

Assessing Public Knowledge and Awareness of Respiratory Diseases in Bayelsa State

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ABSTRACT

Background: Respiratory diseases remain a major public health challenge, particularly in regions affected by environmental pollution. Bayelsa State, located in Nigeria's Niger Delta, experiences high levels of air pollution due to oil exploration, gas flaring, and artisanal crude oil refining, increasing the risk of respiratory illnesses. However, public knowledge and awareness of respiratory diseases, their risk factors, and prevention remain inadequately explored. This study assesses the level of awareness, knowledge gaps, and sources of health information among residents of Bayelsa State.

Methods: A cross-sectional community-based study was conducted among 428 adult residents selected through multi-stage sampling. Data were collected using a structured, interviewer-administered questionnaire covering demographics, disease awareness, risk perception, and health information sources. Descriptive statistics was used to used to analyze the data and findings are presented in frequency distribution tables and chart.

Results: Although 91.3% of respondents were aware of respiratory diseases, only 47.5% correctly identified air pollution as a risk factor, and 33.9% linked household cooking fuels to respiratory conditions. The primary sources of health information were radio/TV (62.5%) and healthcare workers (51.8%), while environmental agencies had low engagement (19.6%).

Conclusion: Despite high awareness of respiratory diseases, knowledge gaps persist regarding environmental risk factors. Targeted health education, environmental awareness programs, and stronger policy interventions are needed to improve public understanding and preventive behaviors in Bayelsa State.

INTRODUCTION

Respiratory diseases are a major public health concern, contributing significantly to global morbidity and mortality. According to the World Health Organization (WHO, 2022a), air pollution is a leading risk factor for respiratory conditions such as asthma, chronic obstructive pulmonary disease (COPD), pneumonia, and lung cancer, particularly in low- and middle-income countries where environmental pollution is widespread. In Nigeria's Niger Delta region, including Bayelsa State, environmental pollution from oil exploration, gas flaring, and illegal crude oil refining has significantly compromised air quality, exposing residents to harmful pollutants such as sulfur dioxide (SO₂), nitrogen dioxide (NO₂), carbon monoxide (CO), ammonia (NH₃), and particulate matter (PM_{2.5}, PM₁₀) (Watts & Zalik, 2020; Nriagu et al., 2016). Despite the established link between air pollution and respiratory health, public knowledge and awareness of these conditions remain inadequate (Ana et al., 2009).

Understanding how much residents know about respiratory diseases, their causes, symptoms, and prevention is crucial for designing effective public health interventions (Ghosh et al., 2021). Research has shown that many individuals in polluted regions underestimate the impact of air pollution on their health, leading to delayed healthcare-seeking behavior and a lack of preventive

measures (Fuller et al., 2022). In Bayelsa State, where pollution levels exceed WHO safety thresholds, assessing public knowledge gaps will provide valuable insights for health policy development and community education initiatives (Manisalidis et al., 2020). Previous studies in other oil-producing regions have demonstrated that targeted awareness campaigns and health education programs significantly improve community responses to respiratory health threats (Lelieveld et al., 2019). However, there is limited data on the level of awareness among residents of Bayelsa State, particularly regarding the links between air pollution and respiratory diseases (Allen et al., 2017). Identifying these knowledge gaps will help policymakers and health professionals develop strategic interventions to improve environmental health literacy and encourage protective behaviors against respiratory diseases.

This study aims to assess public knowledge and awareness of respiratory diseases in Bayelsa State, with a focus on residents' understanding of risk factors, symptoms, and prevention methods. Additionally, it evaluates sources of health information and barriers to awareness. Findings from this study will provide critical insights for public health campaigns, policy recommendations, and environmental health education programs aimed at reducing respiratory disease prevalence and improving community health outcomes.

MATERIALS AND METHODS

Study Design

This study employed a cross-sectional community-based survey to assess public knowledge and awareness of respiratory diseases in Bayelsa State, Nigeria.

