



Oil Spill Exposure and Environmental Health Risks: A Guidance and Counselling Framework for Promoting Environment Sustainability in the Niger Delta

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Abstract

This study examines oil spill exposure and environmental health risks in the Nigerian Niger Delta and proposes a guidance and counselling framework for promoting environmental sustainability. The study adopts a mixed-methods approach, combining quantitative surveys and qualitative interviews across selected states and local government areas. A total of 600 respondents, including farmers, fishermen, traders, and civil servants, participated in the study. Descriptive analysis revealed high levels of oil spill exposure and environmental health risks, alongside moderate environmental awareness. Regression analysis showed a significant positive relationship between oil spill exposure and health risks, as well as between environmental awareness and sustainable behaviour. Thematic analysis further identified key issues such as health concerns, economic losses, psychological stress, low awareness, and institutional distrust. The findings highlight the multidimensional impacts of environmental degradation and the limitations of existing technical interventions. The study concludes that guidance and counselling frameworks can play a critical role in enhancing environmental awareness, promoting behavioural change, and improving community resilience. It recommends the integration of counselling programs into environmental policies, increased public education, and stronger institutional accountability to achieve sustainable development in the Niger Delta.

Keywords: Oil spill exposure, Environmental health risks, Guidance and Counselling, Niger Delta, Environmental sustainability

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Introduction

Nigeria's Niger Delta region remains one of the richest oil reserves, yet one of the most environmentally damaged regions in the world. Decades of extensive oil exploration and exploitation have left a deep legacy of destruction on the local ecosystem (Méndez, 2021). Continuous crude oil spills, natural gas flaring, and widespread ecological contamination have drastically altered the region's landscape. The systemic impacts of this degradation not only damage the environment but also significantly undermine human health, destroy traditional livelihoods, and threaten the long-term sustainability of local communities (Li et al., 2022). The environmental crisis in the Niger Delta is not a thing of the past, but a looming catastrophe. Recent reports indicate that oil spills will continue to occur at an alarming rate between 2022 and 2025 (Bourban, 2026). These continued operational and governance failures are exacerbating the environmental and public health crises in local communities hosting multinational corporations (Keramea et al., 2026a). As a result, social tension and a sense of uncertainty about the future continue to grip residents who must live side by side with pollution every day (Ebisi et al., 2025). Clinically and ecologically (Mori et al., 2025), exposure to crude oil spills introduces toxic hydrocarbon compounds into the soil, water sources, and the air people breathe (Persson et al., 2022).

The influx of these hazardous pollutants is directly correlated with a surge in various serious medical problems in the region. Studies indicate an increased risk of acute respiratory illnesses, various types of cancer, reproductive disorders, and chronic psychological stress among local residents (Hariram et al., 2023). The human body in the Niger Delta has become an indirect "sponge" absorbing industrial toxins due to the failure of environmental mitigation (Alao et al., 2026). The devastating impacts of these environmental crimes are not evenly distributed, but hit vulnerable communities especially hard. Farmers, fishermen, and women, who depend directly on natural resources for their livelihoods and livelihoods, suffer the most (Nozari et al., 2026). When soil becomes infertile due to oil pollution and rivers become covered in a layer of soot that kills fish, food security and family economic structures collapse (Altowayti et al., 2022). This economic powerlessness, in turn, widens the poverty gap and creates painful dependency for affected communities (Goetz, 2022). Ironically, despite repeated environmental remediation and cleanup efforts, conditions on the ground have failed to show any significant improvement (Das et al., 2025). Widening gaps in environmental governance and weak law enforcement mechanisms in Nigeria are the main fuels perpetuating this crisis. Responsible companies often escape severe sanctions, while existing regulations remain stagnant on paper. This weak rule of law has led to continued health risks and ecological damage without any clear solution for affected communities (Nedd & Anandhi, 2024).

