

IMPACTS OF ARTISANAL CRUDE OIL POLLUTANTS ON POST FOOD CRISIS AND RESPIRATORY DISEASES IN IKWERRE LOCAL GOVERNMENT AREA (L.G.A) OF RIVERS STATE, NIGERIA

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ABSTRACT

This study investigated impacts of artisanal crude oil pollutants on post food crisis and respiratory diseases in Ikwerre L.G.A of Rivers State, Nigeria. Two objectives and two research questions were used for the study. This study used descriptive research design. The population of the study consisted of residents of Ikwerre L.G.A of Rivers State, Nigeria. A sample of 200 respondents was selected for the study. This was achieved using purposive sampling technique to independently select artisanal crude oil refiners at their refining sites in Ikwerre L.G.A in Rivers State, Nigeria. The instrument titled Impacts of Artisanal Crude Oil pollutants on Post Food Crisis and Respiratory Diseases Questionnaire (IACOPPFCDQ) was used for data collection. The instrument was content validated by professionals in the Department of Sociology, Faculty of Social Sciences, University of Port Harcourt, Choba. Furthermore, test retest method was used to establish the reliability value of 0.82 Correlation Coefficient for the study. Percentage and a frequency table were used to analyze biographical data of respondents for the study while mean and standard deviation were used as statistical methods to answer the research questions. The findings showed that impacts of artisanal crude oil pollutants were responsible for food crisis and respiratory diseases in the study area. Based on the findings of this study, recommendations were made among others, that the Federal Government in conjunction with the State Government should create awareness and educate the people about the dangers of crude oil pollutants and their impacts on agricultural produce which in turn led to food crisis in the study area.

Keywords: Impacts of Crude Oil Pollutants, Food Crisis, Respiratory Diseases

INTRODUCTION

Nigeria is the largest oil producer in Africa, and the eleventh largest producer of crude oil in the world. Prospecting and extraction of petroleum occur in over 50% of the Niger Delta region, resulting in a cornucopia of access roads, pipelines, wells, gas flaring, dredged spoils, and flow stations that are often located near homes, schools, farms, and within communities. Oil spills are common throughout the area, as a consequence of pipeline corrosion, poor maintenance of infrastructure, spills or leaks at the well heads, human error, theft of oil and intentional vandalism. The amount of oil that is spilled in the Niger Delta is unknown. Crude oil pollution is an unhealthy practice that poses health and environmental challenges to the inhabitants that are exposed to it. According to Nriagu (2011), artisanal crude oil pollution leads to losses for the oil companies caused by direct damage to the pipelines, and for commercial fisheries and aquaculture businesses because of decline in market activities.

Oil theft has considerable economic, social, environmental, governance and security implications. This criminal act has contributed to poverty and degradation that exist in the Niger Delta region of Nigeria today. The issue of oil theft in the Niger Delta region has been a problem for a long time but considered by many as tolerable. Large-scale oil bunkering has become an increasingly significant issue in recent years. The violence in Niger Delta is predicated on the activities of an illegal oil stealing syndicate that collaborates with foreigners to fuel the civil unrest with a view to creating opportunities to enable them engage in their illicit oil deals in the creeks. Another

negative impact of crude oil bunkering is environmental damage. The social and environmental costs of oil theft have been very extensive in the Niger Delta region of Nigeria.

The younger generation, particularly those who grow up in areas affected by crude oil bunkering, may have a different perspective. They may be more exposed to the immediate economic benefits, and may view it as a source of employment or income generation. Younger individuals may have a lesser understanding of the long-term environmental and health consequences associated with crude oil bunkering, which can influence their perception. However, there is also a growing awareness and concern among young people about environmental issues, which could lead to a more critical view of crude oil bunkering. Older individuals may rely on traditional media sources or community networks for information, while younger generations may have greater exposure to digital media and alternative sources of information.

Crude oil pollution often involves extraction methods that are crude, unregulated, and environmentally damaging. It can lead to oil spills, contamination of water bodies, and destruction of ecosystems. These activities have severe health implications for both humans and wildlife, affecting the quality of air, water, and food sources. Those involved in crude oil bunkering, such as the individuals directly engaged in the theft, or those working in the black market trade, face significant health risks. These risks include exposure to toxic chemicals, fires, explosions, and physical injuries. The lack of safety standards and protective measures further exacerbate these hazards (Adishi, 2016).

