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Malaria Incidence Mapping In Abraka, Delta State Nigeria

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Abstract – The study examined spatial analyses mapping of malaria incidence in Abraka, Ethiope East Local Government Area, Delta State, Nigeria. The study produced a GIS Map of Abraka showing spatial distribution of malaria disease occurrences in order to identify the causes and effects. Secondary data were collected from Abraka and Eku Government hospitals Medical Records units, Ethiope East LGA Delta State, Nigeria. 200 questionnaires were administered to respondents in Abraka in which only 150 copies were retrieved. The retrieved questionnaires were collated and data obtained were presented in form of tables, percentages and graphs. Data on GIS were sourced and analyzed using Arc GIS, 10.4.1 software to producing spatial analysis map showing low medium and high incidence zones in spatial distribution analyses of malaria outbreak in Abraka. The result of the findings also showed that there is a significant difference in the occurrence of malaria among children and adults in Abraka. The study concluded that the occurrence of malaria outbreak is prevalent among children below l0years and adults (l8years and above) in Abraka community. The study therefore recommend that malaria tests should be introduced in the Health Care curriculum in primary schools/ hospitals and made compulsory for children between 0-l5years and especially for the expectants in the stages of their early pregnancies, as the malaria infections are asymptomatic.

Keywords – Malaria, Mosquitoes, Infectious incidence, GIS and Spatial.

I. INTRODUCTION

Malaria is a long-term infectious disease emanating from mosquito bite. The term malaria originated from medieval Italian meaning “bad air”. The disease was originally called ague or marsh fever due to its correlation with water logged and wet environment (Caraballo, 2014). Malaria is a major killer disease and was in the past in most common disease in Europe and North America where it is now non-endemic, though imported variants do occur (Nadjm and Behrens, (2012). Omotor and Atubi (2009) asserted that, about 92% of the cases of malaria attacks resulting to death are mainly children and pregnant women. Malaria is a serious illness that can result to death if not well properly and professionally managed.

As plasmodium lava from one person to another is distributed from female Anopheles mosquito bite. Malaria is mosquito-borne infectious ailment affecting man resulted from parasitic protozoans (micro-organisms) of Plasmodium specie (Caraballo, 2014). Malaria results in symptoms that include vomiting, high fever, headache and fatigue In Nigeria, malaria affects around 4 to 5 million people annually throughout the countries, with morbidity and fatality rates of 13 to 35% and 15 to 17%, respectively (Federal Ministry of Health, 2014). Plasmodium viva x and Plasmodium falciparum are the two dominant malaria parasites in Nigeria. They are common in all malaria’s environment in the country (usually below 2000 meters above sea level) with P.falciparum representing about 65-75% of the total reported malaria cases, relative frequency variation through space and time within a given geographical ranges. About 75% of the land and 60% of the population is exposed to malaria in Nigeria.

II. Study Background

Nigeria is considered as low-to-moderate malaria transmission intensity country. However, the health sector in Nigeria is greatly affected by climate change which has profound consequences on the transmission cycles of vector-borne infectious diseases like Malaria. Due to instability and seasonal transmission of malaria in Nigeria, protective immunity of the population is generally low and all age groups are usually at high risk. Malaria is the most treated disease worldwide. With estimated 300 million to 500 million clinical cases reported annually, results in approximately 1.5 million to 2.7 million deaths. According to the World Health Organization (WHO, 2015) an estimated 840 million people are at high risk of malaria in Sub-Saharan Africa and literature shown that, 99% of the deaths occur in children under five years living in African is as a result of malaria, with about 60 million people experienced malaria attack at least twice a year in Nigeria (Finkel, 2017). Prevalence of malaria is currently estimated to be 1.3% (Nigeria Malaria Indicator Survey, 2011). However, exposure to malaria varies by location and season. Nigerians live at altitudes ranging from 100 to >4220m, the topography made fertile ground for the bumper reproduction of the epidemic. More than 50 million (68%) of the population live in environment below 2000 m asl are at high risk of malaria infection with consequent variation in minimum and maximum temperatures .Generally, reasons given for the observed increases are significant ecological and climatic variations.

It has been discovered that Malaria disease is mostly common among poor children who do not have access to medical treatment and quality health care delivery due to lack of fund (Hartman, et al, 2010). Malaria is not only a health problem; it is also an economic problem. Malaria attack is expensive for sustainable welfare at both the household and national levels, since it affects productive time and eventual earnings.

Malaria is a life-threatening disease caused by parasites, is transmitted to people through the bites of parasite infected female Anopheles mosquitoes. In 2015, countries and environment had ongoing malaria transmission as it is preventable and curable, and increased efforts are significantly reducing the malaria burden in many parts of the world. Between 2010 and 2015, malaria incidence among populations at risk (the rate of new cases) fell by 21% in the world. In that same period, malaria mortality rates among populations at risk fell by 29% worldwide among age groups, and by 35% among children under the age 5 (Kokwaro, 2009). Sub-Saharan Africa carries a disproportionately high share of the global malaria challenges. In 2015, the regionto 90% of record rose global malaria cases and 92% of malaria deaths (Turschner and Efferth, 2009).

Malaria is not just a disease associated with poverty. Malaria is associated with poverty and has a major negative effect on socio-economic growth and development. Evidences suggest that it is a major cause of poverty and a hindrance to economic growth and development (White, 2018). Although tropical regions are most affected, malaria's further influences many temperate zones have extreme seasonal variations. The disease has been associated with serious negative economic effects on environment where it is widespread (Trarnpuz, et al., 2013). During the late 19th and early 20th centuries, it was a significant factor in the slow economic development of the American southern states (Fernando, et al, 2010). Poverty increases the risk of malaria since those involved do not have the financial capabilities to prevent or treat the disease. The economic impact of malaria has been estimated to cost Africa US$12 billion every year (Olupot and Maitland, 2013). The economic impact includes costs of health care, working days lost due to sickness, days lost in education, decreased productivity due to brain damage from cerebral malaria, and loss of investments and impacts on tourists and tourism. The disease has a heavy toll and burden in many countries, where it responsible for 30 to 50% of hospital admissions, up to 50% of outpatients, and up to 40% of public health spending (Olupot and Maitland, 2013).

Cerebral malaria is a leading cause of neurological disabilities in African children. Literatures comparing cognitive functions before and after treatment for severe malarial illness continued to show significantly impaired school performance and cognitive abilities even after recuperation (Murray, et al., 2012). Consequently, very serious cerebral malaria has extensive socio-economic consequences that extend beyond the immediate effects of the disease. Children with severe malaria, frequently develop some of the following symptoms; severe, respiratory distress, anaemia in relation to metabolic acidosis or cerebral malaria. In adults, multi-organ challenges is also common.

In malaria endemic environment, people may develop partial immunity, allowing asymptomatic infections to occur (Bhatt, et al, 2015). Malaria has several serious complications. Among these are the development of respiratory distress, which occurs in 25% of adults and 40% of children with severe F. falciparwnmalaria. Possible causes include respiratory compensation of metabolic acidosis, noncardiogenic pulmonaryoederna, concomitant pneumonia, and harsh anaemia according to Pates and Curtis, (2005). Though, malaria acute respiratory distress syndrome occurs in 5-25%, adults and up to 29% of pregnant women, co-infection of HP

with malaria increases mortality. Renal collapse is a feature of black water fever, where hemoglobin from lysed red blood cells leak into the urine (Enayati and Hemingway, 2010). Mehlhorn (2018) posits that infection with F. falciparum may result in cerebral malaria, a form of severe malaria that involves encephalopathy. It is associated with retinal whitening, which may be a useful clinical sign in distinguishing malaria from other causes of fever.

Malaria in pregnant women is an important cause of still births, infant mortality, abortion and low birth weight, particularly in F. falciparum infection, but also with F. vivax (BardajI, et al, 2012). Korenromp, et al., (2015) posits that malaria disease is most commonly transmitted by an infected female Anopheles mosquito. The mosquito bite transfer the parasites from the mosquito's saliva into a person's blood system. The parasites goes to the liver where they mature and reproduce. Five species of Plasmodium can infect and be distributed by humans. Enlarged spleen, enlarged liver or both of these, severe headache, low blood sugar, and hemoglobin in the urine with renal failure may occur (Bardaji, et al., 2012). Complications may include spontaneous bleeding, coagulopathy, and shock. Most deaths are caused by P. falciparum because P. vivax, P. ovale, and P. malariae generally cause a milder form of malaria. The species P. knowlesi hadly causes disease in humans. Malaria is typically diagnosed by the microscopic analysis of blood using blood films, or with antigen-based rapid diagnostic tests. Methods that use the polymerase chain reaction to detect the parasite's DNA have been developed in recent times, but are not widely used in environments where malaria is common due to their high costs and sophistication (Beare, et al., 2011).

Malaria is transmitted through infected female Anopheles during a blood meal. The most serious problem related with malaria disease is illness, sickness and in most cases death. This is common in children under the age of 5years. Over the years, government has diverted attention to address malaria disease especially among young children and pregnant women. Another serious problem associated with malaria disease is that its infection is rampant among children under five years and pregnant women. Malaria is serious illnesses which sometimes cause death. Increased death rate is as result of malaria disease may pose severe threat to human existence (Baird, 2013). This is evidence that malaria disease affects human health. The environment of Abraka is presented such a way that it encourages and breeds mosquito which in turn exposes the people of Abraka to malaria attack (Omotor and Atubi, 2009). Malaria is a serious disease which affects the economy of any country. Malaria decreases the income rate of developing countries (such as Nigeria) by depriving the people (especially the labour force) the ability to work. This of no doubt has had a huge negative impact on the socio economic activities of Nigeria. Large resources that should have been allocated to other sectors are diverted to the health sector in other to provide medical care for the sick people.

In recent times, literature have shown less effort have been directed towards examining the spatial analysis of malaria mapping incidence in Abraka. Another serious problem related with malaria is that, there has been series of death cases emanating from the improper use of mosquito nets and harmful insecticides which seem hazardous to human health The major problems which necessitated this pilot study include, large cases of illness/sickness/deaths, infectious diseases, health problems, economic depression, and poverty.

From the aforementioned problems, malaria has been observed to have a direct negative effect on the health, socio-economic development of the people of Nigeria. This study is therefore seeking to address the mentioned problems associated with malaria diseases. It has been observed that not much work have been done on the topic, although effort have been made by various scholars to explain malaria but there have dealt of information on the spatial analysis of malaria mapping incidence in Abraka. The knowledge of malaria infection in Abraka is largely undocumented, hence the study will add to the store of information on the spatial analyses.

III. Aim and Objectives of Study.

The aim of this study is to investigate the spatial analysis of malaria mapping incidence in Abraka. However, the specific objectives are to:

Determine the causes and effects of malaria disease on Abraka people,

Determine the prevalence of malaria disease in Abraka; and

Suggest mitigation strategies and measures to manage malaria disease.

This research work will enlighten the people on the causes and effects of malaria in the area, identification of designated high and low infectious zones of immeasurable benefits to the medical practitioners and the people.. It will help to identify factors that

promote the spread of the disease and educate the victims of malaria on the need to adhere strictly to instructions such as use of mosquito nets and insecticides.

The findings from this study will be an academic compendium for medical personnel, students, environmentalist for studies and practical application of malaria prevention mechanisms.

