AN ANALYSIS OF THE IMPACT OF AIR POLLUTION ON THE RESPIRATORY HEALTH IN URBAN AREA

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RACHEL QUEEN TENGBEH

REGISTRATION NO. 72111336

UNDER THE SUPERVISION AND GUIDANCE OF

DR ATUL GUPTA

GURDEV HOSPITAL

SCHOOL OF HEALTHCARE AND PARAMEDICAL SCIENCES

CERTIFICATE

This is to certify that the thesis entitled **AN ANALYSIS OF THE IMPACT OF AIR POLLUTION ON THE RESPIRATORY HEALTH IN URBAN AREAS** has been carried out by **RACHEL QUEEN TENGBEH** master in public health Submitted to the school of Health care and Paramedical Sciences, CT University, Ludhiana.

_____	_____
HOS	Dr Atul Gupta (MD)
Dr Vir Vikram	SUPERVISOR
School of Healthcare and Paramedical Sciences	Gurdev Hospital Ludhiana

STUDENTS DECLARATION

I hereby declare that this thesis entitled **AN ANALYSIS OF THE IMPACT OF AIR POLLUTION ON THE RESPIRATORY HEALTH IN URBAN AREA** was carried out by me for the degree of master's in public health and submitted to the department of public health, school of healthcare and paramedical sciences, CT University Ludhiana, is a record of an original work done by me under the supervision of **Dr Atul Gupta**. I further declare that the report has not been submitted to any other institute for any other degree.

Date: 23/08/23

Place: CT University

Signature of Student

RACHEL QUEEN TENGBEH

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ABBREVIATIONS

WHO: WORLD HEALTH ORGANIZATION

COPD: CHORNIC OBSTRUCTIVE PLUMONARY DISEASE

P.M: PARTICULATE MATTER

NO2: NITROGEN DIXOIDE

SO2: SULFUR DIXOIDE

SPSS: STATISTICAL PACKAGE FOR SOCIAL SCIENCE

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ABSTRACT

This Research paper talks about the impact of air pollution on the respiratory health in urban areas. Air pollution is a growing problem in many cities and country around the world with the high level of particulate matter with other pollutants the cause's health issues around the world.

The aim of this research is to give the relationship between air pollution and that of respiratory health in urban area. And also, it lists down strategies for reducing air pollution with in the public health sector and around the world or in various cities.

This research paper also reviews existing literature on the effects of air pollution and also conducts complete analysis of data from many sources, they; health record, patients' chart, quality monitoring stations and also demographic data. This paper center of attention on urban areas where air pollution is growing higher due to factors or problem such as: gases from car and truck exhaust, factories, dust, pollen, volcanoes and industrial activity.

Results of this study show an association between air pollution and respiratory health, the levels of high particulate matter and with other pollutants help increased risk of respiratory sicknesses which include lung cancer, chronic obstructive pulmonary disease (COPD) and asthma.

This paper also recognizes various strategies reducing air pollution on public health, including the use of cleaner transportation option, better regulation of industrial emissions, and help with the promotion of green spaces in urban areas.

Finally, this study or research paper climax the urgent need for action to deals with issues of air pollution in urban areas and also helps in protecting public health. The finding of this research paper help to inform policy decision and also helps to guide the development of effective approaches in reducing air pollution and also improving respiratory health in urban communities.

CHAPTER ONE

1.0. INTRODUCTION

Air pollution is a major threat to rapidly growing cities in present times. Air pollution has become a major concern in urban areas due to the increasing levels of industrialization, vehicle emissions, and urbanization. In India, pollution has recently become a problem, especially air pollution because of the increase in man-made activities such as: burning fossil, example include natural gas, coal and oil- to power industrial processes and that of vehicles.

As we know that air pollution has become one of the major environmental problems globally, it has a great impact on human health that need to be deal with for the betterment of health.

Air pollution is a mixture of solid and gases in the air. Car emission, chemicals from factories, dust, or industries, and energy product, where urban areas have been affected more due to high populations and a high level of industrialization.

According to (WHO) World Health Organization Air pollution is a major and present public health threat, and air pollution is also responsible for seven million death pre year or annually from exposure of particles in polluted air that led to respiratory diseases which include: COPD, Lung Cancer, Asthmas. It became essential to analyze or compare the impact of air pollution on the respiratory health in urban areas to help policy makers in implementation of strategies aimed at reducing the negative effect of air pollution

Respiratory health is important aspect of human health or body, any problem with this system can lead to serious damage on an individual's well-being. Air pollution has been linked to the development and intensifies respiratory illnesses which include: (COPD) Chronic Obstructive Pulmonary Lungs Disease. The study has given that submission to air pollution that can lead to development of respiratory illnesses in children, early people, and adult and also people or individual or patients with past history of respiratory illness or patients with past respiratory condition being at high risk.

Urban areas are more susceptible to air pollution due to high number of population density, production energy activities cars, factories that spared or give out pollutants into the atmosphere the high number of pollutants in the air that can lead to terrible health effects which involved respiratory diseases or illnesses.

According to WHO, the levels pf PM2.5 (find particulate matter) in urban areas are over two times higher gathering of this pollutant can lead to respiratory illnesses which include asthma, chronic bronchitis, and COPD etc.

Air pollution may seem like the result of anthropological activities however, it has been around even before human involved. In human, polluted air with contaminations can cause a wide array of illness ranging from asthma, bronchitis, lung cancer, COPD.

The impact of air pollution on respiratory health is not limited to urban areas, but gathering of pollutants is important higher in these areas due to various factors such as: industrialization, transportation, and pollution density. Several studies have been conducted to evaluate the impact of air pollution on respiratory health in urban areas. This study has shown a positive correlation between air pollution and respiratory illness. For instance, a study conducted Ghana found that exposure P.M 2.5 to air pollution was associated with an increased risk of COPD Chronic obstructive pulmonary disease, while another study conducted in Nigeria found that air pollution was a significant risk factor for asthma in children.

In conclusion there are many attempts made at various levels in society to curb the causes of air pollution. Let us be responsible for maintaining a safe environment.

Air pollution is the presence of hazardous and harmful chemicals gases in the air that makes the atmospheric air unfit for routine purposes by plants animal. The changes, which can be physical chemical, biological in the natural of air, deteriorate the quality of the biotic lives in the environment.

