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Potential Health Effects Of Oil Spillage On The Inhabitants Of Oil Producing Areas Of Imo State, Nigeria

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ABSTRACT
This study examined the potential health effects of oil spillage on the inhabitants of oil-producing areas of Imo State, Nigeria. The study adopted the descriptive survey design with a sample size of 597 selected from six oil producing communities using a simple random sampling technique. The instrument for the study was a 4-point Likert Scale titled: "Potential Health Effects of Oil Spillage" (PHEOS). The reliability of the instrument was 0.84. Descriptive statistics mean (x) and standard deviation (SD) was used to answer the research questions whereas regression analysis was used to test the hypotheses at 0.05 level of significance. Based on the analysis of data, The findings of the study reveals the following percentage means: broken pipelines (97.2%), oil droplets from tankers (100%), vandalization (98.3%), bunkering (99.3%), bad road (100%), oil escape from vessels (99.3%), irregular maintenance (95%), inadequate cleanup (100%), indiscriminate exploration (83.8%) and outdated facilities (98.2%). Result also indicated a mean of 3.74 showing that oil spillage has potential effects on the physical health of inhabitants of oil-producing areas of Imo State, such as cough, throat irritation, headache, catarrh, burns, vomiting, eye inflammation, skin irritation, physical injuries and birth defects. Therefore, to arrest the prevalence of oil spillage, oil companies should ensure that their facilities are functional and up-to-date while efforts should be made by all relevant stakeholders to fight sabotage activities to a stop by setting up a functional taskforce to secure oil installation.
Keywords: oil spillage, health effects, oil producing communities

INTRODUCTION

Oil remains the backbone of Nigeria's economy since its discovery in commercial quantity in Oloibiri of present day Bayelsa State having overtaken agriculture. It accounts for Nigeria's foreign exchange for more than 90% of Nigeria's foreign exchange (Bakare & Fawehinmi, 2011). Consequently, a lot of activities are carried out to promote and sustain oil production in Nigeria, such as oil exploration, refining, distribution, marketing and shipping with their ripple effects; it is responsible for more than 90% environmental and socio-economic degeneration occasioned by a number of factors, especially oil spillage, which attendant devastating socio-economic and public health implications among oil bearing or producing communities in the Niger Delta.

Imo State has abundant deposit of crude oil with a number of multinational and local oil companies operating in Imo State. Oil companies operating in the oil producing communities in the State include Nigerian Agip Oil Company (NAOC), Shell Petroleum Development Company (SPDC), Addax

Petroleum Plc, Nigerian Petroleum Development Company (NPDC), Walter Smith Petroleum Plc, Sterling Global Oil Resources and Seplat Energy Plc. Of these oil companies, Nigerian Petroleum Development Company (NPDC), Walter Smith Petroleum Plc, Sterling Global Oil Resources and Seplat Energy Plc are indigenous oil companies. These oil companies possess many oil wells with some having their oil flow stations in these communities depending on the quantity of oil deposits. They are generally involved in upstream sectors, whereby they extract the oil as crude mineral but do not refine them or sell in Imo State (Imo State Ministry of Petroleum, 2022). In their operations, and to adequately manage issues tied around oil exploration and production vis-à-vis oil companies and host communities' relationship, some of these oil companies enter into Global Memorandum of Understanding (GMoU) wherein expectations and responsibilities from both parties are clearly defined and strictly followed as a way of ensuring peaceful co-existence and operations in the area since the inception of oil exploration in the area. Accordingly, communities are grouped in terms of hierarchy based on their contributions to oil explorations. While some communities are treated as oil landlords by reason of having oil wells, others are considered landlords by reason of oil installations like pipelines passing through their communities. In the GMoU, this is clearly spelt out and followed (Imo State Ministry of Petroleum, 2022).

