A study of mosquito borne diseases awareness, life cycle, attitude and practices among the rural population in Ifako Ijaiye, Lagos State

THEME: *GLOBAL CONNECTIONS: INVESTIGATING EARTH AS A SYSTEM TOGETHER*

PROJECT TYPE: *INTERNATIONAL VIRTUAL SCIENCE SYMPOSIUM (IVSS)*

GLOBE PROTOCOLS: *ATMOSPHERE, HYDROSPHERE, PEDOSPHERE, BIOSPHERE*

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TABLE OF CONTENTS

Summary

All over the world mosquito borne diseases are responsible for a large number of morbidity and mortality. A study showed that there are about 350-500 million cases of malaria annually, with the outcome of 1 million deaths. Although there are around 3500 species of mosquitoes tracked down to tropical and subtropical regions of the world only a hand full of species cause most of the vector borne diseases. The objective of this study was to study people's awareness, mosquito life cycle, attitude and practice about mosquito borne disease in rural areas of Ijaiye, Ojokoro and Meiran. Methods: A cross-sectional study was conducted among the residents of Ijaiye, Ojokoro, and Meiran during the rainy season in 2022. Through systemic random sampling a total of 30 houses were selected. After obtaining an informed consent, GLOBE Mosquito Habitat Mapper was used for the collection of data. The GLOBE Observer Mosquito Habitat Mapper Application assist us in tracking the range and spread of mosquitoes, their breeding places, various diseases spread by them, control measures, personal protection measures used in the community and source of treatment. The data collected by the application are shared with public health, government and GLOBE Implementation Office (GIO). Conclusions: Intensified efforts should be made to create public awareness and mobilize the community in the preventive measures against mosquito borne diseases.

Keywords: Community perception, Mosquito borne diseases, Personal protective measures

RESEARCH QUESTIONS

1. Are there any identified mosquito borne diseases in Lagos state, Nigeria?

2. Will removing used tires and creating awareness on mosquitoes reduces mosquito borne diseases?

3. Do increase temperature and precipitation rate improve mosquitoes life cycle?

INTRODUCTION

Literature Review

In recent years, vector-borne diseases have emerged as a serious public health problem in countries of west African region, including Nigeria. Some of the vector borne diseases known to man includes Malaria, Dengue, Chikungunya, Leishmaniasis etc. Vector borne diseases mainly arise in those areas where clean drinking water and proper sanitation system is a challenge (Okanlawon, 2022). These have mainly been treated as diseases of the poor as it is endemic in low socio economic strata and in areas where cycle of illness and poverty exists. From the time immemorial, mosquitoes have been accepted as a source of illness affecting man. All over the world mosquito borne diseases are responsible for a large number of global morbidity and mortality, mainly affecting children and young adults on evaluating the endemic regions of malaria. A study showed that there are over 350-500 million cases of malaria annually, causing about 1 million deaths and more than 90% of mortality experienced by children below the age of 10 mainly in the sub-Saharan Africa (Olawepo, 2022). Although there are around 3500 species of mosquitoes tracked down to areas of tropical and Subtropical regions of the world only a hand full of them cause most of the vector borne diseases. With the better understanding of "agent-host-environment" triad with its application on infectious diseases helps us to get a better view on how to control the vector borne diseases. Some mosquitoes are pollinators and so they help to make fruits and vegetables. There are over 40 genera and over 3,500 known species. However, three of these genera — Aedes, Culex and Anopheles — have species that transmit diseases that impact people, including malaria, chikungunya virus, dengue fever, Zika virus and West Nile virus(Dorain et Brian, 2022). Identifying the breeding areas of mosquitos that are disease vectors for humans is an important component of local disease management and eradication. Prevention and control programs were thus aimed at monitoring and controlling the arthropod vector, like mosquito. Some of the control methods, commonly used are personal protection, family protection, community measures. The life cycle of mosquitoes is closely related to their environment. The egg, larvae and pupae stages of the mosquito life cycle are dependent on water, especially standing water. Different species have different preferences for where to lay their eggs, whether in natural ponds or puddles, or in artificial containers left by humans. Land cover and vegetation also play a role. Species vary in their preferences for vegetation cover, and some favor urban environments and proximity to human dwellings. Temperature is another important factor. The speed of the mosquito life cycle can be impacted by changes in temperature(NASA Earth Education, 2022) . Tracking where mosquitoes and larvae have been observed, along with environmental data, can help determine when outbreaks of disease, such as malaria or dengue, most likely will occur, or when chemical or other controls will be most effective.

