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Assessment of Community Sensitivity to Air Pollution and Its Health Effects in Some Cities in Nigeria

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Abstract

Air pollution is a significant problem in Nigeria due to its negative effects on human health. This study is an empirical investigation into how local populations in Nigeria evaluate the impact of air pollution on public health. A structured questionnaire was used and distributed via an online Google form. One hundred thirty respondents provided information regarding the relationship between air pollution and its health effects in 6 cities in Nigeria. The analysis utilized descriptive and inferential statistics, and the data was statistically evaluated using the chi-square and ANOVA with a 95% confidence level. The mean and standard deviation values of respondent's sex are 65 and 84.8, respectively. The mean and standard deviation of the respondent's age are 43 and 35 years, where 4% were female (n = 5) and 96% were male (n = 125). The two inferential statistics revealed that the city did not significantly influence the health treatment, whereas the health treatment preferences were significantly affected by the city and the age range. Respondents are aware of air pollution in their communities and acknowledge that it is widespread; 41% of respondents strongly concurred and 55% agreed that air pollution and its adverse effects on health are prevalent. Consequently, people's health will deteriorate and air pollution will negatively impact public health due to the significant health hazard. Public health is being seriously endangered as a direct result of the threats that are posed by airborne contaminants.

Keywords: air quality; community health; environmental science

INTRODUCTION

Air pollution has been a significant issue of the last few decades, with severe toxicological consequences for human health and the environment. The pollution sources range from small quantities of cigarettes and natural sources such as volcanic activity to large amounts of emissions from automobile engines and industrial activities (Robinson, 2005; Habre et al., 2014). It is widely recognized that air pollution has long-term effects on the onset of diseases such as respiratory infections and inflammations, cardiovascular dysfunctions and cancer. Therefore, air pollution is associated with millions of deaths yearly (Ghorani-Azam et al., 2016). According to the World Health Organization (WHO, 2019), exposure to air pollutants is the second most considerable environmental risk associated with non-communicable diseases (NCDs) worldwide, following tobacco use. Currently, it is the primary cause of death on a global scale. This condition was causing more than 91% of people worldwide to breathe more polluted air than the standards of WHO. The WHO estimated atmospheric air pollution caused over 3.5 million avoidable fatalities worldwide in 2016 (WHO, 2018). Several

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published studies have discovered socio-demographic variables influencing citizens' air quality opinions. Those who are younger or older, female, city-dwelling, have a higher level of education and have health problems are more likely to be aware of the consequences of air quality issues (Oltra and Sala, 2014; Yu, 2014; Liao et al., 2015; Guo et al., 2016; Schmitz et al., 2018; Sangotayo et al., 2023).

Air pollution has been identified as one of the most severe environmental and public health issues in the world, and both natural and anthropogenic (manufactured) actions harm the natural environment, posing a significant threat to public well-being and the environment as a whole. Persistent human activities such as forest destruction, forest fires and agricultural, and manufacturing operations generate emissions of pollutants. This cause impairs the integrity of the environment and negatively affects the health of humans and animals, as well as the survival of plants (Kostantos et al., 2015). Ajayi et al. (2002) found air pollution-induced respiratory issues, heart disease, impairment and other chronic illnesses in Kano, Uyo and Calabar. According to the WHO, residential and outdoor air contaminants are responsible for approximately 680,000 premature fatalities or 76 per million people.

In 2012, the mortality rate in Nigeria attributable to household air and ambient air pollution was 90 per one million residents, which was higher than in other African nations (WHO, 2012). As a result of the nation's drive for industrialization, many heavy and light industries that generate substantial quantities of air pollution have been found. Scholars have recognized cement ash, machine sound and vibration as byproducts of manufacturing zone production. In addition, cement particles cover the tops of structures, vegetation, land and roadways, and the goods sold by nearby companies. Air pollution from company particles in the area reduces vision. According to Zerrouqi et al. (2008), toxic heavy metals and compounds like chromium, nickel, cobalt, lead and mercury are abundant in cement dust, which is dangerous for human health. It is hazardous for people to breathe in polluted air since SO_x, NO_x and CO_2 are the primary sources of particulate matter emissions. Stanley et al. (2014) identified the physicochemical and microbiological characteristics of 0 to 10 cm-deep soil samples taken from 100 m, 300 m, 500 m and 1 km away from the cement factories. According to the findings, the LAFARGE Cement facility and its surroundings had elevated heavy metals and pH levels.

