

Indiscriminate Disposal of Domestic Sewage and its Health Implication in Obiaruku Community, Niger Delta, Nigeria

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Running title: Assessment of Indiscriminate Disposal of Domestic Sewage

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Abstract:-

Background and Objectives: Domestic sewage has devastating effect on our soil, ground water and emit offensive and unpleasant odour, therefore, the strategies for handling the effects, health and environmental implication of indiscriminate disposal of domestic sewage were investigated in Obiaruku community in the Niger Delta, Nigeria. **Materials and method:** Public opinion on indiscriminate disposal of domestic sewage and its effect on the populace is evaluated using descriptive survey method to statistically design set of persons with different socio-economic characteristics with a focus group of 540 respondents. The data collected was through the use of questionnaire and it was analyzed using the descriptive and chi-square statistical methods.

Results: The result showed that the causes and the effect of indiscriminate disposal of domestic sewage is as a result of inadequate means of domestic sewage disposal and other related causes and lack of information, the result reveals that there are no proper sanitary disposal system and the people are not enlightened of the effect of their actions on their health. There is an evidence of wiliness from the respondents that if they are provided with necessary sanitary disposal system they will desist from disposing their waste indiscriminately. **Conclusion:** However, government should provide the people with necessary sanitary disposal system and deploy health workers to sensitize them on the effect of domestic sewage and to ensure the facilities provided are used and properly taken care of, this will help to curtail this problem in our society.

Keywords:- Domestic Sewage, Indiscriminate Sewage, Disposal, Environment, Health Impact.

I. INTRODUCTION

The word sewage (otherwise known as waste water) can be generated in Domestic or Industrial Environment. It can also be termed domestic Sewage. Domestic sewage could be either solid (faeces) or liquid (urine and waste water from bathroom, wash hand basin, kitchen sink and laundry)¹. Ebikapade et al.², defined sewage as the combination of waste water, faeces, and other excrement of the community. It contains dissolved and suspended impurities with large micro-organisms (e.g. bacteria, protozoa, virus, and fungi) organic and inorganic substances in solution. Domestic sewage when disposed indiscriminately can pollute and contaminate soil, ground water and emit offensive and unpleasant odour³. Ebikapade et al², opined that domestic sewage if not properly dissolved off will consequently cause an adverse effect to man and his environment in general. Domestic sewage disposal is the removal (evacuation) of sewage from man's immediate environment in order to prevent it from constituting nuisance to man⁴. But during the removal process, proper supervision of the activities should be carried out in order to ensure that it does not cause pollution on the environment.

Omofonmwan and Esegibe³ stated that sewage is a waste water or used water from the community containing about 99.9% content of impure waters and it is characterized by the volume or rate of flow and its physical condition, chemical constituents and the bacteriological organism that it contains. Sewage is the main source of pathologic organism especially the causative agent of diarrhea and many other diseases if it comes in contact with our water source and negligence during consumption of such water by man.

Indiscriminate disposal of human waste (sewage) is one of the most serious developing world health problems⁵. Sewage if not properly disposed off can aid in the transmission of diseases such as cholera, typhoid, diarrhea, schistosomiasis and other infectious diseases that affect people in Obiaruku community. Sewage when disposed

indiscriminately causes epidemic outbreak of disease such as cholera which can easily lead to mortality (death). The principal hazard of indiscriminate domestic sewage disposal can contaminate our soil, ground water, emission of offensive odour, breeding of mosquitoes and flies, environmental degradation, food contamination, unsightliness and unsustainable environmental development⁶. It is also said that the majority of inhabitants of the Nigeria practice indiscriminate disposal of faeces because of lack of adequate sanitary facilities which lead to increase in the outbreak of diseases such as poliomyelitis, malaria, dysentery, cholera and diarrhea e.t.c⁷.

The objectives of this study were: to identify the level of awareness and factors responsible for indiscriminate disposal of sewage, and also to assess the health and environmental implication of indiscriminate disposal of domestic sewage with a view to making recommendations on ways and methods of reducing the health and environmental implication of indiscriminate sewage disposal in Nigeria.

II. MATERIALS AND METHODS

Study Area

The study was carried out in Obiaruku community in Ukwuani Local Government Area of Delta State, Nigeria, from January-June 2020. Majority of the inhabitants are substantial farmers and petty traders. The crop usually planted includes; yam, cassava, corn, etc. Cassava is a product that thrives very well in Obiaruku area, and currently people from different communities come to buy garri products from Obiaruku community on market day that is held every four (4) days. The main source of living is farming, petty trading and mini jobs.

Study Design

The study design adopted for this research is the descriptive study survey method to enable the researcher collect meaningful information on indiscriminate disposal of domestic sewage and its health and environmental impact on Obiaruku inhabitants, and consequently provide suitable ways of ensuring that the issues of indiscriminate domestic sewage disposal is solved.