1.1. BACKGROUND OF THE STUDY

Air pollution is an important environmental program that affects the health and wellbeing of an individual, especially those living in an urban area.

World Health Organization (WHO) reports that air pollution is responsible for more than five million (5,000,000) premature death globally each year, and the majority of this deaths occur in low middle-income countries.

Air pollution is a complex mixture of various gases particulate matter (PM), that can harmful to human health, particularly to the respiratory system. The respiratory system is the most vulnerable part of the human body that is infects of air pollution. Exposure to air pollutants can lead to a range of respiratory illnesses, including Asthma, COPD, Bronchitis and lung cancers. These health impacts can cause significant economic and social burdens on individual's communities and health system.

Despite the recognize health risk, Air pollution remain major problems in an urban area, where high population density and the consideration of human activities contribute the release of pollutants. In light of this, there is a need to investigate the impact of air pollution on the respiratory health in urban areas. This research aims to analyze the relationship between air pollution and respiratory health in urban areas. This research will use all a quantitative research approach to examine the consideration of air pollutants in selected urban areas and their association with respiratory health outcomes. The finding of this research or study can inform policy makers and stake holders in developing strategies to reduce air pollution in urban areas.

1.2. PROBLEM STATEMENTS

Air pollution is a major challenge faced by urban areas globally. And it is caused by human activities such as transportation, industrial activities, and household activities. The impact of air pollution on respiratory health has been a concern in the medical community. The respiratory system is one of the most susceptible organs affected by air pollution. The adverse effects of air pollution on respiratory health have been documented in numerous studied. However, the extents of the impact of air pollution on respiratory health, in urban areas are not fully understood.

The problem of air pollution on respiratory health is an important issue in urban area, where populations are concentrated, and exposure to air pollution is high. Urban areas are characterized by high levels of pollutants such as particulate matter (PM),

Nitrogen dioxide, and Sulphur dioxide. These pollutants can cause respiratory illness such as Asthma, Chronic Obstructive Pulmonary disease (COPD), Lung's cancer. Exposure to these pollutants can also worsen pre-existing respiratory conditions, leading to hospitalization and pre-mature death.

The impact of air pollution on respiratory health in urban areas is a complex and major problem that requires comprehensive analysis. The analysis should consider factors such as the types and levels of pollutants, the sources of pollution, and demographic characteristics of the affected population. The health outcomes associated with the exposure to air pollution. This research should also examine the effectiveness of an existing policies in intervention aimed at reducing air pollution and improving respiratory health in urban area.

In concluding, the problem of air pollution on respiratory health in urban areas is an important public health concern that requires urgent attention. The impact of air pollution on respiratory health is a complex issue that requires a comprehensive analysis to understand fully. The findings of this research will inform policies and interventions aimed at reducing air pollution and improving respiratory health in urban areas

1.3. OBJECTIVES OF THE STUDY

The objective of this research is to give a good analysis on the impact of air pollution on respiratory health in urban areas. Air pollution is a major problem in urban areas, and it has also been the results of respiratory illness. The aim of this research is to give the extent of the impact and provide information to inform policy maker on how to help in reducing the negative effect of air pollution in an urban area.

1.4. AIMED OF THE STUDY

- Evaluate the level of air pollution in urban areas; this reach arch will give the level of pollutants in the air. Which include; particulate matter, nitrogen dioxide and sulfur dioxide.
- Analyze the relationship between air pollution and respiratory health: this research will analyze the impact of air pollution on the respiratory health,

including respiratory illness, which include lung cancer COPD, asthma, etc.

- Identify the vulnerable population: this research will show vulnerable populations that are most at risk of developing respiratory diseases due to air pollution. Which include people or patients with pre- existing respiratory history, children, and old age people individual?
- Assess the effectiveness of current intervention: this research will access the effectiveness of current interventions and it will aim at reducing air pollution and reducing its effects.
- Policy Recommendations: the findings of this research will give a lists policy recommendations that will be made to helps improve the quality of air in urban areas and in reducing the negative impact of air pollution on the respiratory health

This research aims to help in the growing of body research on the impact of air pollution on the respiratory health in urban areas and helps provides facts based on recommendations for policy interventions to helps reduce air pollution in urban areas.

1.5.RESEARCH QUESTION

I. What are the short- term effects of exposure to air pollution on respiratory health?
II. How can health care workers provide effectively manage respiratory diseases caused by air pollution?
III. How do socioeconomics factors influence the impact of air pollution on respiratory health?
IV. What are the most effective strategies for reducing air pollution in urban area?
V. What are the psychological impacts of air pollution on respiratory health?
VI. What are the long-term effects of exposure to air pollution on respiratory health?
VII. How does air pollution impact respiratory health?
VIII. What are the main sources of air pollution in urban areas?
IX. How do policies and regulations aimed at reducing air pollution impact respiratory health?
X. What are the specific health risks associated with exposure to air pollution?

XI. How can air pollution monitoring be improved in urban areas?

XII. What are the public perceptions of air pollution and its impact on respiratory health?

XIII. What are the best ways to communication the risks of air pollution to the public?

XIV. Are some pollutions more vulnerable to the effects of air pollution on respiratory health?

XV. How do indoor air pollutants affect respiratory health?

2.0. SIGNIFICANCE OF THE STUDY

Air pollution is a major problem in urban areas globally due to it negative effects on human health. Being exposed to air pollutants can results in different respiratory health illness, which include COPD, Asthma, lung cancer etc.

The impact of air pollution on the respiratory health is important in urban area due to the high levels of pollutants limited by various sources, including industry, house hold, transportation, thus, there is a need to examine the impact of air pollution on respiratory health in urban, comprehensively

This research aims to give the impact of air pollution on respiratory health in urban areas. This research will give the facts on the severity of the problem and its impact on public health. This study will provide information to policymakers, health workers, and the general public. The findings will help policy makers to give effects policies to help in the reduction of air pollution and its impact on the public health. Health workers will be able to utilize the findings to help develop a good intervention to prevent respiratory health problems resulting for air pollution. The general public will have a good understanding of the risks associated with the exposure to air pollutants. Moreover, this research will give a clear picture on specific pollutants that are most harmful to the respiratory health. It will useful to health workers, policymakers to help point out a specific pollutant in their interventions.