IV. Study Area

Abraka is located within Ethiope East Local Government Area (L.G.A.) Delta State, Nigeria, Niger Delta region of Nigeria as shown in figure 1 and 2. It is situated in the Southern pail of Nigeria has abundant rainforest vegetation and it is characterized by evergreen deciduous forest vegetation. It is located approximately on latitudes 05° 451N and longitudes 06° 00'E. The study area covers a total land area of about 21.30km2 square kilometers (8.2 square mile) (Efe, 2006). Abraka region is bounded by Orhiowonlocal government area of Edo State in the north, the the east and south by Ukwani L.G.A and Ughelli North L. G. A. of Delta state and to the west by IkaL.G.A. of Delta State. There are six (6) communities that make up the Abraka region. These communities arranged in a North East to south-west direction along River, Ethiope are: Urhuoka, Oria, Ekrejeta, Otorho, Urhuokie, Erho and Abraka P.O. that constitute declared planning urban environment

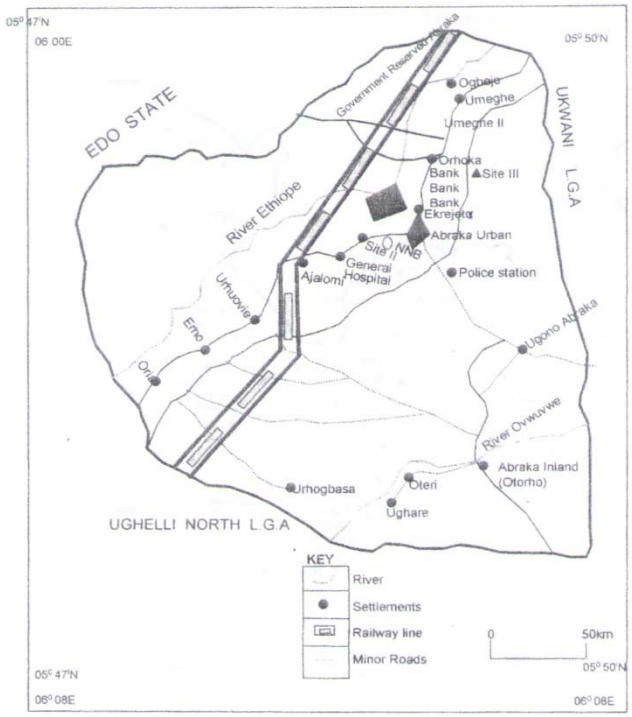


Fig. 1a Map of AbrakaStudy Area

Source: Adapted From Abraka Region (2005)

Fig. 1b: Map of Delta State showing Study area

Source: Ministry of Lands. Survey and Urban Development. Asaba (2001)

i. Climate

Abraka falls within equatorial climate characterized by high temperature that falls between November and April and may be as high as 290C to 25°C between April and October. The annual range of temperature is low (between 3°C and 5°C). Raifall throughout the year due to its location in the Niger Delta, where monsoon wind continually blows from the Atlantic Ocean. The apparent movement of the sun north and south of equator, results into two seasons, namely wet and dry seasons.

The annual rainfall put between 2000mm to 3 000mm respectively. This is linked to emergence of inter tropical discontinuity (ITD), a low pressure belt moves northward or southward of the equator. It is on the North in May to October during rainy season (May to October) and southward during the dry season (November to April) where it draws North westerly dry winds (Harmattan wind) and south easterly moisture laden wind respectively from the Atlantic Ocean. According to Alakpodia (2000), the mean annual rainfall recorded for coastal in Patani and Warn is around 3,200mm.

ii. Vegetation

The vegetation of the area is tropical rainforest with special tall trees and consist of underground sand climbers the upper, middle and lower companies of tress, the influence of man has reduced the forest mainly to secondary growth (deciduous vegetation). The major trees are Iroko, Obeche, Opepe, Sapele. They constitute mahogany of numerous species hard woods and other wood works, raw materials of Timber in industries. Abraka was covered with green and trees scenery of grass and tress the area experience high rainfall throughout the year and its drained by River Ethiope and Ovwuvwe.

The vegetation was in its natural state, has numerous species diversity and abundant pure stands of different trees with varying canopy heights. Most part of vegetation belonged to decidious forest category and possessed the features of a natural forest that is relatively undisturbed). Trees grow to possible heights or attainable because of the prevailing climatic conditions and competion for sunlight. These trees. grow in distinct layers of canopies.

iii Relief and drainage

The topography of the area is a low plain table land with about slope of 6°. This area is drained by rivers Ethiope and Uvwuvwe. The relief falls under the lowlands of south-south and Western Nigeria. markedin the North by the edge of the basement complexrocks of the Western highland and in the south by the quatemary deposits of the Coastal margin. The rocks are deposits sedimentary secondary and tertiary sedimentary that gently southward. Abraka region is under the Benin lowlands marked by

uniformity in the topography, which even stretches up to Urhobo plains at Aghalopke. Going into Abraka inland (Otorho) which forms part of Urhobo division.

There are two major rivers such as River Ethiope and River Ovwuvwe. River Ethiope drains the entire inland of Abraka with several tributaries and distributaries with pattern of the flow with dendritic. In nature and empties their source from it, some of which dry out completely daring the dry season, there streams occur in environment where the soil is clayey. Population and urbanization level in Abraka. The population ofAbraka is 35,000 people (National Population Commission, 1991; Federal Bureau of Statistics, 2007) that grows annually at a rate of 3%, the population of Abraka in 2006 was estimated at 201,600 people (National Population Commission, 2006) and precisely 201, 600x 12. The increasing population of Abraka exert pressure on the vegetation cover by deforestation process for land space in the face of competing needs.

iv Population and urbanization

The population and urbanization process of Abraka (since its declaration as an urban center in 2005 by the ministry of lands, survey and urban development is high. Abraka is a high level growing urban center the area attaining rapid urbanization. Delta state university is a major pull factor for the migration in the area. Again rural-urban migration no doubt has mounted pressure on the available resources in the environment of as high migration of people from neighboring communities has resulted to the degradation of the natural environment to constitute social problem in the area. The struggle for improved facilities, available land spaces, community services, social amenities coupled with rapid urbanization through construction, buildings, roads etc in recent have reduced the natural vegetation to secondary re-growth.

The urbanization has negative impacts on the rainforest vegetation. The prevailing forest are restricted to sacred vegetated shrines land. The core grown urban environment ins now covered with luxurious buildings due to rapid urbanization. It is important to note that if urbanization continues at this pace, there will be time when trees will not be found in Abraka region.

V. Research Method

This empirical study is on the investigation of the spatial analyses of malaria mapping incidence in Abraka for which primary and secondary data collection methods are adopted.

Primary data involved oral interview and administration of questionnaire while secondary data sourced from health related records of disease occurrence as a result of malaria outbreak is divided and the data on health records is from 2010 to 2018 obtained from government General Hospital, Abraka. In the course of this research work, some challenges encountered include language/communication barrier and mission trust: It was difficult to communicate with most illiterate indigenous people in English language during the oral interview. The native dialect, Urhobo and English language was therefore used as official language of communication with respondents. These necessitate paid research assistants employed to generate high integrity data for this study. The researchers administered questionnaires and gathered useful information

Data sourced from the administration of questionnaire in the study area involved the iterms administered and distributed to the inhabitants in the various communities and quarters that make up Abraka. They are; Oria, Ugono, Abraka P.O., Ekrejeta, Ajalomi, Erho, Urhuoka, Otorho, Umeghe and Urhuovie. These communities/quarters are further stratified into two (2) namely, Urban and Rural f or which 100 questionnaires were administered in each quarter.

Data on diseases are collected from General hospital records in Abraka. Secondary data on relevant literature and various contributions on malaria, spatial analysis mapping incidence are presented on malaria disease. It will also discuss the various causes and effects of malaria disease. Questionnaires were administered to the targeted population in each quarter respondents in the study area. This study is carried out in Abraka, which has a population of 128,000 x12 peoples (2020, estimate).

The review of relevant literature to specifically acquire an up to date knowledge on the subject matter as well as work done within and outside the area is involved:

VI. Method of Data Collection

150 questionnaires administered to the targeted population in each quarter which will be 1500 respondents within the study area. The questionnaires were administered along the major road equally in Urban and Rural environment. One on one approach of waiting for the respondents to complete the questionnaire and retrieved immediately was adopted. It should be noted that respondent

willingly accept to fill the questionnaire and provide relevant information. The type of malaria data obtained from Government General Hospital, Abraka include data on malaria incidence records of different age groups (0-5yrs, 5-lOyrs, l0-l8yrs, l8yrs and above) in Abraka of admission and death. This is because, all this diseases are caused as a result of environmental degradation and pollution resulting from mosquito bite data. The point obtained are analyzed and presented in Arch GIS environment to produce a GIS map showing the spatial distribution of malaria mapping incidence of high, medium and low risk zones of different quarters within Abraka community (Oria, Otorho, Erho, Ugono, Ajalomi, Urhuovie, Urhagbessa, Umeghe, Ekrejeta, and Urhuoka).

Data that will be obtained from questionnaire administration that include the socio-economic characteristics of demographic data, such as sex, age, marital status, income level, occupational status, educational qualification, health history and other variables' The questionnaire were administered using the systematic sampling techniques of every 10th home interval along the major roads, with 150administerd in each quarter ;and therefore, a total of 1500 questionnaire were administered in Abraka. The statistical analysis used for this study is the multiple regression using SPSS (Statistical Package for Social Science) software version 21. The statistical analysis includes the descriptive and inferential.

Data t obtained from questionnaire, data on diseases/health record were analyzed using the descriptive and inferential statistical techniques. The presentation of data collected from the field and data collected on malaria diseases in Abraka from 2007-2018.

VII. Result and Discussion

In developing and underdeveloped nations, water sanitation and food handling led to high breeding level of vectors to increase the number of cases. Developing nations, such as those found in parts of Asia and Africa, have the highest rates of malaria (Nnabuchi and Babalola, 2008).

Abraka area lack access to clean water, proper sanitation systems, and proper health care facilities and basic public health needs is no tanticipated in the nearest future (Nsutebu, Ndumbe, and Koulla, 2011). Sanitation and hygiene are important to prevent malaria. Malaria does not affect animals other than humans. Malaria can only spread in environments where human feces are able to come into contact with food or drinking water (Uneke, 2018). Careful food preparation and washing of hands are crucial to prevent malaria.

Statistics from the United StatesCenters for Disease Control and Prevention (CDC), indicated that the chlorination of drinking water has led to dramatic decreases in the transmission of malaria in the United States (Adeniyi and Ramakrishua, 2017). Two vaccines are licensed for use for the prevention of malaria: the live, oral Ty2la vaccine (sold as Vivotif by Crucell Switzerland AG) and the malaria polysaccharide vaccine (sold as TyphimVi by Sanofi Pasteur and 'Typherixby GlaxoSmithKline). Both are efficacious and recommended for travellers to enviroment where malaria is severe (Abate, Degarege, and Erko, 2016). Boosters are recommended every five years for the oral vaccine and every two years for the injectable form.

An older, killed-whole-cell vaccine is still used in countries where the newer preparations are not available, but this vaccine is no longer recommended for use because it has a very high native side effects, such as pain and inflammation rate of side effects (mainly pain and inflammation at the site of the injection). To help decrease rates of malaria in developing nations, the World Health Organization (WHO) endorsed the use of a vaccination program starting in 1999. Vaccinations have proven to be a great way at controlling outbreaks in high incidence environments. Just as important, it is also very cost-effective. Vaccination prices are normally low, less than US$1 per dose.

The cost of vaccination is usually low and poor communities in Nigeria are more willing to take the advantage of it. There are a number of pharmaceutical products that can help prevent or interrupt malaria in travelers to places where infection is common. Many of these drugs are also used in treatment (Vogel, 2013). Chloroquine may be used where chioroquine-resistant parasites are not common. In places where Plasmodiun is resistant to one or more medications, three medications mefloquine (Lariam), doxycycline (available generically), or the combination of atovaquone and proguanil hydrochloride (Malarone) are frequently used when prophylaxis is needed.