Ojo et al. (2014) studied the societal viewpoint of LAFARGE Cement's corporate social responsibility (CSR) in Ewekoro. They discovered that CSR contributes to developing peace and harmony in the host community. Afolabi et al. (2012) used empirical data and comprehensive conversations with residents to examine air pollution-related diseases, and their findings indicated a high incidence of air pollution-related ailments, with 19.7%, 11.4%, 13.2% and 5.2% of respondents revealing asthma, heart disease, skin cancer and diarrhea, respectively. Otti et al. (2014) investigated the environmental health consequences of exposure to air pollution in industrialized regions. They found that air pollution induces twice as many fatalities from cardiovascular disease as lung cancer and other respiratory disorders. Nriagu et al. (2006) reported that the area surrounding the Niger Delta is distinguished by high levels of oil discharge and significant indicators of variables determining health outcomes with high levels of illness symptoms and environmental discomfort. Egondi et al. (2013) conducted an empirical study focusing on perceptions of Nairobi slum dwellers of air pollution and related health problems. Around 55% of respondents listed industrial activity as a significant source of air pollution and the most common health risks related to air pollution were cough/cold, respiratory disorders, headaches and eye problems.

Major cities in affluent nations no longer have this type of black pollution. Air pollution worsens in metropolitan areas, where 50% of the world's population lives, and 400 million city people are exposed to motor vehicle emissions. Air pollution levels have dropped since 1960. Thus, industrialized nations no longer worry about the short-term effects of high air pollution. The long-term implications of chronic low-dose exposure are fresh concerns. However, it is challenging to study the long-term effects of air pollution due to the complexity of determining orientation, the low intensity of the potential impact and the time required before the onset of the potential impact. The Environmental Science

Engineering Programme at the Harvard School of Public Health determined that 4% of the United States mortality rate is attributable to air pollution (Dockery et al., 1993). Moreover, it has been estimated that the cost of air pollution from traffic in three European countries exceeds that of traffic accidents (Künzli et al., 2000).

The adverse impacts of air pollution on human health and the environment are of great concern in contemporary society. Many emission sources exist, with autos and industrial processes constituting the predominant contributors to air pollution. The six primary air pollutants the WHO identified include particle pollution, ground-level ozone, carbon monoxide, sulfur oxides, nitrogen oxides and lead. The human body experiences diverse toxicological effects from exposure to airborne toxicants, both short-term and long-term (Ghorani-Azam et al., 2016). These effects encompass a range of health issues, such as respiratory and cardiovascular disorders, neuropsychiatric difficulties, eye irritation, skin diseases and chronic conditions like cancer. Previous research has demonstrated that the public's understanding of air pollution's origins, evolution and sources is inadequate. According to Smallbone (2012), only 51% of the respondents could identify one or more air pollutants. Also, 54% of Europeans feel uninformed about the air condition of their own country (European Environment Agency, 2019). Knowing valuable insights on local air pollution and its impact on individuals' well-being and overall quality of life is essential. This study aims to evaluate individuals' perceptions of the detrimental effects of air pollution on their health within certain cities in Nigeria. The findings from this assessment will inform the implementation of appropriate remedial actions for the concerned localities.

MATERIALS AND METHOD

Study design

This research was carried out with the primary focus on perceptions of respondents of air pollution. The information from the respondents was acquired through the use of well-crafted questionnaires. These were given to respondents online in a Google Form so that they may self-administer them as part of the research. The questionnaire has a few questions adapted from Egondi et al. (2013) to inquire about the perspectives of respondents on the dangers of air pollution to their health.

Sampling technique

A basic random sample was adopted to represent the entire information population accurately. The method involved randomly picking members of the population without considering any other factors. The questionnaires used to collect data for the study were designed to be self-administered by respondents using an online Google Form. Respondents were instructed to fill out the forms and submit them online.

Data collection

This study made substantial use of questionnaires constructed to collect data and the instruments used to create the questionnaires were created with background material acquired from sources evaluated in the literature. The postgraduate and undergraduate students participated in this study and were asked to fill out the closed-ended questionnaire. The participants were assured that the data would only be used for research during the study. Respondents were given the options of strongly agreeing, agreeing, disagreeing or strongly disagreeing with the statement.

Data analysis

The information is presented in the form of charts. Analysis of variance (ANOVA) and chi-square were used in this study. ANOVA is a tool that is part of the Statistical Analysis System (SAS), and it was used to examine the differences between groups in a sample by applying a set of estimate processes linked with it. The chi-square distribution can be thought of as a series of distributions, each of which has its unique form determined by the number of degrees of freedom it contains.