Sampling Techniques:

Based on the study, a target population of 540 persons was used representing a fraction of the total population of the study area in order for accurate information to be achieved. The simple and stratified sampling methods were used for the study.

Obiaruku community was stratified into three strata with each stratum representing a quarter. The simple random sampling technique was used to pick 180 persons from each quarter to form a sample size of five hundred and forty (540) respondents for the study and this was done using balloting method. In conducting the research, the researcher collected the names of all the people that participated in the exercise. There were selected cards with agreed (A), Strongly Agreed (SA), Disagreed (D), and

strongly disagreed (SD) Options kept in a box and shuffled, in which participants picked one after the other and after all the people have picked, strongly agreed (SA) were selected to make up the sample size as equal opportunity was given to all participants/respondents.

Instrument Design

Two major instruments were used for data collection. These were; questionnaires and personal observation. The questionnaires were developed by the researcher to gather information from host communities and environmental health officials in the community. Also, in order to determine the degree of agreement or disagreement in each of the scaling statement in the questionnaire, values were allotted to different scaling as follows:

| | |
|-------------------------|-----|
| Strongly Agreed (SA) | = 4 |
| Agreed (A) | = 3 |
| Disagreed (D) | = 2 |
| Strongly disagreed (SD) | = 1 |
| Undecided (UD) | = 0 |

The cutoff point was calculated as follows: $\frac{10}{4} = 2.5$

The response whose mean score is below 2.5 is not accepted as agreed and the responses from 2.5 and above are accepted as agreed.

Method of Data Collection

The researcher used questionnaire and oral interview method. The questionnaires were administered by the researcher to the respondents selected for the study. The respondents were enlightened on the significance and purpose of the study by providing instructions on how to answer the questions accurately. Respondents who could not read and write were interviewed based on the questionnaire as to ensure uniformity.

Pretest / Pilot Study

The research instrument was subjected to a meaningful validation, criticism and amendment. Copies of the questionnaire were submitted to the project supervisor for verification. After validation, the research instrument was sized and administered to 20 persons outside the sample, sized and same instrument was administered to another 20 persons. The two results were the same and the instrument was considered reliable.

Method of data analysis

The data collected from various respondents were analyzed through the use of frequency distribution table. Percentage and chi-square (χ^2) statistical methods were employed.

The formula for chi-square is as follows:

$$\text{Chi-square, } \chi^2 = \sum \frac{(O-E)^2}{E} \text{ (Cochran}^8)$$

E

Where:

χ^2 = chi-square

\sum = summation

O = Observed frequency

E = Expected frequency

III. RESULTS AND DISCUSSION

Level of Awareness of Indiscriminate Disposal of Domestic Sewage

Table 1 below indicates that out of 480 responses, 85 inhabitants of Obiaruku community strongly agreed that they understood the term “domestic sewage”; 65 inhabitants also strongly agreed that the people in the community were exposed to fresh water faeces or waste water; and finally, 75 inhabitants strongly agreed that the pollution problems in the environment are as a result of indiscriminate disposal of domestic sewage by the people of the community. This is in

line with the findings of Oruonye et al.⁹, who discovered that despite the fact that most of the respondents claimed to be aware of what constituted solid waste and effects of poor disposal. Their claim negated their attitude of indiscriminate solid waste disposal in the study area as revealed by the increasing number of open waste dumpsites and wastes that littered most streets of the town. Mamady¹⁰, found out that community residents had poor knowledge and unsafe behavior in relation to waste management. These findings are in agreement with the report by Yoadia et al.¹¹ who showed that about 83 % of the respondents in their study were aware that improper waste management contributes to disease causation.

Table 1: Summary on the level of awareness of indiscriminate disposal of domestic sewage

| S/N | STATEMENT | A | SA | D | SD | No of Response | Mean Score | Remarks |
|-----|------------------------------------------------------------------------------------------------------------|-----|-----|----|----|----------------|------------|----------|
| 1 | The inhabitant of Obiaruku community understand the term domestic sewage | 45 | 85 | 15 | 15 | 160 | 3.3 | Accepted |
| 2 | The inhabitant of Obiaruku community are exposed to fresh faeces or waste water before | 55 | 65 | 27 | 13 | 160 | 3.1 | Accepted |
| 3 | The pollution problems are as a result of indiscriminate disposal of domestic sewage in Obiaruku community | 65 | 75 | 10 | 10 | 160 | 44 3.3 | Accepted |
| | Total | 165 | 225 | 52 | 38 | 480 | | |

Source: Field Survey 2019. SA=Strongly Agreed, A=Agreed, D=Disagreed, SD=Strongly Disagreed.

