

## Relationship Between Stressful Life Event and Perception of Air Pollution in Rivers State

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**Annatation:** This study examined the relationship between stressful life event and perception of air pollution (i.e we think that our own immediate geographical area is less or more polluted than adjacent areas,). This study adopted correlation research design. Three research questions and three corresponding hypotheses guided the study. The population of the study was 600 residents in Rivers State. A sample of 200 persons was selected using convenience sampling technique. The instruments for data collection were titled: “Perception of Air Pollution Assessment Inventory (PAPAI) and “Perception of Stressful Life Events Questionnaire (PSLEQ) “. The instruments were validated by two experts in Measurement and Evaluation. The reliability of the instruments was determined using Cronbach alpha reliability method. The instruments yielded a reliability coefficient of 0.81 for PAPAI and 0.71 for PSLE. Simple regression was used to answer the research questions, while ANOVA associated with regression was used to tests the corresponding null hypothesis at 0.05 level of significance. The results of the study showed that perceived air pollution has a significant independent relation on perception of stressful life events among male residents in Obio-Akpor Local Government Area in Rivers Slate. Based on the findings of the study, it was recommended that the state government should increase monitoring of air pollution so as to identify major source of pollution and control them, oil companies should be fined and possible closed down if there continue with gas flaring. This would likely reduce the tendency to damage the environment.

**KEYWORD:** Stressful, Life Events, Perception, Air Pollution.

### INTRODUCTION

Understanding the impact of air pollution on the psychosocial functioning of individuals has become imperative due to massive urban pollution. According to the World Health Organization (2018), air pollution is occurring at an unprecedented level and requires constant monitoring to determine the health implications on individuals and societies. According to the same authority, 91% of the global population resides in areas where air pollution levels exceed the normal limits. Previous research has shown that air pollution is an important risk factor for increased morbidity and mortality among humans, with life-long exposure to air pollution being the fifth largest risk factor for all causes of mortality globally (Babatola, 2018). Majorly, it has been shown from empirical evidence that air pollution accounts for over 82% of all cardiovascular and respiratory diseases globally. While these have been fairly established, the impact of air pollution on the mental health functioning of individuals have not be fully established and or explained through research, especially within the

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context of Obio-Akpor Local Government Area of Rivers State. It is this observation that has informed the conduct of the current study.

Experimental and observational studies have shown that air pollution is of serious concern across the globe and is fueled by rapid population growth, continuous urbanization, increases in industrialization, continuous rises in energy demand, deforestation, and increases in car density, especially in major cities. One established fact is that these are often driven by human activities which are referred to as anthropogenic activities. Various anthropogenic activities lead to atmospheric degradation, such as emissions from vehicles, especially those that are older or poorly maintained; coal-powered industrial activities; construction, which produces dust; foundries and smelters; tobacco use; combustion that produces enormous heat; metal-based industries; mining; and excessive pesticide and chemical use (Zhang, Liu, & Li, 2014).

This bleak scenario is further worsened through poor environmental management and regulation, use of inefficient technologies (with low production and high environmental deterioration), construction of congested roads, and the inability to strictly implement environmental regulations and laws, as well as a lack of awareness among the population about the serious health and psychological outcomes of pollution. This issue is even more prominent in underdeveloped and developing countries including Nigeria, where it is a serious concern as it adversely affects public health, alters the quality of life, and impacts the economy (Guo & Zhang, 2013). As these studies shows, air quality significantly impacts the economy as well as the health of the population. Only recently has the focus shifted to ascertain the impact of air pollution on the mental health and functioning of the individual. As Richard and Rosenberg (2014) showed, air pollution is one of the leading factors that upset human emotions and alters behaviour. 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 affect behavior such as eating, recreation, commuting, traveling, and socialization (Torres & Cassey, 2017). A recent study indicated that older people and females suffered more and were more anxious because of low air quality than younger people and males (Andrew & Simon, 2018).

On the other hand, research by Guegen and Jacob (2014), have shown that the positive impacts of clean air on the human psyche, resulting in a pleasant mood and positive behavior. Similarly, different studies have revealed a positive correlation between increased criminality (aggressive and violent behaviors) in humans and elevated temperatures (specifically in the summer) and air pollution (Anderson, 2001). Air pollution has also been correlated with depression, a serious mental disorder affecting people globally, which is continuously increasing. Depression is characterized by a loss of pleasure and interests, guilt, sadness, inter alia, decrease in libido, disruption to sleep, and a loss of concentration. There are several studies available that show a positive correlation between air pollution and depressive disorders that adversely affect human behavior (Anderson, 2001). Most of these studies are foreign-based and might lack ecological validity to the context of Rivers State. It is against this background that the current research is being conducted to ascertain the relationship between air pollution and stressful life events in Obio-Akpor Local Government Area of Rivers State.