Oil companies (MNOCs) engaged in oil and gas exploration and production activities in Nigeria have been involved in disproportionate exploitation of oil resources since the 1970s as a way of boosting the nation's economy (Akpomuvie & Orhioghene, 2011; Bakare & Fawehinmi, 2011). This has made oil spillage a recurring decimal in the host communities, which is usually blamed on vandalisation/sabotage of oil installations and poor state of oil facilities. While the oil companies blame host communities for being responsible for oil spillages through vandalisation and sabotage of oil pipelines, host communities have always raised counter accusations by blaming spill incidents on the corroded pipelines, negligence and poor maintenance by the MNOCs. Specifically, the 2011 UNEP environmental assessment of oil spill and gas flaring in Ogoni stated that generally about 600 million gallons of crude oil have been spilled due either to negligence or poor facility management by the oil companies (Olalekan et al., 2020).

Oil spillage comes in different quantity (or magnitude) and effect. The quantity of oil spillage covers the total amount of oil spilled and how long such spillage lasts in the environment. It is usually determined by the quantity of the spill, the type of product spilled and its mobility or migratory patterns by air, water, or on land (Eykelbosh, 2014).

Nigeria is a major global stakeholder in oil production, from which the country generates a lot of money. In Nigeria, the Niger Delta Region is directly linked with oil production, which accounts for a larger proportion of Nigeria's foreign reserve. Imo State is one of the Niger Delta States with three LGAs- Ohaji/Egbema, Oguta and Oru East- accounting for the highest source of oil production in the State. Oil companies, including Shell, Agip, Seplat, Walter Smith and others are into full oil exploration and production operations in the oil communities in the State.

In the course of their operations, some oil companies hardly adhere to laid down environmental rules and regulations leading to certain effects such as; physical which involves water and land pollution among others; emotional effect which anger and distrust due to sexual deprivation; mental effects involving inability to focus and adequately concentrate and sleep; and social effect that has robust to violence and substance abuses (Imo State Ministry of Petroleum, 2022). Cases of poor or dysfunction of oil installations leading to oil spills abound. Again, in the course of transportation of crude oil out of the host communities, oil spillages occur due to poor transportation dynamics. These issues are compounded by the existence of sabotage whereby some persons illegally tamper with oil pipelines in the quest to obtain crude for personal gains without minding the consequences like oil spills, gas flaring and fire outbreak. Some of these oil companies are only interested in making their fortunes without adequate consideration of how such indiscriminate operation can endanger the environment and humans living in such environment. In some cases, some oil companies fail to develop a Memorandum of Understanding (MoU) that will make for smooth sails and peaceful coexistence thereby occasioning some ripple effects including oil theft and bunkering, which some indigenes find so lucrative without thoughts of the effects of such sabotaging activities (Akpomuvie & Orhioghene, 2011).

The problems associated with oil spills are better imagined than experienced. Instead of being a blessing to host communities, oil production is thought to be a curse in disguise among communities in the Niger Delta Region. Ranging from agricultural damage to aquatic life degradation, oil spillage has remained a significant environmental problem the Niger Delta Region grapples with. The effect is so devastating on aquatic animals and agricultural products, which provide people with food. Oil spillage threatens the survival of fish and crops. More so, communities that hitherto drank water from rivers cannot do so anymore due to oil spills while fishermen lose their jobs and means of livelihood due to incidences of oil spillage rampant in the area. Fishes that come in contact with contaminated rivers often die, and when some people consume them, they tend to contract some diseases due to ingestion of harmful oil chemical properties. In the same vein, crops from contaminated farmlands are no longer healthy for consumption in addition to the fact that such contaminated farmlands experience reduced productivity thereby affecting the food security of the host communities. Usually impact assessments are carried out with a view to ascertain the cause, extent and effects of such oil spills. Consequently, different measures are embarked upon in the bid to cushion such effects and forestall future occurrences (Akpomuvie & Orhioghene, 2011; Bakare & Fawehinmi, 2011).

