in the city centre as a result of the concentration of commercial activities and the increase in traffic in it. This is in addition to the presence of most government departments and institutions in the city centre. Then it decreases as we move towards the outskirts of the city.

keywords: Noise pollution, noise sources, effects on human health, noise levels, noise intensity.

Introduction

Noise pollution is defined as a continuous change in the movement of sound waves when the intensity of the sound exceeds the ear's permissible limits. It is transmitted by it. Sound waves travel in the air at a speed of 700 miles per hour, provided that the medium in which they are transmitted is of constant pressure and that the sound measurement has several units, including the milliwatt/square centimetre, dyne, and decibel. The human ear is to feel it (AlFiqi, 1993, pp. 78-80).

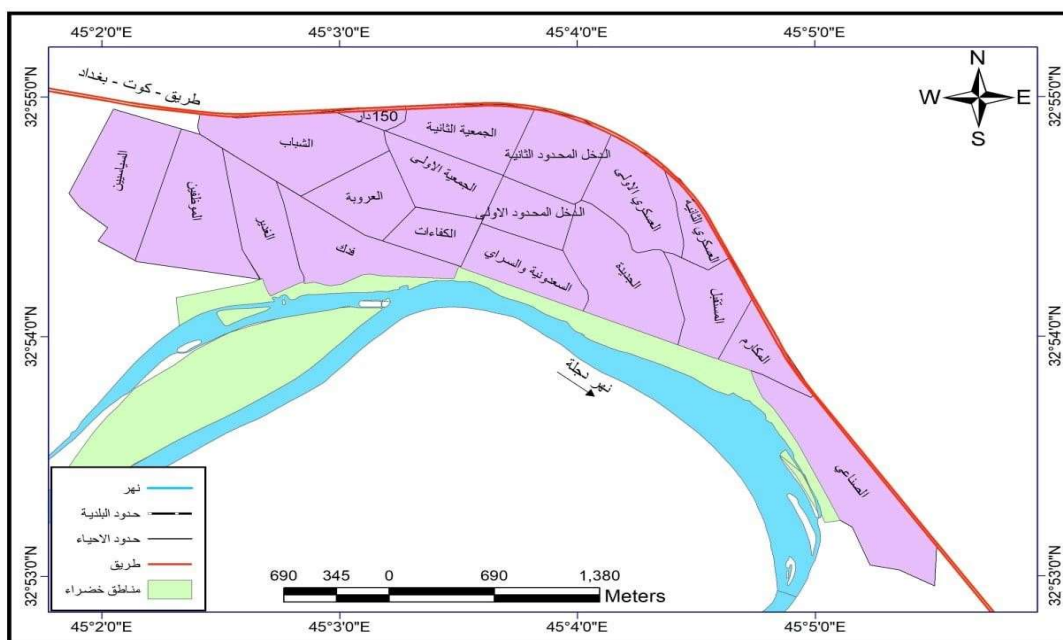
The problem of noise pollution has received great attention from the World Health Organization as well as the competent authorities, as it is one of the environmental problems most dangerous to humans. In order to know the human role in noise pollution in the two study areas, this chapter has dealt with the study and analysis of noise pollution sources represented by industrial sources of noise pollution, main streets and intersections, some parking lots, some commercial activities, as well as household appliances and their relationship to noise pollution.

What has been studied in this chapter is the study of the spatio-temporal analysis of noise pollution in the two study areas, as well as comparing its levels with the limits allowed by the World Health Organization and also comparing them with the local standard. As a result of the multiplicity and diversity of land uses in the study area, only five sites were identified in the city was randomly measured in order to obtain a clear and integrated picture of the levels of noise pollution. The distance from the sound source was adopted as a basic principle in the

measurement, with a distance ranging from 1–5 m. In residential use, distance was excluded, and movement within and between identified residential neighbourhoods was relied on to measure noise pollution levels.

First, the spatio-temporal analysis of the noise pollution resulting from some streets, intersections, and parking yards in the cities of Aziziyah and Numaniyah. The source of noise resulting from the traffic of cars comes primarily from the sounds of car engines and the friction between the vehicle, the air and the ground, and in general, the intensity of the noise resulting from friction with the street floor exceeds that resulting from the sound of the engine when the car speed reaches 60 km/h or more. There are several factors that control the level of sound pressure in relation to traffic noise, including the rate of traffic congestion, the nature of the road surface, and the number and speed of heavy vehicles travelling (Berglund, Lindvall, 1995, p16).

The study main problem of the study is whether there is a spatial and temporal variation in the noise pollution caused by traffic in the city of Aziziyah. Does Azizia suffer from traffic noise? Is there an impact of traffic on human health in the city of Aziziyah? Then Research hypothesis the study hypothesis can be defined as follows: There is a spatial and temporal variation of noise pollution in the study area. Noise pollution has a significant impact on the efficiency of workers, as well as on production capacity, as well as a great impact on the health of the individual. The research aims are: The study aims to analyse the spatial and temporal variations of noise pollution in it. As well as the detection of the impact of that traffic on the noise of the city. The significance of the research: Noise pollution is one of the important topics that preoccupied researchers to enter into human life directly, and it affects the lives of people of all age groups, causing hearing impairment or loss, high blood pressure, low productivity of workers, and others. The importance of the study lies in the geographical spatio-temporal distribution of noise pollution in the city of Aziziyah. The limits of the study: The spatial boundaries of the study are represented by the administrative boundaries of the city of AlAziziyah. The city of Al-Aziziya is located in the Wasit governorate, southeast of the governorate of Baghdad, 85 km away from it and 90 km from the city of Kut in the north. The city of Al-Aziziya is located along the left bank of the Tigris River. 32°N and (35°5) E longitude. See map (1).
Map (1) of the geographical location of the city of Aziziyah.