Study Area

The study was conducted in Bayelsa State, Niger Delta, Nigeria, a region characterized by significant environmental pollution from oil exploration, gas flaring, and illegal crude refining. Five Local Government Areas (LGAs) across two senatorial districts (Bayelsa West and Bayelsa Central) were purposively selected to represent both freshwater and saltwater communities, as these environmental differences may influence public health perceptions.

Study Population and Sampling

This study targeted adults aged 18 years and above residing in Bayelsa State, Nigeria. To ensure representative data collection, a multi-stage sampling technique was employed. First, Bayelsa West and Bayelsa Central senatorial districts were purposively selected due to their high levels of industrial activity and environmental pollution. From these districts, five Local Government Areas (LGAs) were randomly chosen to reflect diverse socio-environmental conditions.

Following the selection of LGAs, study participants were proportionally allocated across 69 communities, ensuring that each area contributed respondents based on population density and pollution exposure levels. To enhance randomization and minimize selection bias, systematic random sampling was applied to select 428 respondents from 214 households. This approach ensured adequate representation of gender, occupational backgrounds, and exposure risk groups.

The sample size ($n = 428$) was determined using the Leslie Kish formula, with a 10% adjustment to account for non-responses and incomplete data (Kish, 2003). This method ensured the statistical robustness of the study findings, allowing for meaningful comparisons and generalizable conclusions regarding the impact of air pollution on respiratory health in Bayelsa State.

Data Collection Instrument

A structured, interviewer-administered questionnaire was developed in accordance with WHO guidelines on respiratory health awareness surveys (WHO, 2022b). The questionnaire was divided into four key sections to comprehensively assess demographic characteristics, disease awareness, knowledge of risk factors, and sources of health information.

The first section gathered demographic information, including age, sex, occupation, education level, and place of residence, which are critical factors influencing health awareness and exposure to respiratory risks. The second section focused on awareness of common respiratory diseases, such as asthma, pneumonia, chronic obstructive pulmonary disease (COPD), and tuberculosis, enabling an evaluation of participants' familiarity with these conditions. The third section assessed knowledge of risk factors and symptoms, particularly the role of air pollution, smoking, and household fuel use in respiratory health. Lastly, the fourth section explored sources of health information, such as media, healthcare professionals, and community networks, to understand how participants access and interpret health-related knowledge.

To ensure validity and reliability, the questionnaire was pre-tested in two non-study communities. The pre-test yielded a Cronbach's alpha reliability score of 0.78, indicating strong internal consistency and ensuring that the instrument effectively captured relevant data on respiratory health awareness and risk perception.

Trained field researchers conducted face-to-face interviews using a standardized questionnaire, ensuring accurate data collection. Respondents who could not read or write were assisted by research assistants fluent in local languages to enhance comprehension and response accuracy.

Data Analysis

Data were analyzed using IBM SPSS Statistics version 27 (IBM Corp, Armonk, NY) and Microsoft Office Excel 2023. Descriptive statistical methods were applied to summarize the demographic characteristics, awareness, and knowledge levels of participants. At

the initial stage of analysis, descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to characterize the dataset. Frequency distribution tables were constructed to present demographic variables and categorical responses related to awareness and knowledge of respiratory diseases. To visually illustrate key findings, bar chart was used to represent overall knowledge levels, highlighting differences in knowledge between the two senatorial zones.

Ethical Considerations

Ethical approval for this study was obtained from the Bayelsa State Ministry of Health Research Ethics Committee, ensuring compliance with established research guidelines. Prior to data collection, written informed consent was obtained from all participants after they were fully informed about the study's objectives, procedures, and their rights, including the right to withdraw at any stage without consequences.

To maintain confidentiality, all collected data were securely stored, with access restricted to authorized research personnel only. Anonymity was ensured by removing personal identifiers, thereby safeguarding respondents' privacy and preventing unauthorized disclosure. Participation in the study was entirely voluntary, with no form of coercion or undue influence.