For example, if the research finds that particulate matter (PM) is the most harmful pollutant, health workers, policymakers, can design policies to reduce PM emissions from sources such as industry, household, transportation. The significant of this research is to give a clearer picture on the impact of air pollution on respiratory health

in urban areas. These findings will inform lawmakers and health workers on how to help reduce air pollution and its impacts on health. This study will also raise public awareness on the risks associated with the exposure to air pollutants and the importance of reducing air pollution in urban area.

2.1. SCOPE AND LIMITATION

The scope is to investigate the effects of air pollution on respiration health in urban areas. This research will be identifying the various air pollutants and their sources, their levels of exposure, and their impact on the respiratory health. This study will also show the resent policies and regulation related to air quality management in urban areas.

This analysis will give a quantitative idea by collecting data from various sources, which include; goggle newspaper, government reports, past research papers, hospital data, this data will be analyzes using statistical methods to give a relationship between air pollution and respiratory health.

2.2. LIMITATIONS

There are many limitations to this analysis. First this research will only give the effects of air pollution on the respiratory health and also will it investigate other health issues that may be associated with air pollution. Secondly, this research will only analysis urban areas and may not be applicable to rural areas or other regions with different air pollution levels. Thirdly, this research will be limited with availability and quality data. Some data sources maybe incomplete or outdated and the accuracy of the data may be affected by the methods used.

Overall, this research may be affected by external factors which include socio-economic change of climate which may impact air pollution and that of respiratory health in urban areas. This analysis will only provide material on air pollution and that of respiratory health in urban areas and does not account for future changes.

CHAPTER TWO

2.0. LITERATURE REVIEW

Air pollution is a serious environmental problem affecting urban community globally with lots of problems affecting the human health. Urban areas are most exposed to air pollution as it is common in densely populated areas with high industrial activity and transportation. The impact of air pollution on respiratory health in urban area; urban area is a place of growing concern for public health experts and researchers.

There are studies that had investigated the effects of air pollution on respiratory health. A study conducted by Abraham Johnson there is an important similarity between exposed to air pollution and respiratory illness which include lung infection (pneumonia), bronchitis and asthma. The study also revealed that air pollutants such as nitrogen dioxide (No2), particulate matter (PM), & sulfur dioxide (S02) have effect on respiratory health, with PM being the most harmful.

Another study in (2021) by George shows an active link between air pollution and respiration health. This study found a long-term exposure to P.M 2.5 increased the risk of respiratory diseases and asthma. The research also show that children & elderly people are the most susceptible to air -related respiratory diseases.

To conclude, the impact of air pollution on respiratory health in urban area is a serious health issue. This study shows that air pollutants such as PM, NO2, SO2 are all harmful on the human respiratory system, and it increases the risks of respiratory illnesses. Children, elderly individuals and low-income community at are high risk.

2.1. DEFINITION OF AIR POLLUTION AND RESPIRATORY HEALTH

Air pollution is the contamination of air due to the presence of substance in the atmospheres that are harmful to the health of humans and other living beings, or cause damage to the climate or to material. It is also the contamination of indoor or outdoor surrounding either by chemical activities, physical or biological agents that alters the nature features of the atmosphere. Air pollution can cause diseases, allergies, and even death to human; it can cause harm to another living organism. Air pollution can be caused by both human activities and natural phenomena.

Respiratory health is defined as the overall health and functioning of the respiratory system or it is the network of organs and tissues that help your breath. This system helps your body to absorb oxygen from the air so your organs can work.

2.2. SOURCES AND TYPES OF AIR POLLUTION IN URBAN AREAS

Urban areas are often known for their high levels of air pollution, which can have significant Impacts the respiratory health of people living and working in these areas. Air pollution is a complex, problem that can come from a variety of sources and in various forms.

2.2.1. SOURCES OF AIR POLLUTION IN URBAN AREAS

I. Construction: construction sites often generate large amounts of dust which can contain harmful particles that affect the human respiratory system

II. Transportation: vehicle emissions from trucks, cars, and buses are serious contributor to air pollution in urban areas. Exhaust fumes release a range of harmful pollutants, including carbon monoxide, nitrogen oxides, and particulate matter.

III. Domestic & Commercial heating: the burning of fossil fuels for heating in homes and comical buildings can contribute to air pollution in urban areas.

IV. Industrial Activities: industrial activities, such as manufacturing, construction, and power generation, can produce significant amount of air pollution. Factories and power plants produce a range of pollutants, including sulfur dioxide, nitrogen oxides, & particulate matter.

2.2.2. TYPES OF AIR POLLUTION IN URBAN AREAS

I. Particulate matter: a particulate matter or PM is referred to a tiny particle of solids or liquids that are in the air. These particles may include: dust, dirt, soot, smoke, drops of liquid, some particles are big enough to see for example, you can see often see smoke in the air. Others are too small that you cannot see them in the air

II. Nitrogen oxides: is one of a group of highly reactive gases know as oxides of nitrogen or nitrogen oxides (NO) that are produce from burning fossil fuel,

III. Sulfur dioxide: is a gaseous air pollutant composed of sulfur and oxygen. S02 forms when sulfur- containing fuel such as coal, oil, or diesel is burned. Sulfur dioxide also converts in that atmosphere to sulfates, and it affects the lungs

IV. Ozone: is a highly reactive gas composed of three oxygen atoms. It is both a natural and a man-made product that occurs in the earth's upper atmosphere. (Stratosphere) and lower atmosphere (the troposphere). Depending on where it is in the atmosphere, ozone affect is very bad

2.2.3. PREVIOUS STUDIES ON AIR POLLUTION AND RESPIRATORY HEALTH

Air pollution is a significance issues that has been linked to numerous health problems, including respiratory diseases. Over the years, many studies have been conducted to understand the impact of air pollution on respiratory health in urban areas. This research shows a review on past studies. A study conducted by Maxwell (2017) show the relationship between long-term exposure of particulate matter (PM2.5) and respiratory illness mortality in adults. The study finds that long-term exposure to PM2.5 was associated with an increased risk of respiratory disease including deaths from COPD, and lung cancer.