Statement of the Problem

Artisanal crude oil pollution in Nigeria has become a major environmental and socio-economic issue, especially in the Niger Delta area, region of Nigeria. Recent times, the Nigerian government has experienced a considerable decline in revenue due to the illegal siphoning of crude oil in the Niger Delta region. The siphoning of crude oil has negatively impacted on the environmental, social, and security sectors in the Niger Delta region. This problem is marked by multiple reasons and major consequences that affect both the environment and nearby communities.

Despite the recognized dangers of artisanal crude oil pollution, stakeholders exhibit varying degrees of awareness, concern, and attitudes towards the issue. This obstructs the execution of thorough strategies aimed at reducing the impact and preventing additional environmental damage. There is widespread unawareness among impacted communities, policymakers, and the public about the particular health hazards linked to artisanal crude oil pollution. Restricted access to information, insufficient health education, and the widespread presence of misinformation seem to lead to this lack of awareness of impacts of artisanal crude oil pollutants on humans. Perspectives on the health impacts of artisanal crude oil pollutants differ among various stakeholders. Some people might downplay the risks or focus more on immediate financial benefits rather than the long-term health effects. Some individuals might recognize the risks better but do not have the necessary resources or assistance to tackle them effectively.

Pipeline vandalism and the activities of local refineries, which are indicators of oil theft, contribute largely to the extensive crude oil spills and pollution in the area. This damage adversely affects the farmland and vegetation of host communities, contaminates rivers, and ultimately undermines the livelihoods of the people. The health issues associated with artisanal crude oil pollutants can manifest in various ways, including air pollution resulting from gas flaring. Ikwerre L.G.A faces significant issues such as environmental degradation and conflict, which include water pollution, increased rates of cancer and heart disease, a decrease in life expectancy, soil nutrient depletion, youth unrest, and communal disputes, all stemming from crude oil bunkering activities. These harmful activities lead to unforeseen disasters due to the destruction of the previously sustainable means of living.

Despite the Federal Government's attempts to reduce artisanal crude oil pollutants in the Niger Delta region through increased security funding and spending millions of naira each year on private security firms, along with equipping personnel from the Nigeria Security and Civil Defence

Corps (NSCDC), there has been a persistent issue with pipeline destruction and the ongoing trade of stolen crude oil by criminal organizations with global ties (Ugwuanyi, 2013). Okiotor (2022, P.14) in his study on "Effects of Oil Spill on Physicochemical Properties of Soil Spilled Sites in Kokori, Etiope East L.G.A of Delta State, Nigeria" by analyzing physicochemical properties, total petroleum hydrocarbon, polyaromatic hydrocarbon, benzene, anions, and selected heavy metal concentrations using standard methods. Data obtained revealed that the physicochemical properties of the assessed soils were insignificantly altered when compared with their respective DPR intervention values. PH values were in the range of 4.80-5.60 which is considered to be strongly acidic. The electrical conductivity ranged from 122 μ S/cm to 185 μ S/cm indicating that the soil was saline. Chloride ion values were between 32.50mg/kg to 82.10mg/kg. Nitrate ranged from 0.85mg/kg to 1.04mg/kg, while phosphate was between 0.34mg/kg and 0.96mg/kg. Total petroleum hydrocarbon varied from 7.12- 45.66mg/kg for topsoil and 7.12-37.82mg/kg for bottom soil. It is lowest at 7.12mg/kg, mean at 18.1mg/kg. These values were within the DPR permissible limits. Benzene and Polyaromatic Hydrocarbon (PAH) had a constant value of 0.001mg/kg in all locations. Iron, arsenic, lead, mercury, cadmium, nickel and copper were the heavy metals detected. Their concentrations at spill sites were moderate and generally did not exceed their respective target limits. However, the level of lead was as high as 11.6mg/kg in location 3. The soil should be monitored so that it does not exceed the threshold values of the studied parameters. Mariana (2010, P.22) carried out a study on "The Effects of Crude Oil Pollution on Soil Properties in Braila County". In case of physical analysis, the values obtained for granulo metric fractions were not influenced by the presence of crude oil. Results obtained showed variation in chemical properties of soil. Organic carbon increased from 2.23% for an unpolluted soil to 5.51% in polluted soil. C/N ratios increased from 13.01 for an unpolluted soil to 20.54 in polluted soil. Mobile phosphorous and potassium registered in polluted soil had similar values with the one characteristic for unpolluted soil. In line with the foregoing, crude oil at high pollution levels inhibited the growth of crops.

