

Knowledge of Oil Spillage Effects on Pregnancy Outcomes Among Pregnant Women in Gokana, Rivers State

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ABSTRACT

This study examined the knowledge of pregnant women towards oil spillage effects on pregnancy outcomes in Gokana, Rivers State. The study adopted a community-based cross-sectional design. The population of the study comprised 384 pregnant women living in Mogho and Bodo communities of Gokana out of which 197 were selected using simple random sampling technique with 192 valid for data analysis. A self-structured questionnaire designed on the modified 4-point likert scale format was used for data collection with a reliability index of 0.85. Data was analysed using descriptive statistics of frequencies, percentages, mean, standard deviation and inferential statistics of chi-square. Results revealed that out of the 192 respondents studied, 150(78.1%) had poor knowledge while 42(21.9%) had good knowledge towards oil spillage effects on pregnancy outcomes; the factors influencing the knowledge of pregnant women towards oil spillage effects on pregnancy outcomes include: age of the women, their level of education, family background, and personal belief/perceptions that oil spillage cannot have effect of children and pregnant women, the perception that health and related problems during pregnancies are associated with spirit possessions/curse and the mass media. The study concluded that majority of pregnant women had poor knowledge of oil spillage effects on pregnancy outcomes. The need for awareness creation to enhance the knowledge of pregnant women towards oil spillage effects on pregnancy outcomes was recommended.

Keywords: pregnant women, oil spillage, awareness, pregnancy outcomes

INTRODUCTION

Knowledge of the effect of oil spillage among pregnant women is essential for them to avoid or minimize their exposure to oil spills which has become the order of the day in the study area. Knowledge as defined by Webster (2019), is the fact or condition of being aware of something. Contextually, knowledge of oil spillage effect is referred to as the practical understanding or awareness about the possible effect of one's exposure to oil spillage. The effects of oil spillage on pregnant women are enormous as shown from different studies. The report of Bruederle and Hodler (2017) showed that, there is an increase in the rate of congenital anomalies and infant mortality (11,000) amongst children born in the Niger Delta region. Majority of these children were from the Ogoni axis. On interviewing the parents of these babies, it was discovered that they are not knowledgeable about the cause of their babies' condition; most attribute it to curses from enemies or witchcraft. According to Chen et al (2014), the exact biological mechanisms linking exposure to crude oil and other petroleum products to adverse effects on fetal development and infant health remain uncertain.

However, a number of clinical and epidemiological studies offer some indication. First, polycyclic aromatic hydrocarbons (PAHs) present in crude oil have carcinogenic effects, and it has been demonstrated that PAHs can cross the placenta and affect the development of the fetus. It was discovered that high levels of PAH-DNA adduct in leukocytes of umbilical cord blood were associated with significantly decreased birth length, weight, and head circumference in newborns (Al-

Hadithi et al., 2012; Atubi, 2015). There is also evidence that maternal exposure to benzene, a hydrocarbon, can initiate childhood leukemia while the child is still in the uterus (Carlos-Wallace et al., 2016). In addition, several epidemiological studies have found harmful effects of air pollution. Bruederly and Hodler (2017) noted that, exposure to air pollution increases the risks of infant and child mortality, incidence of low birth weight, and premature birth. More generally, Currie et al., (2013), stated that, there are good reasons to believe that unborn and newborn infants may be particularly vulnerable to oil-related pollution. First, they are in a critical developmental period. Second, they have not yet developed certain defenses against toxic chemicals, such as the blood-brain barrier. Third, even small doses of pollution may be large in proportion to their low body weight.