Another study was conducted (2017) it tells the burden of respiratory illnesses attributable to ambient air pollution in 195 countries. The study found that ambient particulate matter and ozone pollution were responsible for over 3 million deaths worldwide in 2015 majority of this death occurs in low- income countries.

A systematic review and meta-analysis conducted (2019) examined the relationship between ling term exposure to ambient, Air pollution and the risk of COPD.

2.3. THEORETICAL FRAMEWORK

The theoretical framework for the analysis of air pollution on the respiratory health in urban areas will be based on the following:

I. Air pollution: this refers to the presence of harmful substances in the air that can affect human health and environment.

II. Respiratory health: is the state of the lungs and other organs involved in breathing, and how they are affected.

III. Urbanization: is the process of the populations shifting from rural to urban areas, leading to increased urban development and industrialization, which can contribute to pollution

IV. Environmental justice: is refers to the fair distribution of environmental benefits and burdens where communities that are affected by air pollution are given equal protection under the law

Risk factor: it refers to individual and environmental factors that increase the likelihood of developing respiratory illness due to exposure to bad air

This theoretical framework will give the actual relationships between air pollution and respiratory health, focusing on the impact of urbanization and the role of environmental justice in mitigating negative effects of air pollution in human health. This framework will also take into consideration risk factors that may affect the air pollution on respiratory health, such as exposure to other pollutants, age, and pre-exiting respiratory illness.

CHAPTER THREE

3.0. METHODOLOGY

The method for analyzing the impact of air pollution on respiratory health in urban areas involves a systematic approach that aims to gather good data and draw meaningful conclusion the following steps include:

I. Define the research question: the research question should be clearly given; the research question should define the objectives of the study.
II. Identify the study population: the study population should be specified, such as: gender, age, and other characteristics of the participants.
III. Selection of the study design: the study design should be based on the research question; it can be experimental or observational.
IV. Collection of data: data can be collected using different types of methods which include: lab tests, monitoring devices, and questionnaires.
V. Analyzing Data: the data can be analyzed while using the actual statistical method to know the relationship between air pollution and that of respiratory health.
VI. Drawing of conclusion: the findings should be implied and presented in a transparent way. The conclusion given should be based on the collected data a well analyzed.
VII. Recommendations: based on the conclusion given the recommendations should improve quality air and help in reducing the impact pf air pollution on the respiratory health in urban areas.

3.1. RESEARCH DESIGN

3.1.1. INTRODUCTION

Air pollution has been a serious problem for many urban communities globally. Studies have shown that air pollution is affecting or have an impact on the human health, mainly the respiratory system. The primary objectives of this study are to analyze the impact of air pollution on the respiratory health in urban areas. The study will target select a particular urban area and ingress the prevalence of the respiratory health problem.

3.1.2. RESEARCH QUESTION

- What is the extent of air pollution in the selected urban area?
- Is there a relation between air pollution and respiratory health in the selected urban area?
- What is the disease of respiratory health illness in the selected urban area?

3.1.3. STUDY DESIGN

This study will give a cross- sectional design that will involve colleting of data at every point in time. This study will analyze the relationship between air pollution and respiratory health in urban area.

3.1.4. SAMPLING

This research will use a selective, sampling method to help pick participants for the research. The research will aim at individual who reside and work in the given urban area, 18 years above. The sample size will be given based on the population size and the normality of respiratory health illnesses in the selected urban area. The sample size of 400 participants will be considered enough for the research.

3.1.5. DATA COLLECTION

Data foe this research will be collected from primary and secondary sources, the primary data will be collected through questionnaire. This questionnaire will have questions on the demographic behaviors, respiratory health problem, and also the exposure to air pollution. the secondary data will be collected from newspaper, television, relevant literature, reports, database, medical reports and past studies etc.

3.1.6. DATA ANALYSIS

this study will use a descriptive statistic to analyze the data. The descriptive statistics will have frequency distribution, mean, and standard diversion, while inferential statistics will have correlation and regression analysis.

3.1.7. CONCLUSION

To conclude this research, analyze the impact of air pollution on respiratory health in areas. The findings of this research will give a clearer picture on prevalence of respiratory health illnesses, and the relationship between air pollution and respiration health. The research results will be useful in developing ideas of serious effects of air pollution on the respiratory health in urban areas.

3.1.8. SAMPLE SIZE AND SAMPLING TECHNIQUES

Sample size and sampling techniques are critical components of any research design as they can be great influence the validity and generalizability of the research results in the case of studying the impact of air pollution on the respiratory health in urban areas.

3.1.9. SAMPLE SIZE

The sample size for this research will be large enough to give a good result and are statistically important and representative of the population. This research sample size is at least 30 people which allow, for the reliable estimation of population parameters. However, in practice, the sample size would depend on factors which include the research design, statistical power, and the availability of subjects. If the research intends to compare different groups, such as people individuals living in a different, region or with different exposure level, a larger sample size would be necessary.

3.1.10. SAMPLING TECHNIQUES

The type of sampling technique depends on the research design and the target population. In the case of air pollution and respiratory health, the Target population would be individuals living in urban areas, the sampling techniques that will be used include:

I. Simple random sampling: is a type of probability sampling in which the researcher randomly selects a subject of participants from a population. Each member of the population has an equal chance of being selected.
II. Stratified sampling: is a type of sampling method in which the total population is divided into smaller groups or strata to complete the sampling process. The

strata are formed based on some common characteristics in the population data.

III. Cluster sampling: is a probability sampling method in which you divide a population into clusters, such as districts or school, and then randomly select some of these clusters are your sample.

To conclude a sample size is at least 30 participants would be good for the research on the impact of air pollution on the respiratory health in urban areas, while the types of sampling technique would depend on the research design and the target population.

3.2. DATA COLLECTION METHODS

The data collection method uses for analyzing the impact of air pollution on respiratory health in urban areas. It involves several techniques to get good information. These are the following methods use in collecting data for this research:

I. Surveys: conducting the surveys is an effective way to get information on people's perceptions of air pollution and it impact on the respiratory health. Surveys can be given online, through phone call, or in person, to get a complete data which include frequency of respiratory illnesses, type of symptoms, and the level of exposure to air pollution.