Methodology:

The researcher relied on a set of necessary and appropriate approaches to complete the study, as he came to the fundamentalist approach by studying the sources of noise pollution in the cities of Aziziyah and Numaniyah and showing the geographical characteristics resulting from that phenomenon through field survey and the adoption of the descriptive method in describing and interpreting the data that was obtained, and the study followed the analytical approach in studying and analysing the data and data available for the two study areas on the one hand and by collecting and measuring noise sources and showing the relationship between geographical characteristics and noise pollution on the other hand.

The researcher relied on office work that included collecting information related to the subject of the study from sources and using tables, maps, graphs, and applications of a number of statistical aspects to know the impact of noise sources on the population of the study area.

Results and Discussion

1. Monitor maps:

Monitoring maps were used based on the statistical programme Minitab to find out whether the levels of noise pollution in the cities of Aziziyah and Numaniyah are within the internationally permissible limits.

The minimum and maximum permissible limits for noise intensity were relied upon in different regions according to the World Health Organization and as in Table 1,, which requires that the average and variance of the community be known based on the assumptions made by the World Health Organization. Therefore, the lower and upper limits were calculated in each of the following observation maps, according to the following format:

$$UCL = \mu + \left(\frac{3\sigma}{\sqrt{n}} \right)$$

$$CL = \mu$$

$$LCL = \mu - \left(\frac{3\sigma}{\sqrt{n}} \right)$$

μ : represents the population mean. σ : the population standard deviation

UCL: The upper limit for permissible levels of pollution according to the standards of the World Health Organization.

LCL: The minimum permissible levels of pollution according to the standards of the World Health Organization.

LCL: The minimum permissible levels of pollution according to the standards of the World Health Organization.

Table (1) permissible noise limits for different regions according to the World Health Organization

Allowed limits db	Regions
40 – 25	Acceptable in residential areas
60 – 30	Acceptable in commercial areas
60 – 40	Acceptable in industrial areas
35 – 20	Acceptable in hospital areas
40 – 30	Acceptable in school districts
55day - 45 night	The general community

First, the spatio-temporal analysis of the noise pollution resulting from some streets, intersections, and parking yards in the city of Aziziyah Figure (1) represents the monitoring map of noise pollution levels for a number of roads and intersections in the city of Aziziyah. It is clear from Table (2) and Map (2) that there is a clear spatial and temporal variation in the level of noise pollution in the Aziziyah area in some of the main traffic intersections and central streets that

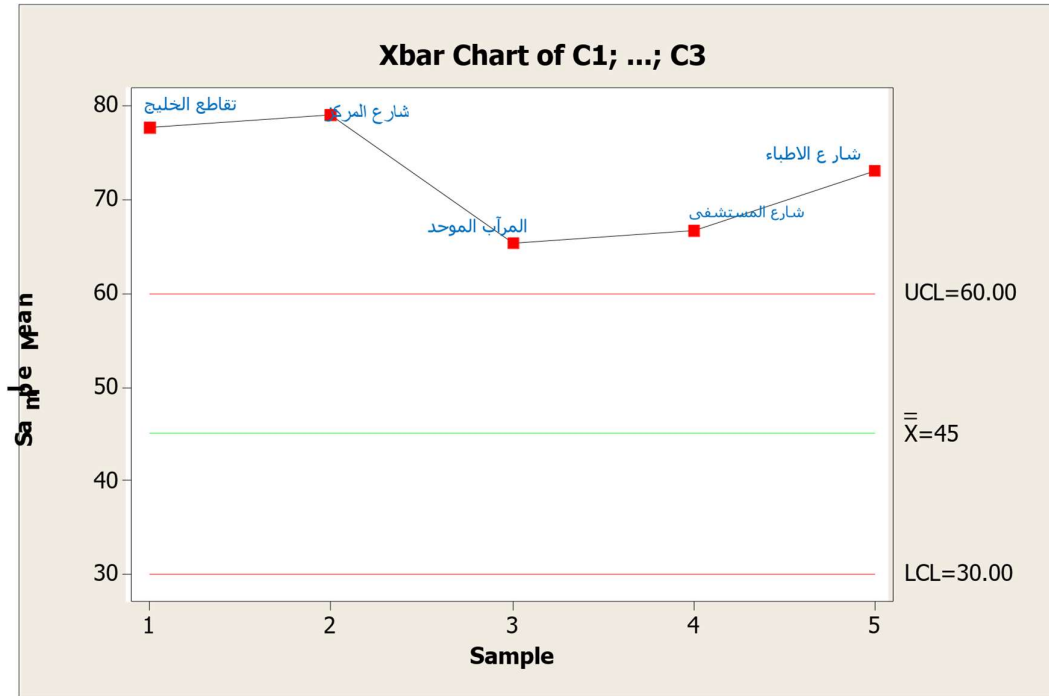
have been recorded. On one day, the noise levels for all sound sources are above the maximum permissible level, which is estimated at 60 decibels. We also find that the highest levels of noise were in Al Markaz Street, where the highest noise rate reached 93 decibels, followed by Al Khaleej Intersection, where the highest noise level was 81 decibels, while the noise levels converged in each of Al Khaleej Intersection, the Unified Garage, and Hospital Street. The levels are closest to the upper limit of the global noise level. The reason for this discrepancy in noise levels is that, of course, the traffic increases in the morning (7-9), coinciding with the direction of thousands of people to their places of work and different destinations, as well as being places that host many commercial establishments as well as the central business district, and that the noise rate in Doctors Street comes as a result of the lack of commercial activity in it as a result of the concern of clinics and medical complexes during the morning period because they are working hours for doctors in hospitals and health centres.

