

Public Health Implication of Sand Fly Infestation in Ozuaha Community Ikwerre Local Government Area Rivers State

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Abstract: This study was carried out to find out the “Public Health Implication of Sand Fly Infestation in Ozuaha Community in Ikwerre Local Government Area. The objectives of this study was to determine the actual presence of the sand flies, to identify the group of individual that are mainly affected, to identify the various health effects of the sand flies in the community in Ozuaha Community Ikwerre Local Government Area Rivers State. A non-probability sampling method was used as the sampling technique and descriptive survey was used as design. Data was collected by the use of questionnaire and was self-administered to the respondents. The target population was two hundred and forty (240) and the research sampled all. The findings state that the use of mosquito coils, wearing of long sleeves shirts, use of ceiling fans, blocking of openings are known preventive measures. Conclusion was drawn after the findings that the measures used in the control of sand flies in Ozuaha community are inadequate to totally solve the problem. That the awareness of the control measures in Ozuaha community is lacking, ignorance, social status and cultural insensitivity persist in the community. Recommendation were made that monthly environmental sanitation exercise should be carried out or enforced in Ozuaha community. The government should subscribe and provides the appropriate drugs required to treat sand fly fever in Ozuaha community. Finally, the government and health workers should carryout awareness / enlightenment campaign on sand flies control programs in Ozuaha community.

Keywords: Public Health, Sand Fly, Infestation, Ozuaha

I. INTRODUCTION

Sand flies (Diptera: Psychodidae) are small-sized hairy Gnats or midges, measuring from 1.5 to about 4mm in length (Ready, 2013). Sand flies are minute biting insects in the order dipteral, which in clutters the true flies, “sand flies is not a technical term, but rather a common name applied to a very diverse groups of flies (Encyclopdia, May 2010). They occur throughout the tropics and sub-tropical countries as well as in temperate zone. They are vectors of leishmaniasis, a vector borne disease endangering some 350 million people in 88 countries, most of them in poorer region of the globe (Orshan, et al., 2010).

People generally refer to any small, biting fly as sand fly. Typically, only female sand fly actually bite using the protein in the blood, they collect to build their eggs, they are also responsible for biting and sucking the blood of mammals, reptiles and birds (Encyclopedia 2010).

Sand flies are known to breed where vegetation and climate favour their breeding sites (Hoelet al., 2007). Sand flies use their mouth parts to probe exposed skin, leading to blood flow from which they draw blood meals (Kellick, 2002, Galati, et al, 2017).

Sand flies are blood suckers and their larvae inhabit places where there is high organic matter such as animals burrow, termites hills and tree holes. Sand flies are best known as vectors of trypanosome species in the genus leishmania, causing diseases collectively known as leishmaniasis (Franklin, 2005).

Though sand flies pose a major threat to public health, control of sand flies is often difficult because methods mainly rely on interrupting contact between females and humans (Rev. SaudePublica, 2016). For both anthroponotic and zoonotic cutaneous leishmaniasis the only choice is chemical and environmental control. The main chemical control methods have been indoor residual spraying of organochlorines (DDT and dieldrin), organophosphates (malathion), carbamates (propoxur), and synthetic pyrethroids (permethrin and deltamethrin) Camargo-Neves V.A. Leishmaniose visceral Americana (Paulisha, 2007). The discoveries of sand flies infestation from the early days of history have a positive effect on our health and well being. Sand flies (Dipterapsychodidarephtebotomin-e) are of considerable public health importance in the tropics and subtropics species of the world genus phlebotomus or American genus lutzoya are vectors of vertebrates pathogens, including zoonotic leishmaniasis species that affect people in more than 80 countries. There are estimated 12 million cases of leishmaniasis worldwide: 2 million new cases occur each year and 350 million people are at risk the disease can present itself in four different forms in humans, all with devastating

consequences. Cutaneous diffuse cutaneous, mucocutaneous and visceral leishmaniassi is fatal if left untreated and the cutaneous forms are often disfiguring and mutilating.

Sand Flies are very much attracted to shiny surfaces, moving objects, warmth, and carbon dioxide. On the contrary to other flies, they are attracted to darker shades of colors than lighter shades. (El Elkholi M. et al 2012).

