

RESEARCH ARTICLE

Audience perception of media messages on environmental cleanliness in Port Harcourt, Rivers State, Nigeria

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ABSTRACT

This study investigates audience perception of media messages promoting environmental cleanliness in Port Harcourt, Nigeria, a city facing critical challenges of black soot pollution and ineffective solid waste management. It aims to assess awareness, exposure, frequency, and perception of such media messages to understand their impact on public engagement and behaviour. Employing a quantitative survey design, data were collected from 385 adult residents across selected Port Harcourt areas using a structured questionnaire. Sampling involved multi-stage cluster and purposive techniques to ensure demographic and geographic representativeness. The analysis focused on percentages and frequencies to capture audience responses regarding environmental media messaging. Results indicate moderate to high awareness of environmental messages, particularly regarding pollution control and waste disposal, with television and radio as dominant channels. Exposure was sustained, but frequency and consistency of messaging exhibited ambivalence. Audience perceptions were largely positive, highlighting message clarity, local relevance, practicality, and motivational impact; visual demonstrations and expert opinions were most compelling. Behavioural responses varied, with information sharing and community cleanup participation prevalent, but lower rates of recycling and proper waste disposal point to infrastructural and socio-economic barriers. The findings support agenda-setting theory by demonstrating media's role in elevating environmental issues on the public agenda yet reveal gaps in media coverage and engagement depth. Effective environmental communication requires integrated media strategies and supportive policy frameworks, emphasizing clear, credible, and actionable messaging to foster sustainable urban environmental practices.

Keywords: Port Harcourt; waste; media; urban; behaviour; Nigeria

1. Introduction

Environmental cleanliness and sustainable living have emerged as paramount concerns globally. International frameworks, such as the UN Sustainable Development Goals, explicitly advocate for cleaner urban environments and diminished pollution levels^[1]. Consequently, the domain of environmental

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communication (EC) has expanded; Bhanye and Maisiri^[2] assert that "the environment has become one of the most critical research areas in the twenty-first century," and that EC functions as "the pragmatic and constitutive vehicle" for comprehending human interactions with nature. Practically speaking, media and communication platforms are regarded as essential for public education. Ogadimma et al.^[3] stress that the media serves as "the driving force behind adopting pro-environmental behaviour among citizens," acting as society's watchdog regarding environmental management. Likewise, Bhanye and Maisiri^[2] underscore the capacity of digital and social media in Africa to enhance awareness, promote participatory dialogue, and encourage environmental activism. These global and regional investigations indicate that well-designed media messages can effectively alter public perceptions and behaviours towards cleaner environments.

In the African context, environmental challenges are severe and escalating. Rapid urbanization, climate change, and industrial growth have intensified issues such as air and water pollution, deforestation, and improper waste disposal in numerous countries^[3]. Despite the increasing use of media campaigns by African governments and NGOs to spotlight environmental concerns, researchers identify ongoing deficiencies. Ogadimma et al.^[3] report that nations in the global south, including Nigeria, continue to experience multiple consequences from exacerbated environmental woes and contend that inadequate media coverage has left citizens poorly informed or unmotivated. Concurrently, Bhanye and Maisiri^[2] illustrate how new media in Africa facilitates networks of activists, local communities, and authorities to address environmental challenges through rapid information dissemination. Together, these studies imply that while African audiences may lack knowledge due to low coverage, digital communications also offer new opportunities to mobilize environmental action.

Nigeria exemplifies the continental challenges associated with urban environmental management. Across the nation, municipal waste and pollution are on the rise due to population growth. Currently, Nigeria produces approximately 32 million tonnes of solid waste annually, with projections indicating a sharp increase by the middle of the century^[4]. However, only around 30% of this waste is properly collected or treated, and two-thirds of urban households, particularly in low-income areas, do not have access to formal waste services^[4]. These shortcomings are evident in international assessments: the 2024 Environmental Performance Index ranks Nigeria 105th out of 180 countries in terms of waste management, with a score of 29.7 out of 100, and a controlled solid waste score of merely 19.0%^[5]. In practical terms, the overflow of refuse and pollution poses significant health risks. A report from the Nigeria Medical Association in July 2025 cautioned that piles of garbage in the streets of Port Harcourt could lead to outbreaks of cholera, typhoid, and respiratory diseases^[6]. Such alerts highlight how failures in sanitation and waste management have escalated into pressing public health issues in Nigeria.

Despite these alarming statistics, there is evidence suggesting that media campaigns can yield positive results. Obasi et al.^[7] discovered that a well-coordinated public relations campaign markedly enhanced waste management practices in Enugu State, Nigeria; their study indicated that a media-driven educational approach had a significantly positive impact on residents' waste disposal habits. This implies that, when effectively targeted, media messages can elevate public awareness and influence behaviour in Nigerian urban areas. Nevertheless, other research conducted in Nigeria reveals a concerning gap: Ogadimma et al.^[3] examined four prominent Nigerian newspapers and identified only 754 environmental stories over a span of two years, with merely eight editorials addressing environmental matters. In essence, environmental issues receive minimal coverage in mainstream media, suggesting that the majority of citizens have limited opportunities to engage with such topics. Ata-Awaji and Ikot-Osin^[8] specifically examined Port Harcourt's radio news editors and concluded that advocacy journalism on soot pollution and waste disposal is "weak" as none of the editors regularly produced commentary or in-depth features on these issues. They recommended

that more frequent news reports be broadcast to strengthen the advocacy and contribute to change of attitudes of the masses toward the environment. These findings point to a disconnect in Nigeria between critical environmental needs and the media's attention.