As for the afternoon observations (12–2 m), the highest rate was recorded at the Gulf intersection, reaching 79 decibels, and the lowest rate of noise pollution was recorded in AlMostashfa Street, reaching 63 decibels. To their homes, as it represents a period of rest for them as a result of the cessation of movement and commercial activities at this time. It is also relatively less in the evening with respect to the main roads and intersections. The highest rate was reached in the evening at the intersection of Al Kafaat and Kafaat, as it reached 78 decibels, and the lowest noise rate was recorded in the unified garage, as it reached 59 decibels. The reason for this discrepancy is the cessation of commercial activities and the lack of traffic, as well as concerns about the garage in the evening.

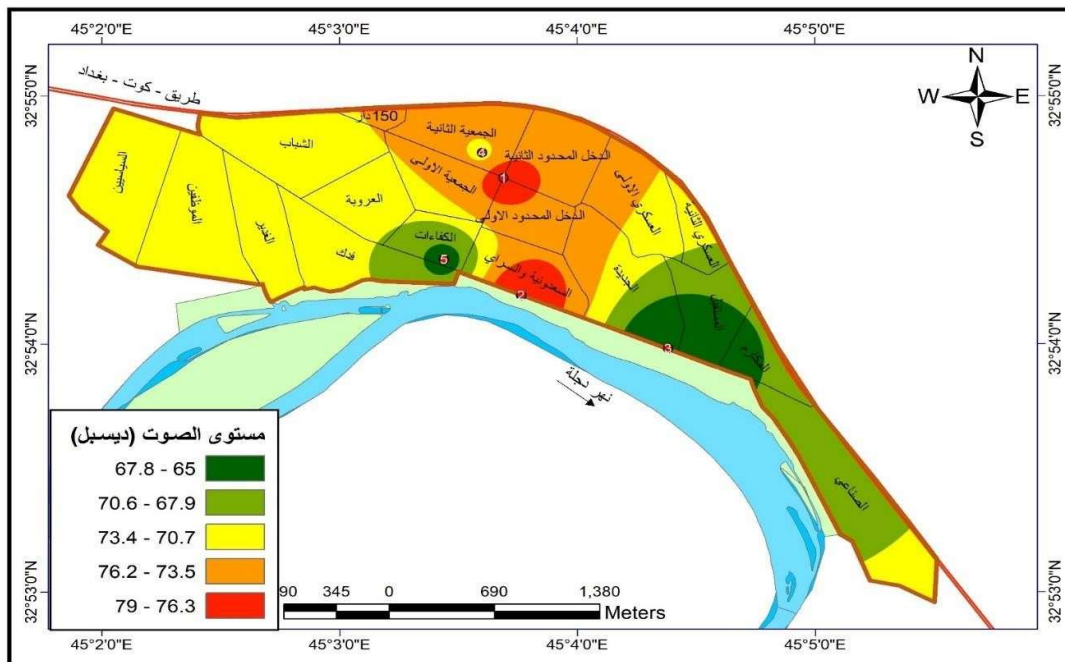
Table (2) Noise pollution levels for a number of roads, intersections and parking yards in Azizia City (2021-2022)

Sound Source	Far from the Source	Measuring Time (min)	Date	The Time	Highest Score db	Lowest db	Average db
Gulf Intersection	Crossed	5- 3	2022\1\28	7-8 am	87	74	81
					82	75	79
					78	68	73
Center Street	Crossed	5- 3	2022\1\28	12- 2pm	98	78	93
					79	68	74
					75	64	70
Uniform Garage	Crossed	5- 3	2022\1\28	6-7 pm	78	68	73
					68	59	64
					74	43	59
Hospital Street	Crossed	5- 3	2022\1\28	7-8 am	89	68	79
					67	58	63
					72	47	58
Doctors Street	Crossed	5- 3	2022\1\28	12- 2pm	74	64	69
					80	72	76
					80	67	74

Figure (1) Noise pollution levels for a number of roads, intersections and parking yards in Azizia City (2021-2022)



Map (2) levels of noise pollution resulting from some streets, intersections and parking lots in the city of Aziziyah.