Doxycycline and the atovaquone plus proguanil combination are the best tolerated; mefloquine is associated with death, suicide, and neurological and psychiatric symptoms (Caraballo, 2014). The protective effect of medication does not begin immediately, and people coming to environments where malaria exists usually start taking the drugs one to two weeks before arriving and continue taking them for four weeks after leaving (except for atovaquone/proguanil, which needs to be started two days before and continued for seven days afterwards).

The application of preventative drugs is often not practical for those who live in environments where malaria exists, and their use is usually only in expectant women and short-term visitors (Nadjm and Behrens, 2012). This is due to the high costs of drugs, side effects from extended usage, and the difficulty in obtaining anti-malarial drugs outside of wealthy and developed parts of the world. During pregnancy, medication to prevent malaria has been found to improve the weight of the baby at birth and decrease the risk of anemia in the mother.

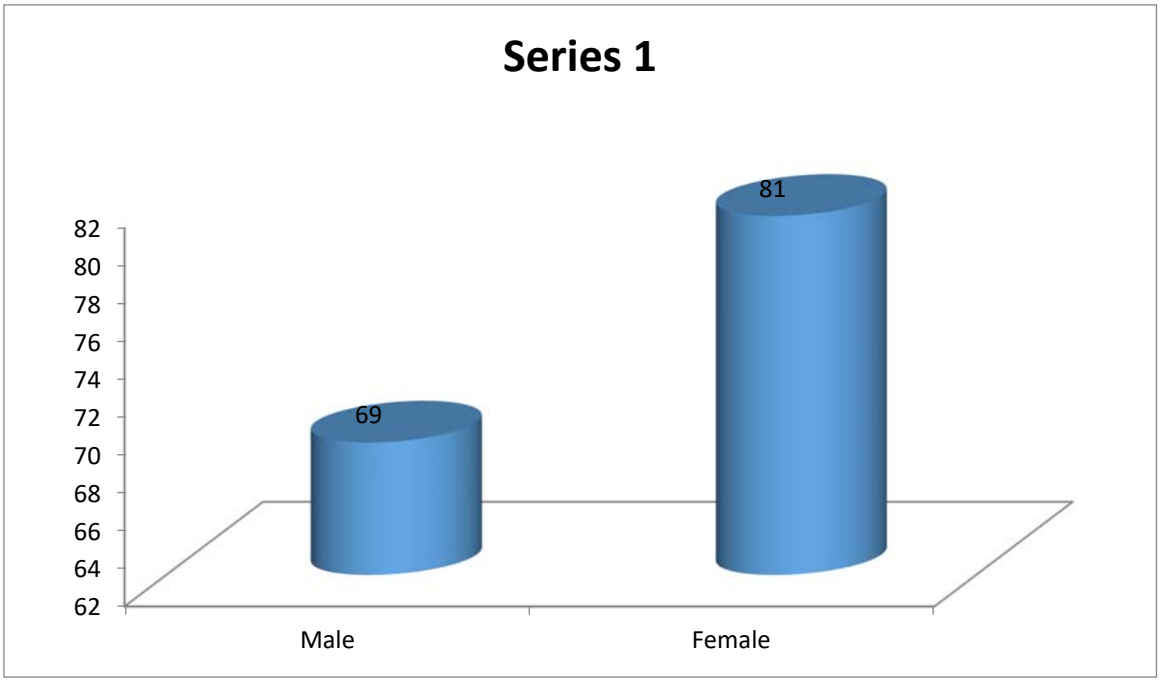
The application of preventative drugs where malaria-bearing mosquitoes are present may encourage the development of partial resistance (WHO, 2001)

Personal Information of Respondents.

This based on interaction and oral interview

Table 1: Sex of Respondents

Sex	Respondents	Percentage
Male	69	46
Female	81	54
Total	150	100



Source: Fieldwork(2019)

Fig 1: Sex characteristics of respondents

From Table 1 on which Fig 1 Bar graph was plotted involved in filling questionnaire and it comprises of more female gender than the male. This is because (46%) of the total population while female (54%) of the remaining population. The respondents consist of clinic, medical, pharmacies and graduate, health practitioners who have knowledgeable and experience about spatial analysis of malaria disease.

Table 2: Age Composition of Respondents

Age	Respondents	Percentage
Below 20 yrs	15	10
20-25yrs	51	34
26-35yrs	31	20
36-50yrs	32	21
51yrs above	21	14
Total	150	100

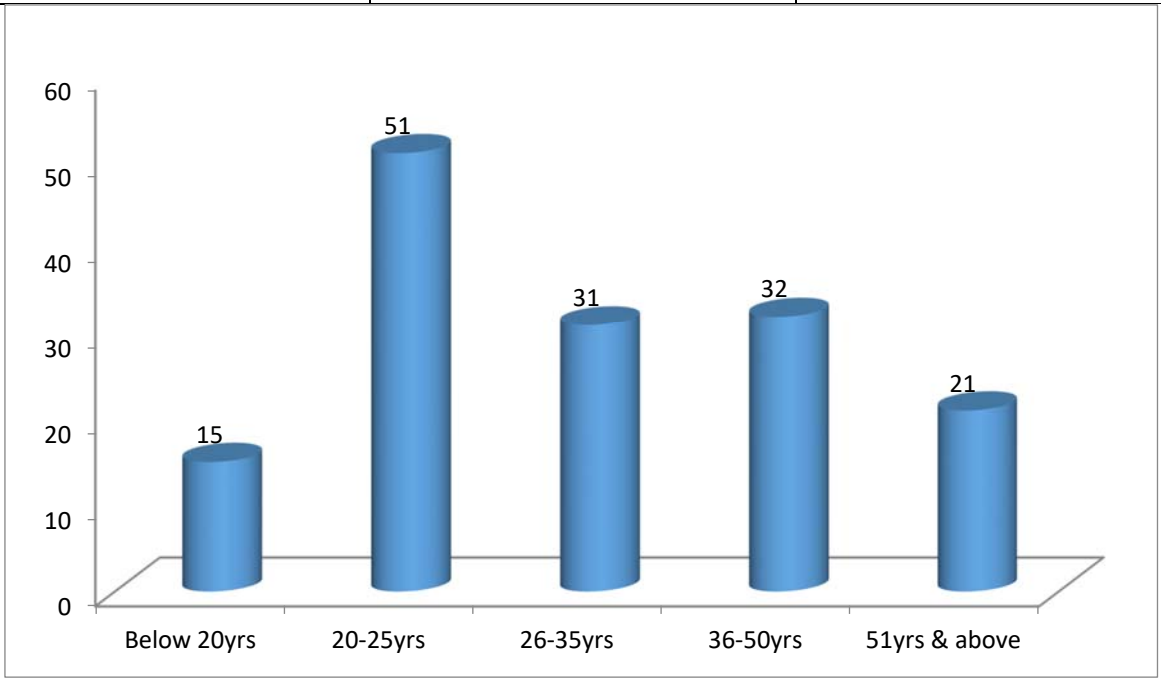


Fig. 2: Age composition of respondents

Table 2 and Fig 2 clearly shows that, 10% of the population are below the age of 20yrs, 34% are between the age of 20-25yrs, 21% are between 6-35yrs, and 36-50yrs respectively, and 14% are 50yrs and above. This simply means that the population consists mostly of active productive youths who are the labour force and who has knowledge on malaria incidences and attend health sector. Thus, group between 20-30years are privilege to fill the questionnaire on malaria diseases than other age groups.

Table 3: Marital Status

Marital Status	Respondents	Percentage
Single	41	27
Married	66	44
Widow	20	13
Separated/Divorced	23	15
Total	150	100

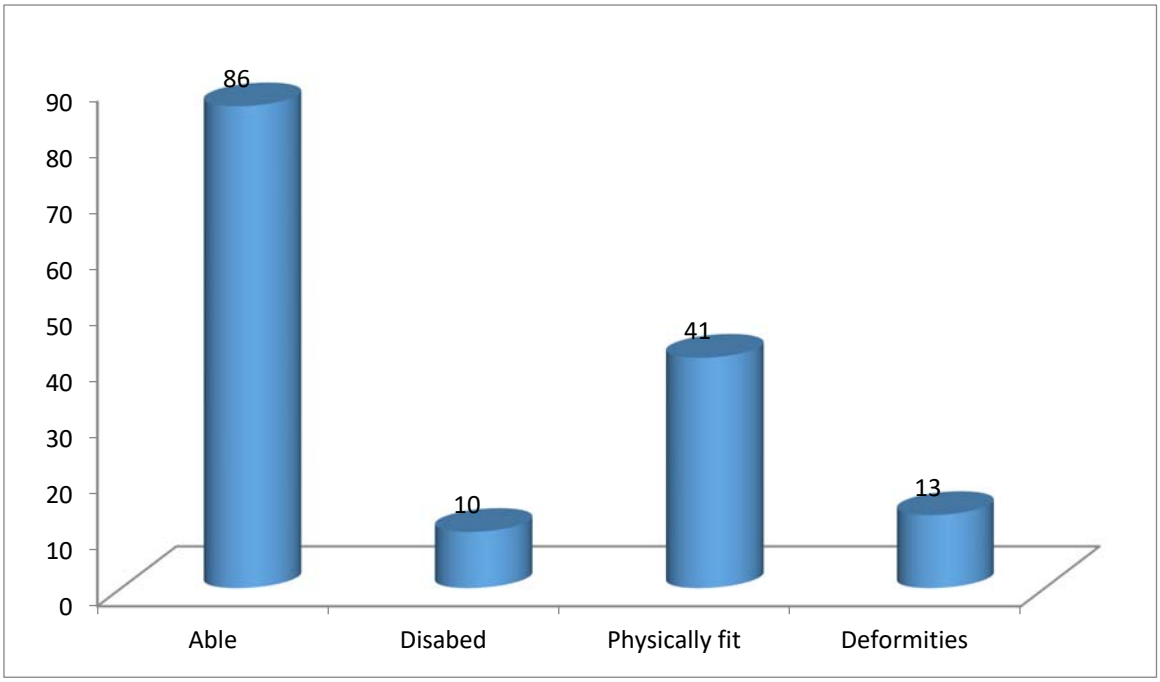
Source: Fieldwork, 2019

From Table 3, 27% are single, 44% are married, 13% are widow and the remaining 15% are separated or divorced. This indicates that majority, of the respondents are married and have knowledge of malaria incidence especially in children and pregnant women in Abraka and its health consequences.

Table 4: Health Status

Health Status	Respondents	Percentage
Able	86	57
Disabled	10	7
Physically fit	41	27
Deformities	13	9
Total	150	100

Source: Fieldwork 2019



Source: Fieldwork(2019)

Fig 3: Health Status of Respondents

The Table 4 and Fig 3 shows 57%of the respondents are able bodied people without any formany form of disability in them), 7% are disabled, 27% are physically fit and 9% of the respondents have deformities indicating that the population is of more physically fit people.

Table 5: Educational Background

Educational	Respondents	Percentage
No formal education	14	9

Primary Education	16	11
Secondary Education	24	16
Higher/tertiary education	96	64
Total	150	100

Source: Fieldwork, 2019

Table 5 shows that, 9% of the respondents are illiterates, 11% have primary education, 16% have secondary education, and 64% attended higher/tertiary institutions with (NCE/OND, B. Sc/HND and M.sc/PhD holders). This implies that, the respondents are knowledgeable on malaria incidence in Abraka.

Table 6: Occupational Skill

Occupational skill	Respondents	Percentage
Skilled worker	51	34
Unskilled worker	99	66
Total	150	100

Source: Fieldwork, 2019

Table 6 reveals that 34% of the respondents are skilled workers while 66% are skilled workers. Skilled workers constitute professionals such as engineers, lecturers, lawyers, doctors, artisans (welders, fashion designers, hairdressers, etc) while the unskilled comprise of the factory workers, traders, self-employed business men who are enlightened and most are learned.