Port Harcourt, the capital of Rivers State, serves as a prime example of this crisis. Once referred to as Nigeria's "Garden City," it is now beset by two interconnected environmental emergencies. Firstly, the city is afflicted by persistent "black soot": since approximately 2016, thick black particulate matter has consistently covered Port Harcourt, originating from illegal oil-refining and gas-flaring activities in adjacent creeks^[9]. Kalu^[9] illustrates how this soot accumulates on window screens, walls, and even children's toys, while local physicians report an increase in respiratory infections among the populace. According to^[9], the soot has emerged as a significant public issue, leading to social media campaigns (e.g., #StopTheSoot) and street demonstrations demanding governmental intervention. Secondly, Port Harcourt is plagued by ongoing solid-waste management failures. Ogboeli et al.^[10] indicate that the rapidly growing Port Harcourt metropolis, with a population exceeding 3 million, generates approximately 750,000 metric tons of waste annually. However, waste collection and processing are grossly insufficient, with refuse frequently discarded in waterways, dumped in streets, or incinerated in open spaces. Ogboeli et al.^[10] observe that this results in environmental contamination and health risks for the general public. Consequently, both air and solid waste pollution impose daily burdens on the residents of Port Harcourt.

In response, local authorities and NGOs have increasingly leveraged media platforms to promote cleanliness. NGOs in Rivers State, such as the Standup for Women Society, regularly conduct awareness campaigns and public service announcements regarding waste disposal, emphasizing themes like "Beat Plastic Pollution" and the necessity for a culture of cleanliness^[11]. Likewise, governmental and public health communications have urged citizens to keep drainages clean and sort waste to avert flooding and disease. Omojunikanbi^[12] finds that a risk communication initiative concerning soot in Port Harcourt was largely successful because majority of residents accessed information through broadcast media, social media, newspapers, and community opinion leaders. In summary, there exists an abundance of media messaging regarding environmental cleanliness in Port Harcourt, encompassing both traditional and new media, all aiming to influence public perception. However, it remains uncertain whether and how these messages resonate with the audience.

Despite the clear significance of maintaining environmental cleanliness in Port Harcourt, and in light of ongoing media initiatives aimed at promoting this cause, there remain substantial gaps in our comprehension. Specifically, there has been no comprehensive research conducted to investigate how residents of Port Harcourt perceive the media messages regarding the cleanliness of their city. We are lacking data on whether individuals recognize these messages, consider them credible, or feel inspired by them. Communication specialists emphasize that the reception by the audience can determine the success or failure of a campaign^[13]; however, local research has predominantly concentrated on media production (for instance, content analysis of news) rather than on the audience's perspective. Ata-Awaji and Ikot-Osin^[8] aptly advocate for enhanced and more thorough reporting on soot and waste to transform the attitudes of the masses, yet without feedback from the masses themselves, it remains uncertain how to tailor those reports. Likewise, the effectiveness of media strategies evidenced in other regions of Nigeria^[7] indicates potential, but it is still unclear which messages genuinely reach the citizens of Port Harcourt and how they interpret them. This gap is particularly critical given the current circumstances. The pollution and waste challenges facing Port Harcourt necessitate effective public engagement, and Nigeria's commitments to the Sustainable Development Goals (for example, SDG 11 concerning sustainable cities) render this issue relevant on a national scale.

In conclusion, the challenge lies in the abundance of environmental messaging available, contrasted with a significant lack of understanding regarding its reception. The current research addresses this significant gap. By examining how audiences perceive media messages regarding environmental cleanliness in Port Harcourt, we seek to reveal the ways in which these messages are received, interpreted, and acted upon by the local populace. This understanding is crucial for developing more effective communication strategies: as Obasi et al.^[7] indicate, well-informed media campaigns have the potential to change waste management behaviours, but only if they resonate with the perceptions and needs of the audience. In a time when Port Harcourt is experiencing a waste chaos and persistent pollution, and when global objectives prioritize clean cities, this study is both timely and pertinent. Gaining insight into the audience's viewpoint will assist in crafting media campaigns that genuinely engage the public and promote a cleaner, healthier environment.

The following objectives guide the study:

1. To assess the level of audience awareness of media messages promoting clean environments.
2. To determine the level of audience exposure to media messages promoting clean environments.
3. To determine the frequency of media messages conveying clean environment themes
4. To identify audience perceptions of media messages on clean environments.

2. Literature review

2.1. Media influence on environmental behaviour change

Recent studies highlight the significant influence of mass media in shaping environmental attitudes and practices. In Nigeria, Odunlami and Aro^[14] discovered that 74% of survey participants acknowledged that the media plays a crucial role in enhancing awareness of environmental issues, while 56% indicated that they altered their behavior as a result of information obtained from media campaigns. Similarly, Arikenbi et al.^[15] indicated that public relations and mass media initiatives have substantially contributed to raising public awareness of environmental concerns in Nigeria, effectively conveying the urgency of environmental protection and encouraging citizens to engage in sustainable practices (such as reducing waste and conserving energy). These results align with broader research indicating that well-crafted media messages can stimulate behavioural change by associating information with explicit calls to action^[14,15].