Second, the analysis of variance for the purpose of comparing the average noise levels according to the time periods during the day (morning, noon, and evening) for each city and comparing the average noise levels between the two cities, a one-criterion analysis of variance was used. One-standard variance analysis for the time periods of Aziziyah City Test Hypothesis

The results of the analysis of variance for the time periods of Aziziyah city are presented in Table (3), which shows that the F-test statistic reached a value of (4.62) and a probability value of (P-value = 0.013), since the probabilistic value associated with the test is less than the statistical significance level ($\alpha = 0.05$) It rejects the null hypothesis, which states that there are no differences in the arithmetic means for the time periods (morning, noon, and evening) and accepts the alternative hypothesis, which states that there is a difference between at least two averages.

One-way ANOVA: Noise versus Time

Source	DF	SS	MS	F	P
Time	2	642.5	321.3	4.62	0.013
Error	77	5353.4	69.5		
Total	79	5996.0			

For the purpose of showing which of the arithmetic means was the cause of the morale of the previous F test, the Tukey confidence limits test was used, which showed the significant difference between the average noise levels in the morning and noon, because the confidence limits for these two periods were with wave signals, which means that the period does not contain zero. which means rejecting the null hypothesis and accepting the alternative, and thus the significance of the difference between the two averages. The test showed that the difference between each of the average noise in the morning period and its counterpart in the evening period is zero because the confidence limits were negative at the lower limit and positive at the upper limit, which leads to the period containing zero and therefore the null hypothesis is accepted. The same thing applies to the confidence limits test for the morning and noon periods, as shown in Table (4).

All Pairwise Comparisons among Levels of Time

Individual confidence level = 98.07% Time =

Afternoon subtracted from:

Time Lower Center Upper -----+-----+-----+-----+

Evening -5.151 1.738 8.626 (-----*-----)

Morning 1.236 6.034 10.833 (-----*-----)

-----+-----+-----+-----+

-6.0 0.0 6.0 12.0

Time = Evening subtracted from:

Time Lower Center Upper -----+-----+-----+-----+

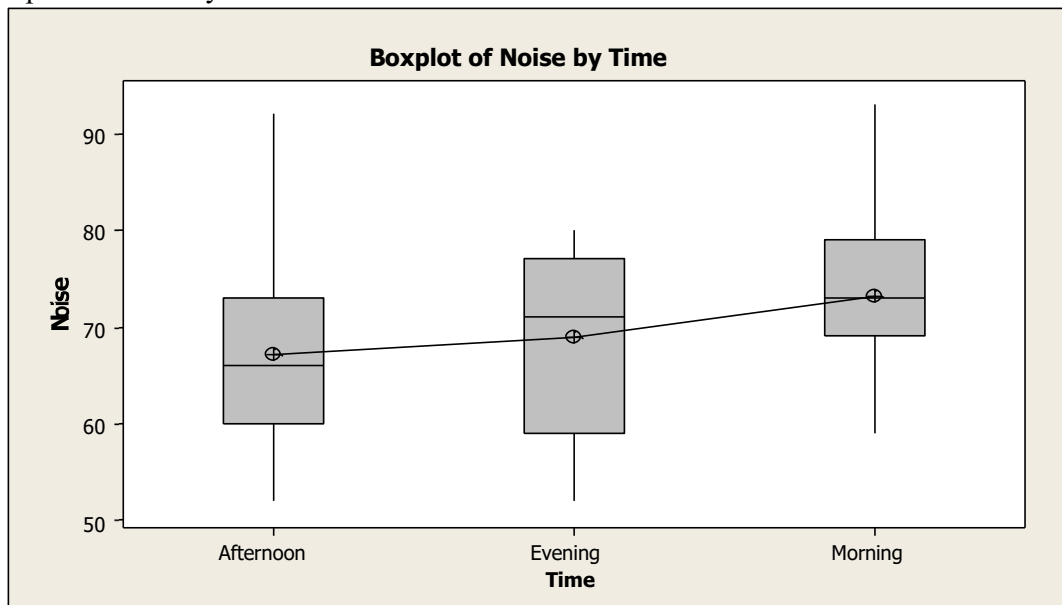
Morning -2.616 4.297 11.209 (-----*-----)

-----+-----+-----+-----+

-6.0 0.0 6.0 12.0

Figure (2) represents the boxplot of the data that represents the average noise levels for the periods of time under study for the city of Al-Aziza, which shows that there is a clear difference between the noise levels for the morning and noon period. in the afternoon as well as the eveninging period, which in turn is a reinforcement of the results of the previous tests.

Boxplot of Noise by Time



Third, the health effects of traffic in the city of Aziziyah The impact of noise pollution on human health is more serious than other pollutants, as much research has proven that noise is one of the most dangerous pollutants to which humans are exposed, and noise is one of the most serious environmental problems due to its effects on human health—the speed of urbanisation and the increase in density Population growth, the spread of industrial areas, the distribution of commercial markets, and the inappropriate selection of health, educational, and recreational sites all contribute to conflicting uses and the addition of disturbing sounds that generate auditory and non-auditory effects; and that prolonged exposure to high noise levels leads to hearing loss in addition to other negative effects on hearing function (Savale, 2014, p1030), as we know.

2. Levels of noise pollution in the two study areas and their impact on human health:

The effects of noise pollution vary according to the level of noise, its intensity, and the time of exposure to it.