### Statement of the Problem

The problem of air pollution in Rivers State has taken a new dimension and has received considerable attention. Across all area of Rivers State, there have been reported cases of air pollution. This is coming as a little surprise because many areas of Rivers State, which provide 60% of Nigeria's crude oil output, have recently been experiencing visible fallout of soot. Soot is the common term for a type of particle pollution called PM 2.5-particulate matter with diameters that are

2.5 micrometers or less. It is mostly formed as a result of the incomplete combustion of hydrocarbons, and due to its tiny size, it can penetrate the lungs and bloodstream easily. While the problem of air pollution has plagued Rivers State for a relatively long time, its impact became pronounced in 2016 when a large section of the capital city Port Harcourt, become massively infested with soot. Following the outrage that trailed its prevalence in 2016, Nyesom Wike, the state governor, had commissioned a technical team in 2018 to investigate the factors causing soot pollution and how to tackle it. According to the report published in 2019, illegal bunkering and gas flaring topped the list of activities causing soot pollution in the state.

An international air pollution monitoring organization, IQ Air, reported that Port Harcourt, the capacity of Rivers State has an air quality index of 173, which is nine times more than the World Health Organization annual air quality guideline. Most of the focus on the impact of air pollution has been tailored towards understanding how it affects the physical health of people, with little or no attention paid to understand the relationship between air pollution and stressful life events. It was based on this observation that the present study seeks to investigate the relationship between air pollution and stressful life events among residents of Obio-Akpor Local Government Area of Rivers State.

### **Purpose of the Study**

The purpose of the study was to investigate the relationship between stressful life events and perception of air pollution among residents of Obio-Akpor Local Government Area of Rivers State. In specific terms, the objectives of this study sought to:

1. Examine the relationship between stressful life events and perception of air pollution among male resident in Obio-Akpor Local Government Area of Rivers State.
2. Determine the relationship between stressful life events and perception of air pollution among female resident in Obio-Akpor Local Government Area of Rivers State.
3. Investigate the relationship between stressful life events and perception of air pollution among resident in Obio-Akpor Local Government Area of Rivers State.

### **Research Questions**

The following research questions have been developed to guide the conduct of this study:

1. What is the extent of relationship between perception of air pollution and stressful life events among male residents in Obio-Akpor Local Government Area of Rivers State?
2. What is the extent of relationship between perception of air pollution and stressful life events among female residents in Obio-Akpor Local Government Area of Rivers State?
3. What is the extent of relationship between perception of air pollution and stressful life events among residents in Obio-Akpor Local Government Area of Rivers State?

### **Hypotheses**

The following null hypotheses were tested at 0.05 level of significance to further guide the conduct of this study:

1. There is no significant relationship between perception air pollution and stressful life events among male residents in Obio-Akpor Local Government Area of Rivers State.
2. There is no significant relationship between perception air pollution and stressful life events among female residents in Obio-Akpor Local Government Area of Rivers State.

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3. There is no significant relationship between perception air pollution and stressful life events among residents in Obio-Akpor Local Government Area of Rivers State.

## Conceptual Review

### Pollution and Mental health

For years air pollutants have been implicated in a range of health outcomes, most notably cardiovascular and respiratory diseases. The 2015 Global Burden of Disease survey estimated that just one aspect of air pollution, fine particulate matter, is largely responsible for 7.6% of all deaths worldwide (Bandyopadhyay, 2016). However, the effects of air pollutants on mental health conditions have been less-well studied, and mostly confined to epidemiological studies, which can demonstrate an association but cannot show causation. Observational evidence has revealed small-to-moderate sized associations between increasing levels of several components of air pollution and a range of mental health outcomes. There is not yet a confident explanation for these observed associations, but a considerable number of biological, psychological and social implications have been hypothesized, and evidenced to varying degrees. One hypothesis called the Neuro inflammatory hypothesis posits that air pollution causes inflammation in the lungs which in turn leads to weakness in the immune system and this impacting on the health of individuals.