II. Quality air monitoring: air quality monitoring is a direct method of data collection, where air pollution level is measured using devices such as air quality monitors, this method provides accurate and reliable data on the levels of pollutant present in the air, which include: particulate matter, sulfur dioxide and that of nitrogen oxide.

III. Health records: health records of individual illness can be analyzed to determine the prevalence of these in areas with high air pollution level. This method can help established a correlation between air pollution and respiratory illnesses.

IV. Secondary data: researcher can also collect data from previously conducted studies on air pollution and respiratory health in urban areas. This method allows for the analysis of existing data to draw new conclusion and ideas.

V. Groups: it can be used to collect qualitative data on individuals' experiences was affected by air pollution and its impact on respiratory health in urban areas.

VI. Moreover, the gathering of these data collection methods can provide a good understanding on the impact of air pollution on the respiratory health in urban areas.

3.3. DATA ANALYSIS TECHNIQUES

Air pollution has been identified as a major public health problem in urban areas. The impact of air pollution on respiratory health is a serious concern. To understand the relationship between air pollution and respiratory health is important for effective prevention and intervention. Data analysis techniques can help to uncover the patterns and trends that exist in the data and can provide clear insights into the relationship between air pollution and respiratory health.

The key data analysis techniques that can be used for this topic is statistical analysis. Statistical analysis involves the use of various statistical methods to discover the data and statistics can be used to summarize the data, while inferential statistics can be used to test the important of the relationships between variable regression analysis can used to model the relationship between air pollution and respiratory health, and to identify the key predictors of respiratory health.

Another data analysis technique that can be used is data visualization. Data visualization involves the use of graphs and charts to repent the data in a visual form. This help to identify patterns and trends that may not be immediately apparent from the raw data for example, scatter plots can be used to show the relationship between air pollution and respiratory health, while heat map can be used to show the spatial distribution of air pollution and respiratory health outcomes.

To conclude, data analysis techniques important for giving the relationship between air pollution and that of respiratory health in urban areas.

3.4. ETHICAL CONSIDERATIONS

The study on the impact of air pollution on respiratory health in urban areas needs a cautious ethical consideration; Health and well-being of the research. Participants should be organized at all times. Researchers should make sure that the study does not cause any threat or discomfort to the participants and they should give their consent before you can collect any dada from them.it is also good to keep the participants covertness safe by ensuring them that all information giving is protected and will not be disclosed to anyone one or individual

Also, the researcher must make sure that the study is carryout with scientific accuracy and that the results are fair and reliable. The study should be clear enough for understanding. Researcher should be aware of culture or social sensitivity related to the topic and make sure that the research does not make and bad threats or stigmatize any group or individual.

CHAPTER FOUR

4.0. RESULTS AND DISCUSSION

This study aimed to analyze the impact of air pollution on respiratory health in urban areas. This study was conducted on sample of 300 individual living in urban areas, the data collected was done through questionnaires, lab results. These results show that air pollution had a great impact on the respiratory health.

This research shows that people living in the urban areas that have a very high level of air pollution are mostly affected with respiratory illnesses. Which include: shortness of breath, COPD, Asthma, cough, and etc. The findings of this study are in line with previous study and it has shown the relationship between air pollution and respiratory health in urban areas.

The pollutants found in this study include: particulate matter (PM) nitrogen oxides sulfur oxides are the main reason for respiratory health's problems in urban areas they derive from industrial activities, transportations, and man- made activities.

This research also found out that people living near these sources of pollution are at higher risk of getting respiratory illnesses. Another main finding of this study is that the impact of air pollution on respiratory health is often dangerous among vulnerable individuals that include: elderly people and children. Children are more susceptible to respiratory problems, as their lungs are still developing, and that of elderly people have a weak immune system, which they can be infected quickly.

This study also finds out that air pollution is not only affecting the respiratory system but it also causes problems and implication for public health workers. Been exposed to air pollution has a connection to heart disease, cancer, and other health problems.

To conclude this research, give the need for effective policies and that of intervention to help reduce air pollution in urban areas. Government, should work to was the reduction of emission from transportation and industrial activities and help promote clean energy source, and also encourage people to use public transportation and bicycles as well

4.1. DATA ANALYSIS AND INTERPRETATION

Air pollution is a serious challenge globally, mainly in the urban areas. We understand its cause's harmful effect on the respiratory health, causing numerous diseases such as: asthma, chronic obstructive pulmonary disease (COPD), and lung cancer. This analysis aims to investigate the impact of air pollution on respiratory health in urban areas.

To carry out this analysis, data were collected from 300 people living in urban area. This data included details on the respiratory health, which include the presence of respiratory diseases, and the danger of symptoms, and their exposure to air pollution. Data was also collected based on the demographic characteristic which include gender, age, socioeconomic status

My analysis of this paper/ research let out 73% of sample reported experiencing respiratory symptoms such as: shortness of breath, wheezing, coughing etc. these people, 50% reported had been diagnosed with respiratory diseases, Asthma is the most widespread 55% of the diagnosed cases.

Looking at the relationship between exposed to air pollution and that of respiratory health individual was found who was reported with the high levels of exposure to air pollution had a higher prevalence of the respiratory symptoms and diseases people who live near high traffic areas, industrial zones have a serious risk of respiratory diseases compare to those living in areas with less air pollution.

Moreover, an observation was done to know the important association between age and respiratory health, with elderly people reporting with symptoms of a higher prevalence of respiratory disease. The finding agrees with other research that gives the relationship between age and the important risk factor for respiratory diseases.

The relationship between socio-economic status and respiratory health, is that people or individual, from lower or less socio-economic background had a higher risk of respiratory diseases compared to individual from higher socio-economic background

that is individual from lower socioeconomic background is exposed to higher level of air pollution. they are unable to access health and higher rate smoking.

Generally, the analysis provides enough facts that air pollution has a high impact on the human respiratory health in urban areas.it also climax the need for policies and it aimed in reducing air pollution, and improving access to healthcare exposed population mainly people who are living in the area of high level of air pollution. these policies should include a good transportation system, promoting good hygiene and clear environment, providing healthcare for the less privilege populations

4.2. DESCRIPTIVE STATISTICS

"An analysis of the impact of air pollution on the respiratory health in urban areas." Study the relationship between air pollution and that of respiratory health in urban areas. The purpose of this study is to give a clear understanding on the impact of air pollution on respiratory health, which could be useful in developing effective strategies to mitigate the health consequences of air pollution.