Even in the absence of maternal exposure during pregnancy, fetal development may be affected as harmful substances accumulate in maternal fat tissue before conception and are released during pregnancy (Reutman and Meadows, 2013). Second, the higher rates of spontaneous abortion associated with paternal exposure to hydrocarbons might result from higher rates of abnormal sperm characteristics (Celis et al., 2000). Third, hydrocarbon exposure may cause chromosomal aberrations in the unborn (Khalil, 1995), which may result in spontaneous abortion, or high morbidity and mortality in infancy and childhood, it could also result in birth defects like cleft palate, neural tube defects and congenital heart defects (Colborn et al., 2011; Khader et al., 2016; McKenzie et al., 2014; Alborz, 2013; Driscoll & Gross, 2009). Besides these direct health effects, oil spills may also have indirect health effects via damage of livelihood resources, such as diminished yields from degraded agricultural land, fishing grounds or wildlife habitat. If an oil spill impairs a community's food situation through degradation of agricultural resources and fishing grounds, resulting maternal malnutrition and sickness may also increase infant mortality risks. Rates of pre-term birth and low birth weight rise with maternal malnutrition and micro-nutrient deficiencies (Bhutta et al., 2013). In addition, the disruptive effects of oil spills also likely evoke mental stress and depression in the local residents (Rung et al., 2016; Webb et al., 2014; United Nations Environment Programme, 2011; Murdoch Children's Research Institute, 2014). Mental stress has been found to increase the risk of spontaneous abortion (e.g., Dean et al., 2015; Bruckner et al., 2016).

Several epidemiological studies have shown adverse effects of parental exposure to hydrocarbons before or after conception on fetal development, pregnancy outcomes and child health (Bruederle and Hodler, 2017). Currie and Schmieder (2009) find that higher air-borne releases of toluene, a hydrocarbon, by US manufacturers lead to shorter gestation, higher incidence of low birth weight, and increased infant mortality. Studies from the field of occupational medicine have documented an increased risk of spontaneous abortions among pregnant women exposed to petroleum products at their work place (Linden and Palsson, 2013; Currie et al., 2013; Merhi, 2010). Infante-Rivard et al., (2005) et al noted that, exposure of mothers before conception or during pregnancy to organic solvents, including compounds like toluene and benzene, has been found to be associated with an increased risk of Acute Lymphoblastic Leukemia in children. Paternal exposure to hydrocarbons, too, is associated with higher rates of spontaneous abortion. Higher risks of fetal malformations have been found in offspring of fathers exposed to organic solvents (Tanaka, 2015; Greenstone and Hanna, 2014; Logman et al., 2005). Similarly, Shu et al., (2004) stated that, exposure of mothers to hydrocarbons is associated with *ras*-mutations in children, which is one of the most common genetic alterations stimulating tumor growth.

Since oil was discovered in 1956, its citizens have had to under gone civil conflict, military rule, political instability, endemic corruption, and widespread poverty. The local soil and water resources has been damaged by oil mining activities which threatened public health in adjacent communities (United Nations Environment Programme, 2011). There is not much of epidemiological study focusing on the health effects of infants' postnatal exposure to environmental contamination from onshore oil spills. A number of studies however examine short-term human health effects on clean-up workers and local residents exposed to major off-shore oil spills (D'Andrea & Reddy, 2014; Almond & Currie, 2011). These studies observe increases in various abnormalities in the hematologic, hepatic, respiratory, renal, and neurological functions after oil spills. Frequently reported acute symptoms include respiratory problems, diarrhea, and vomiting, which, if developed by newborns and infants, can pose serious risks. Pneumonia and diarrhea are indeed major reasons for child death in Nigeria.

Oil spills from pipeline vandalism, theft, and poor maintenance are a major source of environmental pollution in Nigeria. The Nigerian Oil Spill Monitor, which provides data collected by the National

Oil Spill Detection and Response Agency, reports 6,637 oil spills from 2005 to 2015. But the health effects of onshore oil spills are not well understood or known. This poor knowledge about the effect of oil spillage particularly among women, it a bane which can make them suffer more of its effect than expected. According to Maze (2018), there are factors that can influence the knowledge of a pregnant woman about health and health seeking behaviours which include: poor prenatal care, level of education, occupation, poverty, family, personal experience, religious/traditional beliefs, media, and poor access to health care facilities. Thus, it is important that researcher conducts a research to investigate the knowledge of pregnant women on effect of oil spillage on pregnancy outcome in Gokana, Rivers State Nigeria.

