ASSESSING THE IMPACT OF AIR POLLUTION ON VOCAL HEALTH: AWARENESS AND PERSPECTIVES AMONG MUSIC STUDENTS AT THE FEDERAL POLYTECHNIC ILARO, OGUN STATE

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Abstract

This study explores the level of awareness of the impact of air pollution on vocal health among students of Music Technology department at the Federal Polytechnic Ilaro, Ogun state Nigeria. Adopting a descriptive survey design, data was collected through purposive sampling techniques, using online questionnaires administered to 200 students across ND1, ND2, HND1, and HND2 levels. Quantitative data were analysed using descriptive statistics (frequencies and percentages), while qualitative responses from open-ended questions were subjected to thematic analysis. Findings revealed that while students demonstrated a basic understanding of air pollution and its causes, there was limited knowledge of effective protective and preventive measures for maintaining vocal health. The study recommended the incorporation of initiatives such as workshops and seminars into music programs and curriculum to equip student-musicians with practical knowledge for preserving vocal health in polluted environments.

Keywords: *Air Pollution, Environmental Awareness, Music Students, Protective Measures, Vocal Health*

1.0 Introduction

Air pollution has long been recognised as an environmental health issue and a significant threat to human well-being and ecological stability. The World Health Organisation (WHO, 2022) and the United Nations Environment Program (UNEP, 2021) defined air pollution as the presence of harmful chemical, physical or biological substances that modify the natural characteristics of the atmosphere. These substances may be gases, particulates, or biological molecules, and they could pose serious health risks to humans, animals, plants, as well as buildings and other structures in the environment. A study by Seinfeld & Pandis (2016) buttresses this stating that "air pollution is the result of the emission of substances into the atmosphere that have a detrimental effect on human health and the environment". In recent times, especially following observed phenomenon of climate change, discussions on air pollution have gained even more attention. Studies have pointed out the impact of air pollution on health and social well-being and have linked it to increased mortality, particularly affecting the respiratory and cardiovascular systems (WHO, 2022). Respiratory conditions such as asthma, lung cancer, and acute lower respiratory infections have also been observed at low levels of pollutant exposure (Maio et al. 2023). Also, some studies have revealed that 80%

of musicians have in recent times been presented with such cases of respiratory tract issues due to exposure to nitrogen dioxide (NO_2) and sulfur dioxide (SO_2) (Seinfeld & Pandis, 2016).

Generally, every human survives on the functionality of their respiratory system. However, singers places more premium on sound respiratory health for effective performances. They rely heavily on precise breath control, lung capacity, and the delicate balance of the vocal folds to perform. Frequently, singing requires strong respiratory efforts (Lewis et al., 2023). This points to a higher volume of air intake, and they are especially vulnerable to air pollution because of the nature of their profession, which requires optimal respiratory and vocal health. However, from time to time, singers experience some common vocal issues linked to poor air quality (e.g. hoarseness, breathlessness and vocal fatigue). Various studies have revealed that air pollution can affect the respiratory system thereby impacting the voice directly or indirectly. A study by Koufman & Isaacson (1991) explored how environmental irritants in the air lead to vocal fold inflammation and chronic voice disorders and it revealed that a relationship exists between environmental exposure and laryngopharyngeal inflammation, which is commonly found in singers. In another study by Sataloff (2005), it was discovered that when toxic pollutants are inhaled, they can lead to injury of the larynx and pulmonary dysfunction. The environmental pollutants which include smoke, dust, and industrial fumes, can also adversely affect the vocal folds and increase risk of vocal disorders. (UNEP, 2023).

Furthermore, environmental factors such as heating, revealed that air quality and workplace environment play critical roles in the development of voice disorders, especially among singers. A study by Friberg & Hogstedt (1993) examined how long-term exposure to polluted air affects the upper respiratory tract and revealed there is biological evidence linking pollution with chronic upper respiratory inflammation, relevant for singers' vocal fold integrity. This was buttressed by a study by Verdolini & Ramig (2001), which revealed that poor ventilation and air-conditioning methods can cause vocal discomfort and function, leading to occupational risks. More recent investigations, however, have advanced this understanding by using modern environmental sensors and epidemiological data to track how pollutants such as nitrogen dioxide (NO_2), sulfur dioxide (SO_2), and fine particulate matter (PM2.5) exacerbate vocal strain and contribute to chronic inflammation (Lumbanraja et al., 2020; Zarei et al., 2021).