RESULTS

Sociodemographic Characteristics of Study Participants

The study population consisted predominantly of middle-aged adults, with the 30–44 years age group (34.2%) being the most represented, followed by 45–54 years (26.8%). The study was male-dominated (64.7%), with females comprising 35.3% of participants. A notable 65.8% of participants had lived in their communities for over a decade, with 30.1% residing for more than 15 years.

Regarding occupational distribution, trading (27.5%) and farming (16.9%) were the most common professions, while 21.2% of participants were employed in white-collar jobs. Education plays a pivotal role in determining awareness of respiratory health risks. The study found that 41.8% of participants had completed secondary education, while 30.5% attained tertiary education. However, 9.8% of respondents had no formal education.

Income distribution data indicate that 50.9% of participants earned between ₦30,000–₦99,000, while only 10.1% earned above ₦150,000.

Table 1: Demographic Information of the study Participants

Demographic Information	Bayelsa West (n=180)		Bayelsa Central (n=248)		Overall	
	Freq	%	Freq	%	Freq	%
Age years (Mean: 46.8 ± 6.7)						
18 -29	19	10.6	31	12.5	50	11.7
30-44	64	35.6	81	32.7	145	33.9
45-54	48	26.7	68	27.4	116	27.1
55 – 64	41	22.8	55	22.2	96	22.4
65+	8	4.4	13	5.2	21	4.9
Total	180	100.0	248	100.0	428	100.0
Gender						
Male	116	64.4	164	66.1	280	65.4
Female	64	35.6	84	33.9	148	34.6
Total	180	100.0	248	100.0	428	100.0
Duration since resident in the community						
Less than 5 years	23	12.8	37	14.9	60	14.0
5 – 9 years	35	19.4	55	22.2	90	21.0
10 -15	68	37.8	83	33.5	151	35.3
Above 15	54	30.0	73	29.4	127	29.7
Total	180	100.0	248	100.0	428	100.0
Occupation						
Fishing	27	15.0	31	12.5	58	13.6
Farming	39	21.7	36	14.5	75	17.5
White collar	27	15.0	61	24.6	88	20.6
Trading	51	28.3	64	25.8	115	26.9
Mining	14	7.8	13	5.2	27	6.3
Unemployed	12	6.7	21	8.5	33	7.7

Other (eg student)	10	5.6	22	8.9	32	7.5
Total	180	100.0	248	100.0	428	100.0
Educational Level						
Primary	34	18.9	43	17.3	77	18.0
Secondary	84	46.7	97	39.1	181	42.3
Tertiary	38	21.1	87	35.1	125	29.2
Non-formal	24	13.3	21	8.5	45	10.5
Total	180	100.0	248	100.0	428	100.0
Monthly Income Level (in Naira)						
Below 30,000	37	20.6	41	16.5	78	18.2
30,000- 59000	55	30.6	56	22.6	111	25.9
59,000 - 99,0000	43	23.9	67	27.0	110	25.7
100,000- 149000	28	15.6	61	24.6	89	20.8
150,000 and above	17	9.4	23	9.3	40	9.3
Total	180	100.0	248	100.0	428	100.0

Awareness of Respiratory Conditions

Table 2 presents findings on awareness of respiratory conditions among study participants. The results indicate that 92.1% of respondents had heard of lung diseases, with 91.7% in Bayelsa West and 92.3% in Bayelsa Central, demonstrating a high level of general awareness.

Regarding specific respiratory diseases, 81.1% of respondents were aware of tuberculosis, followed by 76.6% for asthma and 67.8% for pneumonia. However, when asked if they had any personally known respiratory conditions, 12% of respondents answered “yes”, with 11.7% in Bayelsa West and 12.6% in Bayelsa Central. Among those who identified specific conditions, 38.9% mentioned asthma, while 42.6% cited pneumonia.

Among participants who had heard of lung diseases, 50% reported living with the condition for 5–9 years, with 51.5% in Bayelsa Central falling within this duration. Additionally, 35.9% stated that they had the disease for less than five years, including 33.3% in Bayelsa West.