Research Questions

The study provided answers to the following questions:

1. What is the level of knowledge of pregnant women towards oil spillage effects on pregnancy outcomes in Gokana, Rivers State?
2. What are the factors influencing the knowledge of pregnant women towards oil spillage effects on pregnancy outcomes in Gokana, Rivers State?

Hypothesis

The following hypothesis postulated was tested at 0.05 alpha level:

1. There is no significant relationship between knowledge of pregnant women towards oil spillage effects and pregnancy outcome in Gokana, Rivers State.

METHODOLOGY

The methods and procedures used in this study are described below:

Study Design: This study adopted a community based cross sectional design. The cross-sectional design studies an attribute in a subset of a given population at a particular point in time. This study aimed at investigating the knowledge of pregnant women towards oil spillage effects on pregnancy outcomes in Gokana, Rivers State Nigeria at the time of the study using a sample of the women.

Study Population: The population for this study was pregnant women living in Gokana Local Government Area of Rivers State. All pregnant women living in the study area for a period of one to three years were consented to participate in the study.

Sample and Sampling technique: The sample size for this study was 197 which was determined using Fisher's Formula: $n = z^2 pq/e^2$ where n = Sample size; z = confidence level taken as 95% = 1.96; p = proportion of the population with desired characteristics which was taken as 50% since the effect is unknown; q = proportion of the population without the desired characteristics = $1 - p$; and e^2 = Degree of precision taken as 5% (0.05). Since the desired population size is < 1000 , relationship $nr = n/1+(n/N)$ was used making the 197. A multistage sampling procedure was adopted to select the respondents. A simple random sampling technique was used to select the respondents for the study. A non-probability (convenience) sampling technique was used to get the required number of participants for this study.

Instrument for Data Collection: A semi-structured questionnaire which was drafted by the researcher was used for data collection. The questionnaire was developed from information available in the literature on effects of oil spillage on pregnancy outcomes. The questions were rated on a four point Likert Scale ranging from strongly agree, agree, disagree, and strongly disagree. Section A was focused on the socio-demographic characteristics of the respondents, Section B on pregnant women's knowledge of oil spillage effects on pregnancy outcomes and Section C on factors influencing the knowledge of pregnant women towards oil spillage effects on pregnancy outcomes.

Validity of the Instrument: Two steps was taken to ensure validity of the questionnaire. Firstly, the questionnaire was drafted based on relevant information from the literature review, study objectives and two other experts in the field from nursing department examined the questionnaire. Secondly, the questionnaire was presented to the supervisor for corrections and approval. Suggestions made were incorporated to draft the final copy of the questionnaire; thus, making the instrument for data collection a valid one.

Reliability of the Instrument: To ascertain the reliability of the instrument, a test-retest procedure was used. The validated questionnaires were administered to 10 respondents in another community for pretesting twice within a week interval. This was to sample their answers to ensure that they understood the questions and the instrument is reliable and measures what it was supposed to

measure. The answers were collected and analysed using Cronbach’s alpha coefficient with a reliability index of 0.84.

Data Collection Procedure: A letter of introduction and Ethical approval was collected from the Programme Coordinator and the Ethical Committee of the University of Port Harcourt respectively. These letters with a letter of application to collect data from pregnant women from the two communities were submitted to the Chairmen of Community Development Committee of Mogho and Bodo communities. The members of the community development committee were briefed on the project and benefits of the project to the pregnant women and the communities. They were requested to sound-out a call to all pregnant women in the communities to come out in mass to the community town hall on the agreed date to fill the questionnaire. Letters were dispatched to different churches within the communities to invite their pregnant women to participate in the study. The researcher and three research assistants visited the study sites before the research date and early on the days of data collection to introduce themselves and sought the consent of the pregnant women to participate in the study. Questionnaires were administered to the pregnant women and the content of the questionnaire was explained to the respondents in the language they understood to enable them respond appropriately. Out of the one hundred and ninety-seven (197) questionnaires that were administered, one hundred and ninety-two (192) was retrieved.