The above studies highlight vividly the harm that polluted air could have on the vocal apparatus and, by

extension, performances, but none have adequately examined how the intersection of environmental degradation and vocal performance manifests within tertiary institutions in Nigeria. They have neither examined the levels of awareness by singers of such risks. As early-career musicians work towards developing technique and understanding of vocal hygiene, limited awareness and inadequate preventive practices may predispose them to long-term vocal damage. Therefore, this study examines the prevalence and awareness of air pollution-related vocal issues among student singers in the Federal Polytechnic Ilaro. It seeks to address the following questions: (1) To what extent are singers aware of the impact of air pollution on vocal health? (2) What environmental conditions within their environment may contribute to vocal challenges? (3) What preventive measures are in place, and how can awareness be improved?

2.0 Methodology

This study was conducted within the Department of Music Technology at the Federal Polytechnic Ilaro, Ogun State, Nigeria. The research focused on assessing students' knowledge of air pollution sources, its effects on respiratory health, and the implications for vocal performance. Although the study was limited to a single institution, the findings may provide broader insights applicable to similar educational and musical contexts in Nigeria. A purposive sampling technique was employed to select participants from the department's student population, comprising 200 full-time and 65 part-time students. For this study, the research targeted the 250 students, who were administered electronic questionnaires.

The questionnaire was structured into four sections: demographic information, awareness of air pollution, the relationship between air pollution and vocal health, and existing preventive practices. It was validated through expert review by two lecturers specializing in music education and musicology. These responses formed the basis for both the quantitative and qualitative analyses presented in this study. The analysis of data collected was approached using quantitative and qualitative methods to provide a comprehensive understanding of the research question. Responses from closed-ended questions were analysed using descriptive statistical analysis via Excel, while open-ended responses were analysed using a thematic analysis approach.

3.0 Results and Discussion

Demographics

The distribution of respondents across academic levels reveals a higher concentration of lower-level students, with ND1 accounting for 38.4% (n = 43) and ND2 for 46.4% (n = 52), while HND1 and HND2

comprised only 8.9% (n = 10) and 6.3% (n = 7), respectively (Table 1). This suggests that a large proportion of the music students surveyed are in the early stages of their musical education, many of whom are still in the process of building professional and sustainable vocal practices. These budding professionals are particularly vulnerable to environmental factors that may affect the voice, as they may not yet have developed strong vocal hygiene practices or awareness of occupational health risks (Sataloff, 2005; Verdolini & Ramig, 2001).

Table 1: Distribution of Respondents by Academic Level

S/N	Academic Level	Frequency (n)	Percentage (%)
1	ND I	43	38.4
2	ND II	52	46.4
3	HND I	10	8.9
4	HND II	07	6.3
Total		112	100

Source: Field Survey, 2025

Awareness Levels of Students

Findings reveal that while majority of music students expressed basic awareness of the sources of air pollution, they mostly identified outdoor performance venues and open-air rehearsals as risk factors, which aligns with recent studies that emphasizes how unregulated outdoor exposure increases contact with airborne pollutants, particularly in areas with high vehicular emissions and dust (Zarei et al., 2021; Lumbanraja et al., 2020). However, the depth in understanding their impact on vocal health is limited. Also, a vast majority of over 80% indicated the need for that more awareness programs within the institution and that they are willing to attend workshops focused on vocal health and pollution. This demonstrates readiness for institutional engagement. Students reported that they currently take some protective measures which are mostly self-driven. These measures include avoiding dusty environments, drinking warm water and wearing face masks.

While these practices are commendable, they may not offer sufficient protection against prolonged exposure to airborne pollutants. A few students went further to suggest environmental interventions, such as banning the burning of refuse around the school premises. The desire for institutional support and more structured guidance highlights the educational gap in current curricular and extracurricular programs in Nigerian tertiary music institutions. Below (figure 1) is a pie chart showing the level of awareness of music students of the effect of air pollution on vocal health. 'Yes' means they are aware while 'No' means not aware.