In spite of measures for forestalling future occurrences and cushioning steps taken so far, oil spillage remains a recurring decimal largely due to faulty oil installations and operations coupled with sabotage activities like bunkering, theft and unprofessional tampering with installations. This has continued to generate concerns of different kinds among the direct and indirect stakeholders. Unfortunately, while concerns are raised as to the effects of oil spillage, there is poor reporting of such incidents. Such incidents are either not reported or underreported. To worsen the problem, while reporting majorly features effects of oil spillage on farmlands, drinking water and aquatic life. However, attention has not been paid adequately on how spilled oil affects people's health, which does not immediately manifest but accumulate overtime. With this development, the people's health and general wellbeing are jeopardized. Therefore, this study examined potential health effects of oil spillage among inhabitants of oil producing Areas in Imo State, Nigeria.

METHODOLOGY

This study was conducted in three oil producing LGAs in Imo State, Ohaji/Egbema, Oguta, and Oru East Local Government Areas. The study adopted the descriptive survey design. The study population consisted of three oil producing LGAs with the population of 601,800. The sample for the study was 597 volunteered who are residents of six randomly selected oil producing communities (Oguta town, Ezi-Orsu, Umuosu, Umuogidi, Umumara, Awo-Omamma). The instrument for data collection was a structured questionnaire titled "Potential Health Effects of Oil Spillage" (PHEOS). The questionnaire was written in English being Nigeria's first language. It was divided into three (3) parts given below:

Validity of the instrument was ascertained and subjected to reliability test for internal consistency using the Cronbach Alpha Reliability Coefficient determine the reliability coefficient. Calculation yielded an index of 0.84, showing that the instrument was reliable for the study. The instruments for data collection were administered by the researcher with the help of research assistants**.** The data collected were sorted out, coded and imputed into SPSS version 15.0 statistical package. Results were presented using frequency tables. Descriptive statistics mean (x) and standard deviation (SD) were used to answer the research questions whereas chi-square inferential statistics was used to test the hypotheses at 0.05 level of significance.

RESULTS

Table 4.1: Extent of Occurrence of Crude Oil Spillage in Oil-producing Areas of Imo State, Nigeria

ITEMS	High extent (%)	Low Extent (%)	Total (%)
There are some broken pipelines	580 (97.2%)	17(2,8%)	597(100%)
Oil droplets from tankers occur regularly	597(100%)	0(0%)	597(100%)
Vandalisation of oil pipelines happens occasionally	587(98.3%)	10(1.7%)	597(100%)
Bunkering occur regularly in oil communities	593(99.3%)	4(0.7%)	597(100%)
Bad road causes oil spillage	597(100%)	0(0%)	597(100%)
Crude escapes from oil vessels	593(99.3%)	4(0.7%)	597(100%)
There irregular maintenance of oil installations	567(95%)	30(5%)	597(100%)
There is inadequate cleanup exercise after oil spill	597(100%)	0(o%)	597(100%)
Indiscriminate explorations are commonplace	500(83.8%)	97(16.2%)	597(100%)
Some oil installations are outdated	590(98.2%)	7(1.8%)	597(100%)

Table 4.1 answers research question one. The table contains ten questionnaire items to address the extent of the occurrence of crude oil spillage in oil producing communities of Imo State. The table reveals the following percentage means: broken pipelines (97.2%), oil droplets from tankers (100%), vandalization (98.3%), bunkering (99.3%), bad road (100%), oil escape from vessels (99.3%), irregular maintenance (95%), inadequate cleanup (100%), indiscriminate exploration (83.8%) and outdated facilities (98.2%). Therefore, answer to research question one is that oil spillage is prevalent in oil-producing areas of Imo State to a high extent.