Sand Flies always travel in swarms (a group of sand flies). Sand flies are not fast, hence they are easily going to give it up.

Aims of the Study

The aim of this project is to identify the various health problems associated by the presence of sand flies and to identify their control measures.

Specific Objectives

The specific objectives of this study shall include the following:

1. To determine the actual presence of the sand flies in Ozuoba Community
2. To identify the group of individual that are mainly affected.
3. To identify the various health effects of the sand flies in the community
4. To proffer ways and means of controlling the problem

Research Questions

1. What are the actual presence of the sand flies in Ozuaha Community?
2. What are the major groups of people mainly affected by this problems
3. Are there any adverse health effects of sand flies on the people of Ozuaha Community?
4. What are the possible ways and means of controlling this problems?

II. RESEARCH METHDOLOGY

This chapter provide as detailed account of the methods used in collecting data as well as the presentation of data. This would serve a an aid of answering our research questions raised in course of the study, why this method were chosen and analyzed would be discussed.

Study Design

For this research work, the researcher resorted to the descriptive survey approach. This method according to Laoye (1993) is an investigating in which self-reporting data were collected from samples with the purpose of describing population to solve variables of interest.

Study Area

This study was carried out in Ozuaha community in Ikwerre Local Government Area. Ozuaha is one of the 23 Local Government Areas in Rivers State of Nigeria. It covers an area of 41km and at the 2006 census it has a population 10,400.

Occupation

The main occupation of the people is majorly farming, aside this, some are civil servants while others are petty traders.

Sample and Sampling Technique Sample size of Two Hundred and forty (240) respondents was drawn for the study. The sample was drawn from different compounds in the community that make up the Ozuoha Community.

Table 3.1: Distribution of Sample Size

S/N	Selected Compounds	Code No.	No. Of questionnaire Distributed	No. Of questionnaire retrieved
1.	OmuNnah	001	53	50
2.	OmuOrdu	002	51	50
3.	OmuNkpuma	003	32	30
4.	OmuAjuru	004	41	40
5.	Omu Woke	005	30	30
6.	OmuNyepkowa	006	41	40
	Total		248	240

Instrument for Data Collection

The instrument for data collection is a structural questionnaire and oral interview

Method of Data Collection

In order to make a successful work, the researchers used some techniques in gathering the information from the people of the area (Ozuaha) these techniques include interview, and questionnaire.

Total number of 248 (two hundred and forty-eight) questionnaires were distributed base on the sample size estimation. The areas were organized into Compounds (1-6) for the purpose of collecting information from respondents on the question asked. Out of 248 (two hundred and forty-eight) questionnaires served, two hundred and forty (240) were correctly filled and retrieved while 8 were missing and not retrieved.

Method of Data Analysis

In this study, the data collected from the respondents was analyzed using statistical tables.

III. QUESTIONNAIRE

SECTION A: BIO DATA

Instruction: Indicate your answers by ticking (✓) in the appropriate box

1. What is your Sex : (a) Male (b) Female
2. What is your age: (a) 18-22 years (b) 23-27years (c) 28-32 years (d) 33-37 years
(e) 48 years and above
3. What is your Marital Status: (a) Single (b) Married (c) Divorce (d) Widow (e) Engage
4. What is your belief/Religion? (a) Christianity (b) Muslim (c) Traditionalist
5. What do you do for a living ? (a) Student (b) Civil Servant (c) Farmer (d) Trader
(e) Business man / Woman
6. What is your Educational qualification? (a) Tertiary (b) Secondary (c) Primary

SECTION B: RESEARCH QUESTIONS

7. Do you feel sand flies bite? (a) Yes (b) No
8. At what period of the day do sand flies bite? (a) Early morning (b) Afternoon (c) evening
9. How long does the bite last before the appearance of sore and itching reactions? (a) During the bite
(b) Shortly after the bite (c) long after the bite
10. What are the major group of people mainly affected by sand flies in Ozuaha?
(a) Farmers (b) Fishermen (c) Traders (d) Students
11. What are the health effects of sand flies bite on the people of Ozuaha community
(a) itching reaction (b) sand fly (c) sore of the skin
12. What are the possible ways and means of controlling the problems of sand flies in Ozuaha community?
(a) use of chemicals (b) reducing vegetations (c) use of mosquito coils (d) wearing of long
sleeves
13. How can Sand flies bites be prevented? (a) Use of mosquito coils (b) Wearing of long sleeves
(c) Use of ceiling fans (d) Blocking openings
14. Is there any particular environmental condition that favour the infestation and breeding of sandflies? (a) Yes (b) No
15. If the answer to the question above is yes, then tick the appropriate box specifying the condition (a) dirty environment
(b) bushy environment (c) stagnant water (d) presence of water bearing plants
(e) all of the above (f) others

