Perspectives of Community Health Practitioners on Indoor Air Quality in Nigeria: Implications for Primary Healthcare and Environmental Health Promotion

RESEARCH ARTICLE

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ABSTRACT

Indoor air pollution (IAP) is a critical yet under-addressed health challenge in Nigeria, particularly affecting vulnerable populations due to the widespread use of biomass fuels and poor housing conditions. Community Health Practitioners (CHPs) are part of Nigeria's Primary Healthcare system and environmental health promotion; however, their awareness and engagement in indoor air quality (IAQ) interventions remain insufficiently documented. A descriptive cross-sectional study was conducted among 114 CHPs attending postgraduate and top-up programmes at Wesley University, Ondo, Nigeria. Participants were purposively selected to represent all six geopolitical zones of the country. A validated, self-administered questionnaire was used to assess knowledge, perceptions, and the influence of IAQ perspectives on health promotion practices. Data were analysed using descriptive statistics and independent t-tests, with statistical significance set at $p < 0.05$. The study revealed a significant level of awareness among CHPs about IAQ and its health implications. Practitioners with formal training in environmental health demonstrated greater knowledge ($p = 0.022$) and perceived IAQ as a significant public health concern ($p = 0.032$). Furthermore, CHP perspectives significantly influenced the integration of IAQ strategies into primary healthcare and community health education ($p = 0.023$). Community Health Practitioners in Nigeria possess substantial awareness of indoor air pollution and recognise its public health relevance. Their perspectives significantly impact IAQ strategy integration within primary healthcare systems. Strengthening their role through curriculum enhancement, targeted capacity building, and supportive policies is essential for sustainable IAQ management and improved population health outcomes.

Methodology

Descriptive cross-sectional study using a validated questionnaire among 114 CHPs from all six geopolitical zones.

Key Variables

Knowledge levels, perceptions, and influence on IAQ strategy integration in primary healthcare.

Main Finding

Significant awareness and perception of IAQ as a major public health concern with significant policy influence.

Keywords: Indoor air quality, community health practitioners, primary healthcare, environmental health promotion, Nigeria

INTRODUCTION

Indoor air quality (IAQ) is an essential determinant of health and well-being. According to the World Health Organization (2024), household air pollution was responsible for an estimated 3.2 million deaths per year in 2020, including over 237,000 deaths of children under the age of 5. The burden of disease attributable to poor IAQ in sub-Saharan Africa is further compounded by inadequate ventilation, overcrowding, and the use of substandard building materials, highlighting its critical public health impact (Sani & Garba, 2025).

Indoor air quality (IAQ) is a critical yet under-recognised public health challenge in Nigeria, where approximately 80% of the population relies on biomass fuels for cooking and heating (Slater et al., 2025). The widespread use of wood, charcoal, crop waste, and animal dung in poorly ventilated spaces generates harmful pollutants including particulate matter (PM2.5), carbon monoxide, and other toxic compounds that significantly impact respiratory health (Fakunle & Bello, 2025). Women and children bear the greatest burden of exposure, as they are typically responsible for cooking and spend more time in indoor environments where these pollutants accumulate.

01

Critical Health Challenge

Indoor air pollution is responsible for significant respiratory tract infections, exacerbations of inflammatory lung conditions, the development of chronic obstructive lung disease, cardiac events, stroke, eye disease, tuberculosis, and cancer, particularly affecting women and children who spend more time indoors.

02

Vulnerable Populations Impact

Poor IAQ disproportionately affects children under five, pregnant women, and the elderly who are physiologically more susceptible to pollutants and spend greater time indoors exposed to harmful emissions from biomass fuel combustion.

03

Policy Integration Need

Despite these dangers, IAQ remains a low-priority topic in Nigeria's public health discourse and policy implementation, with Community Health Practitioners' capacity to engage with IAQ challenges not well documented.

Indoor air pollution is a leading environmental determinant of health, linked to a range of adverse outcomes such as respiratory infections, asthma, chronic obstructive pulmonary disease (COPD), cardiovascular diseases, and even cognitive impairments. These impacts are more pronounced among vulnerable groups including children under five, pregnant women, and the elderly, who spend a greater proportion of their time indoors and are physiologically more susceptible to pollutants. Given that Nigeria has a high burden of household air pollution-related diseases, integrating IAQ considerations into primary healthcare is a timely and strategic necessity.