Table 4.2: Potential Effect of Sabotage on the Rate of Occurrence of Crude Oil Spillage in Oil producing Areas of Imo State, Nigeria

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.230	.031		7.329	.000
	Sabotage causes	.791	.019	.858	40.725	.000

a. Dependent Variable: Crude oil spillage

From the results in Table 4.8, the explanatory variable (sabotage cause) systolic and the explained variable (rate of occurrence of crude oil spillage, or Y), have some degree of connection. Additionally, a coefficient of determination (R square) value of 73.6% was found. This suggests that the explanatory variable (sabotage cause), which may be referred to as a mistake in the model, does not account for the 26.4% difference in rate of occurrence of crude oil spillage (Y). As a result, the independent variable (sabotage causes) is important in understanding the variation in the dependent variable (the rate of occurrence of crude oil spillage). The significant threshold is 0.000 or less than 0.05, which indicates that the independent variable (sabotage cause) has a significant impact on the dependent variable (rate of occurrence of crude oil spillage). Therefore, the null hypothesis is rejected while the alternative is accepted. This led to the conclusion that sabotage has a significant effect on prevalence of oil spillage in oil-producing Areas of Imo State, Nigeria.

Table 4.3: Potential Effects of oil Spillage on the Physical Health of Inhabitants of Oil-producing Areas of Imo State, Nigeria

ITEMS	SA	A	D	SD	∑XW/∑X	*X*	STD	Decision
Cough can result from oil spillage	400 1600	197 591	0 0	0 0	2191/597	3.7	1.4	Accepted
Chemicals from oil spillage can cause throat irritation	500 2000	97 291	0 0	0 0	2291/597	3.8	1.3	Accepted
Headache can be an outcome of oil spillage	197 788	398 1194	2 2	0 0	1984/597	3.3	1.7	Accepted
Inhaling chemical substances from oil spillage can cause catarrh	527 2108	70 210	0 0	0 0	2318/597	3.9	1.01	Accepted
Oil spillage can lead to burns	402 1608	195 585	0 0	0 0	2193/597	3.7	1.4	Accepted
Vomiting can result from oil spillage	477 1908	120 360	0 0	0 0	2268/597	3.8	1.3	Accepted
Eye inflammation occurs when oil is spilled	549 2196	48 144	0 0	0 0	2340/597	3.9	1.1	Accepted
Skin irritation can be caused by oil Spillage	496 1984	100 310	1 2	0 0	2296/597	3.8	1.3	Accepted
Physical injuries can result from oil spillage	460 1840	137 411	0 0	0 0	2251/597	3.8	1.3	Accepted
In some cases, oil spillage can lead to birth defects	399 1596	190 570	7 14	1 1	2181/597	3.7	1.04	Accepted

Mean of means = 37.4/10 = 3.74 (accepted) based on 2.5 criterion mean.

Table 4.3 answers research question two. The table contains ten questionnaire items to ascertain the potential effects of oil spillage on the physical health of inhabitants of oil-producing areas of Imo State. Result indicates a mean of means of 3.74, which based on the criterion mean of 2.5, all the items were accepted. Therefore, answer to research question two is that oil spillage has potential effects on the physical health of inhabitants of oil-producing areas of Imo State, such as cough, throat irritation, headache, catarrh, burns, vomiting, eye inflammation, skin irritation, physical injuries and birth defects.

Table 4.4: Potential Effect of Oil Spillage on the Physical Health of Inhabitants of Oil producing Areas in Imo State, Nigeria

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
		B	Std. Error	Beta		
1	(Constant)	.254	.031		8.255	.000
	Oil spillage	.746	.022	.814	34.235	.000

a. Dependent Variable: Physical health of inhabitants

The result indicates that a coefficient determination of R-square value of 66.3% was found. As a result, the independent variable (oil spillage) is important in understanding the variation (33.7%) in the dependent variable (physical health of inhabitants). The significant threshold is 0.000 or less than 0.05, which indicates that the independent variable has a significant impact on the dependent variable. Therefore, the null hypothesis is rejected while the alternative is accepted. This led to the conclusion that oil spillage has a significant effect on the physical health of the inhabitants of oil-producing Areas of Imo State.

DISCUSSION

Based on the result of data analysis, oil spillage is prevalent in oil-producing Areas in Imo State due to broken pipelines, oil droplets from tankers, vandalization, bunkering, bad road, oil escape from vessels, irregular maintenance, inadequate cleanup, indiscriminate exploration and outdated facilities. Test of null hypothesis indicates that sabotage has a significant potential effect on prevalence of oil spillage in Oil producing Areas in Imo State.