Formulation of hypotheses

Hypothesis 1 consists of the null hypothesis (H0), which posits that the city does not exert a major influence on the therapy and the alternate hypothesis (H1), which suggests that the city substantially impacts the therapy. The second hypothesis, H0 states that city location does not significantly influence health treatment preferences. In contrast, the H1 suggests that the city significantly impacts health treatment choices. The third hypothesis posits that the H0 states that age does not substantially affect health treatment choices. In contrast, the H1 suggests that health treatment preferences are considerably influenced by age. The hypothesis was tested using the ANOVA and chi-test at a confidence level of 95% to confirm the findings.

Chi-square probability distribution

The chi-square distribution is a sequence whose specific form varies according to their degrees of freedom. Chi-square can assess whether two variables are dependent by eliminating the possibility of independence. Correlated variables move in the same or opposite direction. The H0 argues that there is no relationship between the two variables, while the research hypothesis asserts that there is a relationship. The test statistic has a chi-square distribution and the conclusion depends on whether the calculated statistic is greater than the critical statistic at the given alpha level. The chi-square statistic is computed using the Equation 1.

$$X^2 = \frac{\sum(\text{fo-fe})^2}{\text{fe}} \quad (1)$$

Where, X^2 is chi-square, f_o is the observed value and f_e is the expected value.

Overview of ANOVA test

One-way and two-way are the two subcategories of ANOVA. ANOVA is used to determine whether there are statistically significant differences between the means of three or more independent groups and it is useful when evaluating at least three variables. However, it produces fewer type I errors and applies to various problems. ANOVA classifies differences by comparing the means of each group and involves distributing variance across multiple sources. SAS was used to compute the statistical measures of variation aid in making better decisions, such as ANOVA, skewness, kurtosis and coefficient variation. Skewness assesses horizontal pulls of data on either side of the mean (positive or negative) based on extreme values (lower or higher).

Kurtosis is a data-based distribution's vertical upward or downward pull near the mean and its relative standard deviation. This condition also suggests variations due to either side's flatter and heavier tails. Coefficient variation measures the percentage (%) variation when comparing two characteristics with different units and aids in improved clarity. The standard deviation is commonly employed as a metric for quantifying variability and the standard deviation quantifies the degree of variability across individuals concerning their shared mean. The deviations refer to the distances between individual data values and the mean.

RESULTS AND DISCUSSION

Table 1 depicts the socio-economic profiles of respondents. It displays the distribution of respondents based on their job status, income (in USD), age and sex. According to the findings, the majority of respondents, 58% (n = 75) were between the ages of 15 and 30, followed by 38% (n = 49) between the ages of 31 and 50, although 3.88% (n = 5) were older than 50. One hundred

Table 1. Job status, income, age and sex distributions of the respondents

Socio-economic profiles	Frequency	Percent (%)
Sex		
Male	125	96.15
Female	5	3.85
Total	130	100.00
Age		
15-30	75	58.14
31-50	49	37.98
> 50	5	3.88
Total	129	100.00
Job status		
Employed-Academic	15	11.54
Employed-Government	25	19.23
Employed-Non-government organization	5	3.85
Employed-Private sector	25	19.23
Student	55	42.31
Unemployed	5	3.85
Total	130	100.00
Income (USD)		
< 101	75	55.56
101-200	25	18.52
201-500	25	18.52
500-1000	5	3.70
> 1000	5	3.70
Total	135	100.00

Table 2. Descriptive statistics of job status, income, age and sex distributions of the respondents

Descriptive parameters	Job status	Income (USD)	Age	Sex
Mean	21.67	27.00	43.00	65.00
Standard error	7.60	12.81	20.43	60.00
Median	20.00	25.00	49.00	65.00
Mode	25.00	25.00	#N/A	#N/A
Standard deviation	18.62	28.64	35.38	84.85
Coefficient variation	85.93	106.06	82.29	130.54
Sample variance	346.67	820.00	1,252.00	7,200.00
Kurtosis	1.85	2.74	0	0
Skewness	1.28	1.58	0.74	0
Range	50.00	70.00	70.00	120.00
Minimum	5.00	5.00	5.00	5.00
Maximum	55.00	75.00	75.00	125.00
Sum	130.00	135.00	129.00	130.00
Count	6.00	5.00	3.00	2.00
Largest (1)	55.00	75.00	75.00	125.00
Smallest (1)	5.00	5.00	5.00	5.00
Confidence level (95.0%)	19.54	35.56	87.90	762.37

thirty respondents participated in surveys to get data on the association between air pollution and its impact on public health in 6 Nigerian cities: Ogbomoso, Ilorin, Osogbo, Lagos, Ibadan and Enugu. The data reveals that the majority of participants were male (96%, n = 125), while the female respondents were a minority (3.8%, n = 5). Students constitute the largest proportion (42%), followed by government employees (19.2%) and private sector employees (19.2%). The average monthly household income of respondents is below 100 USD for the majority (55.5%), with 18.5% earning between 101 and 200 USD and 18.2% earning between 201 and 500 USD. Table 2 displays the descriptive statistics about the job status, household income (in USD), age and sex distributions of the respondents.