IV. DATA PRESENTATION AND ANALYSIS

This chapter will analyze the data gotten from the use of the (14) fourteen items self-structured or constructed questionnaires and descriptive statistics used to analyze the data collected. The information gotten is presented in tables charts while the tables are computed in percent, the analyze will help to provide answers to the research questions. A total of two hundred and forty (240) questionnaires were distributed and they were all retrieved back.

Table 4.1: Age of Respondents

Age	No. of Respondent	Percentage (%)
10-19 years	10	4.2
20-2years	20	8.3
30-49	90	37.5
50 and above	120	50.5
Total	240	100

Source: Field Survey

The table shows that 120(50.5) of the respondents are within the age of 50 years and above, 90(37.5%) are within 30-49

years, 20(8.3%) are within 20-39 while 10(4.2%) falls within the age of 10-19 years old.

Table 4.2 Sex Distribution of Respondents

Sex	No. of Respondent	Percentage (%)
Male	110	45.8
Female	130	54.2
Total	240	100

The table above shows the sex distribution of the respondents, 110(45.8%) of the respondents are male while 130(54.2%) are female.

Table 4.3 : Occupation of Respondents

Occupation	No. of Respondent	Percentage (%)
Trading	20	8.33
Civil servants	50	20.5
student	70	29.1
Farmers	100	41.6
Total	240	100

Source: Field Survey

The table above shows that occupation of the respondents 8.33% of the respondents are traders, 20.8% are civil servants, 29.1% are students, 41.6% are farmers which are the highest percentage of respondents.

Table 4.4: Educational Level of Respondents

Education	No. of Respondent	Percentage (%)
Non formal	40	16.7
Primary	60	25.0
secondary	90	37.5
Tertiary	50	20.8
Total	240	100

Source: Field Survey

The above shows the educational level of the respondents. 40(16.7%) are non-formal education, 60(25.0%) have primary education, 90(37.5%) have secondary education, 50(20.8%) have tertiary education. The table also reveals that the largest number of respondents have secondary education.

Table 4.5 Religion Background

Religion	No. of Respondent	Percentage (%)
Christianity	170	70.8
Islam	10	4.2
traditional	60	25
Total	240	100

Source: Field Survey

The above table shows that 170(70.8%) are Christians which carries the highest population, 60(25%) are traditional religion while 10(4.2%) are Muslim.

Table 4.6: Marital Status

Marital Status	No. of Respondent	Percentage (%)
Married	130	54.2
Single	80	33.3
divorced	30	12.5
Total	240	100

Source: Field Survey

The table above shows that 130(54.2%) are married, 80(33.3%) of respondents are single while 30(12.5%) of the respondents are divorced.

Section B: Research Questions

Table 4.7: Do you feel sand flies bite?

Reactions	No. of Respondent	Percentage (%)
Yes	140	58.3
No	100	41.7
Total	240	100

Source: Field Survey

The table above shows that 140(58.3%) respondents feel when sand flies bite while 100(41.7%) respondents do not feel when sand flies bite them.

Table 4.8: At what period of the day do sand flies bite?

Reactions	No. of Respondent	Percentage (%)
Early morning	130	54.2
Afternoon	0	0
evening	110	45.8
Total	240	100

Source: Field Survey

The table shows that 130(54.2%) of the respondents are saying that sand flies bite in the morning period, 110(45.8%) of the respondent are saying that sand flies bite during the evening period. The table also revealed that sand flies bite mostly in the early morning period.

Table 4.9: How long does the bite last before the appearance of sore and itching reactions?