Sources of information on lung diseases varied across the study group. The most common source was social media (40.9%), followed by community health workers (32.9%) and healthcare professionals such as doctors and nurses (30.4%). These findings highlight the importance of digital platforms and community health workers in disseminating respiratory health information.

Table 2: Awareness of respiratory conditions among residents in Bayelsa State

GENERAL AWARENESS OF RESPIRATORY CONDITIONS	Bayelsa (n=180)		West Bayelsa (n=248)		Central Bayelsa (n=428)	
	Freq	%	Freq	%	Freq	%
Heard of lung diseases before this survey						
Yes	165	91.7	229	92.3	394	92.1
No	15	8.3	19	7.7	34	7.9
If yes, please specify the lung diseases you are aware of (Select all that apply)						
Tuberculosis	139	77.2	208	83.9	347	81.1
Ashma	136	75.6	192	77.4	328	76.6
Pneumonia	126	70.0	164	66.1	290	67.8
Bronchitis	57	31.7	104	41.9	161	37.6
Lung Cancer	61	33.9	129	52.0	190	44.4
Other (eg flu)	34	18.9	76	30.6	110	25.7
Do you have any respiratory condition you are aware of?						
Yes	21	11.7	33	13.3	54	12.6
No	162	88.38	220	86.7	382	87.4
If yes, what is the name of the condition?					0	0.0
Asthma	7	33.3	14	42.4	21	38.9
Pneumonia	9	42.9	14	42.4	23	42.6
Flu	3	14.3	4	12.1	7	13.0
Other (eg Bronchitis)	2	9.5	1	3.0	3	5.6
Since when have you had the condition (Years)?						

Less than 5 years	7	33.3	7	21.2	14	25.9
5 – 9 years	10	47.6	17	51.5	27	50.0
10=15	3	14.3	6	18.2	9	16.7
Above 15	1	4.8	3	9.1	4	7.4
Where do you usually get information about lung diseases? (Select all that apply)						
Traditional Media. Radio, Tv	48	26.7	75	30.2	123	28.7
Social media- Facebook, WhatsApp, X, internet	67	37.2	108	43.5	175	40.9
Healthcare professionals (doctors, nurses, etc.)	54	30.0	76	30.6	130	30.4
Community Health workers	73	40.6	68	27.4	141	32.9
Friends and family	21	11.7	61	24.6	82	19.2
Other	11	6.1	15	6.0	26	6.1

Participants' Knowledge of Respiratory Conditions

Table 3 presents data on participants' knowledge of respiratory conditions, including risk factors, symptoms, and prevention strategies.

In assessing risk factors, 71.5% of participants recognized genetic predisposition as a factor influencing respiratory conditions, with 75.8% in Bayelsa Central and 65.6% in Bayelsa West acknowledging this association. Tuberculosis (TB) was identified as a risk factor by 69.9% of respondents, with 77.0% in Bayelsa Central and 60.0% in Bayelsa West. However, only 45.3% of participants (43.3% in Bayelsa West and 46.8% in Bayelsa Central) recognized air pollution as a significant risk factor, despite the region's high levels of industrial pollution. Additionally, 55.4% identified occupational exposure, such as artisanal crude refining and construction work, as contributors to respiratory diseases, while only 28.3% understood the risks associated with secondhand smoke exposure. Regarding common symptoms of lung diseases, knowledge was highest for persistent cough (93.3%) and wheezing (92.8%), while fatigue and weakness were recognized by 72.7% of respondents. However, awareness was significantly lower for chest pain (16.1%) and shortness of breath (24.3%), symptoms that can indicate serious respiratory conditions such as pneumonia or chronic obstructive pulmonary disease (COPD).

In terms of preventive measures, the majority of respondents (85.7%) identified seeking early medical attention as a key preventive strategy, followed by getting vaccinated (64.5%). However, knowledge about avoiding air pollution and toxic exposure as preventive measures was notably low (42.5%), highlighting the need for environmental health education campaigns.