Hamber (2017, P.5) conducted a study titled: "The Effects of Crude Oil Spillage on Farmland in Gokana L.G.A of River state in Nigeria". The study was carried out in selected communities Kpoi, Biara, B-dere and K-dere. Soil samples were collected from each of the sampled locations comprising of the oil polluted and non-oil polluted soil following a reconnaissance survey from different soil depths; 0-15cm (surface) and 15-30cm (sub-surface). Total soil samples collected were 16. Heavy metals (Fe, Mn, Cr, and Zn) and THC, TOC, TOM, NO₃, pH, EC, and moisture content analysis of the contaminated and non-contaminated soils were determined using Atomic absorption spectrophotometer, pH meter, walkey-black wet oxidation and the results of the 4 sampled areas were compared with recommended standards.

The vidence of THC, TOC, TOM, NO₃-N, pH, EC were analyzed using the descriptive statistics and the independent "t" -test distribution was used to compare the difference in the heavy metals concentration and total hydrocarbon content across the sampled areas. The Tdistribution statistics shows a high variability of heavy metals and other elements in the oil polluted and non-oil polluted soils. These high values mean that Kpoi1, Biara1, K-dere1 and B-dere1, are affected with crude oil spillage compared with Kpoi2, Biara2, K-dere2, and Bdere2. The result therefore, implies low soil fertility and growth reduction as a result of change processes in plant growing on heavy metal polluted soils, which in turn implies low agricultural productivity and reduced livelihood in the affected areas. Recommendations are also made for quick and sustained intervention which is required to completely reclaim the affected area (soil), in order to appease the communities with the hope of living in a clean environment.

This indicates that the significant public funding allocated for the safety of oil facilities has not produced the desired outcomes. Consequently, oil theft and unlawful crude oil contamination in Ikwerre L.G.A present a challenge that jeopardizes the core of the oil sector and, by extension, the Nigerian economy. What is worrisome is the rising fact of food crisis and respiratory diseases which are yet to be addressed in the study area. Truly, it is this problem that the study seeks to

redress by investigating the impacts of artisanal crude oil pollutants on post food crisis and respiratory diseases in Ikwerre L.G.A of Rivers State, Nigeria.

Objectives of the Study

The following objectives are delineated for the study:

1. To explore the impacts of artisanal crude oil pollutants on post food crisis in Ikwerre L.G.A in Rivers State.
2. To examine the impacts of artisanal crude oil pollutants on respiratory diseases in Ikwerre L.G.A in Rivers State.

Research Questions

The following research questions are posited for the study:

1. What impacts do artisanal crude oil pollutants have on post food crisis in Ikwerre L.G.A in Rivers State?
2. What impacts do artisanal crude oil pollutants have on respiratory diseases in Ikwerre L.G.A in Rivers State?

Literature Review

Artisanal Crude Oil Pollutants and Post Food Crisis

Uche (2016, P.85) researched on Sulfur dioxide (SO₂) Accumulation in Soil and Plant's Leaves around an Oil Refinery: A Case Study of Saudi Arabia and the findings established that:

Crude oil pollutants posed a negative impact on the soil. The population of the study was 753 respondents. A sample of 199 respondents was selected using simple random sampling technique. Mean and standard deviation methods were used to answer the research questions while t-test was used to test the hypotheses at 0.05 level of significance.

Warmate (2017, P.14) analyzed the "Impacts of Artisanal Refining Activities on Soil and Water Quality in parts of Okrika and Ogubolo Areas of Rivers State, Nigeria" and found that oil spillage /pollution occurred as a result of corrosion of oil pipelines and explosion of oil wells/terminal/stations, giving rise to unproductive soil, and reducing the people's interest in agricultural activities. Warmate (2017, P.14) adopted the following methodological procedures: A simple random sampling technique was used to select a sample of 115 respondents for the study. Data collected through questionnaire were analyzed using the percentage.