Descriptive statistics were utilized to examine the distribution pattern of the gathered data and assess asymmetry through the calculation of skewness and kurtosis. According to George and Mallery (2010), to establish a normal univariate distribution, it is generally seen as acceptable for the values of asymmetry and kurtosis to fall between the range of -2 to +2. Bryne (2010) and Hair et al. (2010) have posited that data can be classified as normal when the skewness falls between -2 to +2 and the kurtosis falls within the range of -7 to +7. As evidenced by the data presented in Table 2, the skewness of a normal distribution is precisely zero and it is expected that any dataset exhibiting symmetry will have a skewness value close to zero. The skewness values of 1.28, 1.58, 0.74 and 0 for the variables of job status, income, age and sex indicate a right-skewed distribution. It can be observed that the distribution of the data is uniform and exhibits asymmetry.

Figure 1 depicts the fluctuating air pollution levels within the local neighborhood. In the examined population, a significant segment comprising 41% of respondents exhibited a high level of agreement, while an additional 55% stated concurrence regarding the pervasiveness of air pollution. A substantial proportion of respondents, including 68%, exhibited high concurrence. In comparison, an additional 27% showed agreement about the detrimental effects of air pollution on the psychological welfare of individuals within the community concerning stress, anxiety and irritation. Based on the survey findings, it was determined that a collective 75% of the participants concurred with the proposition that the level of air pollution in this locality is substantial. The survey found that a notable proportion of the participants, specifically 6%, expressed strong agreement with the given assessment.

Conversely, a significant majority, including 69% of the respondents, indicated agreement with the evaluation. A total of 19% of the participants exhibited a high level of agreement, whereas 42% demonstrated agreement regarding the ascription