Table 7: Level of income

Level of income N	Respondents	Percentage
Below 18,000	18	12
18,000-40,000	33	22
41,000-70,000	41	27
71,000 & above	58	39
Total	150	100

Source: Fieldwork, 2019

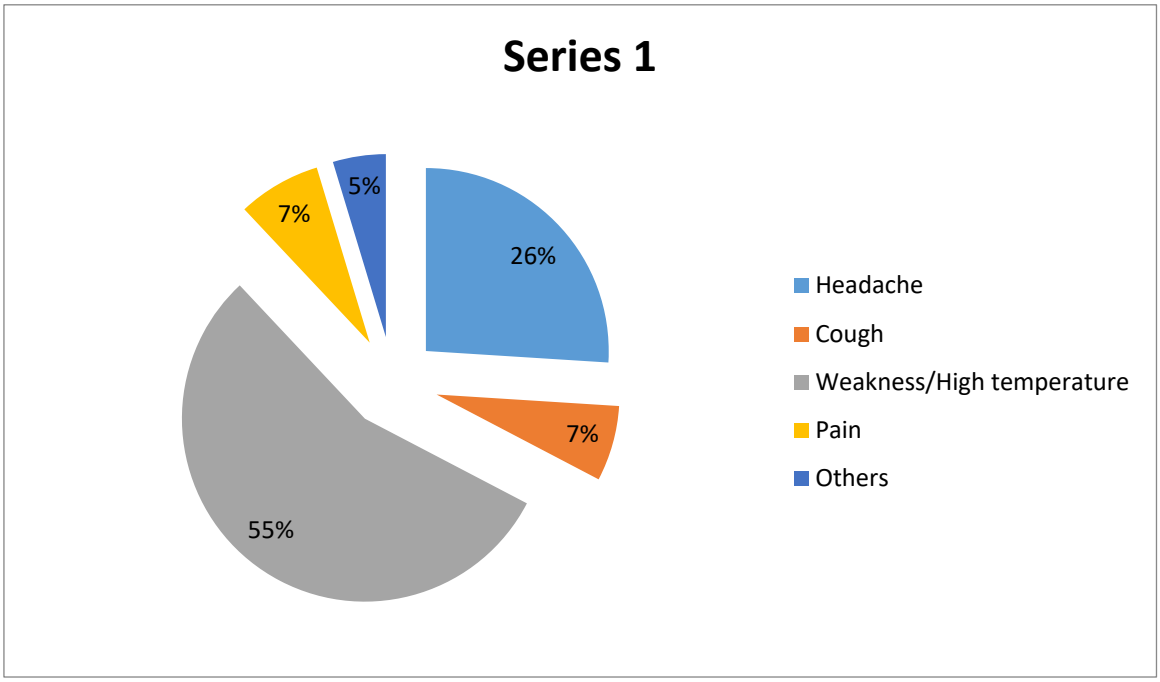
Table 7 reveals that 12% of the respondents earn below 18,000 monthly, 22% earn 18,000-40,000 monthly, 27% earn 4 1,000-70,000 monthly and 39% earn above 70,000. This means that majority of the respondents are high income earners that often prefer hospital medical services than self-medication. They therefore, have knowledge of malaria attack.

Table 8: Noticeable signs and symptoms of malaria

Response	Respondents	Percentage
Headache	39	26
Cough	10	7
Weakness/High temperature	83	55
Pain	11	7

Others	7	5
Total	150	100

Source: Fieldwork, 2019



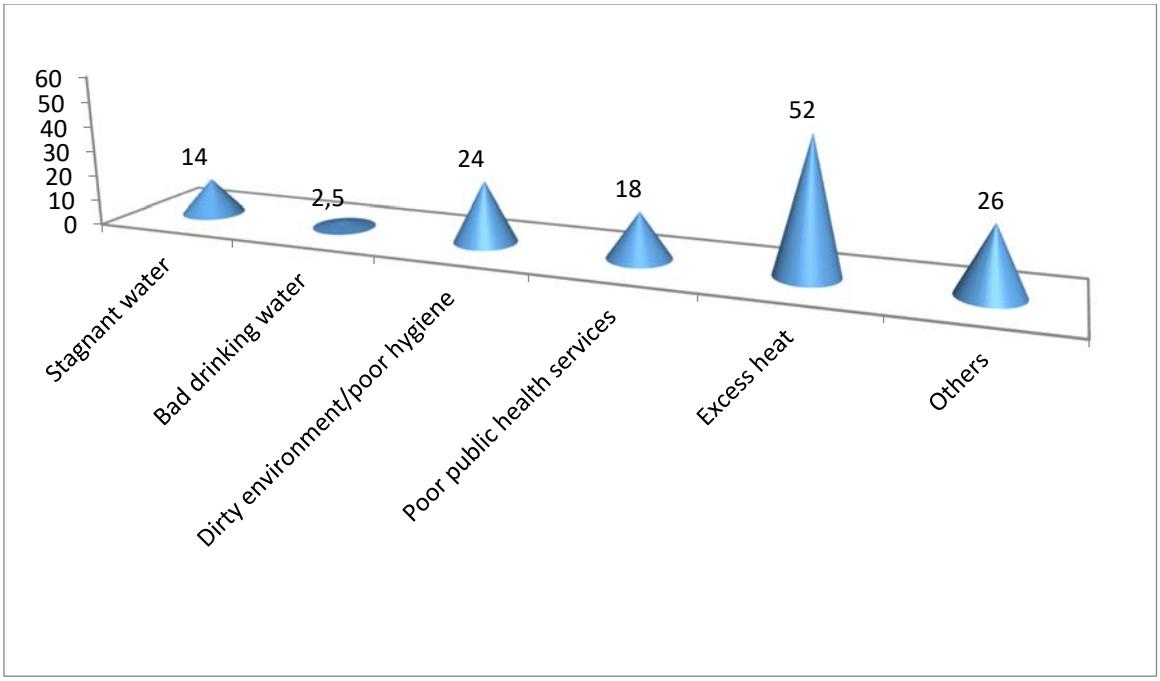
Source: Fieldwork(2019)

Fig. 4: Causes and Effects of Malaria Diseases in Abraka

From Table 8 and Fig 4, 26% of the respondents indicated that headache/high temperature is the most noticeable sign and symptom of malaria, 7% said cough, 55% said weakness/high temperature, 7% said pain and 5% of the respondents mentioned other symptoms such as catarrh, cold, coloured urine, running stomach, and loss of appetite. This means that headache, cough, weakness, and pain are the most common noticeable signs and symptom of malaria.

Table 9: Causes of malaria in Abraka

Causes	Temperature	Percentage
Stagnant water	14	9
Bad drinking water	16	11
Dirty environment/poor hygiene	24	16
Poor public health services	18	12
Excess heat	52	35
Others	26	17
Total	150	100



Source: Fieldwork(2019)

Fig. 5: Causes of malaria in Abraka

Table 9 and Fig 5 shows that, 9% of the respondents indicated that stagnant water is one of the causes of malaria, 11% claimed bad drinking water, 16% endorsed dirty environment and poor hygiene, 12% said poor public health services, 35% said excessive heat and 1 7% mentioned other causes of malaria.

Table 10: Response on the noticeable causes of malaria and its effect

Option	Respondents	Percentage
Economic hardship	18	12
Increased poverty	42	28
Unfavourable environment	52	35
Health issues	24	16
Proper sanitation system	12	8
Others	2	1
Total	150	100

Source: Fieldwork, 2019

Table 10 shows that, 42% of the respondents indicated that increased poverty is the most noticeable effect of malaria caused by stagnant water, bad drinking water and unfavorable dirty environment (52), poor hygiene, poor public health services are noticeable causes of malaria.

Table 11: Noticeable effects of malaria

Effects	Respondents	Percentage
Death	6	4

Illness	40	27
Respiratory disease	11	7
Infections	91	61
Others	2	1
Total	150	100

Source: Fieldwork, 2019

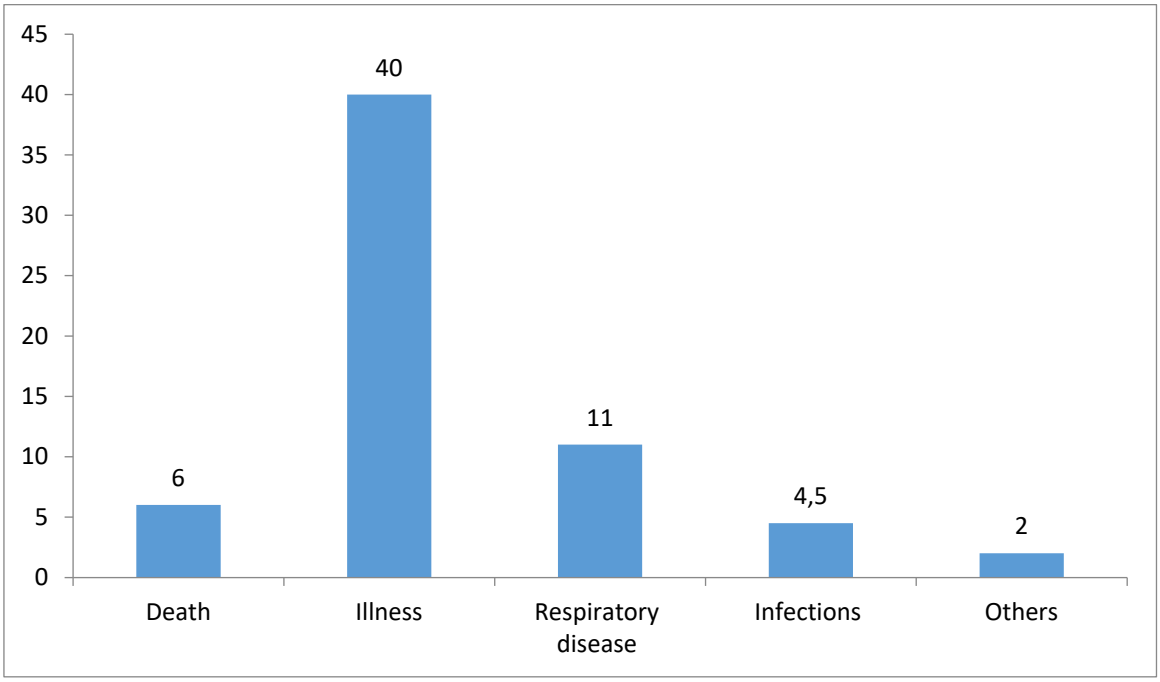


Fig. 6: Noticeable effects of malaria

From Table 11 as plotted in figure 6 Bar graph, 4% of the respondents said malaria cases mostly results to death, 27% said it often leads to illness, 91% said it leads to respiratory diseases, 7% said it results in infections and only 1% mentioned other noticeable effects of malaria.