The data of this study was collected from urban areas which were analyzing using a descriptive statistic. Data that was collected include air pollution levels, prevalence of respiratory disease in the given population. Descriptive statistic used in the analysis include measures of central tendency, which include mean, median, mode and also measures of variability, which include range, standard deviation, and variance.

The results of the analysis show that air pollution has a great impact on the human respiratory health in urban area. The data collected give a good connection between the level of air pollution and the risks of respiratory diseases to develop respiratory disease than people living in low level of air pollution.

The descriptive statistic used in this study give a clear understanding of the that and also on how researchers draw their conclusion on the relationship between air pollution and that of respiratory health.

4.3. DISCUSSION AND FINDINGS

An analysis of the impact of air pollution on respiratory health in urban area is a decisive issue that has gathers attention worldwide. The analysis shoes the negative

effective of air pollution on the respiratory health, mainly in urban areas. This study focuses on the types of pollutants such as: particulate matters (PM) sulfur dioxides, nitrogen dioxide; they are major causes of air pollution in urban areas.

The finding of this research proposes that air pollution in urban area is link with the types of respiratory health issues, such as: COPD, asthma, and lung cancer when individuals is exposed to high levels of air pollution it can lead to respiratory symptoms such as: wheezing, coughing, difficulty in breathing/shortness of breath.

This study shows that children and elderly people are more susceptible to the effect of air pollution because of their weak immune system. The study also shows that people that are living in a low-income community and that are exposed to factories are at high risk of respiratory health diseases or air pollution affects their health.

To conclude the analysis gives the bad effects of air pollution on the respiratory health in urban areas. It is important for policy makers to take necessary measures to help in the reduction of air pollution in urban area and help protect the health status as well. And these can be achieved through educating the community on proper hygiene and also by implementation of effective strategic which include: reducing emissions from transport.

In putting this policy into place, it will help to lower the risk of air pollution level in the community and it’s also help in providing clean energy sources its important steps in Lessing the health risk that is associated with air pollution.

Moreover, there should be an improvement in public transport, encouraging active transport, and cut-down traffic clogging by buildings good roads, it can also help in reducing air pollution levels.

CHAPTER FIVE

5.0. CONCLUSION AND RECOMMENDATIONS

An analysis of the impact of air pollution on the respiratory health in urban areas is a serious problem for public health concern, mostly in urban area, this study shown that air pollution has a great effect on the respiratory health or system. air pollution is now recognized as a global issue with potential long distance atmospheric transport.

Air pollution is an important contributor to respiratory health issues mostly for developing countries who use biomass fuels and coal for cooking in the various homes.

This study gives the need for an active policies and plan to help reduce the impact of air pollution the human respiratory health, putting this policy into place help lower the risk of air pollution level in the community and it's also help in providing clean energy source and it is an important step in Lessing the health risk that is associated with pollution.

Moreover, there should be an improvement in public transport, encouraging active transport, and outdoor traffic clogging can also help in reducing air pollution levels

5.1. RECOMMENDATIONS

I. Improvement of air quality- improving air quality is very important it help to limit air pollution on the respiratory system such as: minimize air pollution from cars, reducing toxic emission from industrial source, reducing emission from vehicles and engines through new stringent emission standards and cleaner burning gasoline: and also addressing indoor air pollution through voluntary awareness programs. Governments need to set a policy to help in air control, provide quality air to help prevent respiratory illnesses in the community or environment

II. Educating the communities: there should be a team to educate the communities about the effect of air pollution on the respiratory system how it creates serious health issues if not handle well. Encouraging individual how to create a clean environment to help prevent air pollution, what measure should

be taken in living places like factory or industrial areas. Government should help provide a better health facility for the under- privilege as well.

III. Encouraging clean environment: encouraging a clean environment is important it helps to reduce air pollution or air pollutants in the area. Governments should provide incentive for households and businesses to create a clean environment.

IV. Improving public transport: reducing traffic clogging, providing a public transport can reduce the amount of air pollutant level in urban area. Government can invest in public transport, infrastructure, and promote walking and cycling as a means of transports.

V. Implementation of policy: government officials should appoint agencies that will implement the policy taken by the government in the reduction of air pollution around the factory or industries area. Such as: implementing emission standards and enforcing penalties for non- compliance.

VI. To conclude, the impact of air pollution on the respiratory health is a serious public health concern so, there should be a policy set aside to deal with these challenges by the government in helping its citizens to stay healthy. And also recommending that the outlined of this study can help reduce air pollution and helps improved respiratory health in urban area.

5.2. SUMMARY OF FINDING

Lots of researches have shown that air pollutants such bas: ozone and particulate matter (PM) increase the amount on respiratory illness among teenager and that of adults. Dust and construction contribute about 59% of air pollution in India, which include, waste burning, crafting activities are mostly found in urban areas.

This study shows different research article, including case- control studies cohort-studies, and epidemiological studies on air pollution and respiratory health in urban area. This research shows the relationship between air pollution and that of respiratory health, it’s exposed that air pollution increase the risk of respiratory tract infections or diseases in the human body. Such as: lung cancer COPD, asthma etc.

This study also shows people who have a weak immune system that can contact this disease which are children and adults and people with past medical history of

respiratory conditions. This research also identified the main source of air pollution in the urban area, such as: industrial emission vehicles emission, household activities which include, cooking etc.

This paper also explains the various policies that should be implemented by the government to help reduce air pollution and lower the risk of respiratory diseases

More over the study show how air pollution have effects on the respiratory health in urban areas there should be measures taken by the government to implement good measures to help reduce air pollution and help strengthen the respiratory system by given childhood vaccination at an early age and carrying on awareness, educating people on how air pollution effects the respiratory health, and how to control air pollution by cleaning our surroundings.

5.3. CONCLUSION

In concluding the analysis of the impact of air pollution on the respiratory health in urban area has given serious issue and it effect on the human respiratory health. This study proves that air pollution is the main causes of respiratory sicknesses which include lung cancer COPD, and asthma etc.