1-The first level (higher than 110 decibels): This level represents the noise rates higher than (110) decibels that cause damage to the auditory system and serious repercussions on the heart and blood vessels in humans, and leads to a state of indistinguishable sounds and not knowing their sources, also that the two study areas This high level was not recorded in all of its locations during the duration of the noise monitoring, so its effect is not present. See Table (5). 2-The second level, which extends between 91-110 decibels, causes a decrease in the intensity of hearing and disorders in the nervous system and heart. This level was not recorded in the two study areas.

3-The third level, which lies between 61-90 decibels, this level has negative effects on the nervous system and leads to headaches, effects at work, and seeing disturbing dreams. The noise rate reached 61-90 decibels, which included recreational centers, educational services, as well as commercial and industrial activities.

4-The fourth level (less than 60 decibels): which causes adverse reactions represented by anxiety and tension as it affects the cerebral cortex, which leads to psychological disorders. The society had a noise rate of 59 decibels, as well as a sewing workshop, where the noise rate was 58 decibels, and it was also monitored in one of the recreational centres (an amusement park) and it reached 52 decibels. As for the city of Numaniyah, this level was not monitored. The effects of noise pollution on human health are varied, and they vary according to the duration and severity of exposure to noise, including mental and neurological diseases, hearing impairment or loss, as well as heart diseases, blood pressure diseases, foetal diseases, and even diseases of the circulatory system, and these diseases affect humans according to the duration of exposure to noise. and above), foetal diseases, and otitis media occur when continuously exposed to a noise level of (65db and above), and hearing loss occurs when exposed to a noise level of (91db).

Table (5) Sound levels and their impact on human health (dB)

Sound Level (dB)	Trace
Above 110	It causes damage to the auditory system and its serious repercussions on the cardiovascular system and leads to the inability to distinguish sounds and their sources.
91 - 110	Decreased hearing, nervous system and heart disorders
61 - 90	Negative effects on the nervous system and lead to pain in the head and effects at work and seeing disturbing dreams
Less Than 60	Adverse reactions of anxiety and stress affect the cerebral cortex, which leads to psychological disorders

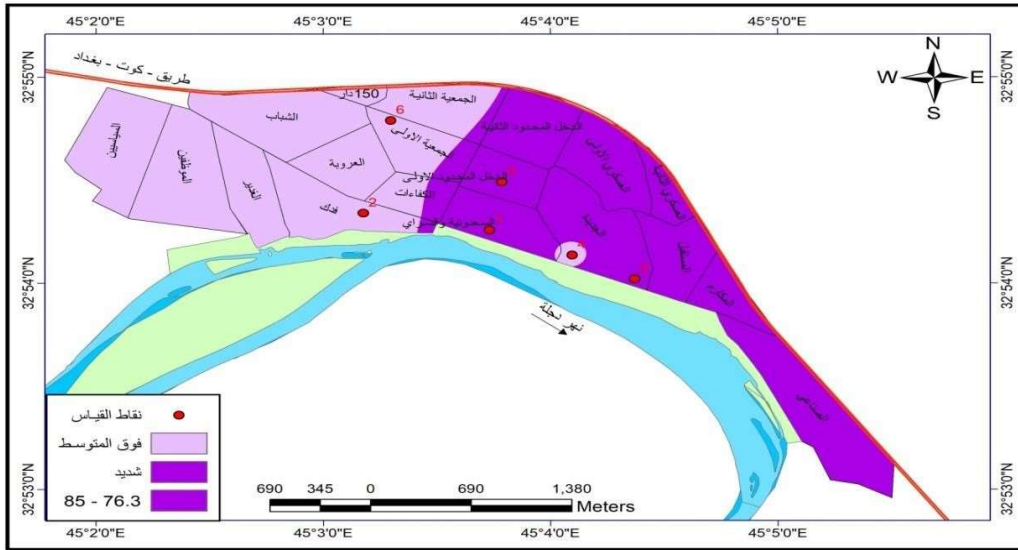
Table (6) Noise levels and their health effects on humans.

Sound Level db	Health Effect
56 and above	Psychiatric and neurological diseases
91 and above	Hearing loss
65 and above	Otitis media and fetal diseases
67 and above	Heart disease
91 and above	Blood pressure
70 and above	Circulatory diseases

The impact of noise pollution on human health has been studied by examining live samples (six samples) in the city of Aziziyah. They were randomly selected to examine and measure their hearing level. Great, even those who work as a salesman in a mall. see map (3).

Map (3) of the geographical distribution of some live samples to measure the level of hearing in

the city of Al-Aziziyah



1. The effect of noise pollution on human hearing:

Noise pollution is considered one of the serious environmental problems that affect human hearing as humans are exposed daily to various noise sources, whether at home, on the street, or at work, and even in recreational areas, which are different in intensity, as is the case for the population in the two study areas. The real danger of partial or total hearing loss is the inability to recover the hearing threshold, and despite the development of science, to this day it has not been found to know its treatment, so the loss of hearing ability is one of the greatest dangers to which a person is exposed, and the risk of hearing loss increases if we know Even after losing more than 4% of their hearing ability, a person does not realise he has become deaf (Youssef, 1983, p. 13). Hearing loss problems are particularly severe in some industries: heavy construction, timber cutting, carpentry, possible agriculture, textile industries, steel and iron industries, automobile production, metal goods production, and printing and publishing (Hoger, 1989, p. 212). Hearing loss affects not only those who work in a place that emits noise, but also everyone who lives in an environment polluted by noise sources from every direction. It is clear from Table (7) that the level of the impact of noise varies according to several factors, which are the duration of exposure to noise as well as the level of noise, as well as things related to the person himself, including the use of means of prevention, especially earplugs and others, which vary or vary in intensity from (0–25 dB), which is normal as a minimum until it reaches the most powerful force with its effect, which is (91-and above), and it has a super strong effect. See map (4).