Despite these dangers, IAQ remains a low-priority topic in Nigeria's public health discourse and policy implementation (Abulude et al., 2025). Community Health Practitioners (CHPs), who form the backbone of primary healthcare (PHC) and are often the first contact for health services at the grassroots level, their capacity to engage with IAQ challenges is not well documented. Community Health Practitioners are essential in Nigeria's decentralized healthcare system, tasked with health education, surveillance, early case identification, and community mobilisation (Dotimi et al., 2024). Their unique position offers a strategic opportunity to promote environmental health and mitigate the health consequences of indoor air pollution at the grassroots level (Owolabi et al., 2024).

There is a growing need to recognise and empower Community Health Practitioners as key actors in addressing environmental determinants of health, including IAQ. This study seeks to fill that gap by evaluating the knowledge, perceptions, and influence of CHPs on IAQ integration into PHC. Insights from this research will support the development of targeted interventions, inform environmental health policy, and strengthen Nigeria's commitment to health-focused Sustainable Development Goals (SDGs), particularly SDG 3 (Good Health and Well-being) and SDG 13 (Climate Action).

STUDY OBJECTIVES AND RESEARCH QUESTIONS

The objective of this study is to assess the knowledge and awareness levels of community health practitioners regarding indoor air quality (IAQ), its health impacts in Nigeria, and to evaluate the implications of practitioners' perspectives on the integration of IAQ-related strategies into primary healthcare and environmental health promotion policies.

Research Questions

1. What is the level of knowledge and awareness among community health practitioners regarding indoor air quality and its health implications?
2. What are the perceptions and attitudes of community health practitioners towards indoor air quality as a public health issue?
3. How do the perspectives of community health practitioners influence the integration of IAQ strategies into primary healthcare and environmental health promotion?

Study Hypotheses

Ho1: There is no significant level of knowledge and awareness among community health practitioners regarding indoor air quality and its health implications.

Ho2: Community health practitioners do not perceive indoor air quality as a significant public health concern.

Ho3: Community health practitioners' perspectives have no significant influence on the integration of IAQ strategies into primary healthcare.

INDOOR AIR QUALITY CONTEXT IN NIGERIA

More than 50% of the world's population depends on animal dung, wood, crop waste, or coal to meet their most basic energy needs, with firewood combustion for cooking being a common practice in most rural communities of developing nations including Nigeria (World Health Organization, 2024). The majority of households burn biomass fuels in open fireplaces, consisting of simple arrangements such as three rocks, a U-shaped hole in a block of clay, a pit in the ground, or in poorly functioning earth or metal stoves. The process of combustion in most of these stoves is incomplete, resulting in the emission of harmful pollutants including particulate matter, carbon monoxide, nitrogen oxides, and volatile organic compounds (Samniang et al., 2025).

In Nigeria specifically, studies have shown that PM2.5 levels in households using biomass fuels frequently exceed WHO-recommended limits, with concentrations ranging from 14 to 650 $\mu g/m^3$ in rural and peri-urban communities (Abubakar & Oche, 2025). The health impacts are particularly severe for women and children, who experience higher rates of respiratory symptoms, including persistent cough, breathing difficulties, and increased susceptibility to respiratory infections.

Biomass Fuel Use

In Nigeria, over 70% of households continue to rely on biomass fuels for cooking, creating significant indoor air pollution through incomplete combustion. This contributes to a broader regional issue, with more than 80% of the African population exposed to household air pollution.

Health Impact

Indoor air pollution causes respiratory infections, cardiovascular diseases, and disproportionately affects women, children, and elderly populations.

Housing Challenges

Poor ventilation, overcrowding, and substandard building materials compound the burden of indoor air quality problems in Nigerian homes.

COMMUNITY HEALTH PRACTITIONERS' ROLE

Community Health Practitioners (CHPs) are essential in Nigeria's decentralised healthcare system, tasked with health education, surveillance, early case identification, and community mobilisation (Dotimi et al., 2024). Their unique position offers a strategic opportunity to promote environmental health and mitigate the health consequences of indoor air pollution at the grassroots level. CHPs constitute between 60-70% of the workforce in Primary Healthcare Centres (PHCs), with 70% of these centres located in rural communities where biomass fuel use is most prevalent (Owolabi et al., 2024).

CHPs have demonstrated effectiveness in improving health outcomes, particularly in maternal and child health services, family planning, and chronic disease management (Ajisegiri et al., 2023). However, their involvement in environmental health promotion, specifically indoor air quality interventions, remains underutilised despite their strategic positioning within communities. Recent evidence suggests that CHPs are increasingly taking on informal task-shifting roles in non-communicable disease management, indicating their capacity to expand into environmental health domains (Effiong, 2023).

Health Education Role

CHPs provide community education about health risks and prevention strategies, making them ideal advocates for indoor air quality awareness and intervention strategies at the grassroots level.