The present study shows the people's perception about mosquito borne diseases and treatment seeking behaviour, their attitude toward the disease and their practices towards preventing mosquito borne diseases. It also highlights the importance of these aspects in making adequate long term strategies, which are tailored to the local needs in order to promote the local population to take protective measures against mosquito borne infection.

Community impact of the project

The purpose of this project was to study mosquito borne diseases awareness, life cycle, attitude and practices among the rural population in Ifako Ijaiye, Lagos State. There has been fewer inhabitant consulting medical or health expert when symptoms of malaria was felt and breeding sites of mosquitoes are encourage. Few of the inhabitant make use of mosquito repellants. We intend to reach out to the communities based on the deadly vectors carrying diseases that claims lives through awareness program on mosquitoes and environmental cleanliness as well as ensuring that they take cognizance of the increase temperature as it improves the life cycles of mosquitoes and how to mitigate it. From our research work, we observed that some of the inhabitants have started adopting the use of mosquito repellants as well as engaging in health talks involving malaria and zika virus also, used car tires and other mosquito breeding sites have been destroyed.

METHODS AND MATERIALS

1. GLOBE observer Application
2. Giovanni IMERGE plotter
3. Plastic containers
4. Thermometer (infrared)
5. Mosquito larva Microscope
6. Used tires
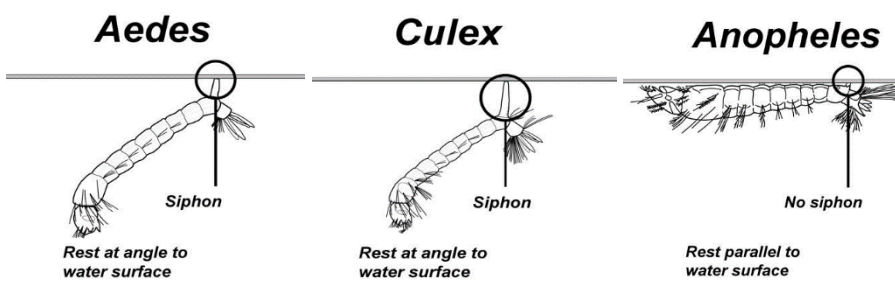7. Awareness posters

Survey of the study area

A cross-sectional study was conducted among the residents of Ifako, Ojokoro, Meiran using Atmosphere, Biosphere, Hydrosphere, and Pedosphere protocol bundles from September 2022 to early February 2023, A total 30 houses from these three Areas were selected for the study through systemic random sampling. After obtaining an informed consent, GLOBE Mosquito Habitat Mapper was used for the collection of data. The GLOBE Observer Mosquito Habitat Mapper Application assist us in tracking the range and spread of mosquitoes, their breeding places, various diseases spread by them, control measures, personal protection measures used in the community and source of treatment. The data collected by the application are shared with public health, government and GLOBE Implementation Office (GIO).
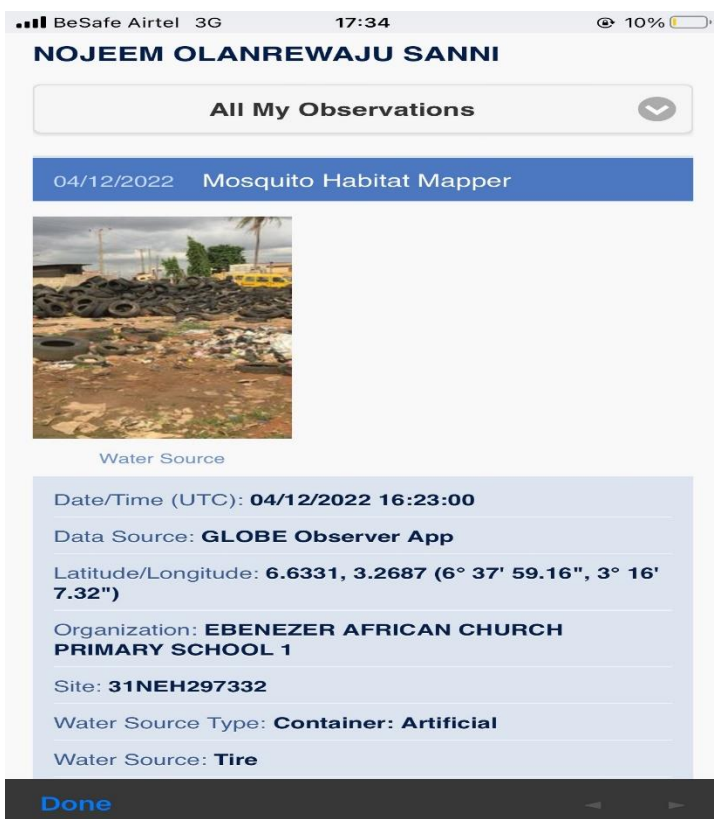
Procedures:

Table 1: data showing number of count of mosquito types seen

S/N	Mosquito types	Ijaiye (10 houses)	Ojokoro (10 houses)	Meiran (10 houses)	Total (30 houses)
1.	Aedes	12	11	15	38
2.	Culex	34	17	12	63
3.	Anopheles	350	478	387	1,215

Disease carrying mosquito larvae identification

Aedes — Siphon — Rest at angle to water surface

Culex — Siphon — Rest at angle to water surface

Anopheles — No siphon — Rest parallel to water surface

STEP 1: Locating water source and vehicle tires dumping sites (Potential Mosquito Habitats) GLOBE Observer App.

all BeSafe Airtel 3G   17:34   10%

NOJEEM OLANREWAJU SANNI

All My Observations

04/12/2022   Mosquito Habitat Mapper

Water Source

Date/Time (UTC): **04/12/2022 16:23:00**

Data Source: **GLOBE Observer App**

Latitude/Longitude: **6.6331, 3.2687 (6° 37' 59.16", 3° 16' 7.32")**

Organization: **EBENEZER AFRICAN CHURCH PRIMARY SCHOOL 1**

Site: **31NEH297332**

Water Source Type: **Container: Artificial**

Water Source: **Tire**

Done

STEP 2: Measuring Air Temperature using Infrared Thermometer in the locations

Table 2: Air Temperature of the three localities randomly selected

S/N	LOCALITIES	t_1 (^{0}C)	t_2 (^{0}C)	t_3 (^{0}C)	Average (^{0}C)
1.	IJAIYE	31	32	30	31
2.	OJOKORO	34	33	32	33
3.	MEIRAN	29	31	27	29

Step 3: Identification of few Adult Mosquito by collecting samples using the plastics

**Female Anopheles Mosquitoes with highest population in the selected areas**

IMG_4546.MOV

Short Video

STEP 4: Determining the average Air Temperature and Precipitation of the localities (lat. / Long.) using the NASA GIOVANNI