Aliu (2018, P.169) investigated "Effect of Different Cadmium Levels on the Growth and Yield Parameters of Wild Vigna in Benin City, Edo State, Nigeria" and found that:

Crude oil pollution had negative effects on growth of wild Vigna. The target population of the study was 950 youths. A sample of 200 youths was selected using stratified random sampling technique. The data were collected through administration of copies of questionnaire. Mean and Spearman rank order were used to answer the research questions while ANOVA was used to test the hypotheses at 0.05 level of significance.

In tandem with foregoing facts, Ehiomogue, *et al.* (2023) noted that crude oil exploration activities have impacted the land, air, and water negatively in places where such activities take place. These impacts generally imply low soil fertility, which in turn implies low agricultural productivity and a reduced source of livelihood in affected areas (Ehiomogue, *et al.* 2023). Also, Ordinioha & Sawyer (2008, P.304) in their study titled "Food Insecurity, Malnutrition and Crude Oil Spillage in a Rural Community in Bayelsa State South-South Nigeria" found that crude oil spillage can increase household food insecurity and childhood malnutrition in the affected communities. With regards to these findings,

it is obvious that spillages whether official exploration or unofficial explorations (artisanal refining) usually have negative impacts on food availability. This is so because artisanal refining degrades agriculture and predisposes the soil to infertility and low production of food in human society.

Furthermore, Richard, *et al.* (2022, P.69) in their article titled "Implications of Artisanal Crude Oil Refining on Sustainable Food Production in the Niger Delta Region of Nigeria showed that:

Activities of artisanal crude oil refiners were harmful to the vegetation cover, thereby altering the physicochemical and microbial composition of the soil, and releasing hydrocarbons into the environment. These are absorbed by vegetation leading to an increase in human and biodiversity contamination from artisanal crude oil refining, as well as loss of arable farmlands, uncontrolled bush burning, and increased cases of soil erosion. Therefore, artisanal crude oil refining activities have negative effects on food security, which are characterized by reduced food availability, accessibility, stability, and utilization.

Sadly, the destructive impacts of crude oil exploitation on the natural environment, which the inhabitants of the Niger Delta depend on for their livelihood, pose major threats to food security (Babatunde, 2023). Thus, with high level of destructive pollutants from artisanal refining people suffer shortage of food production, as well as being predisposed to poor access to balanced diets in human environment.

Drawing from the above facts, Bebetidoh, *et al.* (2022) argue that the high impact of the activities of refiners on farmlands and fishing areas of the host communities has serious effects on access to agricultural produce. By this negative effects of activities of local crude oil refining, the study by Bebetidoh *et al.* (2020,P.1) on "Sustained Impact of the Activities of Local Crude Oil Refiners on Their Host Communities in Nigeria" suggested to the Nigerian government, ways to address the impact of local refining on host communities. The need for proper synergy between the environmental protection agencies, the police, civil defense and military in the enforcement of environmental protection laws was emphasized and recommended (Bebetidoh *et al.*, 2020) . Figure 1 was adapted from polluted cassava farmland in Emohua Local Government Area as cited by Okwakpam & Okah (2021).



Figure 1: Polluted Cassava Farmland in the Study Area
Source: Okwakpam & Okah (2021)

Artisanal Crude Oil Pollutants and Post Respiratory Diseases

Ayodele (2018, P.262) investigated "Threat and Conservation of Wildlife Resources in Niger Delta Region of Nigeria" and established that artisanal crude oil pollutants cause asthma and breathing disorder among the residents of Niger Delta region of Nigeria. In achieving these results, Ayodele (2018, P.262) used the following methodological procedures:

Collected data via individual semi-structured interviews and 3 focus groups. The data were analyzed using interpretative phenomenological analysis. Themes that emerged from analysis included children's health issues, including asthma and other breathing problems, and high death rates among the elderly in the study area. The villagers also observed the increase in mortality and illness in the area, as well as people suffering from anxiety and depression.