At the individual level, the mechanism seems to align with traditional media-effects theories. Odunlami and Aro^[14] reference Agenda-Setting theory: through consistent reporting on sustainability, the media have contributed to making environmental issues prominent on the public agenda, thereby affecting attitudes and subjective norms. The same research revealed that nearly half of the participants encounter sustainability content regularly (or occasionally) via broadcast and print media^[14], indicating that such exposure is linked to pro-environmental intentions. Likewise, Arikenbi et al.^[15] attribute the observed changes in behaviour to the persuasive influence of campaign messages, observing that numerous Nigerians have altered their behaviour, such as reducing waste, conserving energy, and supporting environmental initiatives following exposure to media campaigns. In conclusion, empirical research in Nigeria suggests that multimedia outreach, ranging from radio jingles to print articles can have a direct impact on household waste disposal, resource utilization, and conservation practices.

This finding is consistent with findings from another Nigerian setting. It was demonstrated that broadcast media in Makurdi influence audience perceptions regarding ecological sanitation, as a significant proportion of listeners indicated that radio programming affected their waste disposal practices^[16]. Egwu^[16]

also observed that individuals who frequently engaged with environmental sanitation broadcasts on radio or television were notably more inclined to express pro-sanitation views, in contrast to those lacking such exposure, and by fostering a consensus on appropriate sanitation and recycling practices, the broadcast media effectively encouraged changes in audience behaviour. Collectively, these studies reveal a recurring pattern: when media initiatives are persistent and well-defined, they can lead to observable changes in behaviour among urban populations in Nigeria.

2.2. Audience perception and engagement with environmental media messages

The way in which audiences interpret environmental messages significantly influences the effectiveness of campaigns. Recent survey research conducted in Nigeria reveals crucial aspects of message reception. Isah et al.^[17] examined the residents of Benin City and identified gaps in their awareness of environmental campaigns. A majority of respondents still rely on traditional media outlets such as television, radio, and newspapers for information on sustainability, yet many had not encountered the major campaigns. Notably, those who did view the messages generally assessed them as credible and persuasive. The study indicates a generally positive perception regarding the credibility and effectiveness of media campaigns. In essence, there exists a latent trust in media sources, although the reach of campaigns is inconsistent.

Social norms and community dynamics significantly influence the reception of messages. Isah et al.^[17] observe that the prevailing social norms in Benin City such as local recycling practices and institutional regulations have a profound impact on how individuals respond to media campaigns. This indicates that audience engagement transcends mere passive exposure, occurring instead within a broader social framework. In a similar vein, Egwu's^[16] audience survey conducted in Makurdi revealed that a substantial proportion of listeners concurred that radio coverage regarding environmental sanitation affected their personal attitudes. This research highlights a "feedback" mechanism: audience members remember particular programmes and recognize that exposure to expert or governmental communications about waste has altered their perspectives (for instance, motivating them to reduce plastic consumption or maintain cleaner environments).

Interestingly, even with the increasing prevalence of social media throughout Africa, some evidence indicates that audiences in specific communities continue to depend more on traditional sources for environmental information. In the survey conducted in Benin City, residents showed a preference for traditional media channels when seeking sustainability updates, despite acknowledging the potential of online platforms^[17]. Waititu's^[18] research on Kenyan community organizations partially corroborates this observation: while the use of social media is on the rise, many local NGOs have not fully utilized it for environmental education. Waititu notes that community-based organizations (CBOs) in Nakuru, Kenya, were engaging with social media for environmental awareness at only minimal levels, despite its recognized potential as an engagement tool. Participants in that study similarly conveyed a greater trust in familiar media brands. Collectively, these findings suggest that effective environmental communication should integrate reliable traditional channels (such as local radio, television, and newspapers) with targeted outreach through newer platforms, ensuring that essential messages are both visible and credible to urban residents.

2.3. Traditional vs digital media in environmental awareness

Recent research has underscored significant distinctions between traditional and digital media in disseminating environmental messages across Africa. Evidence from surveys conducted in Nigeria reveals that digital platforms are becoming increasingly influential in discussions surrounding sustainability. According to^[14], a greater number of Nigerians are now utilizing online and social media to interact with environmental content, in contrast to traditional media. In their findings, digital media not only saw more

frequent usage but also played a crucial role in mobilizing grassroots activism. These platforms facilitate the swift sharing of videos, images, and messages from community groups regarding pollution, thereby amplifying calls for local initiatives (such as clean-up events). Indeed, Odunlami and Aro^[14] observe that despite the limited coverage by newspapers, social networking can effectively fill this gap by rapidly spreading narratives about local pollution, exemplified by movements like #StopTheSoot in Port Harcourt.

Nonetheless, traditional media continue to hold a crucial anchoring function. Egwu's research^[16] revealed that broadcast radio is still the primary source of information regarding environmental sanitation for many Nigerians. Particularly, older demographic groups and lower-income audiences may not engage with social media, making radio and television the principal mediums for public education. Isah et al.^[17] similarly noted that in Benin City, a significant portion of the population favoured radio or television for news related to sustainability. Therefore, integrated campaigns are most effective when they leverage both domains. In light of this, numerous researchers advocate for environmental communicators to utilize the advantages of each medium. Waititu^[18] proposes enhancing capacity so that community organizations can effectively employ social media as a social learning environment for environmental education, while also disseminating targeted radio broadcasts for those who are less connected online. Odunlami and Aro^[14] specifically recommend that media organizations leverage digital media platforms to reach a broader audience and produce engaging content while simultaneously being vigilant against online misinformation.

In summary, a hybrid approach is essential in African cities. The traditional media to legitimize and contextualize issues for all citizens, and digital platforms to engage the youth, facilitate discussions, and coordinate collective action.