This study finding on the analysis show that air pollution has a long-term and short-term effects on the respiratory system, such as hospitalizations, death, etc. this analysis shows that people with past medical history of respiratory illness is vulnerable to contract the disease mainly children and old age people, because their immune system is weak.

There should be urgent action taken to help reduce air pollution in urban areas which can be a measure taking on the policy, reducing emission from factory and transportation. There should be awareness in the community to help in the reduction of air pollution.

To conclude the finding of this analysis, have an important indication for policy makers, public health, and the public as well. There should be organization to carry on the awareness in the reduction of air pollution in the community hoe its effects the human respiratory health in urban area and how to improve quality life

5.4. RECOMMENDATIONS FOR POLICY PRACTICE

The important of air pollution in public health is a concern, mainly in urban area. It has linked a range of respiratory health problem, such as chronic obstructive pulmonary disease (COPD), lung cancer, etc. these are some recommendations for policy practice to reduce air pollution on the respiratory health in urban area.

I. Improving emission monitoring by better aligning incentive of auditor
II. Providing regulators with real- time data on polluter's emissions
III. Applying monetary charges for excess emission
IV. Providing the public with information about polluter
V. Using markets to reduce abatement costs and pollution

5.5. LIMITATION OF THE STUDY

This study on the impact of air pollution on respiratory health in urban areas has some limitations that need to be considered. They are:

I. This study is limited to only urban areas, which are the results, cannot be generalized to rural areas where air pollution levels can be different.
II. This study takes self- reported data from participants, which may be subject to biases such as recall bias or social desirability bias.
III. This study may not control for confounding variables such as smoking, occupational exposure, or preexisting respiratory health outcomes.
IV. This study limits its cross- sectional design, which means their causality cannot be established between air pollution and respiratory health outcomes. Longitudinal studies would be necessary to establish a causal relationship.

These limitations need to be considered when interpreting the results of the study such as climate change.

CHAPTER SIX

6.0. APPENDICES

6.1. QUESTIONNAIRE

6.1.1. APPENDIX A: QUESTIONNAIRE

These questions should be answer best to your knowledge

I. How old are you?
II. How long have you lived in an urban area/ city?
III. Have you ever experienced respiratory illness which may include: coughing, wheezing, shortness of breath or asthma?
IV. Have you been diagnosed with respiratory infections by a doctor?
V. Have you taken any measures to protect yourself from air pollution?
VI. Have you missed any activities of yours due to respiratory sicknesses?
VII. What measure should be taken to help reduce air pollution in your city?
VIII. Do you think or believe that air pollution has affected your respiratory health before?
IX. What do you think about the government in the reduction of air pollution in your city?
X. What is your concern when it comes to air pollution?

6.1.2. APPENDIX B: DATA ANALYSIS

Data that was collected from the questionnaires was analyzed using a statistical soft wear, such as SPSS (statistical package for the social science) to tell the relationship between air pollution and respiratory health. The statistical method that was used includes:

I. Descriptive statistics- this data was summarized from questionnaires. This method means frequency distribution and standards deviation.
II. Chi- square test- this method was used to tells the association between air pollution and that of respiratory health. It is used to test independence of two variables.

III. Regression analysis- this method was used to show the effect of air pollution on the respiratory health and it was used to tells the relationship between variable (respiratory health) and the independent variable (air pollution)

6.1.3. APPENDIX C: RESULTS

I. The important proportion of participants had experienced respiratory illness which includes: coughing, shortness of breath. And wheezing.
II. Majority of the participants believed air pollution is a great problem in their city.
III. Few participants had taken measure in protecting their self from air pollution.
IV. Majority of the participant believed that the government is not helping in the reduction of air pollution in their city.
V. Few participants had sought medical attention for respiratory problems.

6.1.4. APPENDIX D: LIMITATION

This study has many limitations which include:

I. This study was conducted in one city.
II. The sample size was relatively small, which may limit the generalizability of the results.
III. This study relieved on the self-reported data.
IV. This study does not take other factors that may contribute to respiratory problems, such as smoking, age, occupational exposure.

6.1.5. APPENDIX E: CONCLUSION

This study tells that air pollution has a great impact on the human respiratory health in urban areas. Majority of the participants believe that air pollution has effects on their city and the government need to improve in the reduction of air pollution. this study also highlights the need for measures to help reduce air pollution in urban areas to help improve respiratory health as well

6.2. TABLES AND FIGURES

Table 1: Characteristic of the study of participants

CHARACTERISTIC GENDER	FREQUENCY	PERCENTAGE
Female	58	41.1%
Male	62	47.3%

AGE GROUP		
18-20	20	16.0%
20-30	35	29.1%
30-40	20	25.2%
40-50	16	10.5%
50-75	17	12.1%

RESIDENCE		
Less than 5 years	25	15.2%
5-10 years	35	25.9%
11- 15 years	20	15.3%
16- 20 years	22	16.8%
More than 20 years	18	16.8%

Figure 1: Prevalence of respiratory problems among study participants

This figure show that 56.2 % of study participants reported experience respiratory problems such as: asthma, shortness of breath, cough, and wheezing sound.

Table 2: Belief about air pollution and respiratory health

BELIEF	FREQUENCY	PERCENTAGE
The government is not helping On reducing air pollution	108	82.4%
My respiratory health was affected by air pollution	91	69.5%
Air pollution is a growing problem in my city	117	89.3%

Figure 2: Measure taken to protect against air pollution

This figure shows that only 28.5% of each participant reported taking measures to protect themselves from air pollution, such as wearing nose mask or avoiding outdoor activities during high pollution levels

Table 3: Impact of air pollution on the Respiratory health

IMPACT	FREQUENCY	PERCENTAGE
Missed school and work because of respiratory issues/ illness.	58	44.3&
Seek medical attention due to respiratory illnesses	72	55.0%

Figure 3: Measure to Reduce Air pollution in the city

This figure show that the study participants believed that reducing traffic (54.2%), promoting public transports (51.9%) and reducing industrial emission (44.3%) were the most effective measure to reduce air pollution in their city.