Scarnati (2018, P.90) assessed the "Impacts of Oil Spill Disaster on Communities and its Influence on Restiveness in Niger Delta of Nigeria", and the findings showed that:

The highest number of moderate to severe respiratory disease symptoms was experienced by respondents from Nembe 12 (41.4%), followed by those from Sampou 8 (27.6%), and then by those from Gbarain 9 (31.0%). Also, coughing that occurred mostly when lying down was found to be significantly prevalent among residents of Nembe [35 (47.9%); p-value: 0.016], among other symptoms. Respiratory disease symptoms were more likely to be found among females (p-value: 0.037), smokers (p-value: 0.002), and those having a low health risk perception related to PAHs exposure (p-value: 0.002). Respondents from the three study sites had in the past 12 months experienced various respiratory disease symptoms, which could be directly related to their exposure to pollution from artisanal crude oil refining. Artisanal refining of crude oil should be continually dissuaded through unwavering enforcement of environmental health laws in order to further improve public and environmental health.

To achieve the foregoing findings, Scarnati (2018, P. 90) explained that:

The study utilized a comparative, cross-sectional design. It was conducted in three communities in Niger Delta. These included Sampou (a mildly exposed community), Nembe, and Gbarain (severely exposed communities). A sample of 615 adults selected by multistage sampling completed the study instrument, which assessed data on their respiratory health. Environmental monitoring of the PAHs levels of the samples was done, and concentrations were determined using the gas chromatography/flame ionization detector (GC/FID). The Statistical Package for Social Sciences version 25 was used to conduct descriptive and inferential analyses.

Akinbobola (2014, P.132) studied "Environmental Worry of River State Residents in the Niger Delta Region, Nigeria" found that:

Crude oil pollution had a negative effect on respiratory organs/system. The population for this study consisted of 750 respondents. A well structured questionnaire was administered to the respondents to help generate the required data for the study. The data generated were analyzed using percentages and mean scores while the stated hypotheses were statistically tested with the chi-square test and the Spearman's correlation co-efficient.

There is no gainsaying the fact that artisanal refining has devastating effects on human health. In concordance with these facts, Nriagu, *et al.* (2016;1) in their study titled "Health Risks Associated with Oil Pollution in the Niger Delta Area, Nigeria" and the findings revealed that there are high levels of disease symptoms and environmental distress (worry, annoyance and intolerance) associated with oil pollution in the Niger Delta areas of Nigeria. Generally speaking, Rusiecki, *et al.* (2022, P.4) in their work titled Incidence of Chronic Respiratory Conditions among Oil Spill Responders: Five Years of Follow-up in the Deep Water Horizon Spill Coast Guard Cohort Study showed that:

For responders reporting exposure to crude oil via inhalation, there were elevated risks for all sinusitis (aHR=1.48; 95% CI, 1.06-2.06), unspecified chronic sinusitis (aHR=1.55; 95% CI, 1.08-2.22), Chronic Obstructive Pulmonary Disease (COPD) and other allied conditions (aHR=1.43; 95% CI, 1.00-2.06) and dyspnea and respiratory abnormalities (aHR=1.8; 95% CI, 1.00-1.67); there was a suggestion of elevated risk for disease classified as asthma and reactive airway diseases (aHR=1.18; 95% CI, 0.98-1.41), including the specific condition, asthma (aHR=1.35; 95% CI, 0.80-2.27), the symptom, shortness of breath (aHR=1.50; 95% CI, 0.89-2.54), and the overall classification of chronic respiratory conditions (aHR=1.18; 95% CL, 0.98-1.43). Exposure to both crude oil and dispersant was positively associated with elevated risk for shortness of breath (HR=2.24; 95% CI, 1.09-4.64).

Affirming the above facts, Bustaffa, *et al.* (2018) argued that exposure to air pollution has been shown to increase the risk of developing chronic respiratory diseases. Table 1 deals with prevalence of specific respiratory disease symptoms (multiple responses were given) as cited from Chukwunweike, *et al.* (2023).