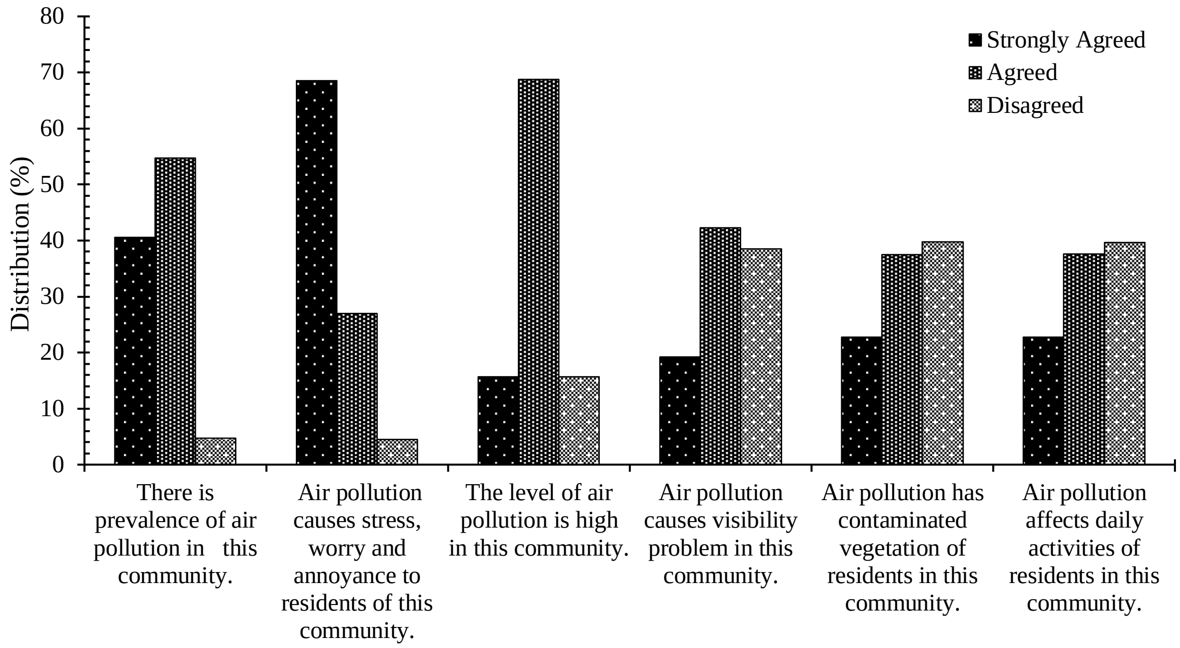

Figure 1. Variations of air pollution

of visibility concerns to air pollution in this specific location. A significant proportion of the participants, precisely 38%, indicated their agreement with the proposition that air pollution has harmed the vegetation in the local community. Furthermore, a notable subset of the respondents, comprising 23%, strongly supported this perspective. A significant proportion of the participants, precisely 38%, agreed that air pollution has a noticeable effect on the daily routines of individuals living within this locality. In addition, it was found that 23% of the participants displayed a significant degree of concurrence with the assertion, as mentioned earlier.

Figure 2 depicts the participants' views on the various health consequences linked to air pollution. Based on the findings, a notable percentage of participants, particularly 47%, conveyed the viewpoint that a constant correlation exists between air pollution and the onset of respiratory ailments. Furthermore, a significant proportion of the participants (43%) reported experiencing frequent nasal discomfort due to air pollution and a notable percentage (35%) expressed suspicion that it frequently leads to coughing. Moreover, a significant proportion of participants, precisely 37%, expressed that air pollution often results in respiratory challenges.

Conversely, a significant majority of 53% of respondents believed that air pollution is infrequently associated with cancer development. Based on the survey findings, a notable percentage of respondents, precisely 47%, conveyed the perspective that influence of air pollution influence on prevalence of asthma is constrained. In a similar vein, it was found that 42% of participants expressed that air pollution infrequently results in skin diseases. The findings presented in this study are corroborated by the research conducted by Afolabi et al. (2012).

The data in Figure 3 illustrates the fluctuation in the number of health centers communities visit to seek medical treatment. The study employed ANOVA analysis to examine the potential interactions between the variables of city and therapy. Table 3 displays the ANOVA distribution, providing evidence of city and treatment interactions.

Testing of research hypotheses - Hypothesis 1

H0 states that the treatment is not significantly affected by the city and H1 states that the treatment is significantly affected by the city. ANOVA analysis to test for interactions between city and treatment is presented in Table 3.

Testing of research hypotheses - Hypothesis 2

H0 states that health treatment preferences are not significantly affected by the city and H1 states

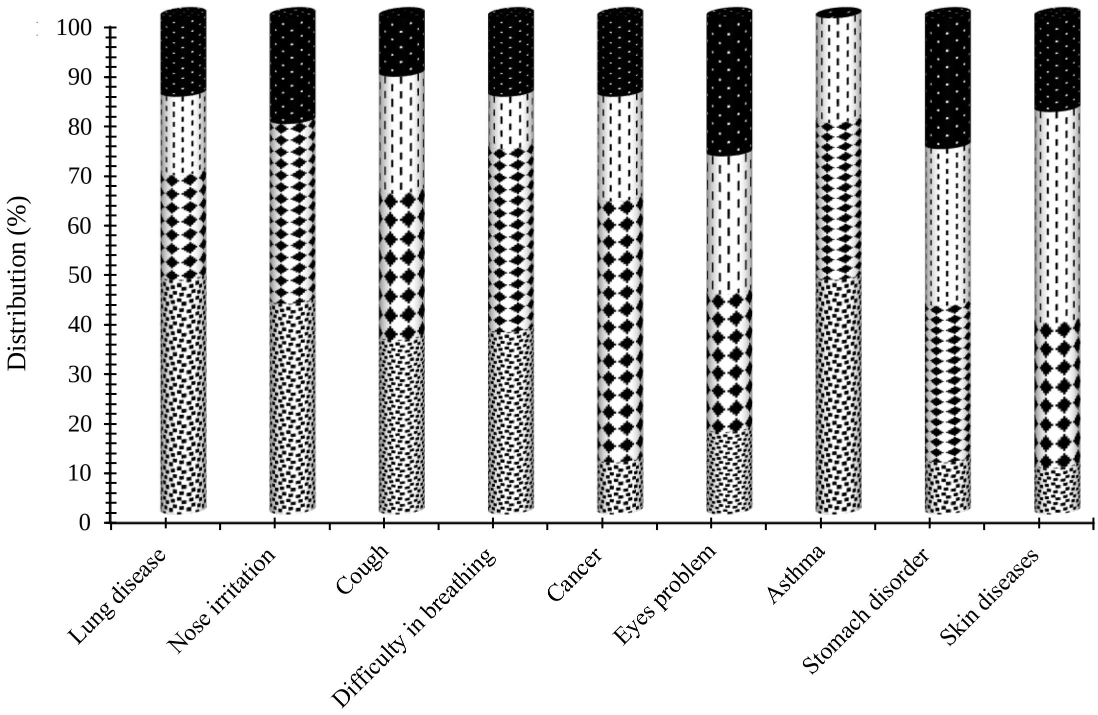

Figure 2. Variations of the health effect of air pollution in the community

that health treatment preferences are significantly affected by the city. Table 5 illustrates the chi-square test distribution hypothesis 2 at a confidence limit of 95%.