Reactions	No. of Respondent	Percentage (%)
During the bite	80	33.3
Shortly after the bite	130	54.2
long after the bite	30	12.5
Total	240	100

Source: Field Survey

From the above table 80(33.3%) of the respondents are saying that itching reaction occur during the bites of sand flies, 130(54.2%) are saying that itching occur shortly after the bite while 30(12.5%) of the respondents are saying that

itching reaction occur long after the bite followed by the appearance of sore.

Table 4.10: What are the major group of people mainly affected by the presence of sand flies in Ozuaha Community?

Reactions	No. of Respondent	Percentage (%)
Farmers	100	41.7
Fishermen	100	41.7
students	20	8.3
traders	20	8.3
Total	240	100

Source: Field Survey

From the table above, 100(41.7%) of the respondent are saying that sand flies affect farmers, the same 100(41.7%) of the respondents are also saying that sand files affects fishermen, 20(8.3%) of the respondents are saying that sand flies affect students, also 20(8.3%) are saying that sand flies also affect trades.

Table 4.11: What are the health effects of sand flies bite on the people of Ozuaha community?

Reactions	No. of Respondent	Percentage (%)
Itching reaction	190	79.2
Sand fly fever	50	20.8
Total	240	100

Source: Field Survey

From the above table, 190(79.2%) of the respondents are saying that bites of sand flies results to body itching while 50(20.8%) of the respondents are in the view that sand flies bites leads to sand fly fever due to their serious bite.

Table 4.12: What are the possible ways and means of controlling the problems of sand flies in Ozuaha community?

Reactions	No. of Respondent	Percentage (%)
Use of chemicals	70	29.2
Reducing vegetations	80	33.3
Use of smaller mesh	90	37.3
Total	240	100

Source: Field Survey

From the above table, 80(33.3%) of the respondents are saying that reducing the vegetation in the surrounding is a way of controlling sand flies, 90(37.3%) are in the view that the use of smaller mesh in the house is a means of controlling sand flies, while 70(29.2%) of the respondents are saying that the use of chemicals application is a way of controlling sand flies.

Table 4.13: How can Sand flies bites are prevented

Reactions	No. of Respondent	Percentage (%)
Use of mosquito coils	50	20.8
Wearing of long sleeves	100	41.7
Use of ceiling fans	30	12
Blocking openings	60	25.5
Total	240	100

Source: Field Survey

From the table, 60(25%) of the respondents are saying that blocking of openings in the house is a way of preventing the bites of sand flies, 100(41.7%) of the respondents are saying that the wearing of long sleeves is a way of preventing the bites of sand flies, 50(20.8%) of the respondents are in the view that the use of mosquito coils in the house is a way of preventing the bites of sand flies, while 30(12.5%) of the respondents are in view that the use of ceiling fan is a way of preventing the bites of sand flies.

V. DISCUSSION OF FINDINGS

This discussion of findings is done in respect to the research questions.

Research Question one (1)

What are the major groups of people mainly affected by sand flies in Ozuaha community? The question was analyzed using table 4.10 the findings showed that sand flies mainly affects the fishermen and farmers in the community and less to students and other groups of people. This is in agreement with (Nwoke, 2016). The extent to which sand fly population increases throughout the year depends on the local climate with significant seasonal changes in temperature and precipitation. It was observed that in the days without rainfall during the rainy season, or at the river where the fishermen were being attacked by sand flies, a large amount of sand flies were found, as observed in June to October. However, the long term rainfall period activity varies greatly on the sand fly population, forcing them to remain in sheltered conditions. The nuisance caused by the bites of sand flies has negative impact on the economic growth of the local community precisely in Ozuaha community. Also asserted by Muller (2011) that It is likely that habitat degradation and climate change greatly impact the abundance and richness of sandflies.

Research question two

What are the adverse health effects of sand flies bite on the people of Ozuaha community? The question was analyzed using table 4.11, the table reveals that 79.2% of the respondents are strongly saying that itching reactions is a health effects of sand flies bite, while 20.8% of the respondents are in the opinion that sand flies bite brings about sand fly fever.

Research Question three:

What are the possible means and ways of controlling sand flies in Ozuaha? The question was analyzed using table 4.12 and table 4.13.

The 4.12 reveals that 37.5% of the respondents are saying that the use of smaller mesh is a way of controlling sand flies, 33.3% of the respondents are saying that cutting down vegetation is a way of controlling sand flies, while 29.2% of the respondents are in the view that the use of chemicals is a way of controlling sand flies in Ozuaha community.