Table (7): The effect of noise levels on the human sense of hearing.

Noise level db	Impact strength
0 – 25	Natural
26 – 40	Basic
41 – 55	Average
56 – 70	Above average

71 - 90	Intense
91 - and above	Super extreme

Thus, we find that the strength of the impact of noise varies from one person to another and from one site to another. This variation is due to a combination of factors, including noise exposure times and intensity, as well as the use of noise prevention or reduction devices (ear plugs) and other factors.

Through table (8), the strength of the impact of noise in the city of Aziziyah, we find that the strength of the effect in each of the following samples (s3, s4, s5, s1) was severe, and this rise in the strength of the effect is due to the continuous exposure to noise in each of the sample sites. It ranged from (6–10 hours), and the noise levels were high in these locations, ranging from (72–85 dB). It is also the interference of commercial activities, as well as the increase in traffic near them. As for the sample sites (s2, s6), the strength of the effect on hearing was (above the average) as a result of non-continuous exposure to noise and its low levels, as it reached, respectively, 68 and 67 dB. See map (5) and figure (3).

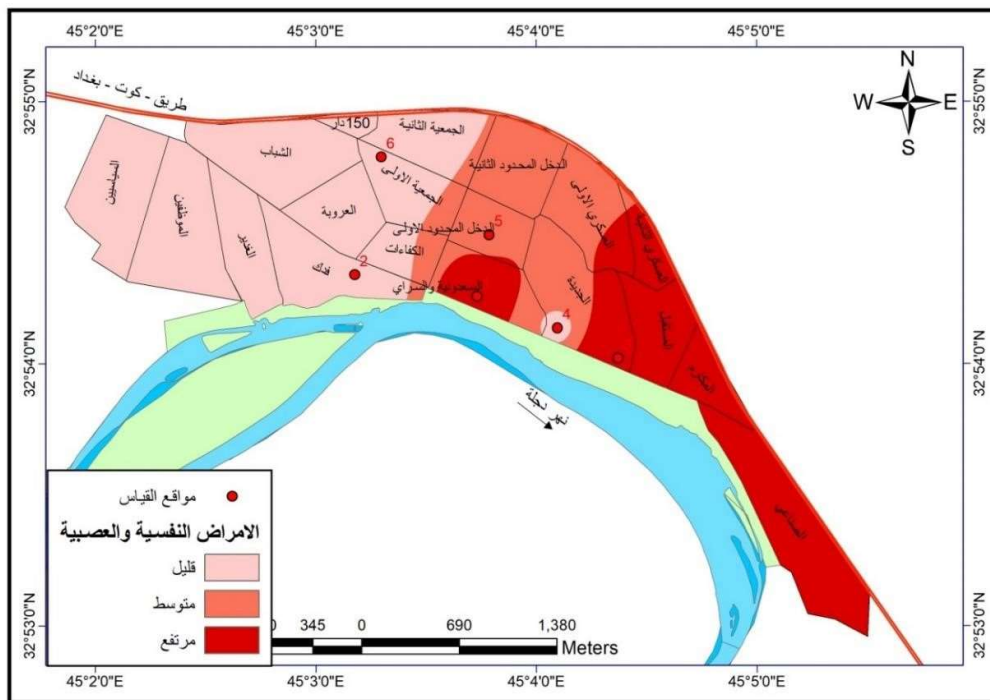
Table (8) The strength of the effect of noise on hearing loss for some live samples in the city of Aziziyah.

Sample location	Code	Live sample	Noise exposure time	Noise level	Impact strength
Center Street	S2	G 1	8 - 10 hours	79	Severe
Public hospital	B1	G 2	6 - 8 hours	68	Above average
Blacksmith's workshop	C7	G 3	8 - 10 hours	85	Severe
Carpentry workshop	C1	G 4	6 - 8 hours	72	Severe
Modern market	A2	G 5	8 - 10 hours	76	Severe
Mall	A4	G 6	6 - 8 hours	67	Above average

Figure (3) represents the strength of the effect of noise on hearing loss for some live samples in the city of Aziziyah

decreased sleep rate and irritability, which are automatic and natural reactions that are uncontrollable and can lead to other secondary problems such as interpersonal disorder, fatigue, uncertainty and decreased productivity (the Science Communication Unit,2015, p6). The effect of noise pollution begins in the nervous state when a threshold is exceeded (56 decibels), and exposure to noise higher than (80 decibels) leads to mood changes and changes in behaviour and produces the effects of anxiety, stress, nervousness, headaches, mood changes, and an increase in psychological conflicts, nervousness, hysteria, and depression, and children and the elderly are more susceptible. (Saber, 2000, p. 50). Continuous exposure to noise leads to violent behaviour and raging emotions, and the person becomes in a turbulent mood. Continuous noise is those who settle in neighbourhoods that share a job, that is, they are residential, industrial, or commercial neighborhoods, and the level of impact varies from one place to another, where we find that the level of impact (high) is affected by each of the following neighbourhoods (Industrial, Makarim, Future, Military II As well as some areas near these neighborhoods). At the (medium) level, it affects each of the following neighbourhoods (Al-Askari First, First Limited Income, Al-Jadida, Al-Saadounia, and Al-Saray), but has little impact on the rest of the city. See map (6).