The decision rule (Table 3) states that when the F-calculated is less than the F-tabulated, H0 is accepted and H1 is rejected. Since the X^2 calculated (3.692308) < F-tabulated (3.837853) the H0 is accepted: hypotheses which state that the treatment are not significantly affected by the city and the H1 is rejected, which states the treatment is significantly affected by the city. Chi-square analysis was used to test for city and treatment preferences dependence, and Table 4 displays observed and expected values for city and treatment preferences dependence.

The decision rule (Table 5) states that when the X^2 calculated is greater than the P-value tabulated, H0 is rejected and H1 is accepted. Since the X^2 calculated (8.15) is greater than P-tabulated (0.05), H0 is rejected: hypotheses which state that the health treatment preferences are not significantly affected by the city and accept the H1, which states the health treatment preferences are significantly affected by the city. Figure 4 presents variations in age range with the treatment center.

Testing of research hypotheses - Hypothesis 3

Figure 4 was further analyzed using a chi-square test distribution at a significance level of 5%. H0 states that health treatment preferences are not significantly affected by age range, and H1 states that health treatment preferences are greatly affected by the age range. Table 6 displays the chi-square test distribution for hypothesis 3 at the significance level of 5%.

The decision rule (Table 6) states that when the X^2 calculated is greater than the P value tabulated,

Table 3. ANOVA Analysis to test for interactions between city and treatment

Source of variation	SS	df	MS	F	P-value
Treatments	240	4	60	3.692308	0.054779
Cities	1203.333	2	601.6667	37.02564	9.04E-05
Error	130	8	16.25		
Total	1573.333	14			

Table 4. Observed and expected values for city and treatment preferences dependence

Treatment center	City			Total
	Ogbomoso	Ibadan	Ilorin	
Primary health center	O(E) 35(38)	O(E) 15(13)	O(E) 20(19)	70
General hospital facility	O(E) 35(38)	O(E) 15(13)	O(E) 20(19)	70
Specialist center facility	O(E) 35(27)	O(E) 5(9)	O(E) 10(14)	50
Chemist shop facility	O(E) 35(35)	O(E) 10(12)	O(E) 20(18)	65
Traditional center facility	O(E) 20(22)	O(E) 10(7)	O(E) 10(11)	40
Total	160	55	80	295

H0 is rejected and H1 is accepted. Since the X^2 calculated (2.82) > P tabulated (0.05), H0 is rejected: hypotheses which state that the health treatment preferences are not significantly affected by age range and accept the H1, which states the health treatment preferences are greatly affected by age range.

It is apparent from the data presented in Figure 1 that a significant majority of the respondents, precisely 96%, agreed on air pollution within the community. Additionally, a substantial 95% of respondents emphasized that air pollution leads to feelings of stress, worry and annoyance among the townspeople. This condition suggests that the community understands the detrimental impact of air pollution on the well-being of its constituents. Most participants, precisely 81%, agreed on a substantial degree of air pollution inside their city. The origins of this phenomenon can be attributed to the industrial revolution within the community, hence necessitating the implementation of appropriate measures to mitigate its negative consequences. A significant majority of the respondents, precisely 75%, indicated that air pollution is responsible for visibility issues within the community.

Additionally, 71% of the respondents concurred that air pollution has contaminated vegetation among community residents. This contamination has adversely affected