2.4. Urban Pollution and Media-Based Interventions in African Cities (Port Harcourt Focus)

Urban areas in Africa are grappling with significant pollution issues, and media initiatives are becoming an integral part of the solution. Port Harcourt serves as a prime example of this predicament. Recent research reveals that persistent black soot and inadequate waste management have compromised local air quality and public health^[19]. Okonkwo et al.^[19] conducted measurements of particulate matter (PM_{2.5} and PM₁₀) in Port Harcourt, discovering levels that exceed the safety thresholds established by the World Health Organization. They identify illegal oil refining and gas flaring as primary contributors to soot emissions. Importantly, Okonkwo et al. advocate for regulatory measures to control emissions along with public awareness campaigns to inform the community about the hazards of black soot pollution. This indicates that, even in the context of a technical issue such as toxic smoke, enhancing public awareness through media is regarded as an essential strategy.

In practice, local governments and NGOs have initiated media-based campaigns. Civil society organizations in Rivers State have commenced awareness initiatives under slogans such as "Beat Plastic Pollution," utilizing radio, television, and social media to promote appropriate waste disposal. Omojunikanbi^[12] even indicates that a multi-channel soot risk communication campaign was notably successful due to residents accessing information through broadcast and social media. Although comprehensive data has yet to be released, these initiatives demonstrate an increasing acknowledgment that media messaging should complement regulatory measures.

Beyond Port Harcourt, research conducted in other Nigerian cities underscores the significance of media engagement. In Makurdi, Egwu^[16] discovered that when environmental sanitation became a consistent element of radio news and talk shows, community attitudes experienced a measurable shift where listeners began to dispose of waste correctly and support cleanup initiatives. Nevertheless, a review of the empirical literature uncovers ongoing deficiencies. Numerous analyses indicate that African media continues to under-

report environmental issues^[16,20]. Okorie^[20] discovered that prominent Nigerian newspapers provided sporadic and predominantly negative coverage regarding pollution, particularly concerning air quality. When coverage is limited, audiences are deprived of the necessary information to mobilize effectively. This highlights a significant challenge where urban inhabitants are unable to engage with environmental campaigns that they do not encounter. Consequently, the literature advocates for more consistent and comprehensive reporting. Egwu^[16] suggests that broadcasters and regulatory bodies (such as Nigeria's NBC) should mandate segments focused on sanitation and necessitate collaborations with NGOs for on-the-ground follow-up. In Port Harcourt and other heavily polluted cities, addressing this coverage gap is essential.

3. Theoretical framework

The Agenda-Setting theory asserts that the greater the attention the media allocate to a particular issue, the more significant it becomes for the public^[21]. When applied to the topic of environmental cleanliness, this theory implies that increased media coverage of pollution and sanitation will enhance public awareness and concern. Empirical research conducted in Nigeria corroborates this assertion: Odunlami and Aro^[14] discovered that 74% of participants recognized that exposure to media significantly heightened their awareness of environmental issues. They explicitly connect these results to agenda-setting, noting that consistent sustainability reporting elevated environmental topics on the public agenda. Likewise, Egwu's study in Makurdi^[16] demonstrated that regular broadcasts concerning ecological sanitation encouraged listeners to adopt pro-cleanliness norms. Egwu^[16] observed that broadcast media generated consent regarding environmental sanitation and contributed to shaping audience attitudes towards ecological sanitation. In summary, when media campaigns focused on waste disposal or anti-soot initiatives are conducted consistently, audiences become increasingly aware and attentive to cleanliness issues. This directly pertains to Objective 1 (awareness of clean-environment messages) and Objective 3 (frequency of such messages): a higher frequency of media coverage should enhance issue salience for citizens in Port Harcourt, as evidenced in other regions of Nigeria.

However, studies also indicate that Nigerian media exhibit weak environmental agendas. Ogadimma et al.^[3] discovered that four prominent Nigerian newspapers published merely 754 stories related to the environment (including only eight editorials) over a span of two years. This minimal coverage suggests a restricted agenda-setting impact where a limited number of citizens become aware of these issues due to the infrequent media coverage. Similarly, Ata-Awaji and Ikot-Osin^[8] reported that the broadcast media in Port Harcourt under-reported issues related to soot and waste. According to agenda-setting theory, these deficiencies in coverage are likely to result in low public awareness in Port Harcourt. In fact, a survey conducted in Benin City revealed that the majority of residents had minimal exposure to climate-change initiatives, typically encountering them solely through radio^[22]. Collectively, these findings imply that unless media communications regarding cleanliness are both frequent and prominent, agenda-setting theory would anticipate low levels of awareness and engagement among audiences in Port Harcourt.

Exposure and Media Channels: In relation to this, the level of audience exposure is contingent upon the utilization of various channels. Research conducted in Nigeria reveals that traditional media, specifically radio and television, continue to serve as the main sources of information for a significant portion of the population. Egwu^[16] highlighted that individuals residing in Makurdi predominantly depend on broadcast media for their informational needs. Similarly, Ezegwu et al.^[22] documented that the residents of Benin City frequently encounter environmental campaign messages through radio broadcasts. These trends suggest that the effects of Agenda-Setting are influenced not only by the frequency of messages but also by the specific outlets that disseminate these messages. In Port Harcourt, non-governmental organizations and governmental

initiatives have employed radio, television, and social media platforms such as the “Beat Plastic Pollution” campaigns^[11] to engage with the public. Furthermore, Odunlami and Aro^[14] note that despite the increasing use of social media, radio remains a crucial source of information for older and economically disadvantaged Nigerians. Consequently, Agenda-Setting in Port Harcourt likely encompasses both traditional and digital media channels: environmental concerns may achieve greater public visibility only when they are consistently featured across multiple platforms. Regarding Objective 2 (exposure), these investigations suggest that a considerable number of residents in Port Harcourt primarily receive information through radio and television, while social media initiatives (like the #StopTheSoot campaigns) can enhance visibility when traditional media coverage is lacking.