When asked about smoking-related risks, 59.1% of participants correctly associated lung diseases with smoking, while 69.2% understood that lung cancer is more common in smokers than in non-smokers. However, only 55% recognized TB as a lung disease, and 45% perceived pneumonia as contagious, with 38% uncertain about its transmissibility.

Table 3: knowledge level of respiratory conditions among Residents in Bayelsa state

KNOWLEDGE ASSESSMENT	Bayelsa West (n=180)		Bayelsa Central (n=248)		Overall (n=428)	
	Freq	%	Freq	%	Freq	%
Which of the following are risk factors for respiratory conditions? (Select all that apply)						
Smoking	105	58.3	150	60.5	255	59.6
Air pollution	78	43.3	116	46.8	194	45.3
Tuberculosis	108	60.0	191	77.0	299	69.9
Genetic Factors	118	65.6	188	75.8	306	71.5
Occupational exposure (Artisan refining of crude, gas flaring)	82	45.6	155	62.5	237	55.4
Secondhand smoke exposure	46	25.6	75	30.2	121	28.3
Poor diet and nutrition	51	28.3	74	29.8	125	29.2
Other	34	18.9	37	14.9	71	16.6
Can you identify common symptoms of lung diseases? (Select all that apply)						
Persistent cough/	156	86.7	244	98.4	400	93.5
Shortness of breath	37	20.6	67	27.0	104	24.3
Chest pain	66	36.7	3	1.2	69	16.1
Coughing up blood	45	25.0	85	34.3	130	30.4
Fatigue and weakness	123	68.3	188	75.8	311	72.7
Wheezing	156	86.7	241	97.2	397	92.8
Fever	101	56.1	163	65.7	264	61.7

No symptoms	14	7.8	16	6.5	30	7.0
Other	3	1.7	0	0.0	3	0.7
How can lung diseases be prevented? (Select all that apply)						
Quitting smoking	95	52.8	146	58.9	241	56.3
Avoiding air pollution and toxins exposure	64	35.6	118	47.6	182	42.5
Getting vaccinated (e.g., flu, pneumonia)	112	62.2	164	66.1	276	64.5
Regular exercise and healthy lifestyle	66	36.7	166	66.9	232	54.2
Seeking early medical attention	131	72.8	236	95.2	367	85.7
Other	13	7.2	7	2.8	20	4.7
Lung diseases are only caused by smoking						
TRUE	94	52.2	159	64.1	253	59.1
FALSE	67	37.2	72	29.0	139	32.5
Don't know	19	10.6	17	6.9	36	8.4
Pneumonia is a contagious disease						
TRUE	68	37.8	124	50.0	192	44.9
FALSE	46	25.6	24	9.7	70	16.4
Don't know	66	36.7	100	40.3	166	38.8
Tuberculosis primarily affects the lungs						
TRUE	98	54.4	138	55.6	236	55.1
FALSE	46	25.6	45	18.1	91	21.3
Don't know	36	20.0	65	26.2	101	23.6
Lung cancer is more common in smokers than in non-smokers						
True	118	65.6	178	71.8	296	69.2
FALSE	36	20.0	33	13.3	69	16.1
Don't know	26	14.4	37	14.9	63	14.7

Overall Knowledge Level on Respiratory Conditions Among Residents in Bayelsa State

Figure 1 presents a compound bar chart summarizing the knowledge levels of respiratory conditions among study participants in Bayelsa State, categorizing them into good knowledge and poor knowledge clusters. The findings reveal that 53.7% (230 out of 428) of respondents demonstrated good knowledge, while 198 participants (46.3%) exhibited poor knowledge of respiratory conditions.

Regional differences in knowledge levels were also observed. Bayelsa Central had a slightly higher proportion of participants with good knowledge (56.9%), whereas Bayelsa West recorded a lower percentage (49.4%), falling below the 50% threshold. These results suggest that awareness and understanding of respiratory diseases remain suboptimal in some areas, highlighting the need for enhanced public health education efforts, particularly in Bayelsa West. Strengthening health literacy programs and targeted awareness campaigns could improve knowledge levels and preventive health behaviors, ultimately reducing the burden of pollution-related respiratory diseases in the region.