This finding agrees with previous studies, such as Akpokodje and Salau (2015) who established an increasing level of oil spills in the Niger Delta. Finding also aligns with Ordinioha and Brisibe (2013) who found that an average of 240,000 barrels of crude oil are spilled in the Niger delta every year, mainly due to unknown causes, third party activity, and mechanical failure. Osueke and Emeka-Opara (2014) found that oil spillage occurred up to two (2) times yearly at Izombe, Oguta LGA mainly due to sabotage of oil installation. Similarly, Isidiho et al. (2020) reported that inadequate enforcement of oil spill laws in Nigeria coupled with lack of political will to strictly enforce these laws has been identified are the causes of oil spillage. Sanchez et al. (2012) reported sabotage and operational failures from pipelines as primary causes of crude oil spillages. For Mba et al. (2018), the "sabotage" cause was significant at a 5% level of significance in the Niger Delta followed by the "operational" and "mystery spill" causes respectively. Anyanwu and Ejem (2020) showed that oil theft has significant relationship with the total number of spill incidents in the Nigerian coastal waters, as against the other independent variables (mechanical failure, marine pipeline leakage and shipping activities) tested, but was found not to contribute significantly to spill incidents in the Niger Delta Region. Ani et al. (2015) showed that oil spillage/pollution occurred as a result of corrosion of oil pipelines and explosion of oil wells/terminal/stations.

In line with the foregoing, it can be accepted that sabotage, poor infrastructure and unknown causes are behind the increasing rate of oil spillage. This is in line with the finding of this study on prevalence of oil spillage.

Result of data analysis for research question two shows that oil spillage has potential effects on the physical health of inhabitants of oil producing Areas in Imo State, such as cough, throat irritation, headache, catarrh, burns, vomiting, eye inflammation, skin irritation, physical injuries and birth defects. Also, test of null shows that oil spillage has a significant potential effect on the physical health of the inhabitants of oil-producing Areas in Imo State.

This finding is in line with Adekola and Mba (2014) who revealed that physical health effects of oil spillage included malnourished children. Isidiho et al (2020) reported diseases of diverse kinds emanating from oil spillage. Isidiho et al. (2020) reported that persons who engage in oil spillage clean-up exercises in Ohaji/Egbema and Oguta in Imo State, Nigeria were susceptible to various ill-health like cough, vomiting, diarrhea, general pain, running nose, eye irritation, blisters, fever and other symptoms experienced in other places worldwide. Ordinioha and Brisibe (2013) stated physical health challenges resulting from oil spillage include childhood malnutrition and that contact with Nigerian crude oil could be hemotoxic and hepatotoxic, and could cause infertility and cancer and other acute and long-term effects on human health problems. Furthermore, finding agrees with Sako (2017) who indicated that effects of oil spillage manifested in children's health issues, such as asthma and other breathing problems; and death rates among the elderly in the area. Similarly, Bruederlea and Hodlera (2018) revealed that nearby oil spills that occur before conception increase neonatal mortality by 38.3% deaths per 1,000 live