Data Analysis: Completed questionnaires were collected, coded and entered into the computer using the Statistical Package for Social Science (SPSS) version 24.0. Results were presented in frequencies and percentages. Inferential statistics of chi square was used to answer all the research hypotheses at 0.05 level of significance to ascertain the relationship between the independent and the dependent variables. Each objective was presented using tables.

RESULTS

The results of the study are presented below in figures and tables:

Table 1: Knowledge of Pregnant Women towards Oil Spillage Effects on Pregnancy Outcomes in Gokana, Rivers State (n=192)

S/N	Items	SA	A	D	SD	\bar{X}	Std Dev	Decision
1	Women living in communities close to oil fields have a higher risk of spontaneous abortion than women living far away from these oil fields	22	36	59	75	2.03	1.02	Poor knowledge
2	Exposure of mothers before conception or during pregnancy to crude oil associated with an increased risk of Leukemia in children	15	18	72	87	1.80	0.91	Poor knowledge
3	Exposure of mothers to hydrocarbons (which is present in crude oil) is associated with <i>ras</i> mutations in children	8	12	84	88	1.69	0.77	Poor knowledge
4	Paternal exposure to hydrocarbons, is associated with higher rates of spontaneous abortion and still births	23	34	66	69	2.06	1.00	Poor knowledge
5	There is increases in various abnormalities in the respiratory, renal, cardiac, and neurological functions after oil spills of infants	10	16	92	74	1.80	0.80	Poor knowledge
6	After oil spill, children are exposed to acute symptoms which include respiratory problems, diarrhea, and vomiting, which, if developed by newborns and infants, can pose serious risks	38	44	72	38	2.43	1.02	Poor knowledge
7	The effects of nearby oil spills causes increase in infant/child mortality	6	14	80	92	1.66	0.75	Poor knowledge
	Grand mean					1.92	0.89	Poor knowledge

Table 1 shows the knowledge of Pregnant Women towards Oil Spillage Effects on Pregnancy Outcomes in Gokana, Rivers State. The result shows that the grand mean for knowledge = 1.92 ± 0.89 is lesser than the criterion mean of 2.50 indicating the pregnant women in Gokana had poor knowledge towards the effect of oil spillage on pregnancy outcomes.