Factors Responsible for Indiscriminate Disposal of Domestic Sewage

Table 2 below reveal that 80 people agreed that there are some factors responsible for indiscriminate disposal of domestic sewage; 73 respondents strongly agreed that lack of adequate water supply is one of the factors, while 80 respondents agreed that inadequate means of sewage disposal facilities could predispose the occurrence; 90 respondents agreed that increase in population, lack of sanitary facilities, and nonchalant attitude of individuals toward sanitation practice could lead to the problem. However, 105 people agreed that blocked drains, erosion and absence of proper drainage system in the community were some of the factors. One hundred and fifteen (115) respondents agreed that lack of funds in purchasing of adequate equipment and facilities that are required for

proper storage and treatment; and finally, 95 respondents agreed that lack of public health awareness about the danger associated with indiscriminate disposal of domestic sewage are some of the factors responsible for indiscriminate disposal of domestic sewage in the community. This agreed with the report of Igboji and Alor⁶, who found out that lack of advance technology, facilities for separation at source, strength of waste management policy and enforcement, low environmental education and income status of individuals among others were all responsible for indiscriminate dumping of solid waste. This is also agreed by Mamady¹⁰ who highlighted no education background, income, female individuals, unplanned residential area, residents' poor knowledge and unsafe behavior in relation to waste management, as factors responsible for indiscriminate disposal of domestic sewage.

Table 2: Summary on the Factors Responsible for Indiscriminate Disposal of Domestic Sewage in Obiaruku Community

| S/N | STATEMENT | A | SA | D | SD | No of Respondent | Mean Score | Remarks |
|-----|------------------------------------------------------------------------------------------------------------------------|-----|----|----|----|------------------|------------|----------|
| 1 | There are factors responsible for indiscriminate disposal of domestic sewage. | 80 | 50 | 10 | 20 | 160 | 3.0 | Accepted |
| 2 | Lack of adequate water supply could lead to the occurrence in Obiaruku community | 57 | 73 | 14 | 16 | 160 | 3.2 | Accepted |
| 3 | Lack of adequate means of sewage disposal facilities can predispose the occurrence | 80 | 40 | 35 | 5 | 160 | 3.0 | Accepted |
| 4 | Increase in population, lack of sanitary facilities and nonchalant attitude of individual towards sanitation practice. | 90 | 20 | 35 | 15 | 160 | 2.7 | Accepted |
| 5 | Blocked drains, erosion and absence of proper drainage system in the community | 105 | 35 | 15 | 5 | 160 | 3.1 | Accepted |
| 6 | Lack of funds in purchasing of adequate equipment and facilities that are required for proper storage and | 115 | 25 | 10 | 10 | 160 | 3.0 | Accepted |

| treatment will encourage it | | | | | | | | |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|-----|----|------|-----|----------|
| 7 | Lack of public health awareness about the danger associated with indiscriminate disposal of domestic sewage could predispose the occurrence in Obiaruku Community | 95 | 35 | 25 | 5 | 160 | 3.0 | Accepted |
| Total | | 622 | 278 | 144 | 76 | 1120 | | |

Source: Field Survey 2019. SA=Strongly Agreed, A=Agreed, D=Disagreed, SD=Strongly Disagreed.

Health and Environmental Implication of Indiscriminate Disposal of Domestic Sewage

Table 3 below shows that out of 640 responses, 94 respondents agreed the health and environmental implication of indiscriminate disposal of domestic sewage causes threat to aquatic life as a result of water runoff from polluted source; 85 respondents strongly agreed that unsightliness, odour nuisance, rodent and flies infestation occurs, while 75 respondents agreed that it favors the speed of disease such as cholera, typhoid fever, poliomyelitis, malaria, etc, and lastly, 119 respondents agreed that water runoff from contaminated source pollute water source, and

food eaten by man. This is in line with the findings of Yoada et al.¹¹, who found out that most of the respondents thought that improper waste management could lead to malaria and diarrhea. The opinion of Ogundele et al.⁴, supported the findings of this study, who reported that in Agbowo and Bodija communities, respondents were reported to suffer of watery stools, typhoid, skin infections, vomiting, sore throat, and abdominal pains. These findings are in agreement with the report by Fazzo et al.⁷, who showed that excreta and other liquid and solid waste from households and the community, are a serious health hazard and lead to the spread of infectious diseases.