Table 4.13 reveals that 41.7% of the respondents are saying that wearing of long sleeve is a way of reducing the bite of sand flies, 25.0% of the respondents are in the view that blocking of openings is a way of reducing the bite of sand flies, 20.8% of the respondents are saying that the use of mosquito coils is a way of reducing the bites of sand flies, while 12.5% of the respondents are in the view that the use of ceiling fans is a way of reducing the bites of sand flies. This is in consonance with Jackson(2013).

VI. SUMMARY

This study the public Health implications of sand fly infestation in Ozuaha community Ikwerre Local Government Area began with the overview of the effects of sand flies that have placed many people in the world a risk. No further studies had been undergone to know if sand flies have the power to resist chemical applications.

The combination of the various means and ways of controlling and preventing will help in reducing and controlling of sand flies infestation in Ozuaha. The control measures include: the use of smaller mesh, the use of chemicals, reducing the vegetations in the surroundings. Use of mosquito coils, wearing of long sleeves shirts, use of ceiling fans, blocking of openings. The combination of all the measures can help attack the problems of sand flies in Ozuaha community.

VII. CONCLUSION

Based on all the analysis derived from the questionnaire, the researcher wish to say:

1. That the measures used in the control of sand flies in Ozuaha community are inadequate to totally solve the problem.
2. That the awareness of the control measures in Ozuaha community
3. That the reason why the people fail to utilize the control measures is attributed to lack of funds, ignorance, social status and cultural insensitivity.
4. That the impact of other measures by government or World Health Organization and Ministry of Health

have not been felt by the people of Ozuaha community.

VIII. RECOMMENDATIONS

The recommendations are thus highlighted:

1. That monthly environmental sanitation exercise should be carried out or enforced in Ozuaha community.
2. The government should subscribe and provides the appropriate drugs required to treat sand fly fever in Ozuaha community.
3. That the government and health workers should carryout awareness / enlightenment campaign on sand flies control programs in Ozuaha community.
4. That government and health workers should encourage regular medical examination by the people in the locality to enhance early detection of sand fly fever cases and prompt treatment with appropriate sand fly fever drugs.
5. That all the houses in the area should be screened with smaller wire or plastic mesh on the windows and doors.
6. That insecticidal chemical should be sprayed using knapsack sprayers, aeroplane or helicopter on the breeding places of sand flies which can also cover farm areas and water sides.

REFERENCES

- [1] Adeleke MA: Bioecology, (2010). Characterization and transmission indices of *Simulium damnosum* Theobald complex (Diptera: Simuliidae) along Osun River, Southwestern Nigeria. PhD Thesis., University of Agriculture, Abeokuta, Nigeria, 218.
- [2] Alexander B, Barros VC, De Souza SF, Barros SS, Teodoro LP, Soares ZR, et al. Susceptibility to chemical insecticides of two Brazilian populations of the visceral leishmaniasis vector *Lutzomyia longipalpis* (Diptera: Psychodidae). Trop Med Int Health. 2009;14:1272–7.
- [3] Ashford (2001). Susceptibility status of wild population of *Phlebotomus sergenti* (Diptera: Psychodidae) to different insecticides in an endemic focus of cutaneous leishmaniasis in northeast of Iran. J Vector Borne Dis.;54:282–6.
- [4] Bray DP, Alves GB, Dorval ME, Brazil RP, Hamilton JGC. Synthetic sex pheromone attracts the leishmaniasis vector *Lutzomyia longipalpis* to experimental chicken sheds treated with insecticide. Parasit Vectors. 3:16.
- [5] Chidinma A. Ikpeama (2018) Bionomics of Sandflies (Diptera: Psychodidae) in Some Remote Communities in Ezinihitte
- [6] Davies CR, Llanos-Cuentas EA, Campos P, Monge J, Leon E, Canales J. Spraying residents houses in the Peruvian Andes with lambda-cyhalothrin against cutaneous leishmaniasis protects. Trans R Soc Trop Med Hyg. 000;94:631–6.
- [7] Dibo M.R. (2016). An experimental study of the peridomestic distribution of *Lutzomyia longipalpis* (Diptera: Psychodidae). Bull Entomol Res.;84:379–82.