4. Materials and methods

The study uses a quantitative research design with a survey research method. This approach allows for the collection of numerical data that can be statistically analyzed to identify patterns and relationships among variables. It is chosen for its efficiency in collecting data from large samples and its ability to produce standardized information suitable for measuring attitudes and perceptions related to environmental cleanliness messages in Port Harcourt. The population consists of adult residents aged 18 and above in Port Harcourt, Nigeria, estimated at approximately 3.1 million as of 2023. The population is socio-economically diverse, including various educational backgrounds and occupations, consisting of both long-term residents and recent migrants. The study’s sample size was determined statistically using an online Australian sample size calculator, resulting in a sample size of 385 respondents.

A multi-stage sampling technique was used to ensure representativeness. At stage one, cluster sampling clustered all 34 areas of Port Harcourt for geographic representation. At stage two, simple random sampling randomly selected 6 areas from the 34 clusters. At stage three, the purposive sampling was applied to select shops, houses, churches, mosques, buildings occupied by people within the selected areas based on the researcher’s judgment. At stage four, the availability sampling allowed copies of questionnaire to be administered to available residents.

Data was collected using a structured questionnaire divided into two sections: demographic data and psychographic data. The questionnaire was subjected to face validity through evaluation by a statistician who reviewed its content, format, clarity, and alignment with research objectives. The test-retest method was used with 20 respondents completing the questionnaire twice within three days. The Guttman Scale formula was applied to calculate the reliability coefficient, which was found to be 0.9 (or 90%), indicating very high reliability. Data were analyzed using percentages and frequency to address research questions.

5. Results

Demographic Data: Table 1 presents the demographic characteristics of the respondents.

Table 1. Demographic characteristics of the respondents. n=385

| Demography of Respondents | | Frequency | Percent |
|---------------------------|--------|-----------|---------|
| Gender | Male | 160 | 42% |
| | Female | 225 | 58% |
| Age | 18-25 | 203 | 53% |
| | 26-35 | 58 | 15% |
| | 36-45 | 63 | 16% |

| Demography of Respondents | | Frequency | Percent |
|--------------------------------------|-------------------------|-----------|---------|
| Length of residence in Port Harcourt | 46-55 | 28 | 7% |
| | 56-above | 33 | 9% |
| | 6 month - 1 year | 85 | 22% |
| | 2-5 years | 73 | 19% |
| | 6-10 years | 72 | 19% |
| | Over 10 years | 155 | 40% |
| Occupation | Student | 163 | 42% |
| | Civil servant | 31 | 8% |
| | Private sector employee | 84 | 22% |
| | Self employed | 81 | 21% |
| | Retired | 26 | 7% |

Table 1. (Continued)

Source: Field Survey, 2025

The demographic profile shows that out of 385 respondents, females constituted a slightly higher proportion (58%) than males (42%). The age distribution indicates that slightly more than half (53%) were between 18–25 years, suggesting a youthful sample. Respondents who had lived in Port Harcourt for over 10 years formed the largest category (40%), indicating that many participants had adequate contextual exposure to local environmental issues. In terms of occupation, students comprised 42% of the sample, followed by private-sector employees (22%) and self-employed individuals (21%). This distribution reflects a diverse mix of residents, with youth and working-class groups strongly represented.

Research Question One: What is the level of audience awareness on media messages promoting clean environments? Result from this research question is presented in **Table 2** and **Table 3** below.

Table 2. Audience awareness of media messages on environmental cleanliness.

| Question: Through which of these media channels have you encountered messages about environmental cleanliness? | | | |
|--|------------|-------------|--|
| Response | Frequency | Percent (%) | |
| Television | 153 | 40% | |
| Radio | 139 | 36% | |
| Newspapers | 93 | 24% | |
| Total | 385 | 100 | |

Source: Field Survey, 2025.

Television was the most common channel through which respondents encountered environmental cleanliness messages (40%), followed closely by radio (36%). Newspapers were the least encountered source (24%). These findings suggest that broadcast media, particularly television, remain the dominant platforms for environmental communication in the study area.

Table 3. Awareness of specific message types. n=385

| Rate your awareness of the following types of environmental cleanliness messages | VLL (%) | LL (%) | Moderate (%) | HL (%) | VHL (%) |
|--|---------|---------|--------------|----------|----------|
| Proper waste disposal methods | 19 (5) | 48 (12) | 93 (24) | 125 (33) | 100 (26) |
| Air pollution control | 29 (8) | 50 (13) | 70 (18) | 131 (34) | 105 (27) |

| Rate your awareness of the following types of environmental cleanliness messages | VLL (%) | LL (%) | Moderate (%) | HL (%) | VHL (%) |
|--|-----------|------------|--------------|-------------|-------------|
| Water pollution prevention | 23 (6) | 48 (12) | 72 (19) | 139 (36) | 103 (27) |
| Street cleaning campaigns | 27 (7) | 58 (15) | 62 (16) | 139 (36) | 99 (26) |
| General environmental hygiene | 22 (6) | 53 (14) | 84 (22) | 121 (31) | 105 (27) |

Table 3. (Continued)

Source: Field Survey, 2025.

Awareness levels across the five categories of environmental cleanliness messages were generally moderate to very high. For instance, 33% and 26% of respondents reported high levels and very high levels respectively of awareness on proper waste-disposal messages, while 61% reported similar levels for air pollution control messages. Water pollution prevention and street-cleaning campaign messages also had strong awareness levels, with more than half of respondents indicating high to very high levels. Overall, the data show that environmental messages are widely recognized, though awareness is strongest for pollution-focused themes compared to waste-related topics.