Table 3 : Summary on the health and environmental implication of indiscriminate disposal of domestic sewage.

| S/N | STATEMENT | A | SD | D | SD | No of Resp. | Mean Score | Remark |
|-------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|----|----|-------------|------------|----------|
| 1 | Threat to aquatic life as a result of water runoff from polluted source due to indiscriminate disposal of domestic sewage | 94 | 46 | 13 | 7 | 160 | 3.1 | Accepted |
| 2 | Unsightliness, odour nuisance, rodent and flies infestation occurs as a result of indiscriminate disposal of domestic in sewage. | 60 | 85 | 11 | 4 | 160 | 3.4 | Accepted |
| 3 | Indiscriminate disposal of domestic sewage favor the speed of disease such as cholera, typhoid fever, poliomyelitis, malaria etc has been observed by individual in Obiaruku community | 75 | 65 | 9 | 1 | 160 | 3.2 | Accepted |
| 4 | Water runoff from contaminated source pollute water source, food eaten by man | 119 | 17 | 19 | 5 | 160 | 2.9 | Accepted |
| Total | | 348 | 213 | 52 | 27 | 640 | | |

Source: Field Survey 2019. SA=Strongly Agreed, A=Agreed, D=Disagreed, SD=Strongly Disagreed.

Ways of Reducing Health & Environmental Implication of Indiscriminate Disposal of Domestic Sewage

From the result in Table 4 below, out of 640 respondents, 110 strongly agreed that some of the ways of reducing health and environmental implication of indiscriminate disposal of domestic sewage in the community is through effective environmental sanitation and personal hygiene practices; 82 respondents agreed that all domestic sewage before disposal should be subjected to effective treatment so as to destroy pathogenic organisms present in waste water that are capable of causing diseases, while 90 respondents agreed that regular inspection of individual premises on where domestic sewage is frequently generated and effective enforcement of suitable legislature that could guide or punish individuals who violate sanitary practices to dispose domestic sewage, and lastly, 122 respondents agreed that proper drainage system should be

constructed in order to ease the free flow of waste and runoff water from the community. This is in concord with the findings of Mamady¹⁰, who suggested that promotion of environmental information and public education and implementation of community action programs on diseases prevention and health promotion will enhance environmental friendliness and safety of the community. Oruonye et al.⁹ suggested that increase enlightenment campaign through jingles in mass media, recruitment and empowerment of community health workers and sanitary officers and reactivation of the monthly environmental sanitation program. The findings of this research also agrees with the work of Yoada et al.¹¹, who stated that proper education of the public, provision of more trash bins, and the collection waste by private contractors could help prevent exposing the public in municipalities to diseases.

Table 4: Summary on possible ways of reducing the Health and Environmental implication of indiscriminate disposal of domestic sewage.

| S/N | STATEMENT | A | SA | D | SD | No of Resp. | Mean Score | Remark |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-----|----|----|-------------|------------|----------|
| 1 | Effective environmental sanitation and personal hygiene practices could reduce the manner created as a result of indiscriminate disposal of domestic sewage in Obiaruku community | 40 | 110 | 7 | 3 | 160 | 3.6 | Accepted |
| 2 | All domestic sewage before disposal should be subjected to effective treatment so as to destroy pathogenic organism present in waste water that are capable causing diseases in Obiaruku community | 82 | 64 | 8 | 6 | 160 | 3.3 | Accepted |
| 3 | Regular inspection of individual premises on where domestic sewage is regularly generated and effective enforcement of suitable legislature that could guide or punish individual who violate sanitary practices to dispose domestic sewage, this could help to reduce the problem specifically the Health and Environmental impact of indiscriminate disposal of domestic sewage in Obiaruku community | 90 | 52 | 13 | 5 | 160 | 3.2 | Accepted |
| 4 | Proper drainage system should be constructed in order to ease the free flow of waste and runoff water from the community | 122 | 31 | 5 | 2 | 160 | 3.1 | Accepted |
| | Total | 334 | 257 | 33 | 16 | 640 | | |

Source: Field Survey 2019. SA=Strongly Agreed, A=Agreed, D=Disagreed, SD=Strongly Disagreed.

IV. CONCLUSION

It can be concluded that there is significant level of awareness about indiscriminate disposal of domestic sewage in Obiaruku community. The result shows that the causes and the effect of indiscriminate disposal of domestic sewage is as a result of inadequate means of domestic sewage disposal and other related causes and lack of information, the result reveals that there are no proper sanitary disposal system and the people are not enlightened of the effect of their actions on their health. There is an evidence of wiliness from the respondents that if they are provided with necessary sanitary disposal system they will desist from disposing their waste indiscriminately.

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SIGNIFICANCE STATEMENT

This study will help to reduce the rate of environmental health impact created by indiscriminate disposal of domestic sewage in the study Area. It will also reduce the cases of disease out-break such as cholera, dysentery, typhoid and poliomyelitis. The study is sine qua non, because the issue of sewage disposal is of great concern, this will cause health workers, policy makers and government to be motivated to educate the population on the danger associated with indiscriminate disposal of sewage in the environment.

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