Table 1: Prevalence of Specific Respiratory Disease Symptoms (Multiple Responses were given)

VARIABLES	SAMPOU	NEMBE	GBARAIN	TOTAL	X ² (p-VALUE)
	FREQ (%)	FREQ (%)	FREQ (%)	FREQ (%)	
Chest pain with deep breathing	75 (34.8)	73 (34.0)	67 (31.2)	215 (35.0)	0.744 (0.689)
Coughing that produces thick sputum	73 (49.3)	39 (26.4)	36 (24.3)	148 (24.1)	22.548 (<0.001)*
Coughing that occurs mostly when lying down	21 (28.8)	35 (47.9)	17 (23.3)	73 (11.9)	8.331 (0.016)*
Coughing up blood	0 (0.0)	5 (55.6)	4 (44.4)	9 (1.5)	4.736 (0.094)
Coughing that wakes one early in the morning	23 (38.3)	25 (41.7)	12 (20.0)	60 (9.8)	5.430 (0.066)
Difficulty breathing	15 (41.7)	13 (36.1)	8 (22.2)	36 (5.9)	2.301 (0.316)
Breathlessness when walking fast	14 (29.2)	20 (41.7)	14 (29.2)	48 (7.8)	1.627 (0.443)
Breathlessness when walking normally	2 (10.0)	6 (30.0)	12 (60.0)	20 (3.3)	7.855 (0.02)*
Breathlessness when working	15 (40.5)	9 (24.3)	13 (35.1)	37 (6.0)	1.610 (0.447)
Persistent stuffy nose	12 (33.3)	16 (44.4)	8 (22.2)	36 (5.9)	2.832 (0.243)
Persistent runny nose	28 (54.9)	18 (35.3)	5 (9.8)	51 (8.3)	17.062 (<0.001)*
Thick mucus production without coughing	6 (16.2)	19 (51.4)	12 (32.4)	37 (6.0)	7.304 (0.026)*
Whistling sounds from chest	1 (5.8)	8 (47.1)	8 (47.1)	17 (2.8)	5.929 (0.05)*
Chest tightness	8 (21.6)	16 (43.2)	13 (35.1)	37 (6.0)	2.818 (0.244)
Episodes of struggling to breathe	5 (29.4)	6 (35.3)	6 (35.3)	17 (2.8)	0.121 (0.941)

Source: Chukwunweike, *et al.* (2023)

METHODOLOGY

This study used descriptive research design. The population of the study consisted of residents in Ikwerre L.G.A of Rivers State. A sample of 200 respondents was selected using purposive sampling technique. The instrument titled: IACOPPFCDQ was used for data collection. It was structured into Section A: Biographic data with multiple questions (items) based on sex, age, educational qualifications and marital status while Section B dealt with responses from

respondents regarding Impacts of Artisanal Crude Oil Pollutants on Post Food Crisis and Respiratory Diseases in Ikwerre L.G.A of Rivers State, Nigeria.

Furthermore, the study used modified four-point Likert scale of Strongly Agreed (SA) rated 4, Agreed (A) rated 3, Disagreed (D) rated 2 and Strongly Disagreed (SD) rated 1. Content validity of the instrument was established by professionals in the Department of Sociology, Faculty of Social Sciences, University of Port Harcourt, Choba. Test retest method of reliability was used to establish the reliability value of 0.82 Correlation Co-efficient for the study. The researchers administered the copies of the questionnaire with the help of a research assistant who collected the copies of questionnaire as soon as the respondents completed their responses. Percentage and a frequency table were used to analyze biographical data of respondents for the study while mean and standard deviation were used as statistical methods to answer the research questions.

RESULTS

The results of the study are presented in Tables 2, 3, and 4. Table 2 results deal with biographic data of respondents while Tables 3 and 4 results deal with answers to research questions for the study.