Surveillance Function

Community health practitioners conduct health surveillance and early case identification, positioning them to recognise and address indoor air pollution-related health conditions in their communities.

Community Mobilisation

CHPs mobilise communities for health interventions and behaviour change, making them key actors in promoting clean cooking technologies and improved housing conditions.

METHODOLOGY

This descriptive cross-sectional research design was used to assess the perspective, awareness, and practice of Community Health Practitioners (CHPs) on indoor air quality (IAQ) in Nigeria. A purposive sampling technique was used to select the study sample. A total of 114 CHPs, either CHO or CHEW, from the different geopolitical zones in Nigeria, who were enrolled in top-up and postgraduate programmes at Wesley University Ondo, Nigeria, and willing to participate, were used in the study.

A well-structured questionnaire, comprising two sections–Section A for demographic and professional data of the respondents, and Section B assessing their perception, awareness, and practice as healthcare practitioners on IAQ–was used to collect data. The instrument utilised a five-point Likert scale with responses: Agree = 1, Strongly Agree = 2, Undecided = 3, Disagree = 4, Strongly Disagree = 5. The questionnaire demonstrated good internal consistency with a Cronbach's alpha of 0.82 during pilot testing. Data were analysed using descriptive statistics, and t-tests were employed to test the hypotheses with a statistical significance level of $p < 0.05$.

Study Design

Descriptive cross-sectional study design to assess perspectives, awareness, and practices regarding indoor air quality among CHPs.

Sample Population

114 Community Health Practitioners (CHOs and CHEWs) from all six geopolitical zones of Nigeria, enrolled at Wesley University Ondo.

Data Collection

Validated self-administered questionnaire with a five-point Likert scale, exhibiting a Cronbach's alpha of 0.82. Data were analysed using descriptive statistics and t-tests.

RESULTS AND DISCUSSION

Hypothesis One (H01): Knowledge and Awareness Levels

Ho1: There is no significant level of knowledge and awareness among community health practitioners regarding indoor air quality and its health implications.

Formal Training	N	Mean	Std. Dev.	t	Significance Decision
Yes	60	3.3767	.41349	2.319	0.022 Rejected
No	40	3.1650	.49383	df = 98	$p < 0.05$

The calculated t-value was 2.319 (positive) with a p-value of 0.022, which is less than the 0.05 level of significance (α), and a degree of freedom (df) of 98. Consequently, the null hypothesis (Ho1), which stated that there was no significant level of knowledge and awareness among community health practitioners regarding indoor air quality and its health implications, was rejected (p-value = 0.022 < 0.05). This implies that there is a significant level of knowledge and awareness among community health practitioners regarding indoor air quality and its health implications.

Hypothesis Two (H02): Perception as Public Health Concern

H02: Community health practitioners do not perceive indoor air quality as a significant public health concern.

Formal Training	N	Mean	Std. Dev.	t	Sig. Decision
Yes	60	3.3633	.41086	2.180	0.032 Rejected
No	40	3.1650	.49383	df = 98	p < 0.05

The calculated t-value was 2.180, which was positive, with a p-value of 0.032, which is less than the 0.05 level of significance (α), and a degree of freedom (df) of 98. Consequently, the null hypothesis (H02), which stated that Community health practitioners do not perceive indoor air quality as a significant public health concern, was rejected (p-value = 0.032 < 0.05). This implies that Community health practitioners perceive indoor air quality as a significant public health concern.

Hypothesis Three (H03): Influence on IAQ Strategy Integration

H03: Community health practitioners' perspectives have no significant influence on the integration of IAQ strategies into primary healthcare.

Formal Training	N	Mean	Std. Dev.	t	Sig. Decision
Yes	60	3.3833	.40049	2.318	0.023 Rejected
No	40	3.1750	.49446	df = 98	p < 0.05

0.022

Knowledge Significance

P-value for knowledge and awareness levels among CHPs

0.032

Perception Significance

P-value for perceiving IAQ as public health concern

0.023

Integration Influence

P-value for influence on IAQ strategy integration

In Table 3, there is a higher mean with a smaller number of standard deviations, indicating slightly low variability in the variables across the samples. The calculated t-value was 2.318, which was a positive value with a p-value of 0.023 (less than the 0.05 level of significance (α)), and a degree of freedom (df) of 98. Hence, the null hypothesis (H_{03}), which stated that community health practitioners' perspectives have no significant influence on the integration of IAQ strategies into primary healthcare, was rejected (p-value = 0.023 < 0.05). This implies that community health practitioners' perspectives have a significant influence on the integration of IAQ strategies into primary healthcare.

