

# PERCEIVED HEALTH EFFECTS OF AIR POLLUTION ON THE INHABITANTS OF EMOHUA LOCAL GOVERNMENT AREA OF RIVERS STATE, NIGERIA

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## **Abstract**

*The quality of air individuals breathe can affect their health as air pollution is detrimental to the health of humans, particularly causing respiratory problems which may affect physical, social and psychological health. This study investigated the perceived health effect of air pollution on the inhabitants of Emohua Local Government Area, Rivers State. The descriptive research design was adopted for the study with a study population of ninety-eight thousand, four hundred and twenty-three (98,423) individuals in Emohua Local Government Area of Rivers State. A simple random sampling technique was used to select a sample size of 288 respondents. The instrument for data collection in this study was a structured questionnaire with a reliability coefficient of 0.79. Data was analysed using percentage, mean, standard deviation and ANOVA. The result of the study showed that, the perceived psychological health effects of air pollution included: emotional stress ( $3.49 \pm 0.70$ ), anxiety and irritation ( $3.20 \pm 0.94$ ), disruption to sleep ( $3.37 \pm 0.85$ ). The perceived physical health effects of air pollution included: difficulty in breathing ( $3.56 \pm 0.56$ ), damage to human lungs ( $3.37 \pm 0.76$ ), interference with sense of smell ( $3.11 \pm 0.84$ ), cardiovascular diseases ( $3.27 \pm 0.89$ ), and eye infection, cough and catarrh ( $3.11 \pm 0.90$ ). The perceived social health effects of air pollution included: interference with healthy interaction between two or more persons in the environment ( $3.31 \pm 0.84$ ), alters behaviour ( $3.04 \pm 0.96$ ), interference with the relaxation or recreation of individuals ( $2.96 \pm 1.05$ ), and interference with the socialization of people ( $3.18 \pm 1.02$ ). It was concluded that, air pollution had psychological, physical and social health effects on any individuals who are exposed to it. It was recommended among others that the environmental health protection agency should intensify their effort to curb activities that causes air pollution.*

**Keywords:** Air, Effects, Inhabitants, Pollution, Emohua

## **Introduction**

Air pollution is topmost among the numerous environmental health problems posing a deleterious effect on the health of individuals in Nigeria. According to Ajayi and Oderinde (2002), Nigeria is one of the countries in the world with high level of air pollution with a total of 30,435 cases of air pollution related diseases. Air pollution is of serious concern across the globe, and is fuelled by rapid population growth, continuous urbanization, increases in industrialization, continuous rises in energy demand, deforestation, and increases in car density, especially in major cities (Cheng, Gong, Wang, Zhang, Wang & Lv, 2013). According to the report by the American Lung Association's (2016), one in two people live in communities with unhealthy air. This report calls for a quick action to curtail its continuity if the health of the inhabitants is to be maintained while going about their daily activities.

Air pollution is the presence of pollutants in the air in large quantities for long periods and the most common air pollutants are ground-level ozone and Particulates Matter (PM). Air pollution is distinguished into two main types: Outdoor pollution which is the ambient air pollution and indoor pollution which is the pollution generated by household combustion of fuels (Manisalidis, Stavropoulou, Stavropoulos & Bezirtzoglou, 2020). Sutton and Giudice (2010) stated that, the exposure of humans to air pollutants is currently a subject of international concern. In 2013, the World Health Organization reported that, about 3.3 million premature deaths are attributed to both indoor and outdoor air pollution yearly and the burden is high among those living in developing countries including Nigeria.

Possible health effects of air pollution in Nigerian cities as noted by Tawari and Abowei (2012) include cough, catarrh, eye infection, asthma, chronic bronchitis and other cardiovascular diseases. In the same vein, Ajayi et al. (2002), a total of 30,435 cases of air pollution related diseases were reported in Rivers State, and Kano, Uyo and Calabar recorded urban air emissions beyond the safe limits which resulted to respiratory disorders, cardiovascular diseases, impairment and other debilitating air pollution related illnesses within these cities. Similarly, the World Health Organization (2012) reported that, globally air pollutions account for about 680,000 premature deaths.