Research Question Two: What is the level of audience exposure to media messages promoting clean environments? Result from this research question is presented in **Table 4**.

Table 4. Audience exposure to environmental cleanliness messages.

| Question: How long have you been exposed to media messages about environmental cleanliness? | | |
|---|------------|-------------|
| Response | Frequency | Percent (%) |
| Less than 1 month | 54 | 14% |
| 1-3 month | 55 | 14% |
| 3-6 months | 62 | 16% |
| 6-12 months | 47 | 12% |
| More than a year | 167 | 44% |
| Total | 385 | 100% |

Source: Field Survey, 2025

A substantial proportion of respondents (44%) reported exposure to environmental cleanliness messages for more than one year, indicating sustained engagement with environmental communication. Only 14% had been exposed for less than one month. This long-term exposure pattern suggests that media messages on environmental cleanliness are consistent and long-standing features of local communication efforts.

Research Question Three: What is the frequency of media messages conveying clean environment themes? Result from this research question is presented in **Table 5** and **Table 6** as seen below.

Table 5. Frequency of media messages.

| Question: I encounter media messages about environmental cleanliness frequently? | | |
|--|------------|-------------|
| Response | Frequency | Percent (%) |
| Strongly disagree | 50 | 13 |
| Disagree | 49 | 13 |
| Neutral | 120 | 31 |
| Agree | 116 | 30 |
| Strongly agree | 50 | 13 |
| Total | 385 | 100 |

Source: Field Survey, 2025.

Responses were widely distributed, with 31% remaining neutral and 30% agreeing that they encounter such messages frequently. Although fewer respondents strongly agreed (13%), the combined percentages of agreement (43%) show that many residents perceive environmental cleanliness messages as fairly regular in the media.

Table 6. Frequency across media channels. n=385

| ITEMS Rate the frequency of environmental cleanliness for each of these media channels: | Very low (%) | Low (%) | Moderate (%) | High (%) | Very high (%) |
|---|--------------|------------|--------------|-------------|---------------|
| Television | 40 (10) | 41 (11) | 168 (44) | 81 (21) | 55 (14) |
| Radio | 49 (13) | 52 (14) | 123 (31) | 112 (29) | 49 (13) |
| Newspapers | 87 (23) | 80 (20) | 162 (42) | 30 (8) | 27 (7) |
| How would you rate consistency of Environmental Cleanliness Messages across these media channels? | | | | | |
| Television | 46 (12) | 47 (12) | 157 (41) | 76 (20) | 58 (15) |
| Radio | 51 (13) | 37 (10) | 145 (38) | 102 (26) | 50 (13) |
| Newspapers | 87 (23) | 75 (19) | 162 (42) | 39 (10) | 23 (6) |

Source: Field Survey, 2025.

Frequency ratings were predominantly moderate across television (44%), radio (31%), and newspapers (42%). High-frequency ratings were more pronounced for television (21%) and radio (29%) compared to newspapers (8%). Regarding consistency, respondents again rated television (41%) and newspapers (42%) as moderately consistent in disseminating environmental messages, with radio following closely. Thus, while the frequency is not overwhelmingly high, it is steady and largely concentrated in broadcast media.

Research Question Four: How does audience perceive media messages on clean environments?

Result from this research question is analysed in **Table 7**, **Table 8**, **Table 9** and **Table 10**.

Table 7. Perception of message qualities. n=385

| Rate your agreement with the following statements about environmental cleanliness messages: | SD (%) | D (%) | N (%) | A (%) | SA (%) |
|---|-----------|------------|-------------|-------------|------------|
| The messages are clear and easy to understand | 23 (6) | 32 (8) | 102 (26) | 145 (38) | 83 (12) |
| The messages are relevant to local environmental issues | 29 (7) | 37 (10) | 105 (27) | 149 (39) | 65 (17) |
| The messages are practical and actionable | 32 (8) | 41 (11) | 125 (32) | 127 (33) | 60 (16) |
| The messages effectively motivate people to keep the environment clean | 33 (9) | 47 (13) | 117 (30) | 121 (31) | 67 (17) |

Source: Field Survey, 2025.

Perceptions were largely positive. For example, 38% agreed and 12% strongly agreed that the messages were clear and easy to understand. Similarly, 39% agreed and 17% strongly agreed that messages were relevant to local environmental issues. Practicality and motivational ability also received strong positive

ratings, with over 49% agreeing or strongly agreeing in each case. These results highlight favourable audience perceptions of clarity, relevance, practicality, and motivational impact of environmental cleanliness messages.

Table 8. Effectiveness of messages. n=385

| How would you rate the effectiveness of environmental cleanliness messages in terms of: | Very ineffective (%) | Ineffective (%) | Neutral (%) | Effective (%) | Very effective (%) |
|---|----------------------|-----------------|-------------|---------------|--------------------|
| Raising awareness | 49 (12) | 51 (13) | 103 (27) | 95 (25) | 87 (23) |
| Changing attitudes | 45 (11) | 56 (15) | 119 (31) | 126 (33) | 39 (10) |
| Promoting behavior change | 41 (10) | 60 (16) | 137 (36) | 100 (26) | 47 (12) |
| Providing practical solutions | 47 (12) | 63 (16) | 128 (34) | 104 (27) | 43 (11) |
| Creating lasting impact | 59 (15) | 57 (15) | 113 (29) | 114 (40) | 42 (11) |

Source: Field Survey, 2025.