Table 12: Economic impacts of malaria in the area

Impacts	Respondents	Percentage
Costs of healthcare	53	35
Lost due to sickness	8	5
Days lost in education	64	43
Decreased productivity due to brain damage from cerebral malaria	9	6
Loss of investment in tourism	10	7
Others	6	4
Total	150	100

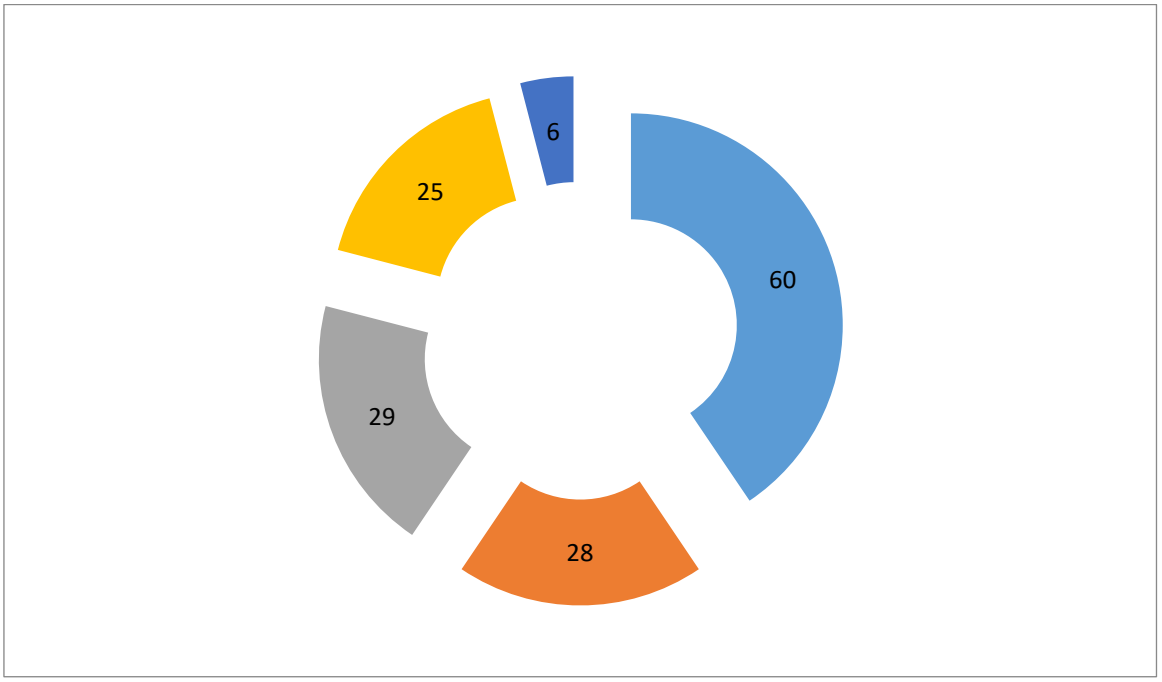
Source: Fieldwork, 2019

From Table 12 shows that costs of health care 35% and days lost due to sickness (5%) days in lot in education (43%) of the respondent. The major economic impacts of malaria in the area, 5% said lost due to sickness, 6% said decreased productivity due to brain damage from cerebral malaria, 7% said loss of investment in tourism and 4% mentioned other economic impacts of malaria occurrence.

Table 13: Severity of malaria diseases in the area

Severity	Respondents	Percentage
Compilation	60	40
Renal failure	28	19
Mortality	29	19
Kidney failure	25	17
Others	6	4
Total	150	100

Source: Fieldwork, 2019



Source: Fieldwork(2019)

Fig. 7: Severity of malaria diseases in the area

From Table 13 and Fig 7, 40% of the respondents indicated that malaria diseases result serious complications among victims, 19% said it results to renal failure and mortality respectively, 17% said it leads to kidney failure and 4% mentioned other severity of malaria diseases in the area. This implies that malaria diseases are severe in the area leading to complications, renal failure, kidney failure and mortality.

Table 14: Prevalence of malaria diseases in Abraka

Prevalence	Respondents	Percentage
Illness and death	35	23
Common in water logged areas	33	22
Rainy season	29	19
After heavy rainfall	28	19
Others	25	17
Total	150	100

Source: Fieldwork, 2019

From Table 14, illness and death occurring among various age groups (23%), diseases common in water lodged areas (22%), rainy seasons (19%), after heavy rainfall (19%) and others (17%) respectively are prevalent in Abraka. It could be observed that malaria outbreak is common in water logged areas, stagnant water regions, lowland regions, flood prone areas which usually experience heavy rainfall, polluted area, and unfavourable environment.

Table 15: Reasons for Severityof the prevalence of malaria diseases in Abraka

Items	Very high	%	High	%	Mild	%	low	%	Very low	%
Stagnant water	23	15	28	19	30	20	43	29	26	17
Poor hygiene and sanitary system	36	24	37	25	28	19	27	18	22	15
Dirty environment	25	17	43	29	23	15	33	22	26	17
Poor healthcare delivery	28	19	26	17	48	32	20	13	28	19
Bushy environment	91	61	17	11	19	13	3	2	20	13

Source: Fieldwork, 2019

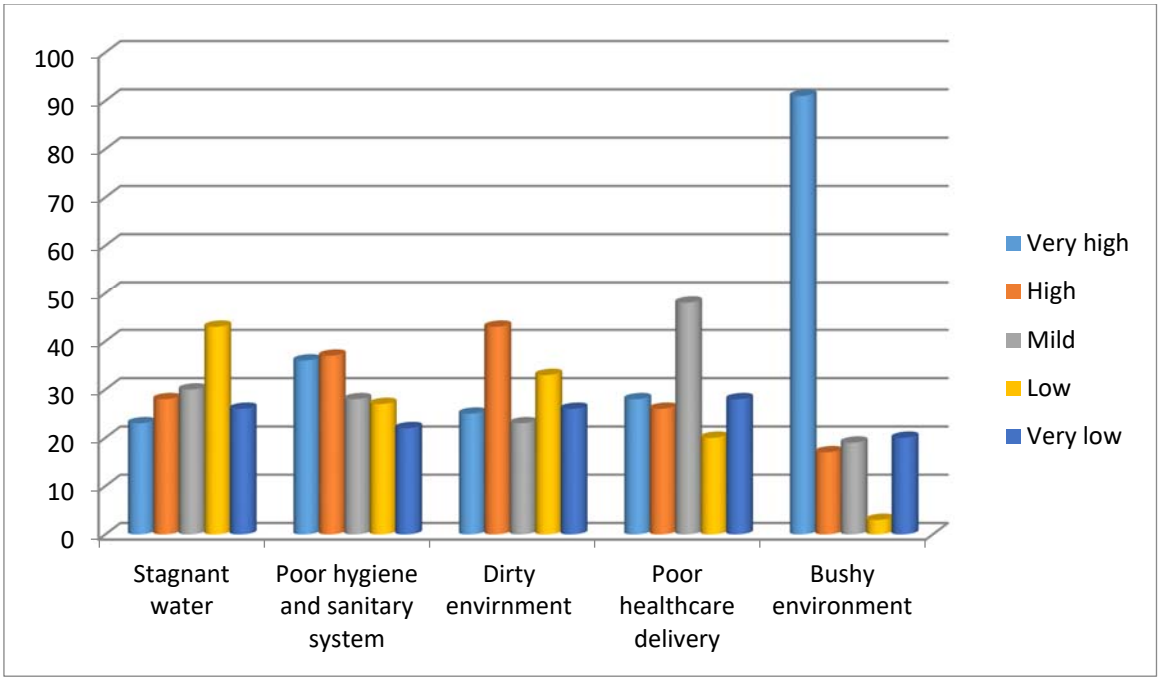


Fig.8 : Reasons for Severity of the prevalence of malaria diseases in Abraka

Source: Fieldwork (2019)

Table 15and Fig 8 Bar group shows that 15% of the respondents indicated that stagnant water as the most prevalent causes of malaria diseases, has a very high effect on Abraka people, 19% said the effect is high, 20% said mild, 26% said low and 17% said very low. This implies that stagnant water has to a very high extent contributed to the prevalence of malaria diseases in Abraka.

The table above also shows that 24% of the respondents indicated that poor hygiene and sanitary system as the most prevalent cases of malaria diseases has a very high effect on Abraka residents, 25% said high, 19% said mild, 18% said low and 15% said very low. This implies that poor hygiene and sanitary system has to a very high extent contributed to the prevalence of malaria diseases in Abraka.

The table reveals that 17% of the respondents indicated that dirty environment as a major cause of malaria is prevalent in the area and has a very high effect on Abraka people, 29% said high, 15% said mild, 22% said low and 17% said very low. This implies that malaria outbreak is prevalent in dirty environment.

Furthermore, it shows that 19% of the respondents indicated that malaria outbreak mainly caused by poor health care delivery has a very high effect on Abraka residents, 17% said high, 32% said mild, 28% said low and 19% said very low. This implies that malaria outbreak is prevalent in areas with poor health care delivery.

Moreover, table above shows that 61% of the respondents indicated that malaria outbreak mainly caused by bushy environment has a very high effect on Abraka people, 11% said high, 13% said mild, 2% said low and 13% said very low. This implies that malaria outbreak is prevalent in bushy environment, untidy areas.

Table 15: Extent to which respondents agree to the causes of malaria in Abraka

S/N	Items	SA	%	A	%	N	%	D	%	SD	%
a.	Refuse dumping in river	40	27	34	23	31	21	24	16	21	14
b.	Air pollution	32	21	60	40	30	20	24	16	4	3
c.	Defecation into water bodies	26	17	32	21	32	21	32	21	33	22

d.	Water pollution	53	35	55	37	15	10	16	11	11	7
e.	Pit close to boreholes	67	45	58	39	16	11	6	4	3	2
f.	Flood	62	41	71	47	8	5	6	4	3	2
g.	Others	26	17	32	21	32	21	32	21	33	22

Note: *SA*- Strongly Agree, A- Agree, N-Neutral, D-Disagree, SD-Strongly Disagree
Source: Fieldwork, 2019

Table 15 shows that 27% of the respondents strongly agreed that refuse dumping in liver is one of the major causes of malaria outbreak in the area, 23% agreed, 21% were neutral (had no idea) 16% disagreed and 14% strongly disagreed. This implies that malaria occurs mostly as a result of indiscriminate waste dump along roadside and drainages.

The table above shows that shows that 21% of the respondents strongly agreed that air pollution is one of the major causes of malaria outbreak in the area, 40% agreed, 20% were undecided, 16% disagreed and 3% strongly disagreed. This implies that malaria outbreak is mostly caused by air pollution.

The table above shows that 17% of the respondents strongly agreed that Defecation into water bodies is one of the maj or causes of malaria outbreak in the area, 21% agreed, 21% were neutral (had no idea), 21% disagreed and 22% strongly disagreed. This implies that most cases of malaria outbreak are mainly as a result of discharge of effluents into water bodies especially river which serve as a major source of drinking water for the populace.