Graph remote sensing from 2008 to 2023

Hovmoller, Latitude-Averaged of Air Temperature (Daytime/Ascending) daily 1 deg. @1000hPa [AIRS AIRX3STD v006] K over 2008-08-05 - 2016-09-24, Region 6.6349E, 3.2689N
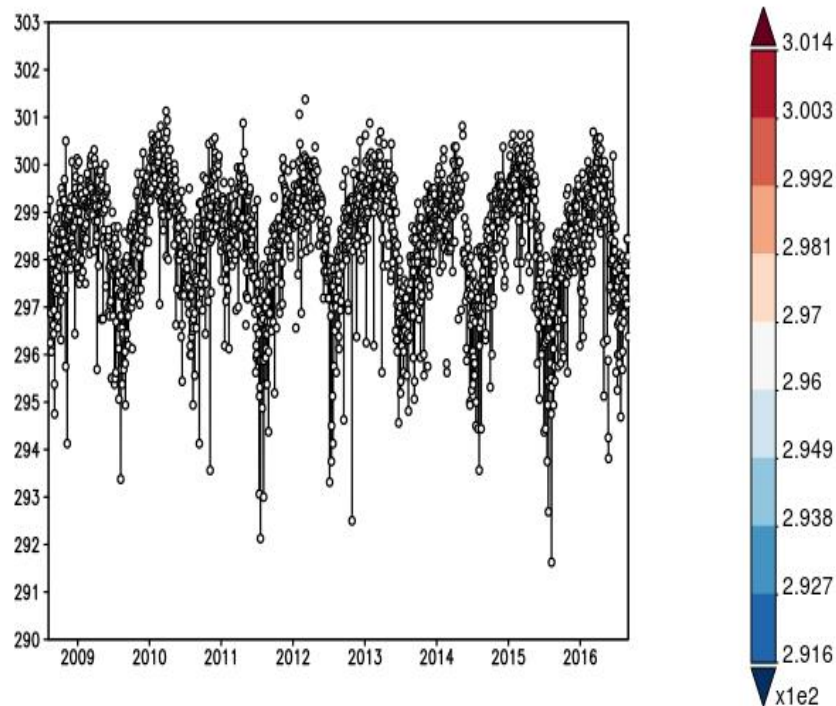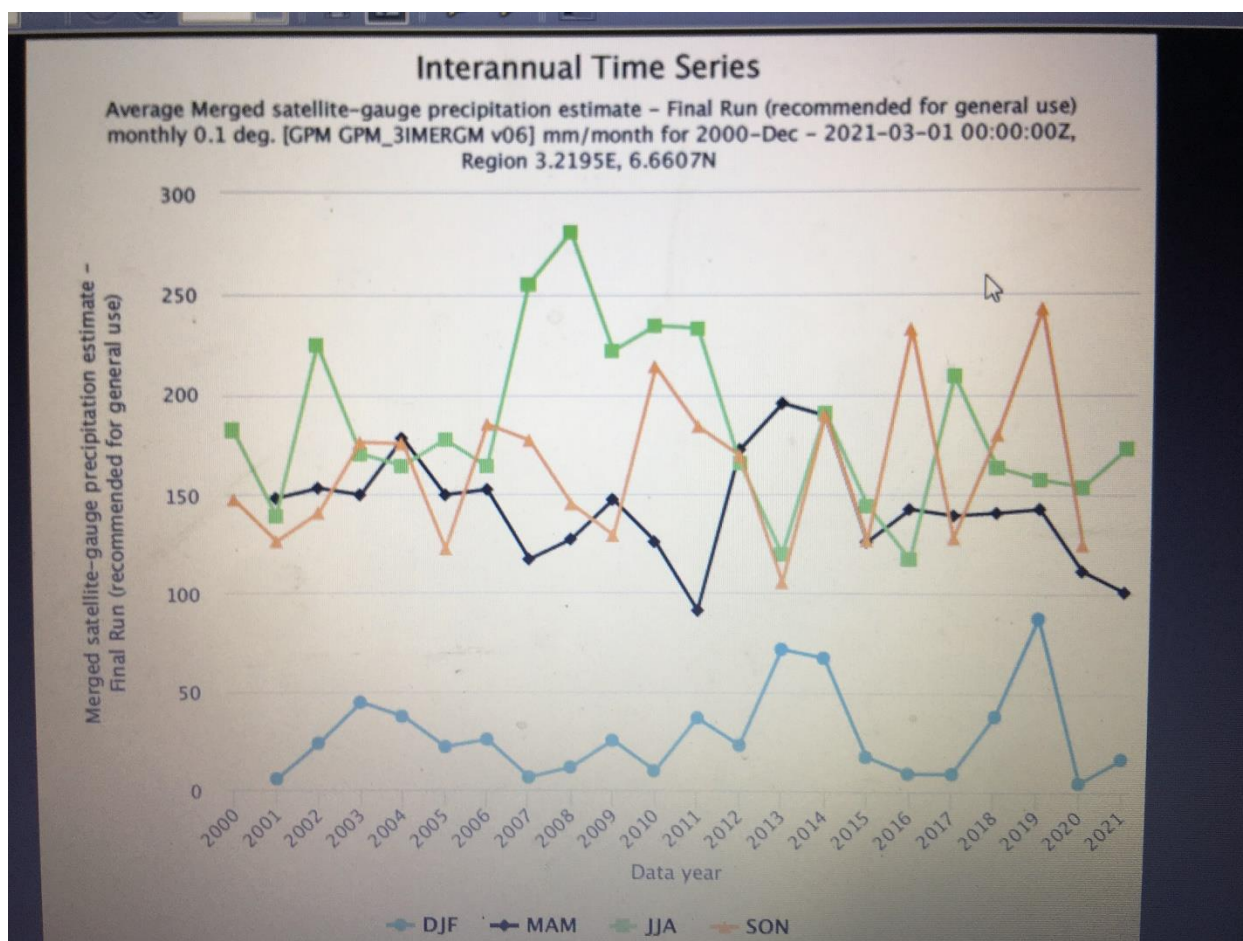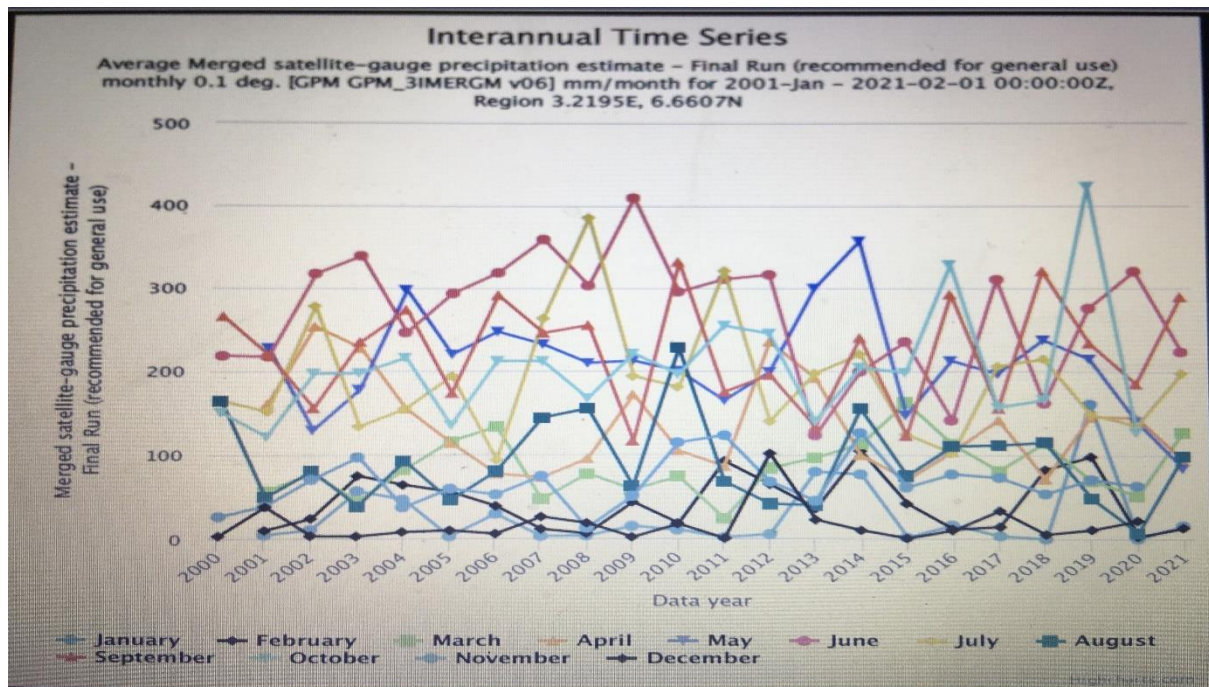