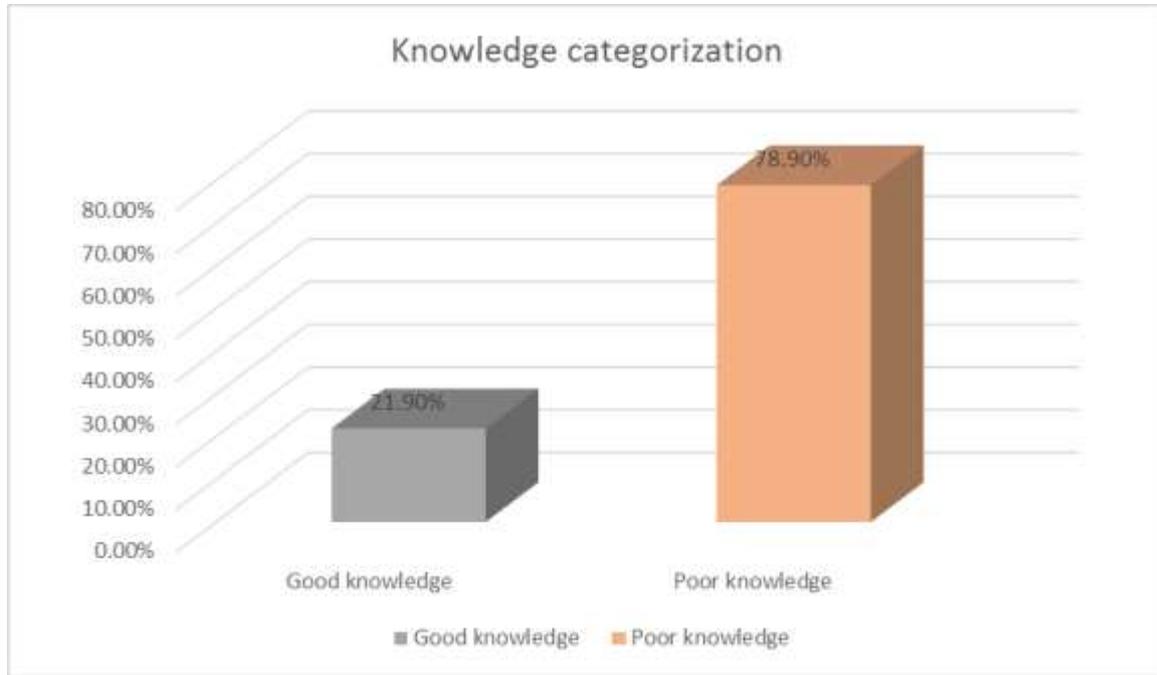


Fig 1: Bar chart showing the categorization of knowledge among women in Gokana

Fig 1 shows the pictorial presentation of categorization of knowledge among women in Gokana. The result shows that out of the 192 respondents studied, 150(78.1%) had poor knowledge while 42(21.9%) had good knowledge of oil spillage effects on pregnancy outcomes.

Table 2: Factors Influencing the Knowledge of Pregnant Women towards oil Spillage Effects on Pregnancy Outcomes in Gokana, Rivers State (n=192)

S/N	Items	SA	A	D	SD	\bar{X}	Std Dev	Decision
1	Age can affect knowledge on effects of oil spills on pregnancy	78	82	12	20	3.14	0.93	Accepted
2	Level of education has a role to play in the knowledge on effects of oil spills on pregnancy outcomes	66	84	18	24	3.10	0.85	Accepted
3	Family can influence way of thinking and doing things of pregnant women	86	69	22	15	3.18	0.92	Accepted
4	Oil spillage cannot have any effect on children and pregnant women	84	76	15	17	3.18	0.92	Accepted
5	Deformed babies, miscarriages and sick babies from the womb are not from God. They are curses from wicked people, witches or the gods of the land	92	70	10	20	3.22	0.95	Accepted
6	Regular attendance in antenatal clinic creates awareness on any adverse effects of oil spills on pregnancy	28	33	69	62	2.14	1.03	Not Accepted
7	Access to health care facilities help to prevent dangers of oil spillage on pregnancy	22	37	88	45	2.19	0.92	Not Accepted
8	Listening to radio, watching television, and reading of newspaper can create awareness on oil spills and its danger to pregnancy	78	92	10	12	3.22	0.81	Accepted

Criterion mean=2.50

Table 2 shows the factors influencing the knowledge of pregnant women towards oil spillage effects on pregnancy outcomes in Gokana, Rivers State. Eight (8) items addressed research question 3 out of which 6 were accepted (items 1, 2,3,4,5 and 8) and 2 not accepted (items 6 and 7) based on the criterion mean of 2.50. This indicates that the factors influencing the knowledge of pregnant women towards oil spillage effects on pregnancy outcomes include age of the women, their level of education, family background, and personal belief/perceptions that oil spillage cannot have effect of children and pregnant women, the perception that health and related problems during pregnancies are associated with spirit possessions/curse and the mass media.

Table 3: Summary of Chi-square test showing Relationship between Knowledge and Attitude of Pregnant Women towards Oil Spillage Effects on Pregnancy Outcome (n=192)

Variables	Attitude		Total	df	P-value	X^2	Decision
	Positive	Negative					
Knowledge						180.451	
Good	40	2	42	1	0.00		Significant
Poor	0	150	150				
Total	40	152	192				

P≤0.05 (Significant), P>0.05(Insignificant)

Table 3 revealed a X^2 value of 180.451, p-value of 0.00 at $df = 3$ indicating that there is a statistically significant relationship between knowledge and attitude of pregnant women towards oil spillage effects on pregnancy outcome in Gokana, Rivers State Nigeria

DISCUSSION OF FINDINGS

The findings of the study are discussed below:

Results from the study revealed that majority of the pregnant women had poor knowledge of oil spillage effects on pregnancy outcomes. This implies that most pregnant women lacked knowledge of the pregnancy related health risks associated with oil spillage. Thus majority of women living in communities close to oil fields had poor knowledge of the fact that they are at higher risk of spontaneous abortion than women living far away from these oil fields. They lacked the knowledge that exposure of mothers before conception or during pregnancy to crude oil associated with an increased risk of leukemia and other health problems in children. Though research evidences show that maternal and paternal exposure to hydrocarbons (which is present in crude oil) is associated with mutations in children and higher rates of spontaneous abortion and still births, a large number of pregnant women do not have adequate knowledge of oil spillage effects on pregnancy outcomes.