Table 2: Demographic Data of Respondents

Biographic Data		Percentage
Sex		
Males	120	60
Females	80	40
Total	200	100
Age		
15-19 years	45	22.5
20-24 years	40	20
25- 29 years	50	25
30 - 34 years	35	17.5
35 and above	30	15
Total	200	100
Education Qualifications		
First School Leaving Certificates (FSLCs)	42	21
West Africa Senior School Certificates(WASSCs)	40	20
Bachelor of Science (B.SC) Certificates	59	29.5
Master of Science (M.SC) Certificates	58	29
Doctor of Philosophy (PH.D) Certificates	1	0.5
Total	200	100
Marital Status		
Married	67	33.5
Single	133	66.5
Divorced	0	0
Total	200	100

Source: Eze, Oriji & Agwanwo (2024), Field Work

Table 2 above shows the information on the biographic profile of respondents. The results of the table revealed that 120 (60%) were males, while 80 (40%) were females. This implies that male respondents were of the majority at the time of this study. The results on age brackets of the respondents in Table 2 above showed that 45 respondents (22.5%) were from ages 15 – 19 years, 40 respondents (20%) were from ages 20 – 24 years, 50 respondents (25%) were from ages 25 – 29 years, 35 respondents (17.5%) were from ages 30 - 34 years while 30 respondents(15%) were from ages 35years and above. Table 2 results above showed information on the respondents' education qualifications. They were represented as follows: FSLCs 42(21%), WASSCs 40(20%), B.SC Certificates 59(29.5%), M.SC Certificates 58 (29%) and PH.D Certificates 1(0.5%).The results in Table 2 delineated the marital status of respondents. Sixty seven respondents (33.5%) were married, 133 respondents (16.5%) were single. This information shows that single respondents were in majority with no responses on divorce.

Research Question One: What impacts do artisanal crude oil pollutants have on post food crisis in Ikwerre L.G.A of Rivers State?

Table 3: Mean Scores of the Impacts of Artisanal Crude Oil Pollutants on Post Food Crisis in Ikwerre L.G.A of Rivers State

S/N	Items	SA	A	D	SD	Total	Mean	Standard Deviation	Remarks
1	Impacts of artisanal crude oil pollutants on farmers' work predispose to food crisis	133	64	2	1	200	3.65	0.21	Agreed
2	Impacts of artisanal crude oil pollutants on the soil fertility predispose to food crisis	97	82	18	3	200	3.37	0.19	Agreed
3	Impacts of artisanal crude oil pollutants kill soil microbes, and in turn predispose to food crisis	102	92	6	0	200	3.48	0.24	Agreed
4	Impacts artisanal crude oil pollutant chemicals are harmful to crop yields, and in turn predispose to food crisis	101	88	7	4	200	3.43	0.21	Agreed

Source: Eze, Orijj & Agwanwo (2024), Field Work

Data in Table 3 show the mean scores of the respondents on the impacts of artisanal crude oil pollutants on post food crisis in Ikwerre L.G.A of Rivers State. In item 1 of Table 3, the respondents agreed that the impacts of artisanal crude oil pollutants on farmers' work predispose to food crisis, with a mean score of 3.65 and a standard deviation of 0.21. In item 2 of Table 3, majority of respondents agreed that the impacts of artisanal crude oil pollutants on the soil fertility predispose to food crisis with a mean score of 3.37 and a standard deviation of 0.19. In item 3 of Table 3, the respondents agreed that the impacts of artisanal crude oil pollutants kill soil microbes, and in turn predispose to food crisis with a mean score of 3.48 and a standard deviation of 0.24. Also, the item 4 shows that the respondents agreed with the statement that the impacts of artisanal crude oil pollutant chemicals are harmful to crop yields, and in turn predispose to food crisis with a mean score of 3.43 and a standard deviation of 0.21 respectively. Their mean response showed that they all agreed on the items in the table with mean scores greater than the criterion mean score of 2.50.

Research Question Two

What impacts do artisanal crude oil pollutants have on post respiratory diseases in Ikwerre L.G.A in Rivers State?

Table 4: Mean Scores of the Impacts of Artisanal Crude Oil Pollutants on Post Respiratory Diseases in Ikwerre L.G.A in Rivers State

S/N	Items	SA	A	D	SD	Total	Mean	Standard Deviation	Remarks
5	Impacts of artisanal crude oil pollutants predispose residents to asthma	78	65	42	15	200	3.03	0.17	Agreed
6	Impacts of artisanal crude oil pollutants predispose residents to chronic obstructive pulmonary disease (COPD)	34	84	46	36	200	2.58	0.15	Agreed
7	Impacts of artisanal crude oil pollutants predispose residents to pulmonary fibrosis	50	118	29	3	200	3.08	0.25	Agreed
8	Impacts of artisanal crude oil pollutants predispose residents to lung cancer	40	90	46	24	200	2.73	0.22	Agreed