- Selected date range was 2008-08-05 - 2023-02-07. Title reflects the date range of the granules that went into making this result.

Hovmoller, Latitude-Averaged of Anomaly of air temperature at surface (Daytime/Ascending) monthly 1 deg. [AIRS AIRGX3STMMA v006] K over 2008-Aug - 2016-Sep, Region 6.6349E, 3.2689N
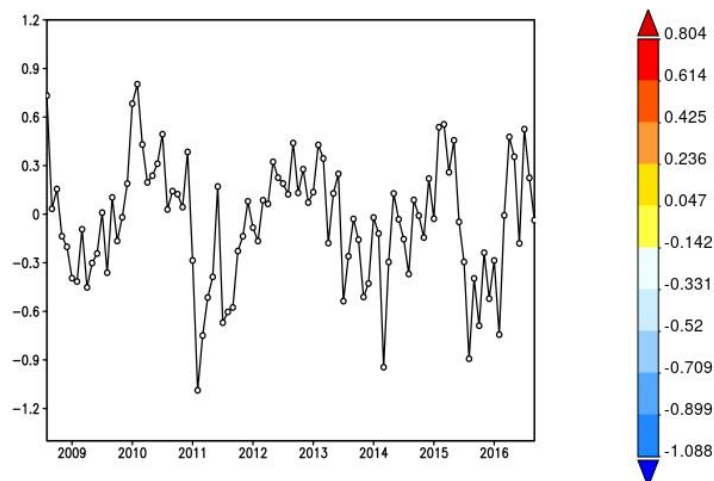
- Selected date range was 2008-08-05 - 2023-02-07. Title reflects the date range of the granules that went into making this result.

Interannual Time Series

Average Merged satellite–gauge precipitation estimate – Final Run (recommended for general use) monthly 0.1 deg. [GPM GPM_3IMERGM v06] mm/month for 2001–Jan – 2021–02–01 00:00:00Z, Region 3.2195E, 6.6607N

Interannual Time Series

Average Merged satellite–gauge precipitation estimate – Final Run (recommended for general use) monthly 0.1 deg. [GPM GPM_3IMERGM v06] mm/month for 2000–Dec – 2021–03–01 00:00:00Z, Region 3.2195E, 6.6607N

RESULTS

Table 1 shows that Anopheles mosquitoes population is the highest hence making the localities more vulnerable.

Table 2 shows that the temperature of the localities are very high on the average hence supporting the breeding and life cycle of mosquitoes. Majority of the inhabitants said that fever & rigor is the most common symptom of mosquito borne diseases. Awareness was made to sensitize the inhabitant that increased temperature of the localities encourage breeding of the deadly mosquitoes hence, breeding sites should be destroyed.

DISCUSSION

This community based observational study assessed the knowledge, attitude and practices about mosquito borne diseases among the rural population in Lagos State, Nigeria. In this study, the highest population count is the Anopheles mosquitoes causing malaria fever. In this study regarding the awareness thought polluted water was a mosquito breeding place and many learnt malaria was spread by mosquitoes and large percentage knew that fever & rigor was the most common symptom of malaria. Therefore their knowledge regarding mosquito borne diseases was good.

This study also found that increase in temperature of the areas selected favours the life cycle of the mosquitoes causing severe health challenges to the inhabitants.

During our awareness program, we found out that average representing 55% subjects visited private general practitioner for consulting on their health issues and lesser ones used mosquito repellents as a personal protective measure. In our study the overall knowledge regarding mosquito borne diseases was satisfactory and the knowledge about prevention of mosquito borne diseases was good but still many households did not practice them. Therefore we have encouraged the community to take necessary actions at the household level to prevent mosquito borne diseases. Also the treating doctors should be encouraged to give health education to the patients and their relatives about the appropriate and affordable preventive measures.

CONCLUSION

More intensified efforts should be to create public awareness and mobilize the community in the preventive measures against mosquito borne diseases. The role of mass media, mainly television and internet needs to be further emphasized in health education and IEC campaigns regarding the breeding sites of mosquitoes, mortal outcomes of mosquito bite and control measures. Thereby it will help in improving the knowledge and awareness of the community and it will in turn help in social mobilization for the full involvement of the community in control of mosquito borne diseases.

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