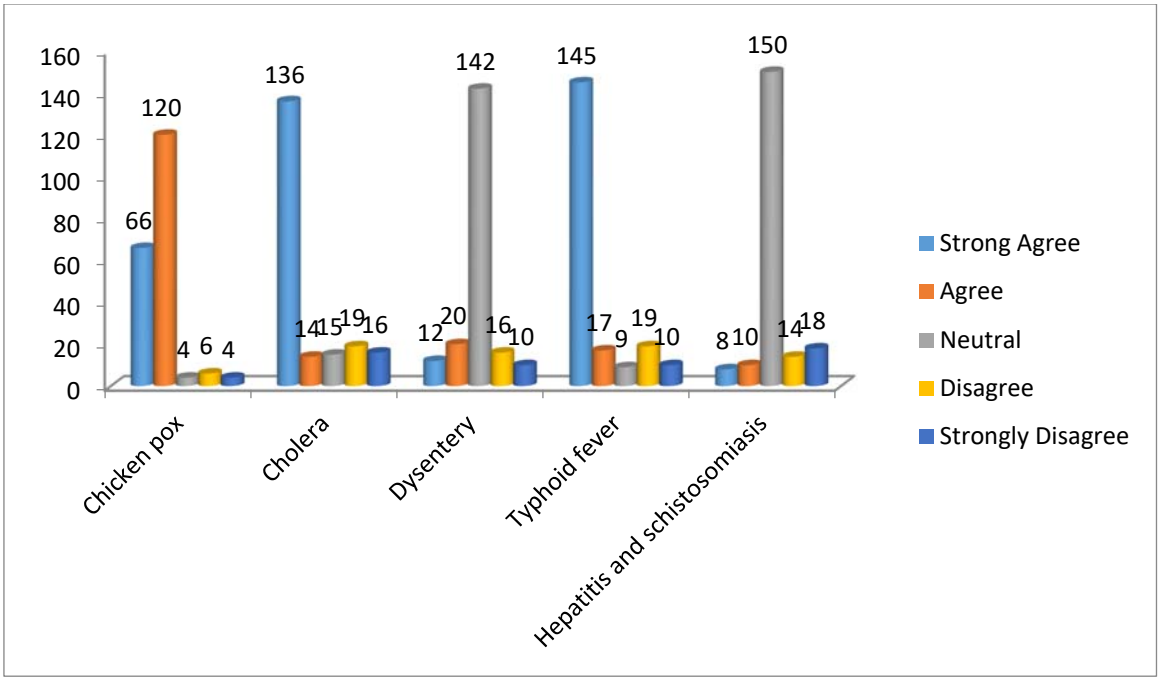
The table above reveals that *35%* of the respondents strongly agreed that water pollution is the major cause of malaria outbreak in the area, 37% agreed, 10% were neutral, 11% disagreed and 7% strongly disagreed. This implies that malaria outbreak is mainly caused by bad water.
The table above reveals that 45% of the respondents strongly agreed that pit close to

boreholes is the major cases of malaria diseases in the area, 39% agreed, 11% were undecided, 4% disagreed and 2% strongly disagreed. This implies that most cases of malaria outbreak are as a result of sitting boreholes close to soak away pits/septic tanks. The table above shows that 41% of the respondents strongly agreed that flood is the major causes of malaria outbreak in the area, 47% agreed, *5%* were neutral (had no idea), 3% disagreed and 2% strongly disagreed. This implies that malaria diseases are prevalent in flood prone areas. The table above shows that 17% of the respondents strongly agreed that there are other causes of malaria outbreak in the area, 21% agreed, 21% of the respondents had no idea, 21% disagreed and 22% strongly disagreed. This implies that malaria outbreak are mostly caused by other factors other than the ones mentioned above.

Table 16: Health related diseases prevalent in Abraka outside malaria outbreak

Types of Diseases	SA	%	A	%	N	%	D	%	SD	%
Chicken Pox	66	33	120	60	4	2	6	3	4	2
Cholera	136	68	14	7	15	8	19	10	16	8
Dysentery	12	6	20	10	142	71	16	8	10	5
Typhoid fever	145	73	17	9	9	*5*	19	10	10	*5*
Hepatitis and Schistosomiasis	8	4	10	*5*	150	75	14	7	18	9

Source: Fieldwork(2019)



Source: Fieldwork (2019)

Fig.9. Health related diseases prevalent in Abraka outside malaria outbreak

From Table 16 and Fig 9 shows 60% of the respondents strongly agreed that chicken pox is prevalent type of health related disease in the area outside malaria, 68% strongly agreed that cholera is prevalent in the area, 71% had no idea if dysentery is the prevalent type of disease in the area, 73% strongly agreed that typhoid fever is the most prevalent type of disease in the area, *75%* of the respondents were neutral if hepatitis and schistosorniasis is prevalent in the area. This implies that the above mentioned diseases are mostly caused by the contamination of water especially on children and infants. It directly affects adolescence and children who constantly drink this polluted and contaminated water especially from unprotected sources.

Table 17: Health diseases occur as a result of malaria outbreak

SIN	Diseases	SA	%	A	%	N	%	D	%	SD	%
a.	Chicken Pox	38	19	48	24	34	17	38	19	42	21
b.	Cholera	40	20	50	25	30	15	36	18	44	22
c.	Dysentery	88	44	20	10	48	24	16	8	28	14
d.	Typhoid fever	102	51	34	17	44	22	12	6	8	4
e.	Hepatitis and Schistosomiasis	96	48	68	34	12	6	14	7	10	5
f.	Cancer (Lungs, liver, kidney, heart)	168	84	4	2	21	11	2	1	5	3
g. -	Malaria	45	23	39	20	40	20	44	22	32	16

Source: Fieldwork (2019)

From Table 17, about 24% of the respondents strongly agreed that chicken pox is one of the health diseases occurring as a result of malaria outbreak which, 25% also agreed that cholera is one of the health diseases occurring as a result of malaria outbreak which, 44% disagreed that dysentery is mainly caused by malaria outbreak, *51%* strongly agreed that untreated malaria leads to typhoid fever, 48% strongly agreed that hepatitis and schistosomiasis are caused by malaria outbreak, 84% strongly agreed that

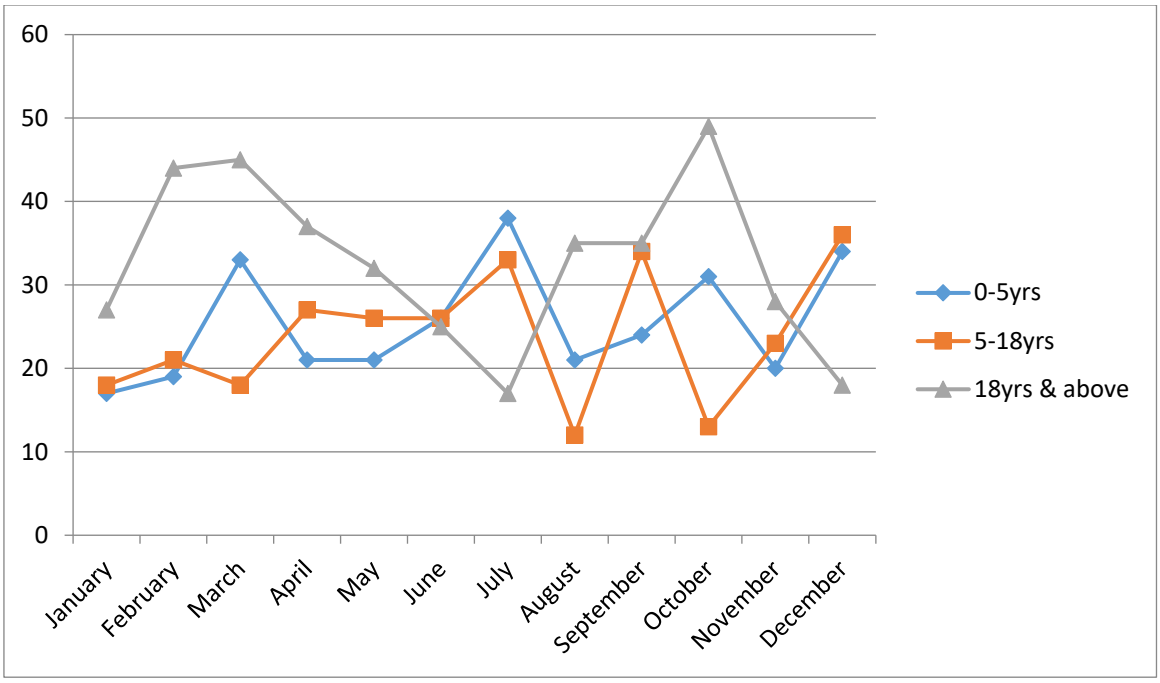
cancer (lung, liver, kidney and heart diseases) are mainly caused by poor health care in Abraka, 23% of the respondents strongly agreed that malaria is prevalent in Abraka. It could therefore be deduced from the above analysis that malaria outbreak has serious effect on the inhabitants of Abraka.

Major Findings from Hospital Record on malaria in Abraka

Table 17: Hospital record on malaria outbreak (2007-2018) from Abraka Government General Hospital, Ethiope East L.G.A Delta State

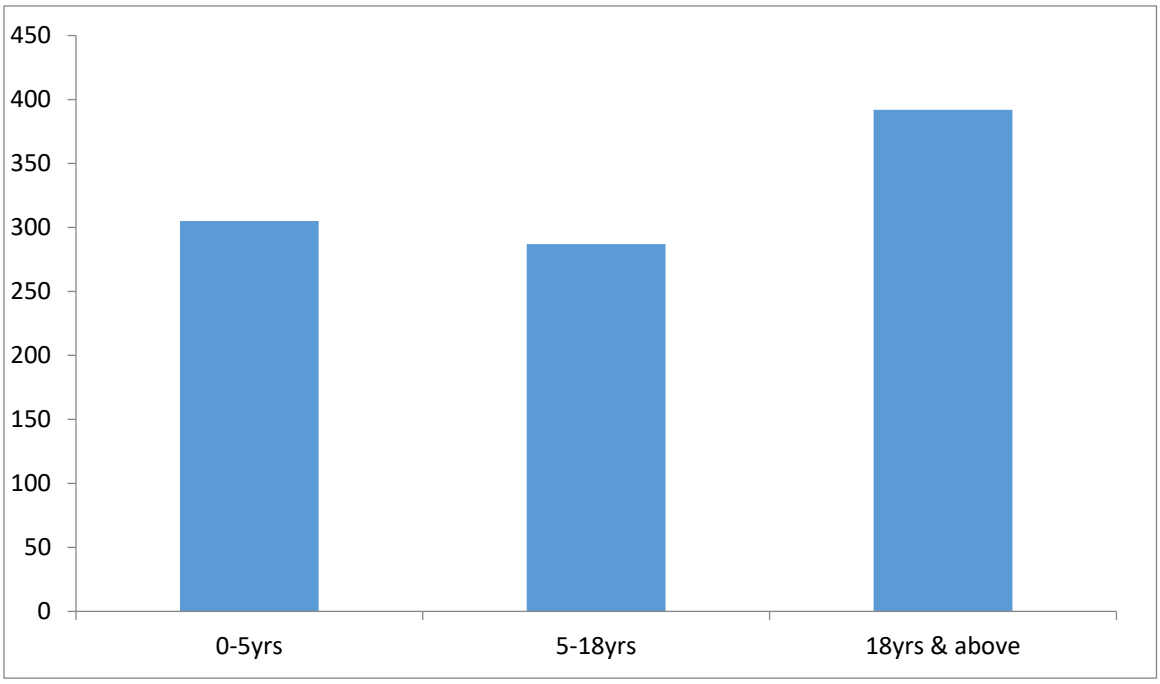
Period	Malaria record			Severity	
Jan	17	18	27	62	5
Feb	19	21	44	84	0
Mar	33	18	45	96	0
Apr	21	27	37	75	3
May	21	26	32	79	1
Jun	26	26	25	67	6
Jul	38	33	17	88	8
Aug	21	12	35	68	0
Oct	31	13	49	93	5
Nov	20	23	28	65	4
Dec	34	36	18	95	0
Total	305	287	392	965	33
Mean	25.42	23.93	32.67	96580.42	2.75

Source: Hospital record from Delta State Government General Hospital, Abraka, Ethiope East L.G. A. of Delta State (2007-2018)