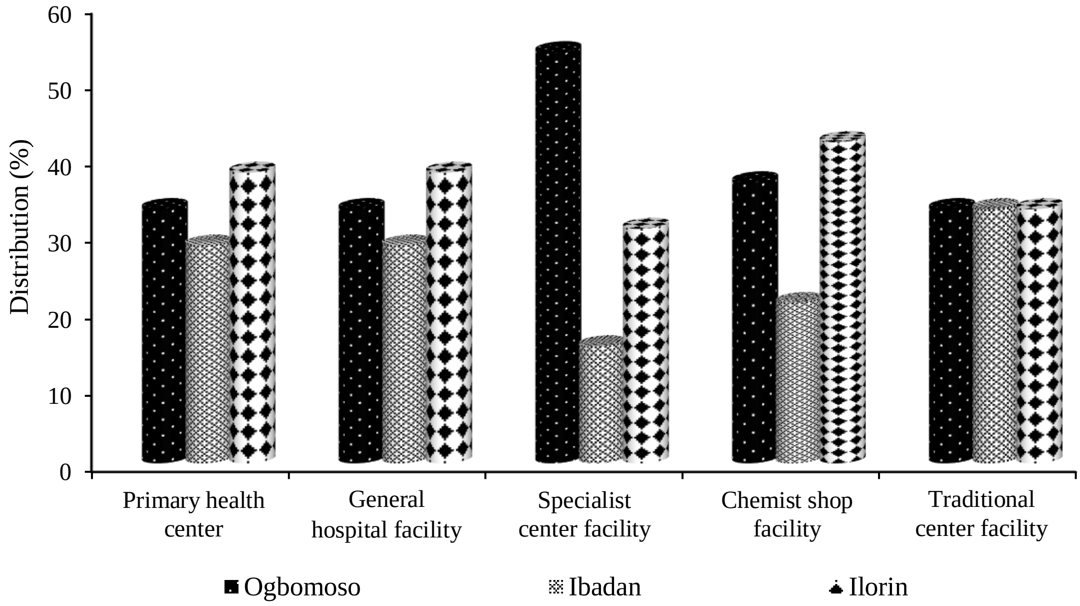

Figure 3. Variation of community visited a health center for treatment

Table 5. Chi-square test distribution hypothesis 2 at a significance level of 5%

Observed frequency (fo)	Expected frequency (fe)	$fo - fe$	$(fo - fe)^2$	$\frac{(fo - fe)^2}{fe}$
35	38	-3	0.24	0.24
35	38	-3	0.23	0.23
35	27	8	2.29	2.29
35	35	0	0.00	0.00
20	22	-2	0.13	0.13
15	13	2	0.29	0.29
15	13	2	0.29	0.29
5	9	-4	2.00	2.00
10	12	-2	0.37	0.37
10	7	3	0.87	0.87
20	19	1	0.05	0.05
20	19	1	0.05	0.05
10	14	-4	0.93	0.93
20	18	2	0.32	0.32
10	11	-1	0.07	0.07
$X^2 = \frac{\sum(fo - fe)^2}{fe}$				8.15

the ecosystem, disrupting the ecological chain and subsequently impacting aquatic animals and reptiles. Hence, it can be inferred from the responses of 60% of the participants that air pollution significantly affects the everyday routines of neighborhood inhabitants. It is supported by Ghorani-Azam et al. (2016) that the human body encounters both short-term and long-term harmful effects due to exposure to airborne contaminants. It can be deduced that the participants are aware of the detrimental impact of air pollution on the well-being of individuals. Governmental bodies and non-governmental organizations (NGOs) must impose penalties and enforce regulations restricting polluting industrial activities, aiming to mitigate community pollution caused by the Industrial Revolution in urban and suburban areas. There should be a compelling

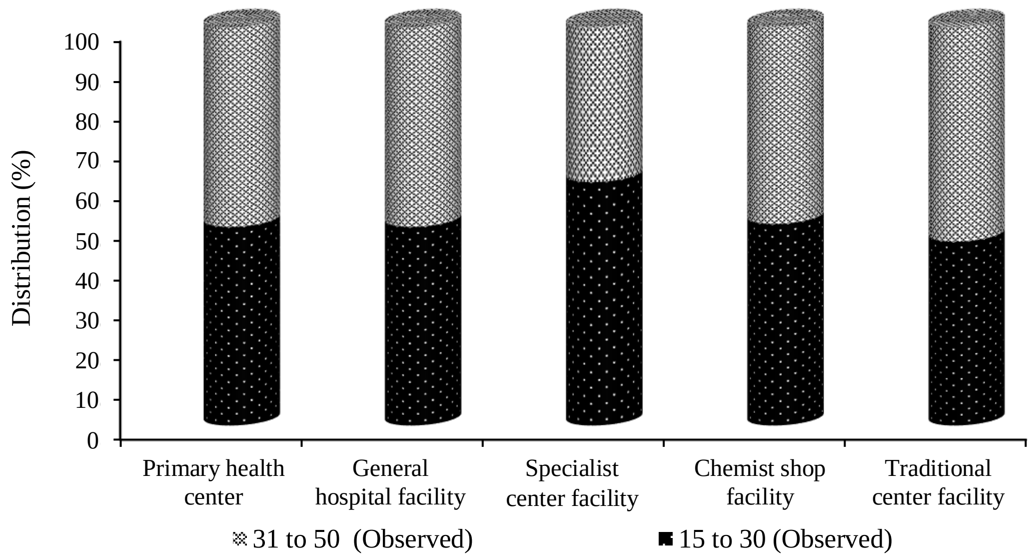

Figure 4. Variations of age range with the treatment center

argument for providing free local and statewide treatment for illnesses directly linked to air pollution from the industries.