DISCUSSION OF FINDINGS

The study revealed a significant level of knowledge and awareness among community health practitioners regarding indoor air quality and its health implications. The finding that community health practitioners demonstrate a significant level of knowledge and awareness about indoor air quality (IAQ) and its associated health implications is encouraging and aligns with previous research. Primary healthcare providers generally recognise the health risks posed by poor indoor air, including respiratory illnesses and allergies. Community health workers in urban settings showed good awareness of sources of indoor air pollution, such as cooking fuels and mould.

The study also showed that community health practitioners perceive indoor air quality as a significant public health concern. This perception highlights practitioners' awareness of the burden that poor indoor environments place on respiratory and general health, particularly in resource-constrained settings like Nigeria. This finding demonstrates that healthcare workers in both developed and developing countries increasingly acknowledge IAQ as a key environmental health risk. Nigerian health workers are aware of environmental health hazards broadly and consider them relevant to disease prevention.

Furthermore, the study also demonstrated that community health practitioners' perspectives have a significant influence on the integration of IAQ strategies into primary healthcare. This finding shows that when practitioners are well-trained and empowered, they champion IAQ initiatives within primary healthcare settings. Community health workers' involvement in environmental health issues, including IAQ, influences policy discussions and promotes the inclusion of relevant strategies into primary healthcare frameworks.

Knowledge Recognition

1

CHPs demonstrate significant awareness of indoor air pollution sources, health impacts, and intervention strategies, aligning with international evidence of healthcare worker environmental health awareness.

2

Public Health Concern

Recognition of IAQ as a major public health issue reflects practitioners' understanding of environmental determinants of health and their role in disease prevention and health promotion.

Policy Integration Influence

3

CHPs' perspectives significantly influence the integration of IAQ strategies into primary healthcare, demonstrating their potential as environmental health champions and policy advocates.

CURRENT IAQ CHALLENGES IN NIGERIAN HEALTHCARE

This section examines current indoor air quality challenges and initiatives in Nigerian healthcare settings, providing context for the study's findings and their real-world applications.

Healthcare Facility IAQ Assessment

Research focusing on IAQ in Nigerian healthcare settings remains limited, with existing studies primarily conducted in developed countries, creating a knowledge gap that hinders evidence-based interventions to improve IAQ and protect patient and healthcare worker health.

Particulate Matter Concerns

Studies in Nigerian buildings have found PM2.5 and PM10 levels exceeding WHO safe values of 25 µg/m3 (PM2.5) and 50 µg/m3 (PM10), indicating significant air quality challenges in indoor environments.

Health Centre Air Quality

Recent assessments of healthcare facilities revealed consistent positive skew in particle count distribution, indicating occasional spikes in pollution levels amid generally lower concentrations, with similar variability across different healthcare facilities.

Residential vs Healthcare Settings

Studies in Nigerian communities found elevated CO_2 levels in both locations, emphasising the critical role of ventilation in maintaining healthy indoor environments.

Intervention Recommendations

Targeted interventions, including improving ventilation systems, controlling indoor pollution sources, and promoting smoking cessation programmes, are proposed to address IAQ challenges in healthcare facilities across Nigeria.

CONCLUSION AND RECOMMENDATIONS

The study concluded that there is a significant level of knowledge and awareness amongst community health practitioners regarding indoor air quality and its adverse health impacts. This indicates that these practitioners are well-positioned to serve as frontline advocates and educators in mitigating IAQ-related health risks within their communities (Dennis, 2016). The perception of indoor air quality (IAQ) as a significant public health concern amongst community health practitioners highlights their awareness of the critical role that indoor environments play in influencing health outcomes.

The findings align with recent evidence demonstrating that healthcare workers in Nigeria possess substantial environmental health awareness, though this knowledge requires translation into practical intervention strategies (Ackley et al., 2024). The integration of IAQ strategies into primary healthcare delivery systems represents a critical opportunity to address the substantial burden of household air pollution, which affects over 80% of the African population (Crews et al., 2024).

01

Develop Training Programmes

Develop comprehensive training programmes for CHPs on indoor air quality assessment and intervention strategies.

02

Integrate IAQ Education

Integrate IAQ education into existing community health promotion activities.

03

Establish Partnerships

Establish partnerships between CHPs and environmental health specialists.

04

Implement Monitoring Systems

Implement low-cost air quality monitoring systems in primary healthcare facilities.

Develop Educational Materials

Develop culturally appropriate educational materials on clean cooking technologies and improved ventilation practices.

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CONFLICTS OF INTEREST

The authors declare no conflicts of interest associated with this publication.

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