Perceived effectiveness varied across dimensions. Approximately half of respondents rated the messages effective or very effective in raising awareness (48%) and promoting behaviour change (38%). Effectiveness in changing attitudes also showed strong positive ratings (43%). While neutral responses were relatively high across items, consistently higher proportions rated the messages as effective rather than ineffective, indicating general satisfaction with their impact.

Table 9. Most compelling aspects of messages.

| Question: What aspects of environmental cleanliness messages do you find most compelling? | | |
|---|------------|-------------|
| Response | Frequency | Percent (%) |
| Visual demonstrations | 126 | 32 |
| Expert opinions | 114 | 30 |
| Community impact stories | 66 | 17 |
| Integration of entertaining elements | 12 | 3 |
| Call to action | 52 | 13 |
| Enforcement of sanitation duties and awareness | 15 | 4 |
| Total | 385 | 100 |

Source: Field Survey, 2025.

Visual demonstrations (32%) and expert opinions (30%) emerged as the most compelling elements of environmental cleanliness messages. Community impact stories (17%) and calls to action (13%) also influenced some audience members. Entertainment-based elements had minimal impact (3%). These findings stress that audiences are most persuaded by visually rich and authoritative message formats.

Table 10. Behavioural responses to messages action taken as a result of media messages.

| Question: What actions have you taken as a result of these media messages? | | |
|--|-----------|-------------|
| Response | Frequency | Percent (%) |
| Proper waste disposal | 16 | 4 |

| Question: What actions have you taken as a result of these media messages? | | |
|---|------------|------------|
| Recycling | 47 | 12 |
| Reduced littering | 39 | 10 |
| Water conservation | 55 | 14 |
| Sharing environmental information with others | 98 | 26 |
| Community clean-up participation | 87 | 23 |
| None | 43 | 11 |
| Total | 385 | 100 |

Table 10. (Continued)

Source: Field Survey, 2025.

Environmental messages influenced several forms of action. The most common behaviour was sharing environmental information with others (26%), followed by participation in community clean-up activities (23%). Actions such as recycling (12%) and water conservation (14%) also featured prominently. Only 11% reported taking no action. This indicates that environmental messages are translating into meaningful, though varied, behavioural shifts among residents.

6. Discussion of findings

The findings of the study on audience perception of media messages on environmental cleanliness in Port Harcourt reveal several critical insights when viewed through the lens of empirical studies referenced within the manuscript. These findings underscore the complex interplay between media exposure, message frequency, audience awareness, perception, and resultant behaviour in a context marked by significant environmental challenges.

6.1. Audience awareness and exposure to environmental messages

The study found a generally moderate to high level of audience awareness of environmental cleanliness messages, with television and radio emerging as the dominant communication channels. Awareness was particularly strong around pollution control and waste disposal themes, indicating that media efforts have succeeded in foregrounding these issues to a considerable extent. This aligns with findings from^[14] and^[15], who demonstrated that media campaigns raise awareness and influence environmental practices in Nigeria through consistent coverage. The consistency and longevity of exposure reported by nearly half the respondents support the notion of sustained media presence contributing to issue salience, consistent with the Agenda-Setting theory^[21], which holds that media emphasis elevates the importance of issues in public consciousness.

However, the frequency ratings indicate some ambivalence, with around a third of respondents neutral on message frequency and only 43% agreeing that messages were frequently encountered. This points to a gap between message availability and audience perception of frequency, likely connected to the finding that newspapers and some traditional media remain underutilized for environmental reporting. This echoes Ogadimma et al.'s^[3] observation of limited environmental coverage in Nigerian newspapers and the previously noted under-reporting in Port Harcourt broadcast media^[8]. The dual role of traditional broadcast media alongside emerging digital platforms, such as social media campaigns like #StopTheSoot, reflects the hybrid media landscape characterized in recent Nigerian studies, where traditional media retain primacy for broader demographic reach while digital media engage younger, more connected segments^[14,18].

6.2. Perception of message credibility, clarity, and relevance

The research highlighted predominantly positive perceptions of message qualities, including clarity, local relevance, practicality, and motivational impact. A majority considered the messages effective in raising awareness (48%) and changing attitudes (43%). This is significant as audience perception is critical for campaign success, as noted by^[13], who emphasized that reception determines impact. The finding that visual demonstrations and expert opinions were the most compelling message elements aligns with studies indicating that authoritative and engaging formats enhance retention and behavioural motivation^[16]. Community impact stories and calls to action, though less cited, contribute to the social norming necessary for environmental behaviour change, consistent with social cognitive theories of media influence.

While mixed neutrality in responses suggests room for improvement in message engagement strategies, the generally favourable perception resonates with Egwu's^[16] and Isah et al.'s^[17] works on the trust and credibility of environmental campaigns when delivered through trusted local media and voices. The balance between traditional and digital communication here is crucial; despite rapid social media growth in Africa, many still rely on familiar radio and television sources for trustworthy information^[14,17].

6.3. Behavioral responses to environmental messaging

The translation of media messages into action varied across behaviours, with the highest reported activities being sharing information, participation in cleanup initiatives, and water conservation. These outcomes affirm the capacity of media campaigns to promote pro-environmental behaviour, echoing the findings of^[7] on media's role in waste management behaviour change in Nigeria. Nonetheless, the relatively lower engagement in practices like recycling and proper waste disposal flags a potential behavioural gap that communication efforts must address further. The gap may stem from systemic infrastructural and socio-economic constraints common in urban African environments, where knowledge and motivation do not always translate into capacity for behaviour change^[4,10].