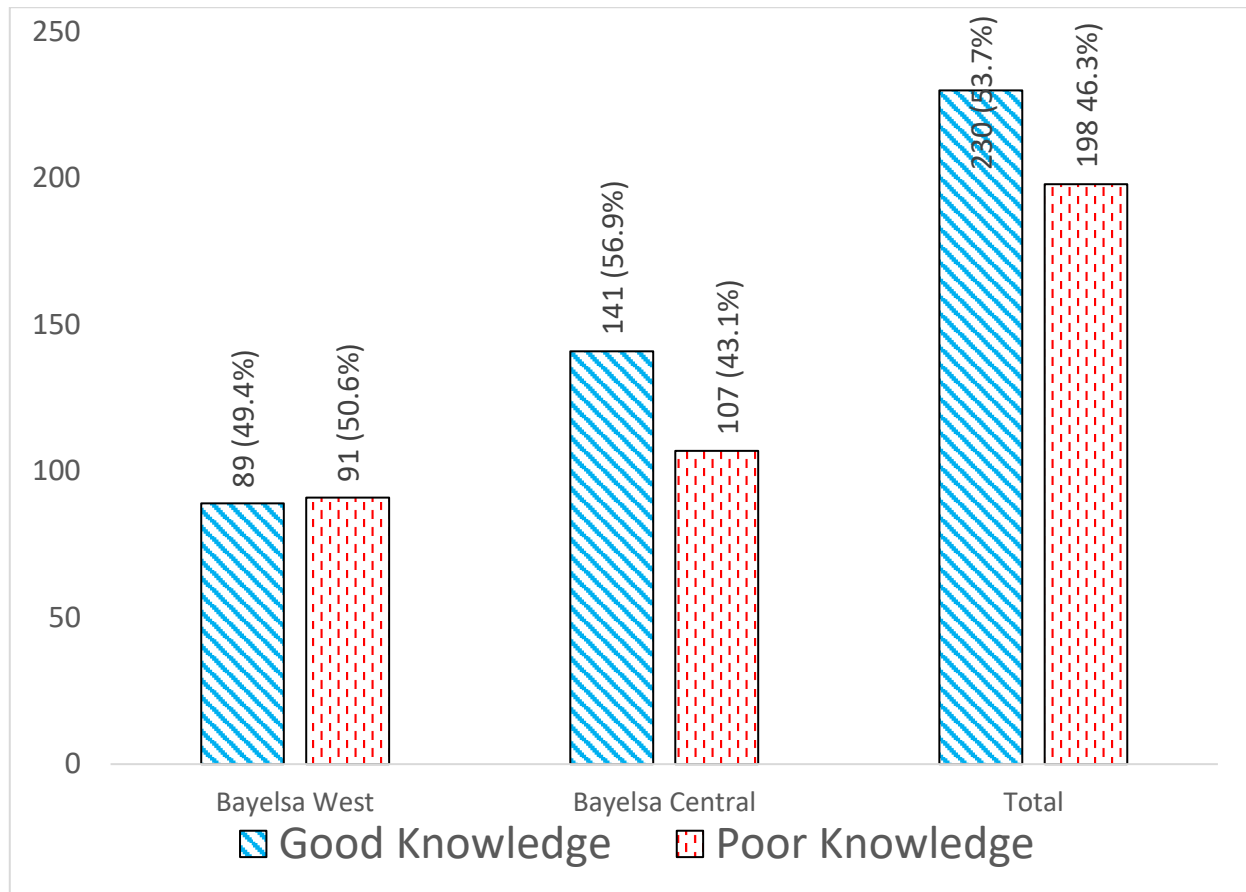


Figure 1: Compound bar chart representing the overall knowledge of respiratory conditions among respondents

DISCUSSION

This study assessed public knowledge and awareness of respiratory diseases in Bayelsa State, a region with significant environmental pollution due to oil exploration, gas flaring, and illegal crude refining. The findings reveal a high level of awareness of respiratory diseases but gaps in knowledge regarding symptoms, risk factors, and environmental influences. These results align with previous studies indicating that while individuals in polluted regions may recognize respiratory illnesses, they often lack a clear understanding of their causes and prevention (Fuller et al., 2022; Manisalidis et al., 2020).