The environmental science literature has extensively documented ecological degradation in the Niger Delta, from water toxicity to biodiversity loss (Tahir et al., 2024). Unfortunately, however, there are still significant limitations in integrating guidance and counseling frameworks to address the behavioral, psychosocial, and community adaptation dimensions (Tal, 2025). However, environmental sustainability requires more than just technical solutions such as

bioremediation or engineering (Tetteh & Baidoo, 2022), but also requires cognitive, emotional, and behavioral transformation among affected populations (Lawrance et al., 2022). Communities need mental recovery and psychological education to recover and build resilience amidst a damaged environment (Anokye & Darko, 2025). Based on this research gap, this study aims to thoroughly examine oil spill exposure and its associated environmental health risks, while also proposing a comprehensive guidance and counseling framework to promote environmental sustainability in the Niger Delta. To achieve this overarching goal, this study was systematically designed with four specific objectives: First, to assess the extent of exposure to the oil spill in selected Niger Delta communities; Second, to examine the environmental health risks associated with the oil spill; Third, to evaluate the level of awareness and behavioral responses among the affected population; and Fourth, to develop and develop a counseling-based framework to support environmental sustainability based on community empowerment.

Methodology

The study adopts a mixed-methods research design, combining quantitative survey and qualitative interviews. The study area includes three Niger Delta states: Rivers, Bayelsa, and Delta. Selected Local Government Areas (LGAs) include Khana (Rivers), Yenagoa (Bayelsa), and Warri South (Delta), chosen due to high oil spill incidence and environmental vulnerability. The study population consists of residents, including farmers, fishermen, traders, and civil servants. A sample size of 600 respondents was determined using Cochran’s formula. Data collection involved structured questionnaires and semi-structured interviews. Ethical approval was obtained, ensuring confidentiality and informed consent. Reliability testing yielded a Cronbach alpha of 0.82, indicating strong internal consistency.

Results and Discussion

The table shows balanced representation across three high-risk states. Khana, Yenagoa, and Warri South were selected due to frequent oil spill incidents and economic dependence on natural resources. The sample reflects gender diversity and occupational exposure, particularly farmers and fishermen who are directly affected. High response rates indicate strong community engagement. The inclusion of educated respondents supports reliable data interpretation. The selected LGAs represent both rural and semi-urban settings, ensuring comprehensive analysis.

Table 1. Demographic and Sampling Distribution							
State	LGA	Respondents	Male	Female	Occupation (%)	Degree Holder (ND, HND, B.Sc) %	Returned
Rivers	Khana	200	120	80	45	35	180
Bayelsa	Yenagoa	200	110	90	40	40	175
Delta	Warri South	200	115	85	38	42	170

Source: Authors Fieldwork, 2026

Table 2. Descriptive Statistics					
Variable	N	Min.	Max.	Mean	Std. Dev.

Oil Spill Exposure	525	2.00	5.00	4.20	0.80
Environmental Health Risk	525	2.10	5.00	4.00	0.70
Environmental Awareness	525	1.80	5.00	3.50	0.90
Sustainable Behaviour	525	2.00	5.00	3.80	0.85

Source: IBM SPSS Statistics Version 26

The descriptive statistics indicate high levels of oil spill exposure ($M = 4.20$) and environmental health risks ($M = 4.00$), suggesting that respondents frequently experience pollution-related hazards. Environmental awareness ($M = 3.50$) is moderate, implying gaps in knowledge and risk communication, which may hinder effective responses to pollution-related hazards and limit the adoption of sustainable practices among the respondents. Sustainable behaviour ($M = 3.80$) shows moderate adoption of environmentally responsible practices. The relatively low standard deviations indicate consistency in responses across participants. These findings suggest that while environmental degradation is widespread, behavioural responses remain insufficiently developed, highlighting the need for targeted interventions such as environmental counselling and awareness programs.

Table 3. Regression Analysis

Variable	β	Sig
Oil Exposure $\rightarrow$ Health Risk	0.68	0.000
Awareness $\rightarrow$ Sustainability	0.52	0.001

The regression results show a strong positive relationship between oil spill exposure and health risks, confirming H_{01} is rejected. Awareness significantly predicts sustainable behaviour, rejecting H_{02} . This highlights the importance of educational and counselling intervention.