Another hypotheses argues that air pollution interacts at the genetic level which impact on the functioning of the genes in the body. Regarding the mental health impact, research has shown that various forms of mental health problem has been traced to the problem of pollution. Case in point, living close to a road has been implicated in many proposed mechanisms affecting mental health, from noise levels to safety concerns. While studies using road proximity as a proxy for air pollution exposure do identify these confounding factors, efforts to adequately adjust for them are lacking, which weakens the studies' ability to accurately measure the association between air pollution and mental health.

Socially, air pollution is unequally experienced, yet exposure can vary by neighborhood, city, country, income level, ethnicity, age, and whether people live near to the center, or industrialized areas of cities, or near major roads. In the US for example, inner-city poorer neighborhoods experience higher levels of air pollution and associated health impacts (Stewart et al, 2016). Yet these variations are not predictable: in several European cities, where central areas are associated with higher housing prices, in some cases the more well-off experience greater exposures, but not necessarily greater health impacts, and in other cases, poor and less-well educated people are most exposed, despite not living near the center. Globally, the less well-off and least educated in society have poorer mental health outcomes. Part of the observed air pollution and mental health association may be reasonably explained by these and other individual and population-level sociocultural confounders, which again, are difficult to measure, control, or adjust for (Cesaroni, et al 2010, Deguen et al, 2015).

Despite these observations, prior research has shown that air pollution has been linked to depression, anxiety disorders psychosis, mental dysfunction among children and older people, as well as increased suicide attempts. Regarding depression, Vert and colleagues in Barcelona identified significantly increasing rates of depression among those exposed to a range of air pollutants, with doubling odds of depression (2.00, 95% CI; 1.37, 2.93) for each 10 ug/m<sup>3</sup> NO<sub>2</sub> increase to a population. This study also identified associations between higher concentrations of air pollutants and psychiatric medication usage (Vert et al, 2019).

Regarding anxiety disorders, Power et al (2015), using the US nurses' cohort reported on estimations of air pollution exposure, and distance to nearest major road. They found significantly higher odds of

‘meaningfully high symptoms of anxiety’ in nurses exposed to higher levels of particulate matter - PMIO and PM2.5 - in the preceding month and year. Urban rural differences in the incidence of schizophrenia are well established in the literature, and recently air pollution has been inculcated as having potential to mediate this relationship (Attademo & Bernardino, 2017).

Finally, Yackerson (2014) showed that there is an association between air pollution and suicide attempts. The study showed a weak but positive correlation between Eastern winds in Israel, which carry high concentrations of solid air-suspended particles, and psychotic exacerbations of schizophrenia and suicide attempts in people who have schizophrenia. Similar findings were observed for gaseous pollutants and particulate matter and suicide attempts in Vancouver (Szyszkowics, 2010), particulate matter and completed suicide in Seoul (Kim et al, 2010), and PMIO and N02 on ‘suicide risk’ in Guangzhou (Bakian, et al, 2015).

### **Perception of Air Pollution**

The concept of individual air quality is fluid and open to various interpretations. There are several reasons for studying the determinants of perceived air quality. Individual’s health reactions to air pollution may be mediated by their affective reactions. Irritation, discomfort and perhaps more serious outcomes like anxiety or depression may be determined by persons’ affective reactions to pollution. Whether one avoids, ignores, or increases exposure to poor ambient conditions is based partially upon individual judgments about environmental quality. Finally, from a policy perspective, it is the sum of individual judgments about the quality of environmental conditions that largely determines economic and political decisions that affect environmental quality (Craik & Zube, 1976).

Both objective measures of ambient contaminants and observer characteristics have been studied in order to predict citizen judgments about community air quality. Perceived air quality is moderately related to particulate and dust-fall as well as visibility or haze. Gaseous pollutants like photochemical smog have proven more difficult to model. One reason for the low to moderate correlations between perceived and objective measures of air quality is the existence of moderating individual differences. Persons with pre-existing respiratory impairments, more education, greater income, and those who have not habituated through long term exposure to poor air quality, are more likely to be aware of and concerned about local air pollution.

From the review done above, it is shown that social scientists including environmental psychologists are beginning to understand and examine the social and psychological consequences of human exposure to air pollution. However, the prevailing findings support the assumption that stressful life events and perceived air quality play a role in the etiology of psychological dysfunction. Depressive symptoms rose with perceived poor air quality. These findings imply that individual psychological vulnerability to environmental degradation may be influenced by psychosocial factors. A principal mechanism for these effects may be psychological stress which has been shown to decrease resistance to subsequent environmental demand (Jacobs, et al 2016). Result from Jacobs et al (2010) further confirms that perceived air pollution quality is an important indicator for understanding the psychological impact air pollution on human stress.