The health effects of air pollution can impact various aspects of health including the physical, social and psychological well-being of humans. Lu, Zhou, Xu, Zheng, Guo and Wellenius (2015) stated that, elders, infants, children, sensitive people and those suffering from asthma and such other disorders are more vulnerable (physically and psychologically) to the effects of air pollution. Air pollution is also associated with low mood and potency (Fisch, Andrews, Fisch, Golden, Liberson & Olsson, 2003), and changes in sexual behaviour (WHO, 2012). Air pollution is one of the leading factors that upsets human emotions and alters behaviour (Reeve, 2014). Long-term exposure to polluted air results in a variety of psychological problems (such as stress, depression, anxiety, irritation, becoming short-tempered, and mood swings), which adversely affects social health such as behaviour (such as eating, recreation, commuting, traveling, and socialization) (Torres & Casey, 2017). The foregoing concretized the adverse health effects of air pollution on humans. However, the perception of the people is very crucial to their adoption of preventive behaviour against air pollution.

Perception is a subjective assessment of exposure level to an environmental hazard and the concern with the consequences of the exposure. Perception is a vital aspect of behaviour change therefore, investigating people's perception is a rudiment for interventions

aimed at promoting protective behaviour against air pollution particularly among humans (Sjöberg, Moen & Rundmo, 2004). The perception of individuals about the health effects of air pollution is very important given that it can influence the behaviour of individuals towards the adoption of preventive behaviour against air pollution.

### **Statement of the Problem**

The quality of air individuals breathe can affect their health as air pollution is detrimental to the health of humans, particularly causing respiratory problems which may affect physical, social and psychological health. For instance, World Health Organization (2012) reported that, air pollution exposure caused deaths of 7 million people, or one in eight of total global deaths. Other perceived effects of air pollution included among others: irritation of the eyes, nose, skin, throat, wheezing, coughing and chest tightness, and breathing difficulties, to more serious states, such as asthma, pneumonia, bronchitis, and lung and heart problems. Short-term exposure to air pollution can also cause headaches, nausea, and dizziness.

These problems can be aggravated by extended long-term exposure to the pollutants, which is harmful to the neurological, reproductive, and respiratory systems and causes cancer and even, rarely, deaths. Short-term exposure is related to hypertension; stroke, myocardial infarcts, and heart insufficiency. These health impacts established by literature can be amplified by negative perception about air pollution which may increase their exposure thereby affecting their health negatively. Thus, the need to highlight the perceived health effects of air pollution, so as to give a pointer to what actions needs to be taken to alleviate the problem.

### **Research questions**

The following research questions were answered in the study:

1. What are the perceived psychological health effects of air pollution on the inhabitants of Emohua Local Government Area, Rivers State?
2. What are the perceived physical health effects of air pollution on the inhabitants of Emohua Local Government Area, Rivers State?
3. What are the perceived social health effects of air pollution on the inhabitants of Emohua Local Government Area, Rivers State?
4. What are the perceived sources of air pollution on the inhabitants of Emohua Local Government Area, Rivers State?
5. What are the perceived preventive measures to air pollution on the inhabitants of Emohua Local Government Area, Rivers State?

### **Hypotheses**

The following null hypotheses postulated were tested at 0.05 level of significance:

1. There is no significant difference between educational status of the respondents and their perception of the health effects of air pollution on the inhabitants of Emohua Local Government Area, Rivers State.
2. There is no significant difference between the age of the respondents and their perception of the health effects of air pollution on the inhabitants of Emohua Local Government Area, Rivers State.

## Methods

### *Participant and recruitment*

The research design adopted in this study was a descriptive research design. The population for the study consisted of all the individuals in Emohua Local Government Area of Rivers State which is ninety-eight thousand, four hundred and twenty-three (98,423) (National Population Commission, 2010). A Sample size of 288 was determined using the Cochran formula for calculating sample size,  $n = \frac{z^2pq}{d^2}$  Where,  $n$  = sample size,  $p$  (proportion of people with the desired perception which was 10.5%);  $z$  = confidence level 95%  $(1.96)^2$ ,  $q = 1 - 0.105 = 0.895$ ,  $d^2$  = confidence interval = 5% =  $0.05^2 = 0.0025$ ;  $n = 144$ . This was doubled to reduce the error level, making the sample size 288. The simple random sampling technique was used to select the sample for the study.