Despite high awareness of diseases such as asthma, pneumonia, tuberculosis, and COPD, the study found that less than half of respondents identified air pollution as a risk factor, even though Bayelsa State experiences high levels of sulfur dioxide (SO₂), nitrogen dioxide (NO₂), carbon monoxide (CO), and particulate matter (PM_{2.5}, PM₁₀). This suggests that many residents do not associate their polluted environment with respiratory conditions, a trend reported in similar studies conducted in other oil-rich states in the Niger Delta including Portharcourt (Ana et al., 2009; Nriagu et al., 2016). The low recognition of industrial pollution and occupational exposure as sources of respiratory conditions further highlights the need for improved environmental health literacy. The World Health Organization (WHO, 2022b) has identified household air pollution, industrial emissions, and smoking as primary contributors to respiratory disease burden in low- and middle-income countries. However, this study found that only about thirty percent of respondents associated household cooking fuels with respiratory illnesses, despite widespread use of biomass, charcoal, and kerosene for domestic energy. Studies in Ghana and India have similarly reported that lack of awareness about indoor air pollution leads to continued use of hazardous fuels, worsening respiratory health outcomes (Ghosh et al., 2021; Majumder et al., 2023). These findings emphasize the urgent need for targeted health education programs focusing on the environmental determinants of lung diseases.

The study identified multiple barriers to knowledge and preventive practices, including limited healthcare access, weak environmental policies, low literacy levels, and economic constraints. These challenges are consistent with findings in other developing regions, where socioeconomic status significantly influences health literacy and access to information (Lelieveld et al., 2019).

The study also found that radio and television were the primary sources of health information, followed by healthcare workers and community health talks. The low engagement from environmental agencies suggests that governmental bodies responsible for pollution control are not effectively communicating health risks to the public. Research in Bangladesh and South Africa has shown that integrating environmental health education into public health campaigns significantly improves disease awareness and

preventive behaviors (Naidoo et al., 2019; Batool et al., 2019). Therefore, policymakers must prioritize collaborative approaches that involve both healthcare providers and environmental regulators in raising awareness.

This study highlights serious knowledge gaps regarding respiratory health and air pollution among residents of Bayelsa State, emphasizing the need for targeted interventions. The findings indicate that close to fifty percent of participants have poor knowledge of respiratory diseases, with lower awareness in Bayelsa West. Furthermore, while many respondents recognized tuberculosis, asthma, and pneumonia as respiratory conditions, fewer identified air pollution, occupational hazards, or secondhand smoke as risk factors.

To address these gaps, policy recommendations include strengthening environmental health education, expanding access to respiratory healthcare, enhancing public engagement through media campaigns, and enforcing stricter pollution control policies. Promoting alternative energy sources and community-based health screenings can further mitigate health risks. A multi-sectoral approach involving government, healthcare providers, and civil society organizations is crucial to reducing pollution-related respiratory diseases and improving public health outcomes in Bayelsa State.

CONCLUSION

This study highlights critical gaps in public knowledge and awareness of respiratory diseases in Bayelsa State, despite high exposure to environmental air pollution. While awareness of diseases is high, knowledge of risk factors, symptoms, and environmental causes remains limited, particularly regarding industrial pollution, household air pollution, and occupational hazards.

Barriers such as limited healthcare access, weak environmental policies, and low literacy levels further hinder awareness and preventive measures. Education level was found to be a strong predictor of respiratory disease knowledge, underscoring the need for targeted public health interventions. Strengthening environmental health education, improving access to healthcare, and enforcing pollution control policies are crucial to mitigating the impact of air pollution on respiratory health in Bayelsa State.

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