Despite reports that after oil spill, children are exposed to acute symptoms such as respiratory problems, diarrhea, and vomiting, most pregnant women do not know that effects of nearby oil spills causes increase in infant/child mortality. The study findings are consistent with the submission of Sebastian, Armstrong and Stephens (2012) that majority of pregnant women have poor knowledge of oil spillage effects on pregnancy outcome especially those living in the proximity of oil fields. The results are also in consonance with the findings of a study conducted by Aminaho (2018) which revealed lack of knowledge on the consequences of oil and gas exploratory activities on maternal and child health among women. The submission of D'Andrea and Reddy (2016) that only a few women are knowledgeable about the association between exposures to crude oil during pregnancy and maternal/child health also corroborate the results of this study.

The study findings showed that the factors influencing the knowledge of pregnant women towards oil spillage effects on pregnancy outcomes include age of the women, their level of education, family background, and personal belief/perceptions that oil spillage cannot have effect of children and pregnant women, the perception that health and related problems during pregnancies are associated with spirit possessions/curse and the mass media. These results are in agreement with the submission Oghenetega *et al.* (2020) that the major factors influencing the knowledge of pregnant women towards oil spillage effects on pregnancy outcomes include their perceptions, cultural beliefs and individual previous pregnancy experiences. The results are in tandem with the assertion of Teyssere *et al.* (2019) who identified maternal age, educational level, culture, belief systems, internet, magazine and television sources of information as the main factors influencing the knowledge of pregnant women towards oil spillage effects on pregnancy outcomes. The result also agrees with the submission of D'Andrea and Reddy (2016) that culture and educational exposure of women influence their knowledge and attitudes towards the effect of oil pollution on pregnancy.

The study findings showed that there was a statistically significant relationship between knowledge and attitude of pregnant women towards oil spillage effects on pregnancy outcome in Gokana, Rivers State Nigeria. This implies that knowledge directly influenced the attitude of pregnant women towards oil spillage effects on pregnancy outcome. This result agrees with the Sebastian *et al.* (2012) that the poor knowledge of pregnancy outcome of living in the proximity of oil fields is directly associated with the fact that majority of the women have negative attitudes and wrong perceptions regarding the effect of oil pollution on maternal and child health. The result also agrees with the submission of Aminaho (2018) that the negative attitude of most mothers towards oil spillage effect on pregnancy is linked to their poor knowledge and awareness on the consequences of the event on pregnancy outcomes.

CONCLUSION

This study on the knowledge of pregnant women on effect of oil spillage on pregnancy outcome in Gokana, Rivers State Nigeria concludes that most pregnant women have poor towards oil spillage effects on pregnancy outcomes. The factors influencing the knowledge of pregnant women towards oil spillage effects on pregnancy outcomes include age of the women, their level of education, family

background, and personal belief/perceptions that oil spillage cannot have effect of children and pregnant women, the perception that health and related problems during pregnancies are associated with spirit possessions/curse and the mass media.

RECOMMENDATIONS

Based on the study findings, the following were recommended:

1. Midwives and other healthcare providers should increase public awareness on the effects of oil spillage on pregnant outcomes as a way motivating members of the public to discourage the practice of oil sabotage communities with a view to preventing the maternal, child and related health consequences on the populace.
2. Healthcare organization, local and international agencies should support and enhance use of the news media in enhancing the knowledge spillage of effects on pregnancy outcome.
3. Government and key players should sanction any organization based on existing environmental legislation.

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