



The Economic Impact of Air Pollution on Human Health in Niger Delta Region of Nigeria

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Abstract

The health and financial effects of air pollution in the Niger Delta Region of Nigeria are examined in this research, with an emphasis on calculating the economic losses of sicknesses and early deaths due to air pollution. The study combines quantitative and qualitative data collection and analysis methods including air quality monitoring, questionnaire surveys, and key informant interviews using a mixed-methods strategy. With a commensurate decrease in life expectancy of 2.5 years, the research discovers that air pollution in the Niger Delta Region causes an estimate of 12,000 early deaths annually. Each year, illnesses linked to air pollution in the area are thought to cost around \$3.8 billion USD offensively. 4 trillion naira The findings of the study underline the need of immediate action to lower air pollution in the area, which includes policy changes to manage emissions from industry sources, cars, and other sources as well as more spending in healthcare infrastructure and services to overcome the health effects of air pollution. The policy suggestions of the study offer a template for solving the health and financial effects of air pollution in the Niger Delta Region, therefore adding to the expanding body of knowledge on the health and financial effects of air pollution in Nigeria.

Keywords: Air pollution, Human health, Niger Delta Region, Nigeria

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Introduction

Particularly in developing nations such Nigeria (World Health Organization, 2020), air pollution is a significant global public and environmental health issue. Amnesty International (2019) notes that the activities of the oil and gas sector, which has resulted in the release of great amounts of pollutants into the air, have made the Niger Delta Region of Nigeria among the most

contaminated places in the planet. Linked to different diseases including respiratory, cardiovascular, and cancer (Pope & Dockery, 2006; Jerrett et al., 2013), these pollutants are particulate matter (PM), nitrogen dioxide (NO₂), sulphur dioxide (SO₂), and volatile organic compounds (VOCs). Significant economic costs from air pollution on human health can be divided into three main sectors: death, morbidity, and productivity (OECD, 2016). Mortality costs reflect the value of lives lost as a result of air pollution; morbidity costs reflect the medical expenses and healthcare services for conditions caused by air pollution. On the other hand, productivity costs pertain to the loss of efficiency and economic output caused by diseases and fatalities associated with air pollution.

The economic losses of air pollution in Nigeria are projected to be roughly 1.5 percent of the GDP of the nation (Croitoru et al., 2020). Still, this calculation could be undervalued since it ignores the long-term consequences of air pollution on human health and economic conditions. Research by (Boonyanam, 2016); (Pinchbeck et al., 2020). In Nigeria, 2017 estimated the financial price of air pollution could reach 3.5% of GDP. Because of its high population density and limited access to healthcare services (National Population Commission, 2016), the Niger Delta Region is especially susceptible to the financial impacts of air pollution. An investigation by (Echendu et al., 2022); (Lala et al., 2024) discovered that the economic price of air pollution in the Niger Delta Region might reach 5.6 percent of the GDP of the country. Although the issue is important, little study has been done on the financial costs of air pollution on human health in the Niger Delta Region (Kponee et al., 2018); (Ofori et al., 2021); . Although little emphasis has been given to the economic effects, most research on air pollution in Nigeria have concentrated on the environmental and health effects (Babayemi et al., 2016); (Suku et al., 2023); (Guleria et al., 2019).

This study therefore seeks to bridge this knowledge gap by approximating the monetary cost of air pollution on human health in the Niger Delta Region. Particularly in developing countries, this research will add to the current body of knowledge on the financial effects of air pollution on human health. The results of this research will also offer legislators and interested parties with insightful data on which to base sound policies and initiatives meant to lower air pollution and enhance general health in the Niger Delta Region.

Methodology

This research used a mixed methods strategy including both qualitative and quantitative data collection and analysis techniques. The Niger Delta Region of Nigeria (only the south-south region) was the study area, and the study sample included all of the 6 states' population as projected by Nigeria population commission (NPC) as at 2006 census at 21,004,000. 1,000 randomly chosen sample size were given a questionnaire survey to compile information on their socio-demographic qualities, health condition, and financial activity. Furthermore, ten sites in the area were monitored for air quality to gather information on sulphur dioxide (SO₂), nitrogen dioxide (NO₂), particulate matter (PM_{2.5} and PM₁₀), and ozone (O₃) values. Portable air quality monitor results were analysed using spatial analysis methods and descriptive statistics. Data on air quality were gathered using this device. Using the Air Quality Life Index (AQLI) model which projects the amount of early death and life expectancy reduction caused by air pollution, the health effects of air pollution were estimated. Using the cost-of-illness (COI) method which estimates the direct and indirect impacts of diseases related to air pollution, the financial costs of air pollution were calculated. The costs of ailments brought on by air pollution, including respiratory and cardiovascular diseases were estimated utilizing the COI methodology. To provide qualitative data on the perceived health and economic effects of air pollution in the area, the research also carried out main informant interviews with twenty stakeholders, including government officers, healthcare experts, and community leaders. Thematic analysis approaches helped us go over the

qualitative data. A stakeholder workshop validated the findings of the study by presenting and stayed with interested parties to validate that the results indeed represented the study area.

Results and Discussion

This study's results show that the people of the Niger Delta Region of Nigeria suffer significant health and financial consequences from air pollution. Exceeding the guidelines of the World Health Organization (WHO) data from air quality monitoring shows that the levels of particulate matter (PM_{2.5} and PM₁₀), nitrogen dioxide (NO₂), sulphur dioxide (SO₂), and ozone (O₃) present are indicative of bad air quality in the area. Using the Air Quality Life Index (AQLI) model, the health impact assessment shows that annual air pollution is accountable for an estimated 12,000 early deaths in the Niger Delta Region, which is consistent with earlier research findings (Ganguly et al., 2024); . According to the AQLI model, air pollution cuts life expectancy in the region by 2.5 years, which matches with the results of other studies (Siriopoulos et al., 2021); (Wei, 2024).

An economic cost study using the cost-of-illness (COI) approach shows yearly estimated economic costs of air pollution-related diseases in the Niger Delta Region at about ₦1.4 trillion (about \$3.8 billion USD), in line with earlier research findings (Jumbo et al., 2023); (Richard et al., 2023). Furthermore, the COI approach says that the direct costs of air pollution-related diseases, including healthcare expenses and lost output, are projected to be roughly ₦934 billion (about \$2.5 billion USD) per year, while the indirect costs, including lost economic output and welfare losses, are estimated to be around ₦466 billion (approximately \$1.3 billion USD) per year. The results of this research match the empirical data reviewed, which stresses the major health and economic effects of air pollution (Juginović et al., 2021); (Kapoor et al., 2024); (Gaybullaev, 2024). These results also support the theoretical framework of the Environmental Kuznets Curve (EKC), which holds that until a certain limit is passed, pollutants including air pollution rises with economic development, after which environmental degradation diminishes (Singh & Yadav, 2021); (E. Ite et al., 2018).

Conclusion

The Niger Delta Region of Nigeria is the focus of this paper, which has given a thorough examination of the financial effects of air pollution. The research's results show that the people of the area suffer major economic and health consequences from air pollution. With a related decrease in life expectancy of 2.5 years, the research calculates that air pollution claims roughly 12,000 yearly early deaths in the region. Each year, air pollution-related diseases in the area are figured to cost some \$3.8 billion USD. The results of the study are in line with the reviewed empirical literature, which emphasizes the large health and financial costs of air pollution. The results of the research are also in line with the theoretical basis of the Environmental Kuznets Curve (EKC), which proposes that until a certain threshold is surpassed, then environmental degradation decreases, including air pollution rises with economic development.

Conflicts of Interest

The authors declare no conflict of interest.

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