Source: Eze, Oriji & Agwanwo (2024), Field Work

Data in Table 4 indicate the mean scores of the respondents on the impacts of artisanal crude oil pollutants on post respiratory diseases in Ikwerre L.G.A of Rivers State. In item 5 of Table 4, the respondents agreed that the impacts of artisanal crude oil pollutants predispose residents to asthma with a mean score of 3.03 and a standard deviation of 0.17. In item 6 of Table 4, the respondents agreed that the impacts of artisanal crude oil pollutants predispose residents to COPD with a mean score of 2.58, and a standard deviation of 0.15. Item 7 of Table 4, the respondents agreed that the impacts of artisanal crude oil pollutants predispose residents to pulmonary fibrosis with a mean score of 3.08, and a standard deviation of 0.25. In item 8 of the same table, the respondents agreed that the impacts of artisanal crude oil pollutants predispose residents to lung cancer with a mean score of 2.73 and a standard deviation of 0.22 respectively. Their mean response showed that they all agreed on the items in the table with mean scores greater than the criterion mean score of 2.50.

Discussion of Findings

This study critically examines impacts of artisanal crude oil pollutants on post food crisis and respiratory diseases in Ikwerre L.G.A of Rivers State, Nigeria. In the research question one, the findings of the study revealed that the impacts of artisanal crude oil pollutants on farmers' work predispose to food crisis, the impacts of artisanal crude oil pollutants on soil fertility predispose to food crisis, the impacts of artisanal crude oil pollutants kill soil microbes, and in turn predispose to food crisis, and the impacts of artisanal crude oil pollutant chemicals are harmful to crop yields, and in turn predispose to food crisis. These findings agree with Warmate (2017,P.14) who in his work titled "Impacts of Artisanal Refining Activities on Soil and Water Quality in parts of Okrika and Ogubolo Areas of Rivers State, Nigeria" and found that oil spillage /pollution occurred as a result of corrosion of oil pipelines and explosion of oil wells/terminal/stations, giving rise to unproductive soil, and reducing the people's interest in agricultural activities.

Also, in the research question two, the findings of the study revealed that the impacts of artisanal crude oil pollutants predispose residents to asthma, COPD, pulmonary fibrosis and lung cancer.

These findings are in agreement with Ayodele (2018) who in his work titled "Threat and Conservation of Wildlife Resources in Niger Delta Region of Nigeria" and established that artisanal crude oil pollutants cause asthma and breathing disorder among the residents of Niger Delta of Nigeria.

CONCLUSION

Based on the findings, the study concludes that artisanal crude oil pollutants have lucid impacts on food crisis and respiratory diseases in Ikwerre L.G.A. of Rivers State, Nigeria. Thus, to halt the impacts of artisanal crude oil pollutants on residents' food production and respiratory health, the study suggests that further researches be carried out on the relationship between artisanal crude oil refining and punishment of offenders in Rivers State, Nigeria.

RECOMMENDATIONS

The following recommendations are made based on the findings of this study:

1. The Federal Government in conjunction with State Government should create awareness and educate the people about the dangers of crude oil pollutants and their impacts on agricultural produce which in turn lead to food crisis in the study area. Also, the Federal Government should encourage the artisanal crude oil refiners on decent agricultural techniques through workshops. With these awareness and workshops, people, especially the youths will engage in legal activities instead of artisanal crude activities in the study area.
2. There should be a comprehensive approach that combines regulation, community involvement, economic alternatives, and technological innovations that would enhance paid employment, agricultural productivity as well as self employment, in order to reduce artisanal crude oil refineries and associated pollutants in human ecology.
3. The Federal Government in conjunction with Rivers State Government should strengthen healthcare infrastructure and improve access to healthcare services in affected areas of pollutants from artisanal crude oil refineries; in addition to focusing on preventive care and early diagnosis of pollution-related diseases. They should deploy mobile health units to reach remote communities impacted by artisanal crude oil pollutants. There should be local monitoring groups to monitor environmental health, as well as report artisanal crude oil activity offenders to law enforcement agencies for appropriate prosecution in the study area.

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