The findings robustly support the applicability of Agenda-Setting theory to environmental communication in Port Harcourt. The moderate to high awareness driven by sustained media exposure exemplifies the transfer of salience from media to public agenda. However, agenda-setting effects appear attenuated by inconsistent media coverage and limited message frequency, which likely constrains broader and deeper public engagement. This is illustrated by the restricted number of environmental news stories in mainstream media and limited editorial advocacy observed in Nigerian media analysis^[3,8]. Moreover, the role of social norms and community influence in message reception, as highlighted in contextual literature from Benin City and Makurdi^[16,17], complements the theoretical framing by emphasizing that environmental communication success hinges not only on message dissemination but also on embedded socio-cultural dynamics that foster or inhibit behavioural adoption.

7. Conclusion and recommendations

This study examined the audience perception of media messages promoting environmental cleanliness in Port Harcourt, Nigeria, a city grappling with significant urban pollution challenges including persistent black soot and inadequate solid waste management. Findings demonstrate a generally moderate to high level of awareness of media campaigns focused on environmental cleanliness, particularly regarding pollution control and waste disposal themes.

Audience exposure to these messages is characterized as sustained but channel-dependent. A significant portion of residents reported exposure lasting more than a year, indicating that environmental messaging is a long-standing feature of the Port Harcourt media landscape. However, exposure is heavily skewed towards

television and radio. This reliance on traditional media suggests that while the reach is broad among general demographics, current strategies may be missing opportunities to deepen exposure through print and emerging digital channels, which showed lower penetration rates. Evidence from the study supports the applicability of agenda-setting theory in this context: sustained media exposure contributes to raising public salience of environmental issues.

However, media coverage of environmental topics particularly in print media and some mainstream outlets was uneven and often limited in frequency, which constrains the depth and reach of public engagement. The mixed perceptions regarding message frequency and consistency reveal a gap between media availability and audience recognition, indicating room for enhanced messaging strategies.

Audience perceptions of media messages were predominantly positive, emphasizing clarity, local relevance, practicality, and motivational impact. Visual demonstrations and expert opinions emerged as the most compelling message elements, which align with theories stressing the importance of authoritative, engaging content to motivate behaviour change. Despite this favourable view, behavioural changes varied notably. Actions such as sharing environmental information, participating in community clean-up activities, and water conservation were fairly common among respondents, but more systemic behaviours like proper waste disposal and recycling showed lower engagement. This suggests a behavioural gap likely influenced by broader infrastructural and socio-economic constraints beyond media influence alone.

In sum, while media messages on environmental cleanliness have positively influenced awareness and some behaviours in Port Harcourt, systemic deficiencies in media coverage and infrastructural barriers limit their full impact. The study highlights the need for comprehensive communication efforts that integrate consistent, credible media messaging with supportive environmental management policies, community involvement, and capacity building through the following recommendations:

1. **Adopt a Cross-Platform Hybrid Strategy:** While television and radio are effective, relying on them exclusively limits reach. Stakeholders must integrate digital media strategies to target younger demographics who may be less exposed to traditional broadcasts. Campaigns should repurpose TV content into short, shareable social media clips to broaden exposure.
2. **Diversify Message Themes:** To move beyond general awareness, media outlets should diversify content to include under-reported specific themes. Messages should rotate focus between general hygiene, recycling specifics, and soot mitigation to ensure comprehensive awareness across all environmental categories.
3. **Regulatory Mandates for Consistency:** To address the "neutral" perception of frequency, regulatory bodies such as the National Broadcasting Commission (NBC) should mandate that broadcast stations allocate a specific quota of weekly airtime to environmental sanitation and pollution control. Newspapers in Port Harcourt must move beyond sporadic reporting. Editors should be encouraged to institutionalize environmental reporting through dedicated weekly columns or editorials, ensuring that environmental discourse remains a constant, rather than occasional agenda item.
4. **Since respondents explicitly identified visual demonstrations and expert opinions as the most compelling elements, future media messages should prioritize video contents that show the "how-to" of waste management rather than just talking about it. Featuring local health experts and environmental scientists will further boost message credibility. Messages must remain localized. Using local dialects, recognizable landmarks, and addressing specific local grievances (like the black soot) ensures the messages remain relevant to local environmental issues, a key factor in**

positive audience reception. The study showed that while audiences want to act (positive perception), they often do not recycle or dispose of waste properly. Therefore, media campaigns must be synchronized with government infrastructure projects. It is counter-productive to broadcast messages about "using dustbins" if no dustbins exist. Communication campaigns should launch simultaneously with the provision of public waste bins and recycling depots to ensure that the behaviour demanded by the media is physically possible for the residents.

Author contributions

Conceptualization, Somtochukwu Okeke; methodology, Peace Nwamaka Ojonta, Robert C. E. Ezeanwu and Emeka Orekyeh; validation, Goodness Nwaneji, Obioma Ozioko and Charles Eze; formal analysis, Uzoamaka Chioma Ogor and Ambrose Igboke; investigation, Somtochukwu Okeke and Emeka Orekyeh; resources, Uzoamaka Chioma Ogor; data curation, Robert C. E. Ezeanwu; writing—original draft preparation, Somtochukwu Okeke; writing—review and editing, Peace Nwamaka Ojonta and Ambrose Igboke; supervision, Goodness Nwaneji; project administration, Somtochukwu Okeke; funding acquisition, Nil. All authors have read and agreed to the published version of the manuscript.

Conflict of interest

The authors declare no conflict of interest.

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