### *Instrument and Measures*

The instrument for data collection in this study was a structured questionnaire. The questionnaire consisted of two sections A and B. Section A focused on the socio-demographic data of the respondents such as age, religion, marital status, education and occupation while Section B was focus on the perception on the health effects of air pollution on a four-point scale of 'strongly agree, agree, disagree and strongly disagree'. Validation of the instrument was done by three experts from the fields of Health Education and Measurement and Evaluation. A reliability coefficient of 0.79 was obtained after subjecting the instrument to reliability test using Cronbach alpha. The researcher administered the questionnaires to the respondents through personal contact. This was to ensure that the questionnaires were properly served to the respondents. Data collected were analysed with the aid of the Statistical Product for Service Solution (SPSS V-23) using mean, standard deviation and One-way analysis of variance (ANOVA) at 0.05 alpha level.

## Results

The results of the study are presented below

**Table 1: Perceived psychological health effects of air pollution**

SN	Items	Mean	Std Dev
1	Air pollution can lead to emotional stress	3.49	.70
2	It is also associated with mood swing among individuals	3.02	.80
3	Long-term exposure to polluted air results in anxiety and irritation	3.20	.94
4	Long-term exposure to polluted air results in depression which is characterized by a loss of pleasure and interests, and sadness	3.03	.94
5	Exposure to air pollution can also bring about disruption to sleep	3.37	.85
6	Exposure to air pollution can lead to loss of concentration	3.05	.84
	<b>Grand mean</b>	<b>3.19</b>	<b>0.84</b>

### **Criterion mean = 2.50**

Table 1 showed the perceived psychological health effects of air pollution. The result showed that the grand mean of  $3.19 \pm 0.84$  was greater than the criterion mean of 2.5 indicating that air

pollution had psychological health effects. The perceived psychological health effects of air pollution included: emotional stress ( $3.49 \pm 0.70$ ), anxiety and irritation ( $3.20 \pm 0.94$ ), disruption to sleep ( $3.37 \pm 0.85$ ).

**Table 2: Perceived physical health effects of air pollution**

SN	Items	Mean	Std Dev
1	Difficulty in breathing	3.56	.56
2	Air pollution can interfere with the sense of smell	3.11	.84
3	Air pollution can lead to damage of the human lungs	3.37	.79
4	It can lead to eye infection, cough and catarrh	3.11	.90
5	It can lead to cardiovascular diseases	3.27	.89
6	Long-term exposure to air pollution can even lead to death if left unchecked	3.15	.80
	<b>Grand mean</b>	<b>3.26</b>	<b>0.76</b>

Table 2 showed the perceived physical health effects of air pollution. The result showed that the grand mean of  $3.26 \pm 0.76$  was greater than the criterion mean of 2.5 indicating that air pollution had physical health effects. The perceived physical health effects of air pollution included: difficulty in breathing ( $3.56 \pm 0.56$ ), damage to human lungs ( $3.37 \pm 0.76$ ), interference with sense of smell ( $3.11 \pm 0.84$ ), cardiovascular diseases ( $3.27 \pm 0.89$ ), and eye infection, cough and catarrh ( $3.11 \pm 0.90$ ).

**Table 3: Perceived social health effects of air pollution**

SN	Items	Mean	Std Dev
1	Air pollution can interfere with healthy interaction between two or more persons in the environment	3.31	.84
2	Air pollution is one of the leading factors that alters behaviour	3.04	.96
3	Air pollution can interfere with the relaxation or recreation of individuals	2.96	1.05
4	Air pollution can also interfere with the socialization of people	3.18	1.02
	<b>Grand mean</b>	<b>3.12</b>	<b>0.96</b>

Table 3 showed the perceived social health effects of air pollution. The result showed that the grand mean of  $3.12 \pm 0.96$  was greater than the criterion mean of 2.5 indicating that air pollution had social health effects. The perceived social health effects of air pollution included: interference with healthy interaction between two or more persons in the environment ( $3.31 \pm 0.84$ ), alters behaviour ( $3.04 \pm 0.96$ ), interference with the relaxation or recreation of individuals ( $2.96 \pm 1.05$ ), and interference with the socialization of people ( $3.18 \pm 1.02$ ).