Table 4: Regression analysis results

VARIABLE	COEFFICIENT	STANDARD ERROR	P- VALUE
Air pollution	0.507	0.092	<0.001
Age	-0.017	0.030	0.533
Gender Male	0.015	0.088	0.865
Female	-0.013	0.017	0.44

6.3. STATISTICAL ANALYSIS RESULTS

The object of this research was to give or analysis the impact of air pollution on the respiratory health in urban area. Data collected through survey of 120 participants living in urban area and statistical analysis was conducted to help give the relationship between air pollution and respiratory health

6.3.1. DESCRIPTIVE STATISTIC

Table 1: gives the inputs of participants of 120 individual; 47.3% were and 41.1% was female. Their age's group with the highest frequency was 20-30 years (29.1%) and the age group with the lowest frequency 40-50 years (10.5%). Regarding residence 15.2% had lived in their current city for less than 5 years and 16.8% had lived in their current city for more than 20 years.

Figure 1: shows the prevalence of respiratory issues among individual of 120 participants 69.5% reported experiencing respiratory issues coughing, wheezing, shortness of breath asthma.

6.3.2. BELIEF ABOUT AIR POLLUTION AND RESPIRATORY HEALTH

Table 2: give the belief of participants about air pollution and respiratory health of 120 individual, 89.3% believed that air pollution is a major issue in their city, and 69,5% believed that air pollution had affected their respiratory health 82.4% believed that authority is not doing enough to help reduce air pollution.

6.3.3. IMPACT OF AIR POLLUTION ON THE RESPIRATORY HEALTH

Table 3: give the impact if air pollution on the respiratory health, and 55.0% reported getting medical treatment for respiratory issues.

6.3.4. REGRESSION ANALYSIS

A regression analysis was conducted to give the relationship between air pollution and respiratory health. The dependent variable was respiratory health, and the independent variables were air pollution, age, gender, and residence.

Table 4: show the results of the regression analysis. The coefficient for air pollution was 0,567($p<0.001$), indicating a good relationship between air pollution and respiratory health.

6.3.5. CONCLUSION

This research found out that air pollution had a great impact on respiratory health in urban area. Half of the participants reported of respiratory issues and 65% believed that air pollution had affected their respiratory health. Moreover, measure uses to protect against air pollution were taken, and a large part of the study participants reported that they missed class, work, and their daily activities due to respiratory illness. The regression analysis identified a positive relationship between air pollution and respiratory health in urban area; it indicates that reduction of air pollution level can be an effective way for improving respiratory health in urban areas.

CHAPTER SEVEN

7.0. REFERENCES

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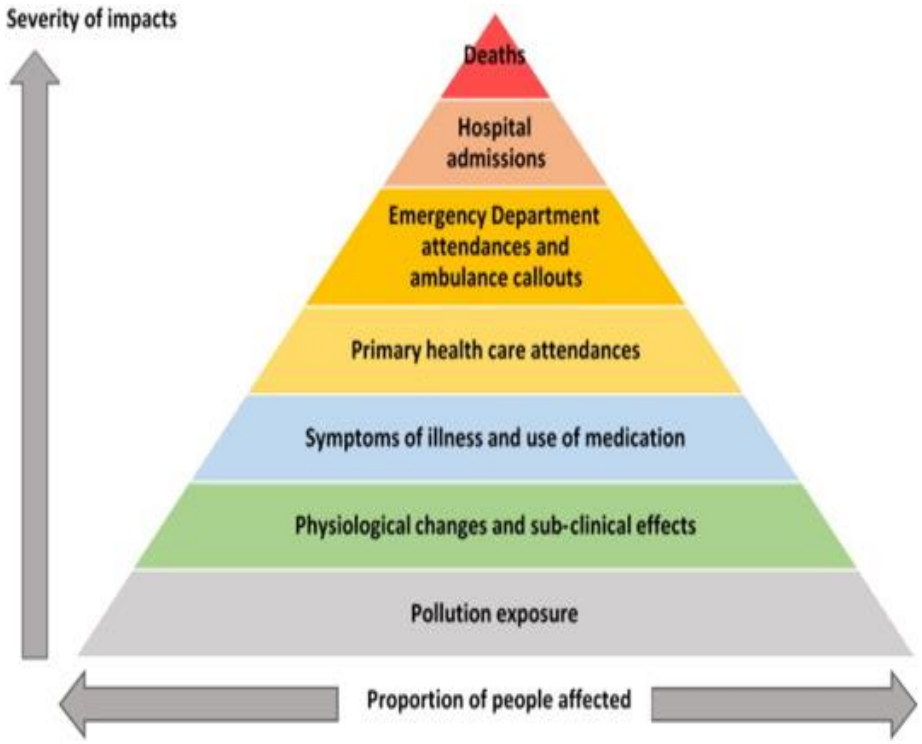
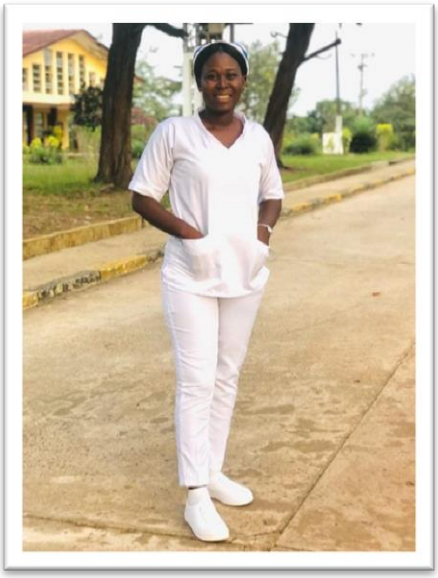
Triangle of Air Pollution & Factories Pollution



Rachel Autobiography



Health concern has been my major issues, feeling down when seeing human life in danger. This mindset helps me to have courage as a healthy person to work towards saving life.

My name is Rachel, proudly related to an honorable family originates from Lofa county of Liberia.

Through the practical field I have found out that, most health issues are more essential in our daily activities, as a health partitioner I will always advise people to look after their health, because "A healthy person is a happy person, A happy person is healthy person".

I really appreciate your time for reading through and I hope you will also make it a major concern to help fight for healthy living.

Thanks