births in around 100% girls and boys irrespective of socio-economic backgrounds, and locations. This agrees with medical and epidemiological evidence, which indicates that exposure to hydrocarbons can pose risks to fetal development; neonatal mortality can persist for several years after the occurrence of an oil spill. Finding also agrees with Ejumudo and Amede (2019) who revealed that effects of oil spillage included a variety of health problems like skin diseases, diarrhea, dysentery, respiratory illnesses, anemia, complications in childbirth, Yellow fever, cholera, dengue, malaria and other epidemic diseases and respiratory problems in the region. Richard et al. (2022) revealed that some of the associated health concerns related to air pollution caused by spillage include irritation of the nose, eyes, skin, and throat; coughing; shortness of breath; dizziness; and weakness. In another study, Kpae (2020) discovered that oil spillage oil spill implication on the people of B-Dere and Bomu's health includes long-term health effects like cancer and neurotoxicity; short term effects include skin redness, oedema, dermatitis, rashes and blisters; inhalation exposure can lead to red, watery and itchy eyes, coughing, throat irritation, shortness of breath, headache and confusion; nausea and diarrhea. Atubi et al. (2015) reported persistent bronchitis, cough, asthma, cardiovascular diseases, eye infection and skin infection due to gas flaring. Furthermore, Lyons et al. (cited in Anyanwu, 2019) found a statistically significant increase in cases of headaches, nausea, sore eyes and throat, cough, skin infections, shortness of breath and a condition of general weakness among exposed subjects to oil spillage as those residing along the area had significantly higher cases of headaches, skin irritations, anxiety and depression due to proximity to the oil spill than those living on the northern coasts far away from site of the spill. Janjua et al. (2013) observed a wide range of adverse health effects, such as acute respiratory infections, neurological, dermatological, and gastrointestinal problems, particularly an elevated risk of sore eyes and throat, irritability, and fatigue among residents, which decreased as distance from the spill site increased. Eykelbosh (2014) reported short-term impacts of sore and irritated throats and eyes, skin rashes, and long-term impacts of cancer, lung and kidney problems as prevalent, especially among clean-up workers who were in direct contact and highly exposed to the oil contaminants. D'Andrea et al. (2013) found that victims of oil spillage often manifest frequent asthmatic attacks, diarrhea, dizziness, and other symptoms. Hurtig and San Sebastian (cited in Anyanwu, 2019) reported that leukemia incidences in children in the Amazon Basin of Ecuador are linked to their proximity to oil fields with no significant difference between the prevalence of leukemia in male and female children. Peres et al. (2016) revealed that women exposed to the oil spill had a significantly higher chance of experiencing symptoms like burning sensations in the nose and lungs, sore throat, red eyes, dizziness, and wheezing.

A look at these previous studies above indicates that oil spillage has some adverse effects on the physical health of the inhabitants of oil-producing communities in Areas in Imo State.

CONCLUSION

Based on the analysis of data and the discussion of findings, the study concludes that oil exploration activities in oil-producing communities in Imo State, while enriching government treasuries and the oil companies, the host communities have not been positively impacted. The study concludes that these communities suffer from the negative fallout of oil exploration activities like spillage. Oil spillage is found to be highly prevalent due to broken pipelines, oil droplets from tankers, vandalization, bunkering, oil escape from vessels, poor maintenance, and irregular cleanup among others. The potential impacts of oil spillage on host communities cut across the physical, mental, social and environmental health of inhabitants of oil-producing Areas in Imo State. Negative potential health impacts include cough, throat irritation, depression, headache, stress, communal crisis, restiveness, displacement, poverty, exposure to harmful chemical particles, contamination of farmlands, contaminated water bodies, life risks for aquatic animals, and economic loss. Therefore, oil spillage has significant potential effects on the various health aspects of the inhabitants of oil-producing Areas of Imo State.

RECOMMENDATIONS

Based on the findings of the study and the conclusions drawn thereof, the following recommendations were made to remedy the ugly trend:

1. To arrest the prevalence of oil spillage, oil companies should ensure that their facilities are functional and up-to-date while efforts should be made by all relevant stakeholders to fight sabotage activities to a stop by setting up a functional taskforce to secure oil installation.
2. To curb the potential effects of oil spillage on the physical health of the inhabitants, oil companies and the government through the National Oil Spill Detection and Response agency (NOSDRA) should make efforts to evacuate people from affected areas while thorough cleanup is carried out in addition to providing adequate medical attention to affected communities.
3. Oil droplets and deposits arising from oil spill should be promptly cleaned to prevent people from inhaling such particles, which poses mental health hazards for the inhabitants as well as alerting the people to avoid the infested or affected sites.
4. To ensure that the environment is safe for the inhabitants, the government through the Federal Ministry of Environment and the Nigerian Oil Spill Monitor should enact and enforce universally standard laws and guidelines for oil exploration activities as well as institute a functional taskforce that checkmate installation vandalization through bunkering and pipeline destruction.

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