**Table 4: Perceived sources of air pollution**

SN	Items	Mean	Std Dev
1	Burning of refuse in the surrounding	3.62	.64
2	Burning and clearing of bush	3.16	.73
3	Household use of burning woods or kerosene stove	3.34	.87
4	Smoke from the exhaust of vehicles	3.16	.76
5	Cement dust from construction activities	3.38	.83
6	Tobacco use like smoking of cigarettes close to households	3.15	.83
7	Carbon monoxide from generators	3.40	.81
<b>Grand mean</b>		<b>3.31</b>	<b>0.78</b>

Criterion mean = 2.5

Table 4 showed the perceived sources of air pollution. The result showed that the sources of air pollution included: burning of refuse in the surrounding (3.62±0.64), burning and clearing of bush (3.16±0.73), household use of burning woods or kerosene stove (3.34±0.87), and cement dust from construction activities (3.38±0.83).

**Table 5: Perceived preventive measures to air pollution**

SN	Items	Mean	Std Dev
1	Limit exposure to air pollution as low as possible	3.42	.80
2	More effort to ban smoking close to households	2.99	.92
3	Ensure that gas or kerosene stoves at home should be properly installed and maintained	3.11	.92
4	Avoid going into freshly painted rooms	3.11	.95
5	There should be a barricade in every construction site to avoid polluting the environment with the emission from the site	3.05	.86
<b>Grand mean</b>		<b>3.14</b>	<b>0.89</b>

Table 5 showed the perceived preventive measures to air pollution. The result showed that the preventive measures of air pollution included: Limit exposure to air pollution as low as possible (3.42±0.80), more effort to ban smoking close to households (2.99±0.92), proper installation and maintenance of gas or kerosene stoves at home (3.11±0.92), and putting barricade in every construction site (3.05±0.86).

**Table 6: One-way ANOVA of difference between educational status and perception of the health effects of air pollution**

Source of variance	Sum of Squares	df	Mean Square	F-value	p-value	Decision
Between Groups	.494	3	.165	2.055	.107	H <sub>0</sub>
Within Groups	20.670	258	.080			Accepted
Total	21.164	261				

**\*Not Significant**

Table 6 showed the One-way ANOVA of difference between educational status and perception of the health effects of air pollution. The result showed a non-significant difference [F(3,258) = 2.055; p>0.05]. Thus, the null hypothesis which states that there is no

significant difference between educational status of the respondents and their perception of the health effects of air pollution was accepted.

**Table 7: One-way ANOVA of difference between age and perception of the health effects of air pollution**

Source of variance	Sum of Squares	df	Mean Square	F-value	p-value	Decision
Between Groups	1.919	3	.640	8.574	.000	Ho
Within Groups	19.245	258	.075			Rejected
Total	21.164	261				

\*Significant

Table 7 showed the One-way ANOVA of difference between age and perception of the health effects of air pollution. The result showed a significant difference [ $F(3,258) = 8.574$ ;  $p < 0.05$ ]. Thus, the null hypothesis which states that there is no significant difference between age of the respondents and their perception of the health effects of air pollution was rejected.

### **Discussions**

The finding of this study showed that the perceived psychological health effects of air pollution included: emotional stress, anxiety and irritation, and disruption to sleep. This finding is not surprising because air pollution is not without psychological disturbance. The finding is in accordance with the result of Jerome et al (2016) that many respondents indicated high emotional distress on air pollution. The finding of this study also agrees with that of Torres and Casey (2017) which showed that, exposure to polluted air results in a variety of psychological problems such as stress, depression, anxiety, irritation, becoming short-tempered, and mood swings. The finding of this study is in keeping with that of Kessler and Brome (2013) which showed that air pollution has also been correlated with depression, a serious mental disorder affecting people globally, which is continuously increasing. The finding of this study also support several other studies available that show a positive correlation between air pollution and depressive disorders that adversely affect human behaviour such as Lim et al. (2012) and Calderon-Garciduenas et al. (2015). The finding of this study is in consonance with that of Fisch, Andrews, Fisch, Golden, Liberson and Olsson (2003) which showed that air pollution is also associated with low mood and potency. This similarity found between the previous studies and the present one might be due to the similar in the concepts studied.