Map (6) the effect of noise pollution on the psychological and nervous state and human behavior in the city of Aziziyah



3.Physical effects: They are represented in: its effect on the foetus through:

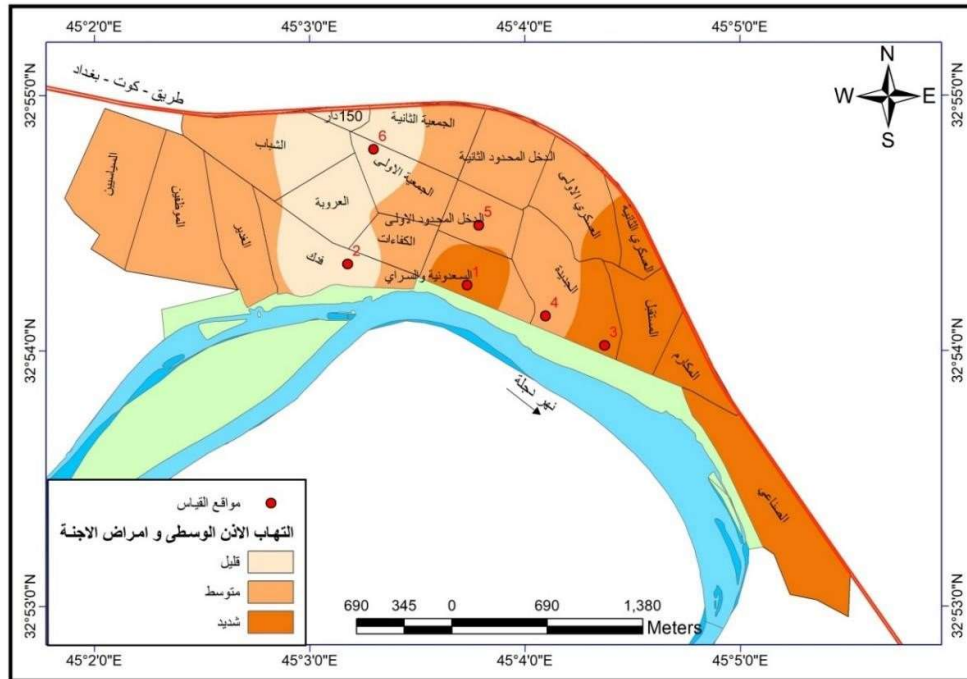
A: Noise affects the foetus before birth while it is in its mother's womb, as it makes movements and kicks (kicking) in the late days of pregnancy, and with it the heart rate increases.

B-When a pregnant woman is exposed to a disturbance caused by a noise of more than 65 decibels, it will lead to the constriction of the blood vessels in the womb, which provides adequate

nourishment and oxygen to the fetus.

C-The occurrence of congenital malformations in the foetus ("congenital deficiency"), see map (7).

Map (7) The effect of noise pollution on otitis media and fetuses for the population of Azizia city.



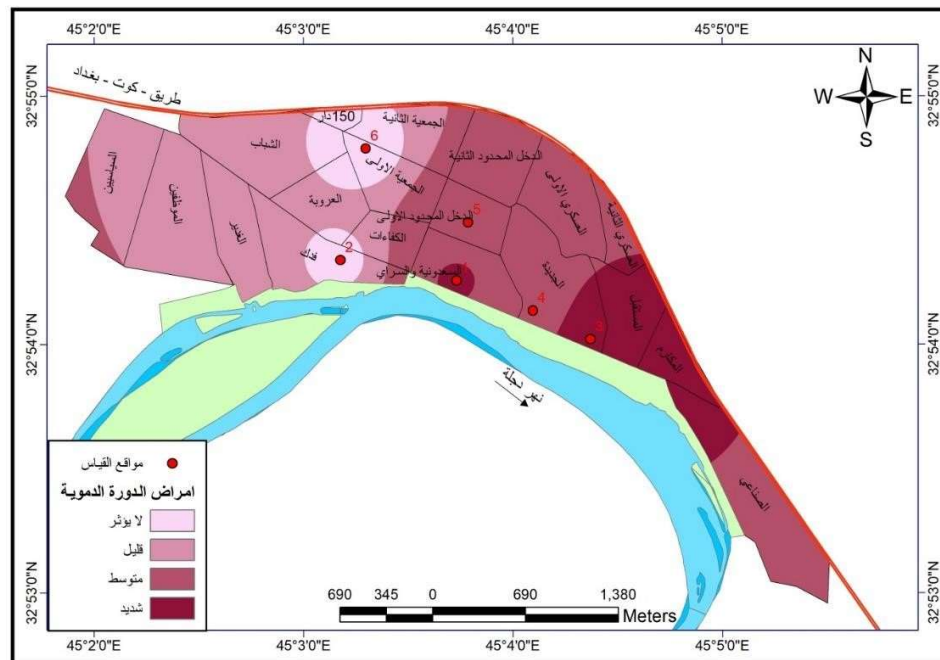
It is clear from the map (7) that the residents of Al-Aziziya city who suffer from otitis media and foetal diseases are the same people who live in high-noise neighborhoods. The residents of these neighbourhoods suffer from (severe) otitis media and foetal diseases, and we also note that the presence of some residential neighbourhoods that suffer from these diseases in a eighborhoods suffer from (severe) otitis media and foetal diseases, and we also note that the presence of some residential neighbourhoods that suffer from these diseases in a few ways, which are both (Fadk, Al-Orouba, 150, and some of the areas of the first association and the second assembly). As for the rest of the residential neighbourhoods in the city of Al-Aziziya, they suffer moderately from noise pollution, which causes otitis media and foetal diseases. Relatively high blood sugar: The number of diabetics in the city of Aziziyah (245 people) Lymphatic tissue decomposition, which leads to immunodeficiency with the possibility of various bacterial infections such as stomach ulcers, -- Disorders that result in skin problems, such as spots, for example, as chronic skin diseases in men reached 36 percent and 2.2 percent in women in Iraq for the year (2006). -Homosexuality and infertility-An increase in the level of cholesterol in the blood, as the ideal level of cholesterol in the blood is estimated to not be more than 200 mg/100 mm (Arzrouni et al., 2013, p. 52).