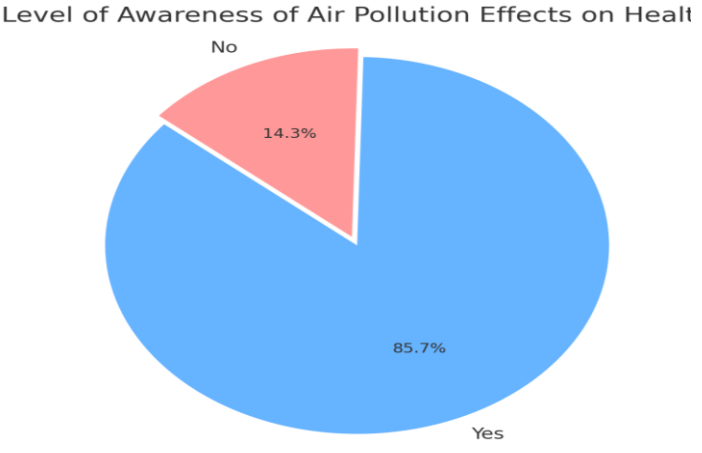

Figure 1: Awareness of Air Pollution's Effects on Vocal Health

Prevalent symptoms of Vocal issues Among Students

Vocal symptoms reported in this study suggest a pattern of mild to moderate vocal health challenges that may be aggravated by air quality conditions. Also, it shows that many students have not received formal education on how to protect their voices from air pollution. Students reported vocal issues such as frequent throat infections, dry throat, hoarseness, shortness of breath, difficulty in breathing, irritation in the throat and vocal fatigue. These vocal challenges are realized especially after being exposed to polluted environments for extended hours. This emphasizes a strong link between environmental conditions and vocal health as previous studies such as Wati et al., (2022) have revealed. These findings emphasizes that environmental conditions have a direct impact on vocal efficiency, especially among young singers who may lack vocal training on preventive care. It also highlights the pedagogical gap in music education programs in Nigeria. It is uncommon to find institutions in Nigeria that integrate vocal health modules into their curricula. Without structured guidance on how to manage environmentally induced vocal issues, students are left to rely on instincts which may delay early intervention or aggravate vocal challenges over time. Below (Figure 2) is a bar chart showing common vocal symptoms experienced by singers.

In addition, the data provides a foundation for advocacy and policy change within academic institutions. Simple interventions such as tree planting, enforcing clean-air zones, improving ventilation in practice rooms, and providing access to vocal health workshops could make significant differences in student well-being and vocal longevity.

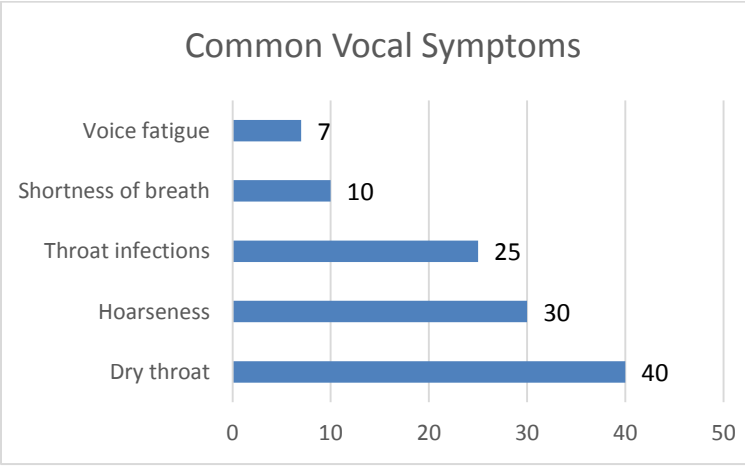

Figure 2 (Bar chart): Common Vocal Symptoms Experienced by Student Singers

4.0 Conclusion and Recommendations

As much as music students are aware of the harm that air pollution has on vocal health, they lack formal education and knowledge on protective practices. This study revealed a strong need for awareness programs and possibly a curriculum integration of vocal health education, particularly in environments where environmental degradation is a daily reality. It also presents the benefits of interdisciplinary collaboration between music departments and environmental science units in tertiary institutions in order to promote healthier learning environments and sustainable musical practices. Students need proactive health engagement and environmental action, not just awareness. There is a clear need to build better knowledge and institutional support (like seminars or an appropriately defined environmental policies) to protect vocal health.

As climate change continues to exert influence on health, there is a need for environmental health education to be included in music training programs. Also, music institutions can incorporate it into vocal pedagogy and performance coaching, as it is the responsibility of educators and institutions to address this issue in the form of workshops, seminars, and health initiatives. These would enhance awareness among musicians and provide them with the knowledge and tools that are necessary to protect them from environmental hazards, and by extension, musicians can join hands in making the environment safe for the community.

By bridging the gap between environmental health research and vocal performance studies, this inquiry contributes to a more inclusive and context-specific understanding of vocal care, environmental advocacy, and cultural sustainability in Africa, especially Nigeria where high vehicular emissions, and poor environmental regulation contribute to poor air quality (Ilechukwu et al., 2021).

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