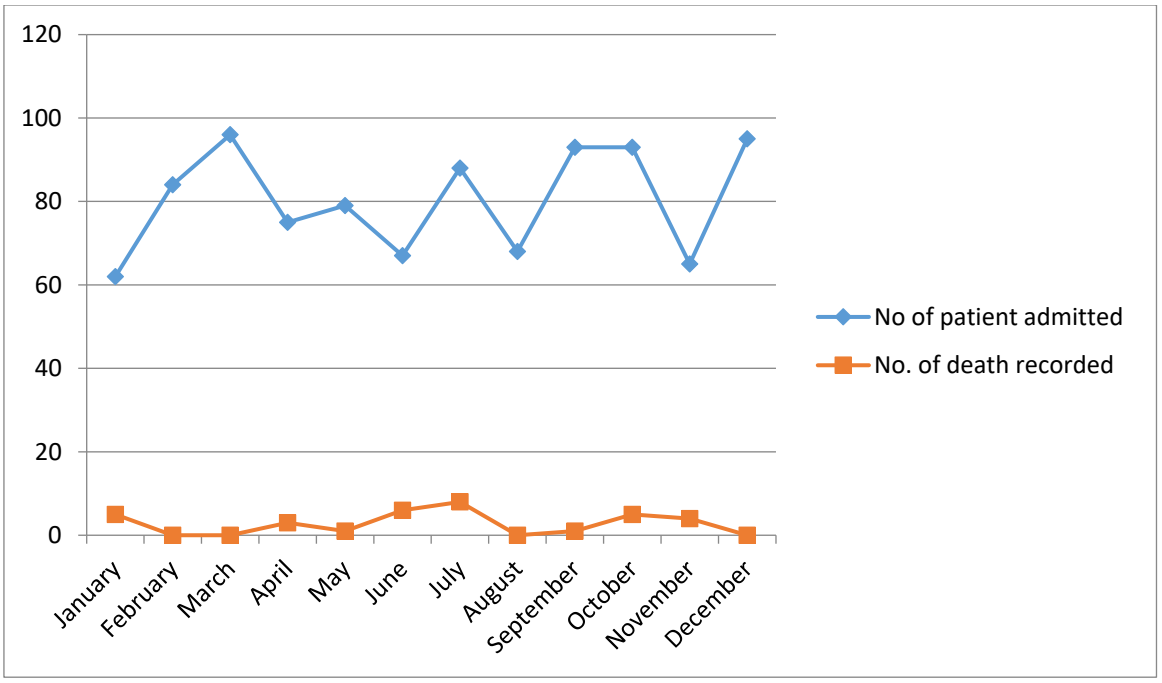


Source: Fieldwork(2019)

Fig. 10a: Hospital record on malaria outbreak (2007-2018) from Abraka Government General Hospital, Ethiope East L.G.A Delta State (record)

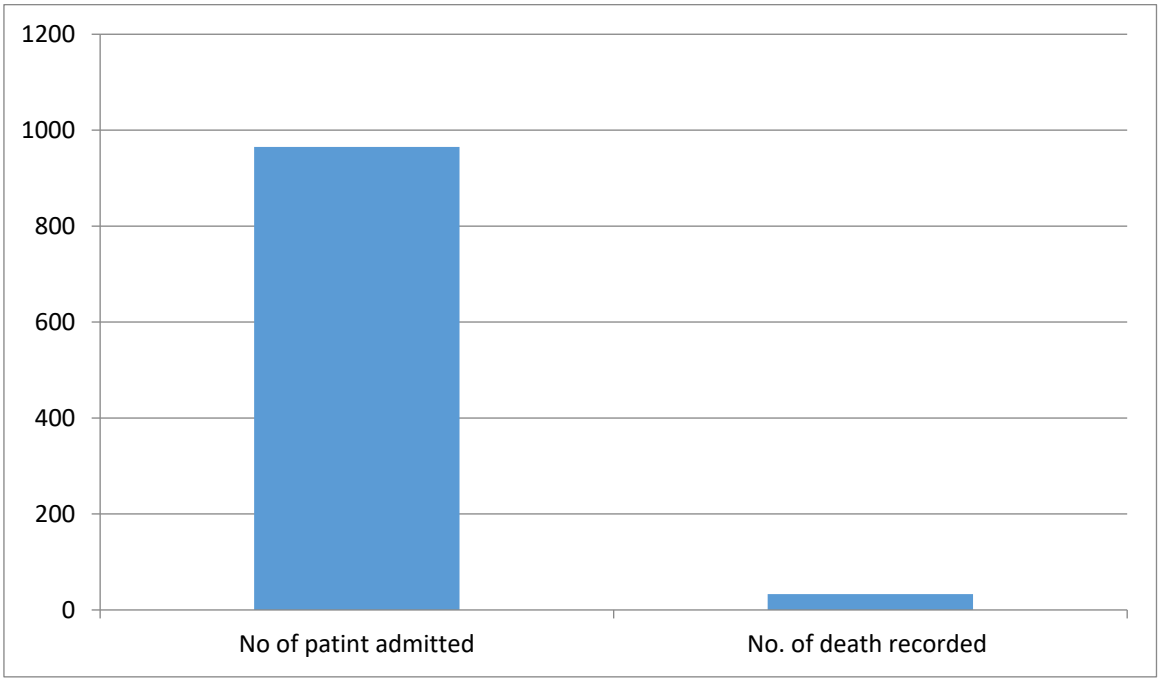


Source: Fieldwork(2019)



Source: Fieldwork(2019)

Fig. 10b: Hospital record on malaria outbreak (2007-2018) from Abraka Government General Hospital, Ethiope Eat L.G.A of Delta State (severity)



: Fig. 10c: Hospital record on malaria outbreak (2007-2018) Abraka Government General Hospital, Ethiope East L.G.A of Delta State (severity)

Source: Fieldwork (2019)

Table 17 and Fig 10(a-c) showed the hospital record of malaria incidence in Abraka obtained from the Government General Hospital, Abraka from 2007-20l8. The statistical diagrams shows that Abraka admitted about 305 patients (children below 5years)

suffering malaria diseases caused by poor hygiene, lack of medical care, stagnant water, bad water, unfavourbale environment, intense heat, rise in temperature and harsh climate.

Malaria outbreak has been discovered to have an adverse effect on the health of 0-5years patients since patients under malaria attack may not be comfortable when receiving treatment at the general hospital. This is the case of patients admitted with 0-5years diseases from 2007 to 2018. Lt could be established from statistical evidence that malaria more prevalent in Abraka especially among ages below 5years. Also, 287 patients aging between 5-l8years were admitted in Abraka with severe malaria cases. It could be established from the above statistical diagram that, Abraka people among other neigbhouring communities are major victims of malaria attack. This implies that, malaria is prevalent in rainy season where increased rainfall, rise in temperature makes the *environment marshy* for increased mosquito breeding which affect the health of the inhabitants in Abraka. The statistical analysis provided above shows that malaria outbreak and other health related diseases affect the health and well-being of Abraka people.

Table 17 and Fig 9(a-c) shows that l8years and above are prone to malaria diseases in Abraka. The statistical record obtained based on admitted 18years and above (392) patients shows that ages above l8years with malaria diseases rank first among the various age groups. This implies that malaria outbreak has a huge effect on the health working group and well-being of Abraka people. Also, malaria diseases which is often caused by dirty environment, bushy environment, stagnant water, poor sanitary system and poor health care delivery causes severe damage to the life of persons above l8years than other age groups. This is because ages below l8years can easily recover from malaria attack due to their immune system as compared to ages above l8years. Again, it has been established from the statistical analysis that malaria diseases is prevalent in marshy areas and areas prone to flood than high land areas.

Between the years 2007 to 2018, the Delta State Government General Hospital, Abraka, Ethiope East L.G.A of Delta State admitted 965 patients who suffered from malaria diseases (0-5years, 5-l8years, and l8years and above) out of which 33 deaths recorded from 2007 to 2018.

About 62 patients were admitted in January out of which 5 died. In February, about 84 patients were admitted in February out of which the hospital did everything possible to save the lives of those patients. It is important to note that, no death was recorded in February. About 96 patients were admitted in March out of which none died, 75 patients were admitted in April out of which 3 died, 79 patients were admitted in May out of which only one died, 67 patients with malaria disease were admitted in June, out of which 6 died, 88 patients was admitted in July out of which 8 died, 68 patients were admitted in August out of which none died, 93 patients were admitted in September out of which only one died, 93 patients were admitted in October out of which 5 died of the disease, 65 patients were admitted in November out of which 4 died and 95 patients were admitted in December out of none died. From the above statistical diagram, it could be inferred that malaria diseases has severe effect on the health and well-being of Abraka people.

Table 18: Malaria incidence among male and female in Abraka

Malaria Diseases								
Year	**0**-5 years	**5**-l0 years	**10**-l5 years	**15**-l8 years	**18**-20 years	**20**-25 years	**25 years &**above	Total
2007	11	77	10	22	21	42	34	. 217
2008	15	213	44	26	62	21	37	418
2009	12	132	31	27	31	20	19	272
2010	10	129	21	32	20	20	13	245
2011	11	139	***25***	51	32	31	10	299
2012	12	75	10	27	41	36	11	212

2013	10	84	46	38	32	33	39	282
2014	21	90	47	*45*	20	29	15	267
2015	24	127	12	10	21	26	17	237
2016	26	95	36	. 67	10	22	22	278
2017	29	33	10	25	20	32	19	168
2018	37	44	9	66	54	33	11	254
Total	218	1238	301	436	364	345	247	
Mean	18.17	103.17	25.08	36.33	30.33	28.75	20.58	

Source: Government General Hospital, Eku (Summary Statistics of male and female patient admitted under malaria diseases, 2007-20 18 health record)

Table 18 shows that 218 patients (0-5years) with severe malaria cases were admitted in the government general hospital in Eku, Ethiope East LG.A of Delta State between 2007-2018, 1238 patients (5-loyears) were admitted same period, 301 patients (lOi5years) were admitted between 2007- 2018, 436 patients (15-l8years) were admitted same period, 364 patients (18-20years) were admitted same period, 345 patients (2025years) were admitted same period and 247 patients (25years and above) were admitted between 2007- 2018. This showed that majority' of the patients admitted with malaria diseases are below I0years and I8years who were seriously affected by malaria outbreak in the area.

It could be observed from the above table that 0-1 5years recorded a mean value of 18.17, 5-l0years recorded 103.17, 15-I8years recorded 25.08, 18-20years recorded 36.33, 20-25years recorded 30.33 and 25years and above recorded 28.75 between 2007-2018 indicating that children under the age of I Oyears are more prone to malaria attack and this negative effect on the health of the inhabitants of Abraka, Ethiope East L.G.A of Delta State.

Table 18 and also showed that a total of 217 cases of malaria was recorded in 2007, 418 cases recorded in 2008, 272 cases recorded in 2009, 245 cases recorded in 2010, 299 cases recorded in 2011, 212 cases were recorded in 2012, 282 cases were recorded in 2013, 267 cases were recorded in 2014, 237 cases recorded in 2015, 278 cases recorded in 2016, 168 cases recorded in 2017 and 254 cases recorded in 2018 indicating that malaria is prevalent in Abraka.