### **Methodology**

#### **Research Design**

The predictive correlational research design was used for this study. This design was considered appropriate because the research was focused on ascertaining the relationship between stress life events and perception of air pollution in Obio-Akpor Local Government Area of Rivers. None of the variables in the study were manipulated, but were used as they were in their current state.

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### Population of the Study

The population of this study comprises of all city dwellers in Obio-Akpor Local Government Area, comprising of three separate kingdoms, namely Aparā, Evo, and Akpor. This area was specifically chosen because of the large number of residential area in the area. Furthermore, the area is characterized by a large number of industries including oil servicing firms. Also, the area has been in the news recently for increased concentration of soot and other air pollutants. Finally, the researcher believes that the residents would be knowledgeable about the topic under consideration because they are might have experience some forms of air pollution.

### Sample and Sampling Technique

From this population, a sample of 600 residents was selected using stratified random sampling technique. From each of the kingdoms in the area, a sample of 200 persons was selected using convenience sampling technique. Convenience sampling technique was adopted because the researcher is interested in using any available member of the population that is willing to respond to the instrument.

### Instrument for Data Collection

Two instruments were used for data collection. Both instruments were developed by the researcher. The first instrument was titled “Perception of Air Pollution Assessment Inventory (PAPAI), while the second instrument was titled “Perception of Stressful Life Events Questionnaire (PSLEQ). The first instrument was broadly divided into two sections: A and B. Section A of the instrument was constructed to elicit information on the demographic characteristics of respondents, while section B was constructed using 10-items constructed in a Likert scale of Strongly Agreed, Agreed, Disagreed and Strongly Disagreed which were scored as 4, 3, 2, and 1 point(s) respectively. The second instrument was also designed using the Likert scale of Strongly Agreed, Agreed, Disagreed and Strongly Disagreed which were scored as 4, 3, 2, and 1 point(s) respectively. The instrument is made up of 15-items.

### Validity of the Instrument

Validation of the instruments were done by subjecting the instrument to expert judgment. The instruments were given to one expert each in Educational Psychology and one expert in Measurement and Evaluation. Their contributions were integrated into the final version of the instruments before administration.

### Reliability of the Instrument

Reliability of the instrument was done using the Cronbach Alpha method. The instrument was administered to 30 residents of the area were not part of the target sample. After analysis, alpha coefficient of 0.81 for PAPA! and 0.71 for PSLEQ was obtained indicating that the instrument possessed suitable level of reliability.

### Method of Data Collection and Analysis

The research, with the help of three research assistants administered the instrument to the respondents. The instruments were collected on the spot immediately after collection. Simple regression was used to answer the research questions, while ANOVA associated with regression was used to tests the corresponding null hypothesis. The hypotheses were tested at 0.05 level of significance with the result presented below.

## RESULTS

**Research Question One:** What is the extent of relationship between perception of air pollution and stressful life events among male residents in Obio-Akpor Local Government Area of Rivers State?

**Hypothesis One:** There is no significant relationship between perception air pollution and stressful life events among male residents in Obio-Akpor Local Government Area of Rivers State.

**Table 1: Simple Linear Regression Coefficient of extent of Relationship between Perception Air Pollution and Stressful Life Events among Male Residents**

R = 0.301	R <sup>2</sup> = 0.283	AdjR <sup>2</sup> = 0.275			
Model	Um of Squares	df	Mean Square	F	Sig
Regression	6666.762	1	6666.762	866.524	0.000
Residual	1900.340	247	7.693		
Total	8567,101	249			

As the result in Table 1 showed, a linear regression coefficient value obtained was 0.301, with the coefficient of determination, R<sup>2</sup> of 0.283 and the adjusted R<sup>2</sup> was 0.275. From this result, it therefore suggests that air pollution accounts for about 27.5% of perceived stressful life events among male residents in Obio-Akpor Local Government Area of Rivers State. Furthermore, in testing the corresponding null hypotheses, the result indicated that an F-value of 866.524 was obtained at 1 and 247 degrees of freedom with an associated p-value of 0.000. Since the obtained p-value was lesser than 0.05, it therefore indicate that perceived air pollution has a significant independent relation on perception of stressful life events among male residents in Obio-Akpor Local Government Area in Rivers State.

**Research Question Two:** What is the extent of relationship between perception of air pollution and stressful life events among female residents in Obio-Akpor Local Government Area of Rivers State?

**Hypothesis Two:** There is no significant relationship between perception air pollution and stressful life events among female residents in Obio-Akpor Local Government Area of Rivers State.