The finding of this study showed that the perceived physical health effects of air pollution included: difficulty in breathing, damage to human lungs, interference with sense of smell, cardiovascular diseases, and eye infection, cough and catarrh. The finding of this study is in consonance with that of Brook et al (2010) whose evidence showed the effect of air pollution on reduced lung function, heightened severity of symptoms in individuals with asthmatics, and ischaemic heart disease which includes heart attacks. The finding of this study also corroborates Brunekreef and Holgate (2002) which showed that, air pollution is largely recognized as a risk factor for several outcomes including increased mortality, increased hospital admissions and emergency visits for both respiratory and cardiovascular diseases, and impairment of respiratory function, including reduced lung function, exacerbation of asthma and chronic obstructive pulmonary disease. Also, the

findings of this study is in line with that of Filleul et al. (2005) who reported associations between increased respiratory and cardiovascular mortality and acute and chronic exposures to particulate air pollution. Furthermore, the finding of this study corroborates several other studies which showed that the short-term effects of air pollution are temporary and range from simple discomfort, such as irritation of the eyes, nose, skin, throat, wheezing, coughing and chest tightness, and breathing difficulties, to more serious states, such as asthma, pneumonia, bronchitis, and lung and heart problems. Short-term exposure to air pollution can also cause headaches, nausea, and dizziness (Leary, Kaufman, Barr, Bluemke, Curl & Hough, 2014).

The finding of this study also showed that the perceived social health effects of air pollution included: interference with healthy interaction between two or more persons in the environment alters behaviour, interference with the relaxation or recreation of individuals, and interference with the socialization of people. The finding of this study agrees with that of Torres and Casey (2017) which showed that, exposure to polluted air results in a variety of problems which adversely affect behaviour such as eating, recreation, commuting, travelling, and socialization. The finding of this study also corroborates the report of the World Health Organization (2012) which reported the effect of air pollution on changes in sexual behaviour.

The result showed that the sources of air pollution included: burning of refuse in the surrounding, burning and clearing of bush, household use of burning woods or kerosene stove, and cement dust from construction activities. The finding of this study is in line with that of Konstantinos et al, (2015) which showed that the sources of air pollution are from constant activities of man such as burning and clearing of bush, agricultural and industrial activities in the quest for development result to pollution emission which degrades the natural environment and adversely affects the human health, animals and vegetation. The finding of this study is also in agreement with the report of the World Health Organization (2012) which showed that household and outdoor air pollutions account for about 680,000 premature deaths which correspond to 76 deaths per lakh of population. The mortality rate attributed to household-air pollution and ambient-air pollution in Nigeria was 90 per lakh of population in 2012, which is higher than other countries in Africa (WHO, 2012). The finding of this study further agreed with that of Nwanakwere and Oyedokun (2020) who noted that, the perceived sources of air pollution noted were smoke, vehicle emission, and burning of bush.

The result showed that the preventive measures of air pollution included: Limit exposure to air pollution as low as possible, more effort to ban smoking close to households, proper installation and maintenance of gas or kerosene stoves at home, and putting barricade in every construction site. This finding is not surprising because, to prevent air pollution, several measures must be put in place. The finding of this study is in agreement with the report of the American Lung Association (2016) that to prevent air pollution, the following must be done: ban smoking at home, well-ventilated kitchen to whisk away air when cooking, making sure gas stoves and central heating and air-conditioning systems are properly installed and well-maintained. The similarity found between the present study and the previous ones might be due to the similarity in the concepts under study.



## **Conclusion**

Based on the findings of the study, it was concluded that, air pollution had psychological, physical and social health effects which were perceived to be emotional stress, anxiety and irritation, difficulty in breathing, damage to human lungs, interference with sense of smell, eye infection, interference with healthy interaction between two or more persons in the environment, alters behaviour and interference with the relaxation or recreation of individuals.

## **Recommendations**

Based on the findings of the study, the following recommendations were made:

1. The environmental health protection agency should intensify their effort to curb activities that causes air pollution.
2. Environmental health workers should monitor and make conscious effort to ensure that people do not indulge in any activity that contaminate the air and environment.
3. The government should ban smoking with prompt prosecution of offenders.
4. Community health care workers should give health education to members of the community on proper installation and maintenance of gas or kerosene stoves at home.
5. Construction industries should ensure they always put a barricade in every construction site to avoid emission from such sites to the neighbouring environment.

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