Figure 2 illustrates the diverse health effects associated with air pollution. Notably, 47% of the respondents consistently said that air pollution is a regular cause of lung disease, while 21% indicated that air pollution contributes to lung disease. Infrequently, 37% of the respondents reported experiencing common nose irritation due to air pollution. In comparison, 36% reported experiencing nose irritation infrequently and 35% of the respondents reported experiencing regular coughing due to air pollution. In contrast, 29% reported experiencing coughing infrequently and 37% of the respondents reported experiencing regular difficulty in breathing due to air pollution.

In comparison, 37% reported experiencing difficulty in breathing infrequently, and 17% of the respondents reported experiencing regular eye problems due to air pollution. In comparison, 27% reported experiencing eye problems infrequently, and 47% of the respondents reported experiencing regular eye problems due to air pollution, while 32% reported experiencing eye problems infrequently. Infrequently, a mere 9% of the respondents indicated that air pollution consistently leads to skin illnesses. In comparison, a more significant proportion of 29% acknowledged that air pollution occasionally contributes to developing nasal skin disorders. The results of this study align with the research conducted by Kostantos et al. (2015), which demonstrated that air pollution has detrimental impacts on both human and animal health, as well as the viability of plant life. Hence, it can be inferred that air pollution significantly impacts the daily activities of individuals residing inside the neighborhood, as previously said. It can be deduced that the community possesses an awareness regarding the detrimental impact of air pollution on the well-being of its constituents. Air pollution has been identified as a significant contributor to various ailments, necessitating immediate efforts to limit potential mortality risks associated with its strong effects.

According to the decision procedure presented in Table 5, if the calculated X^2 value exceeds the tabulated P-value, the H0 is rejected in favor of the H1. Based on the calculated X^2 value of 8.15, which exceeds the tabulated P-value of 0.05, the H0 is rejected. H0 posits that the city does not considerably influence the preferences for health treatment. Instead, the H1 is accepted, asserting that the city strongly influences the priorities for health treatment.

According to the decision rule outlined in Table 6, if the calculated X^2 value exceeds the tabulated P-value, the H1 is accepted and the H0 is rejected. Based on the calculated X^2 value of 2.82, which exceeds the tabulated P-value of 0.05, the H0 is rejected. This condition implies that the hypotheses suggesting that age range does not significantly influence health treatment preferences are rejected, while the H1 stating that age range significantly affects health

Table 6. Chi-square test distribution for hypothesis 3 at a significance level of 5%

Observed frequency (fo)	Expected frequency (fe)	$fo-fe$	$(fo-fe)^2$	$\frac{(fo-fe)^2}{fe}$
35	36	-1	1	0.03
35	36	-1	1	0.03
30	25	5	25	1.00
35	35	0	0	0.00
25	28	-3	9	0.32
35	34	1	1	0.03
35	34	1	1	0.03
19	24	-5	25	1.04
34	34	0	0	0.00
29	26	3	9	0.35
$X^2 = \frac{\sum(fo-fe)^2}{fe}$				2.82

treatment preferences is accepted. The urban environment tremendously impacts individuals' preferences toward health care. It is common knowledge that people's healthcare preferences change as they age.

CONCLUSIONS

Air pollution is widely recognized as a significant environmental risk factor that contributes to the development and progression of a variety of diseases, including, but not limited to, asthma, lung diseases, cancer, respiratory difficulties, autism and others. Residents affected by air pollution are irritable and unproductive. The preferences for health treatment are heavily influenced by the city and age range, but the therapy itself is not. The study determined that air pollution is detrimental to society. Higher levels of air pollution harm human health, whereas lower levels are beneficial. Air pollution is also damaging to public health. The primary health threat will worsen public health and air pollution harms public health. The government and NGOs should penalize and prohibit polluting industrial operations to prevent community pollution. A proficient environmental conservation organization should possess sufficient financial resources for administrative functions, monitoring activities, research endeavors and developmental initiatives. This funding allocation is essential for effectively addressing and managing environmental issues, notably air pollution.

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