4.Effect on blood circulation:

Capillary hypertrophy is an actual natural product of loud noises and leads to a rise in blood pressure in noisy residential areas by 27% compared to 20% in quiet and natural places

(Al-Omari, 2008, p. 19), in which the tiny blood vessels shrink and blood flow decreases. The contraction is caused even by short-term noise and continues for a few minutes after the noise is interrupted (Hoger, 1989, p. 214). The number of people suffering from circulatory diseases in the city of Al-Aziziyah reached 286. We find through a map (8) that there is a spatial variation in the spread of circulatory diseases in the city of Al-Aziziyah as a result of the combination of several factors, including the duration and intensity of exposure to noise, as well as distance from noise sources. As shown, these factors led to the variation in the spread of circulatory diseases and their concentration in some areas but not others, as shown. See map (8).

Map (8) of the effect of noise on the circulatory system of Al-Aziziyah city residents.



Conclusions

1. The study showed that there is a spatial and temporal variation in the levels of noise pollution within the city.
2. The high levels of noise were concentrated in the centre of the city of Al-Aziziya, and its sources varied as a result of the concentration of commercial activities in this area, which led to an increase in traffic and a multiplicity of different modes of transport, especially the old local means of transport.
3. The levels of noise pollution in the two study areas are higher than the permissible limits within the World Health Organization.
4. High noise levels are concentrated in the city centre and decrease as we head towards the outskirts as a result of moving away from noise sources in the study area.
5. The statistical analysis showed the lowest rate of noise pollution levels reached (58db) in Azizia city near Hospital Street at the third observation (at night). The first (morning)

Recommendations

- 1.Planning the construction of the city by separating the industrial areas from the residential neighborhoods and imposing penalties on people violating the construction of factories and workshops between residential neighborhoods, especially near schools and hospitals.
- 2.Spreading environmental awareness on the issue of noise pollution and clarifying its damages to human health
- 3.Building industrial zones outside cities to get rid of the noise problem.
Use ear protectors for workers in this field to ensure the efficient and safe functioning of the production process.
- 5.Pay attention to afforestation, because areas covered with trees and gardens absorb traffic noise.
- 6.Issuing laws to prevent the use of loudspeakers and recording devices in the streets of cities, cafes, and public stores.

Reference

- 1.El-Feki, Mohamed Abdel-Qader, The environment, its problems and issues, Ibn Sina Press, Cairo, 1, 1993.
- 2.Hoger, Laurent, Environmental Pollution, translated by Muhammad Ammar al-Rawi, Abd al-Rahim Muhammad Asher, 1989
- 3.Arzuni and others, Sonia, Noise pollution in Basra Governorate (its sources, effects, and treatment), Basra and Arabian Gulf Studies Center, University of Basra, 2013.
- 4.Saber, Muhammad, Man and Environmental Pollution, published research, General Administration for Scientific Awareness and Publication, King Abdulaziz City for Science and Technology, 2000.
- 5.Ministry of Environment, Planning and Follow-up Department, Air Quality Department, published research.
- 6.Al-Omari, Abdel Hafeez Ahmed, Noise Pollution, Oyoun Al-Ma'rifah Publications, 2008, on the website: <http://www.knowes.blogspot.com>
- 7.Youssef, Wajih Fawzy, Architecture and the Noise of the City, Benha University, 1983, on the website: [htt://woginyo ussef.tumblr.com](http://woginyo ussef.tumblr.com)
- 8.Wasit Health Department, Statistics Department, unpublished data, 2022
- 9.Berglund, B. Thomas, L. (1995). Community noise , Jannes Snabbtryck , Stockholm
- 10.Savale, A. P . (2014). Effects of Noise Pollution on Human Being : expression and control , Department of Physics , Arts and Science College , Bnalod , manarashtra (India)
- 11.The Science Communication Unit. (2015). University of West of England (UWE), Bristol (Noise impacts on health Environment. Issue 47, January).