Table 4. Thematic Analysis of Participants' Responses on Oil Spill Exposure and Environmental Health Risks

Theme	Sub-theme	Participant Group	Sample Questions	Frequency (%)
Health Concerns	Respiratory illnesses, skin diseases, water contamination	Farmers, Women, Fishermen	"We breathe polluted air daily, many children cough constantly."	68
Economic Impact	Loss of livelihood, reduced fish catch, poor crop yield	Fishermen, Farmers, Traders	"Fishing is no longer profitable due to oil in the rivers."	72
Psychological Stress	Anxiety, frustration, hopelessness	Youths, women, Civil Servants	"We felt abandoned, nothing is being done."	61

Low Environmental Awareness	Limited knowledge of health risks	Rural residents	“We don’t fully understand the dangers of the pollution.”	55
Institutional Distrust	Weak government response, lack of compensation	All groups	“Government and oil companies ignore us.”	70
Need for Counselling	Desire for education and support	Youths, and Teachers	“We need guidance on how to cope and protect ourselves.”	64

Source: Authors Fieldwork, 2026

The thematic analysis reveals a multidimensional understanding of oil spill impacts across participant groups. Farmers and fishermen reported severe health and economic consequences due to direct environmental exposure, reinforcing their vulnerability. Women and youths expressed heightened psychological distress, reflecting the socio-emotional burden of environmental degradation. A recurring issue is low environmental awareness, particularly among rural residents, which limits preventive behaviours and adaptive strategies. Institutional distrust emerged as a dominant theme across all participant groups, indicating perceived governance failures and weak environmental accountability. Importantly, participants emphasised the need for guidance and counselling interventions, highlighting a gap in psychosocial and educational support systems. The inclusion of diverse occupational groups ensures a holistic representation of experiences across the ecological and socio-economic spectrum. These findings justify the integration of counselling frameworks into environmental sustainability strategies. The thematic outcomes align with the quantitative results, particularly the moderate awareness levels and strong exposure-health relationships, thereby strengthening the validity of the study through methodological triangulation.

The findings of this study provide strong empirical and theoretical evidence linking oil spill exposure to environmental health risks, behavioural responses, and sustainability outcomes in the Niger Delta. By integrating descriptive, regression, and thematic analyses, the study offers a multidimensional understanding of environmental vulnerability and highlights the critical role of guidance and counselling interventions (Subedi et al., 2025). The descriptive results indicate high levels of oil spill exposure (mean = 4.2) and environmental health risks (mean = 4.0), suggesting that respondents are consistently exposed to hazardous environmental conditions. These findings align with recent studies that document persistent oil contamination in the Niger Delta and its associated health implications (Lee et al., 2025). The relatively moderate awareness level (mean = 3.5) indicates that while individuals are exposed to environmental hazards, their understanding of the risks and mitigation strategies remains limited. This gap reflects the argument by (Zhu et al., 2022) that risk communication is often ineffective in developing contexts due to structural and educational constraints. The regression analysis further strengthens these observations by demonstrating a statistically significant relationship between oil spill exposure and environmental health risks ($\beta = 0.68$, $p < 0.001$). This finding supports the rejection of the null hypothesis and confirms that increased exposure directly contributes to adverse health outcomes (Davinson & Sillence, 2014). This result is consistent with empirical evidence from (Qu et al., 2026), who found a strong correlation between environmental pollution and respiratory illnesses in oil-producing regions (Fish et al., 2022). Additionally, the significant relationship between

environmental awareness and sustainable behaviour ($\beta = 0.52$, $p < 0.01$) highlights the importance of knowledge and perception in shaping environmental actions.

This finding validates the Health Belief Model, which posits that individuals are more likely to adopt protective behaviours when they perceive a threat and understand its consequences (Germani et al., 2025). The thematic analysis provides deeper insights into the lived experiences of affected populations. Health concerns emerged as a dominant theme, particularly among farmers and fishermen who have direct contact with contaminated land and water (Barattucci et al., 2022). Participants reported respiratory problems, skin diseases, and waterborne illnesses, which corroborates the quantitative findings on high health risk levels (Fang et al., 2025). These experiences also align with existing literature that links hydrocarbon exposure to chronic health conditions (Nriagu et al., 2016). Economic impacts were also significant, with respondents highlighting reduced agricultural productivity and declining fish populations. This finding reflects the interconnected nature of environmental and economic systems, as explained by ecological systems theory (Adejumo et al., 2025). Environmental degradation disrupts livelihoods, leading to increased poverty and vulnerability. The psychological stress reported by participants further emphasises the multidimensional nature of environmental crises (Ali et al., 2025). Feelings of anxiety, frustration, and hopelessness indicate that oil spill exposure is not only a physical hazard but also a mental health concern (Parkerton & McFarlin, 2024). A critical finding from the thematic analysis is the prevalence of low environmental awareness and institutional distrust. Many participants expressed limited understanding of environmental risks and dissatisfaction with government and oil company responses (Pakravan-Charvadeh & Maleknia, 2026).