**Table 2: Simple Linear Regression Coefficient of Extent of Relationship between Perception Air Pollution and Stressful Life Events among Female Residents**

R = 0.456	R <sup>2</sup> = 0.208	Adj R <sup>2</sup> = 0.203			
Model	Sum of Squares	df	Mean Square	F	Sig
Regression	1782.27	1	1782.27	50.111	0.000
Residual	8784.832	247	35.566		
Total	8567.101	249			

As the result in Table 2 showed, a linear regression coefficient value obtained was 0.456, with the coefficient of determination, R<sup>2</sup> of 0.208 and the adjusted R<sup>2</sup> was 0.203. From this result, it therefore suggests that air pollution accounts for about 20.3% of perceived stressful life events among female residents in Obio-Akpor Local Government Area of Rivers State. Furthermore, in testing the corresponding null hypotheses, the result indicated that an F-value of 50.111 was obtained at 1 and 247 degrees of freedom with an associated p-value of 0.000. Since the obtained p-value was lesser than 0.05, it therefore indicate that perceived air pollution has a significant independent relation on perception of stressful life events among female residents in Obio-Akpor Local Government Area in Rivers State.

**Research Question Three:** What is the extent of relationship between perception of air pollution and stressful life events among residents in Obio-Akpor Local Government Area of Rivers State?

**Hypothesis Three:** There is no significant relationship between perception air pollution and stressful life events among residents in Obio-Akpor Local Government Area of Rivers State.

**Table 3: Simple Linear Regression Coefficient of Extent of Relationship between Perception Air Pollution and Stressful Life Events**

R = 0.556	R <sup>2</sup> = 0.514	Adj R <sup>2</sup> = 0.5033			
Model	Sum of Squares	df	Mean Square	F	Sig
Regression	1151.051	1	1151.051	92.661	0.000
Residual	7418.050	497	12.422		
Total	8567.101	498			

As the result in Table 3 showed, a linear regression coefficient value obtained was 0.556, with the coefficient of determination, R<sup>2</sup> of 0.514 and the adjusted R<sup>2</sup> was 0.503. From this result, it therefore suggests that air pollution accounts for about 50.3% of perceived stressful life events among female residents in Obio-Akpor Local Government Area of Rivers State. Furthermore, in testing the corresponding null hypotheses, the result indicated that an F-value of 92.661 was obtained at 1 and 497 degrees of freedom with an associated p-value of 0.000. Since the obtained p-value was lesser than 0.05, it therefore indicate that perceived air pollution has a significant independent relation on perception of stressful life events among residents in Obio-Akpor Local Government Area in Rivers State.

### Discussion of Findings

From the result obtained from the answer to the research questions and the testing of the corresponding null hypotheses, it was shown that air pollution had a significant prediction on the perception of stressful life events among residents in Obio-Akpor Local Government Area. From the findings gotten, it was shown that male residents reported a higher level of stressful life events compared to female residents. These results might be attributed to the fact that males engage in more outdoor and vigorous activities compared to females. More so, males involve in daily employment activities where they are a high likelihood of experiencing a greater level of air pollution compared to females. This result is in contrary to the result obtained by Andrew and Simon (2017) who stated that females suffered more and were more anxious because of low air quality.

Another result obtained from this study is that air pollution had a significant influence on perception of stressful life events among residents in Obio-Akpor Local Government Area of Rivers State. This result might be attributed to the fact that air pollution results in increased level of weakness and negative health outcome among residents. These negative health outcomes are likely to induce negative experience among residents. When people experience such negative stressful events, it might result in depression, anxiety, and other mental health dysfunction. The findings of study is similar to that obtained Anderson (2001) who revealed a positive correlation between increased criminality (aggressive and violent behaviors) in humans and elevated temperatures (specifically in the summer) and air.

### Conclusion

The result that there is a positive relationship between air pollution and stressful life events implies that air pollution and stressful life events implies that an increase in air pollution is likely to induced negative emotional reaction among people residing in the area. With the increasing level of



environmental pollution in the area, more people are likely to witness stressful psychological problems.

### Recommendations

The study recommends as follows:

1. The state government should increase monitoring of air pollution so as to identify major source of pollution and control them.
2. Oil companies should be fined and possible closed down if there continue with gas flaring. This would likely reduce the tendency to damage the environment.
3. Illegal oil bunkering should be nipped in the bud. This can be done by destroying places suspected to be engaging in oil bunkering.
4. There should be synergistic relationship between security agencies and industry regulators monitor instances of air pollution in the area.

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