Table 19: Hospital records of malaria incidence among male and female in Abraka Quaters from Eku Government General Hospital, Ethiope East L.G.A. of Delta State

Quarters	Years	Malaria record			Severity	
		0-5 yrs	5-8 yrs	> 18 yrs	Admitted patients	Death
	Total	305	287	392	965	33
Umeghe		32	31	41		
Urhuoka		38	34	53		
Ekrejeta		29	29	44		
Abraka P. O.		21	25	32		
Ajalomi		32	27	41		
Urovie		27	25	31		

Ero		35	32	39		
Otorho		40	40	47		
Ugono		51	44	52		

Maleria GIS Incidence Map 0f Abraka

The base map of the study area was generated within Geographic Information System (GIS) software environment using the ArcGiS 10.4.1 software. Spatial features were extracted from Google map inputted and georeferenced to prepare the map. A database incorporating malaria incidence data was connected to the basemap and subsequently visualized the map shows areas of maleria disease of high. low and mediem incidence areas (fig 11a and 11b) in abraka as follow:

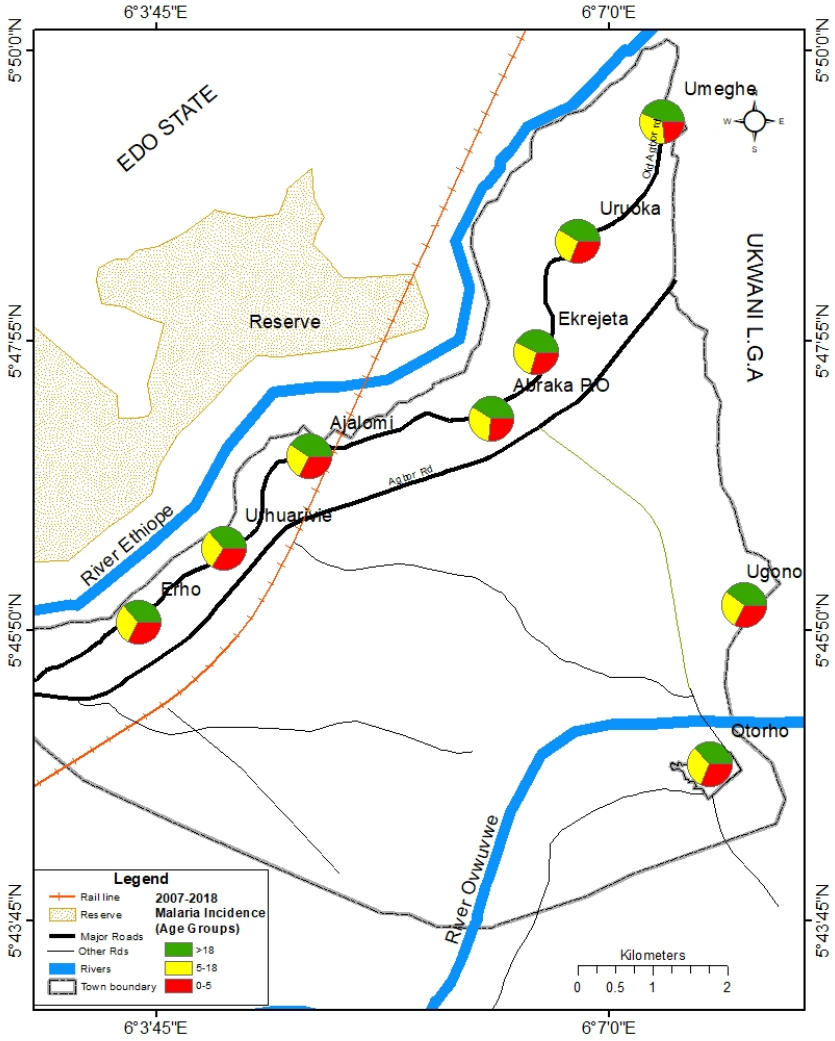


Figure 11a;The Base Map of Abraka study area

Source: Fieldwork(2019)

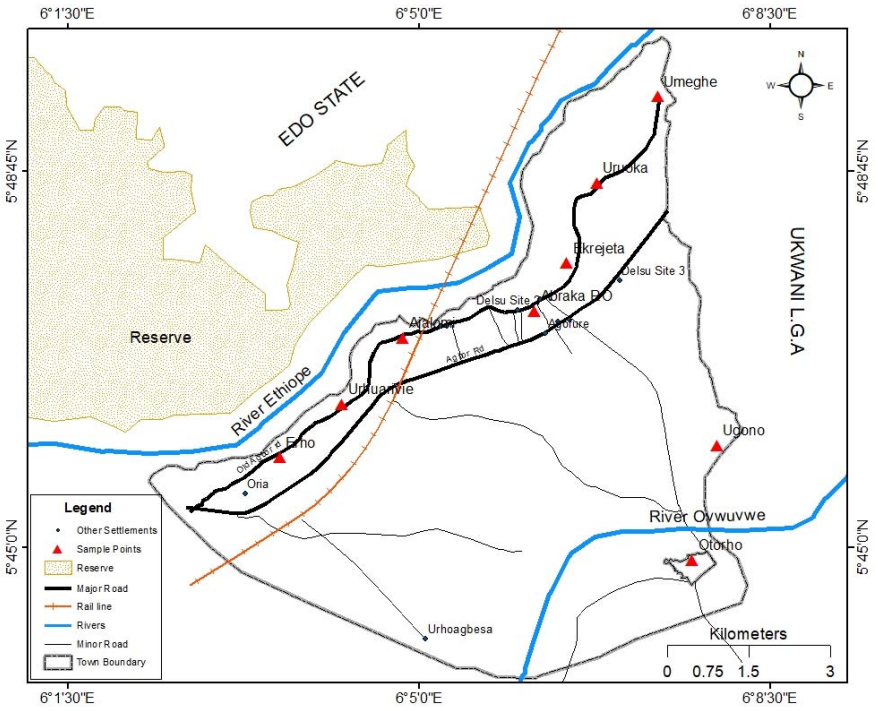


Fig. 11b: Map showing Maleria Disease of High. Low and Mediem Incidence Areas (Severity) in Abraka, Ethiope East L.G.A of Delta State

Source; Fieldwork(2019)

VIII. Conclusion

The study carried determine effects, causes, prevalence and spatial analysis on malaria with GIS incidence produced map of Abraka showing the spatial distribution of malaria disease occurrences in high, medium and low risk zones, Below are the following facts revealed in this study. The symptoms of malaria typically begin 8—25 days following infection. However, symptoms may occur later in those who have taken anti-malarial drugs as prevention. Initial manifestations of the disease common to all malaria species are similar to flu-like symptoms, and can resemble other conditions such as sepsis, gastroenteritis, and viral Ethiope East L.G.A of Delta State (severity)diseases (Baird, 2013).

The presentation may include headache, fever, shivering, joint pain, vomiting, hemolytic anemia, jaundice, hemoglobin in the urine, retinal damage, and convulsions (Vaughan, et al, 2008). The classic symptom of malaria is paroxysma cyclical occurrence of sudden coldness followed by shivering and then fever and sweating, occurring every two days (tertian fever) in P. vivax and P. ova/c infections, and every three days (quartan fever) for P. malariae, P. Falciparum infection can result recurrent fever every 36-48 hours, or a less pronounced and continuous fever (Hedrick, 2011). Severe malaria is usually caused by P. falciparum (often referred to as falciparum malaria). Symptoms of falciparum malaria arise 9-30 days after infections. Individuals with cerebral malaria frequently displays neurological symptoms, such as abnormal posturing, nystagmus, conjugate gaze palsy (failure of the eyes to turn together in the same direction), opisthotonus, seizures, coma (Wilson, 2012). Malaria parasites belong to the genus Plasmodium (phylum Apicomplexa). In humans, malaria is caused by P. fa1ciarum, P. malariae, P. ovale, P. vivax and P. knowlesi. Among those infected, P.falczparum is the most common species identified (75%) followed by P. vivax (20%). Although P. fa1czarum traditionally accounts for the majority of deaths, recent evidence suggests that P.Vivax malaria is linked with potentially life-threatening conditions about as often as with a diagnosis of P: fa1czarum infection. P. vivax proportionally is more common outside Africa (Hartman, et al., 2010).There have been documented human infections with several species of Plasmodium from higher apes; however, except for P. knowlesi - a zoonotic species that causes malaria in macaques these are mostly of limited public health importance. Global warming is likely to affect malaria transmission, but the severity and geographic distribution of such effects is uncertain (Sarkar, et al, 2009).

Transmission is more intense in the environment where the mosquito lifespan is long(so that the parasite has time to complete its development inside the mosquito) and where it prefers to bite humans rather than other animals. The long lifespan and strong human-biting habit of the African vector species is nearly 90% of the world's malaria cases are in Africa (Enayati and Hemingwa, 2010). Transmission also depends on climatic conditions that may affect if number and survival of mosquitoes, such as rainfall patterns, temperature are humidity.In many places, transmission is seasonal, with the peak during and just after the rainy season (Noor, et al, 2009). Malaria epidemics can occur when climate and other conditions suddenly favor transmission in environment where people(quartan fever) for P. malariae. P. falciparum infection can cause recurrent fever every 36-48 hours, or a less pronounced and almost continuous fever (Hedrick, 2011). Severe malaria is usually caused by P.falcrparum (often referred to as falciparum malaria). Symptoms of falciparurn for malaria arise 9 to 30 days after infection. Individuals with cerebral malaria frequently exhibit neurological symptoms, including abnormal posturing, nystagmus, conjugate gaze palsy (failure of the eyes to turn together in the same direction), opisthotonus, seizures, or coma (Wilson, 2012). Malaria is classified into either "severe" or "uncomplicated" by the World Health Organization (WHO). It is deemed as severe, when any of the following criteria are present, otherwise it is deemed or considered uncomplicated (Pasvol, 2015). These criteria include; decreased consciousness, significant weakness such that the person is unable to walk, inability to feed, two or more convulsions, low blood pressure (less than 70 mmHg in adults and 50 mmolL/g in children), breathing problems, circulatory shock, kidney failure or hemoglobin in the urine, bleeding problems or hemoglobin less than 50gIL (5 gIdL), pulmonary oedema, blood glucose less than 2.2 mmol/L (40 mgldL), acidosis or lactate levels of greater than 5mmol/L, and parasite level in the blood of greater than 100,000 per micro litre (1iL) in low-intensity transmission environment, or 250,000 per 4L in high-intensity transmission environment.

Malaria is the most prevalent parasitic disease in the tropics, and thus the king of all parasites is poverty. Forbes and Jackson (1993), Ngele (2008), Obiukwu and Okwuonu (2008), Bray and Anderson (1979), exerts that in endemic malarious area like Abraka in the tropics of West Africa, placental malaria is a frequent occurrence in women at parturition. These studies show that incidence of infection was highest in women with first pregnancy and declined progressively with increasing maternal parity. Malaria exerts a heavy toll of illness and death, especially amongst children and pregnant women. At present, over one million children under 5 years of age die annually as a result of malaria (Mashal, 2016). Treatment and control of malaria proves difficult with the spread of drug resistance strains of parasites and insecticides resistance strains of mosquito vectors. Prevalence of infection on bases of socio-economic class, showed that malaria infection does not respect individual's socio-economic status.

There is need to sustain the current intervention measures and awareness campaign among residents in Nigeria for prevalence rate to be reduced to the desired zero level (Mashal, 2016). In 2000, malaria caused an estimated 21.7 million illnesses and 217,000 deaths. It occurs most often in children and young adults between 5 and 19 years old. In 2013 it resulted in about 161,000 deaths, a reduction down from 181,000 in 1990. Infants, children, and adolescents in south-central and Southeast Asia experience the greatest burden of illness. Outbreaks of malaria are frequently reported from sub-Saharan Africa and countries in Southeast Asia. Historically, in the pre-antibiotic era, the case fatality rate of malaria was 10-20% (Ukpai and Ajoku, 2001). Today, with prompt treatment, it is less than 1%. However, about 3-5% of individuals who are infected will develop a chronic infection in the gall bladder. Since S.Typhi is human-restricted, these chronic carriers become the enabling reservoir, which can persist for decades for further spread of malaria disease, further complicating the identification and treatment. Lately, the study of Typhi linked with a large outbreak and a carrier at the genome level provides new insights into the pathogenesis of the pathogen (Ohanu, et al, 2003). 6.0 Recommendations The use of net and unharmful insecticides to get rid of mosquitoes periodically be adopted as policy framework to stern the high number of deaths recorded for malaria. It is recommended that mitigation strategies with measures to control malaria disease be adopted.

Malaria studies should be included in the health care curriculum in hospitals and tesst made compulsory for ages between 0-I 5years especially for the pregnant women in their early pregnancies since most of the malaria infections were asymptomatic. Enlightenment should be made to this group and especially to pregnant women and illiterates. The study recommends that intervention programs aimed at reducing malaria infections be increased in endemic environment, particularly in the wet seasons and pecial attention should be directed to malaria infection rates in the Nigeria.

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