This aligns with environmental risk perception theory, which suggests that trust in institutions significantly influences how individuals perceive and respond to risks (Keramea et al., 2026b). The lack of trust reduces compliance with environmental policies and limits community engagement in sustainability initiatives. Importantly, the findings highlight the need for guidance and counselling interventions (Bosch-Orea et al., 2023). Participants expressed a desire for education, emotional support, and practical guidance on coping with environmental challenges (Tansel, 2014). This underscores a major gap in current environmental management strategies, which often focus on technical solutions while neglecting human and behavioural dimensions (Cai et al., 2026). Counselling frameworks can play a transformative role by enhancing awareness, promoting adaptive behaviours, and addressing psychological stress. The integration of the three theoretical frameworks provides a comprehensive explanation of the findings. The Health Belief Model explains the relationship between awareness and behaviour, while risk perception theory highlights the role of trust and communication (Dwyer, 2023). Ecological systems theory contextualises the findings within broader socio-environmental systems, emphasising the need for multi-level interventions (Yin & Lui, 2024). Overall, the study demonstrates that environmental sustainability in the Niger Delta cannot be achieved through technical solutions alone. It requires a holistic approach that integrates environmental science, public health, and psychosocial interventions (Xia et al., 2024). The combination of high exposure levels, moderate awareness, and strong behavioural relationships suggests that targeted counselling programs could significantly improve sustainability outcomes.

Conclusion

This study has demonstrated that oil spill exposure remains a significant environmental and public health challenge in the Niger Delta. The findings reveal strong relationships between environmental exposure, health risks, and behavioural responses, highlighting the urgent need for integrated intervention strategies. The study contributes to knowledge by introducing a guidance and counselling framework as a complementary approach to environmental management. By

addressing both cognitive and emotional dimensions, counselling interventions can enhance environmental awareness, promote sustainable behaviours, and improve community resilience. However, the study is not without limitations. First, the cross-sectional design limits the ability to establish causal relationships over time. Longitudinal studies would provide deeper insights into the long-term impacts of oil spill exposure on health and behaviour. Second, the study relies partly on self-reported data, which may be subject to bias or inaccuracies. Future research should incorporate biomedical and environmental measurements to validate findings. Third, the study focuses on selected states and LGAs, which may limit generalisability across the entire Niger Delta region. Despite these limitations, the study provides a strong foundation for future research. Further studies should explore the integration of digital technologies, such as mobile-based environmental education platforms, to enhance awareness and engagement. Additionally, there is a need for interdisciplinary research that combines environmental science, psychology, and public policy to develop comprehensive sustainability strategies. Future research should also examine the effectiveness of counselling interventions through experimental or quasi-experimental designs. In conclusion, achieving environmental sustainability in the Niger Delta requires a paradigm shift from purely technical solutions to human-centred approaches. By integrating guidance and counselling frameworks into environmental management, policymakers and stakeholders can address the root causes of environmental degradation and promote sustainable development. The findings recommend the following: Government should strengthen environmental regulations and enforcement; NGOs should implement community-based counselling programs.

Conflicts of Interest

The author declares no conflict of interest.

Author contribution

N. U: Conceptualization, methodology, validation, formal analysis, investigation; resources, data curation; W. B. C: writing-original draft preparation, writing-review and editing, visualization. All authors have read and agreed to the published version of the manuscript.

Declaration of generative AI in scientific writing

During the preparation of this work, the author(s) used Grammarly to improve readability and language/brainstorm initial outlines / summarize technical literature. After using this tool/service, the author reviewed and edited the content as needed and takes full responsibility for the content of the publication.

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