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Research Article
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Perceived Psychosocial and Economic Burdens of Malaria in Pregnant Women in Obiyon Amendokian Community, Esan North East, Edo State

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ABTRACT
Malaria remains a significant public health concern, particularly among women pregnant in malaria-endemic regions. This study aims to determine the psychosocial and economic burden of malaria in pregnancy among women in Obiyon Community, Uromi, Edo State. A descriptive survey design was applied, with a population of [1520] registered pregnant women for a period of four weeks in 2024, and a sample size of 380. Descriptive analysis using mean, standard deviation, frequency, and percentage, alongside inferential analysis using chi-square statistics, was conducted to test the hypothesis at a 0.05 level of significance. The findings reveal that malaria during pregnancy exerts a profound impact on women in Obiyon Community, affecting them across psychosocial, economic, health, and socio-cultural dimensions. Demographic variables such as age, marital status, educational level, and occupation significantly influence the extent and nature of these burdens. Health-wise, malaria increases the risk of severe complications for both mothers and unborn babies, contributing to maternal mortality, and adverse birth outcomes like low birth weight. Psychosocially, affected women experience heightened social isolation anxiety, emotional stress, and economically influence high cost of medical bills associated with the disease. This study emphasizes the need for comprehensive malaria control strategies that address both the medical and broader psychosocial and economic challenges faced by pregnant women in this community.

Keywords: Malaria, psychosocial, economic and burden

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INTRODUCTION

The present-day devastation caused by malaria sadly is nothing new to the world. Malaria is a parasitic infection caused by the four (4) species of *Plasmodium* that infect humans: *vivax, ovale, malariae*, and *falciparum*. Of these, *Plasmodium falciparum* is the most deadly. It is also a potentially life-threatening infection caused by parasites called *plasmodium*, which is spread to humans through the bite of infected Anopheles mosquito (female mosquito responsible for mosquito infectious transfer) (Pimenta *et al*., 2015). The term malaria originates from Medieval Italian: mala aria - "bad air"; the disease was formerly called ague or marsh fever due to its association with swamps and marshland. Malaria is one of the most prevalent human diseases. It has been given different definitions by different scholars all over the world. According to Davis *et al*, (2017), malaria is an infectious diseases caused by protozoa parasites from the plasmodium family that can be transmitted by biting. Malaria can manifest with different symptoms in the body of pregnant women such as fever, chills, sweating, and

can lead to severe complications if not treated promptly.
Malaria parasite is the most illustrious cause of morbidity and mortality in many tropical regions of the world. Globally approximately about 216 millions of cases of malaria occur annually (WHO, 2017). The WHO (2015) disclosed that closed that about 3.4 billion people are at worldwide.

WHO (2022) disclosed that there were 241 million cases in 2019. In Sub-Saharam African, malaria is accounted to be one of the most dangerous diseases which affect humanity and it has become a serious health problem mainly in pregnant women (WHO, 2017). The estimated number of malaria deaths stood at 627, 000 in 2020, resulting to an increase of 69,000 deaths over the previous years. World malaria report (WMR) revealed that four African countries accounted for just over half of all malaria deaths around the world. The Democratic Republic of the Congo (12.2%) United Republic of Tanzania (4.1%), Mozambique (3.8%) and Nigeria (31.9%) (WHO, 2022).

Malaria is transmitted throughout in Nigeria, with 97% of the population at risk of malaria. The duration of the transmission season ranges from year-round transmission in the south to three months or less in the north. *Plasmodium falciparum* is the predominant malaria species. The primary vector across most of the country is *Anopheles (An.) gambiae s.s.*, accounting for 67.1% of all the *An. gambiae s.s.* collected, with *An. funestus* as a secondary vector in some areas of Nigeria. According to the 2021 World Malaria Report, Nigeria had the highest number of global malaria cases (26.6 % of global malaria cases) and the highest number of deaths (31 % of global malaria deaths) in 2021 (WHO, 2021).

Nigeria accounted for an estimated 54 % of malaria cases in West Africa in 2021 (WHO, 2021).Case numbers decreased 2% between 2020 and 2021, from 312.7 to 306 per 1000 of the population at risk. Deaths increased 3.5%, from 0.94 to 0.91 per 1000 of the population at risk during that same period (WHO, 2021). However, microscopy data from the 2018 Nigeria Demographic and Health Survey (NDHS) show that the prevalence of malaria parasitaemia in children under five years of age is 23% (a decrease from 27% in 2015 and 42% in 2010), although there are significant regional, rural-urban, and socioeconomic differences: prevalence ranges from 16% in the South and South East Zones to 34% in the North West Zone. In rural populations, prevalence is 2.4 times that in urban populations (31% vs. 13%) especially during pregnancy.

Malaria during pregnancy contributes to significant prenatal morbidity and mortality. Infection is known to cause higher rates of miscarriage, intrauterine demise, premature delivery, low-birth-weight neonates, and neonatal death. As funding increases to combat both malaria and maternal mortality, understanding how malaria specifically affects pregnant women is crucial in our efforts to improve maternal and prenatal health and curb the spread of this preventable infectious disease. Malaria is an important cause of stillbirth throughout endemic areas. Malaria in pregnant women contributes to 12-20% of stillbirths in endemic regions of sub-Saharan Africa, with lower rates if the mother undergoes treatment (Moore *et al.,* 2017) *P. falciparum* detection both in peripheral blood samples or placental samples at delivery nearly doubles the odds of stillbirth (odds ratio 1.81 and 1.5, respectively). Malaria can have particularly severe psychological effect on pregnant women and their unborn children. The psychosocial burden of malaria during pregnancy are most notable in areas where the disease is endemic and transmission is high and they includes; However, the psychosocial effects of malaria in pregnant women includes, placental malaria, depression, inflammation, preterm birth, low birth weight, cognitive changes and anemia, anxiety and stress.
Studies have shown malaria parasites can lead to various psychosocial effects. Andrea *et al.* (2018) conducted a research on the effect of malaria in pregnancy and they revealed that malaria can impaired the functionality of placenta, leading to a condition known as placental malaria. This can result in reduction of the flow of nutrients and oxygen to the developing foetus. WHO, (2020); Elphinstone *et al.(*2019) & McDonald *et al. (*2018), Observed that the abnormal changes to the placenta caused by malaria were associated with decreased birth weight, causing preterm and inflammation, Moeller *et al*.(2019).

Inflammation is a reflection of cell damage caused by infection or physical injury or in the response of tissues to an antigenic challenge, and was first studied in relation to physical disease. In recent years numerous clinical studies have established the presence of chronic low grade inflammation in major psychiatric disorders such as the affective and psychotic disorders and the anxiety disorders (IDCCP, 2017). Thus, cytokines have been associated with the pathogenesis of not only physical disorders such as malaria Eze and Agbo, (2019), but also with preterm (Rache *et al.,* 2019). Therefore, these psychosocial burdens can create a huge economic burden on pregnant women.

Economic burdens according to Andrade *et al* (2022) refer to the various costs, responsibilities, or hardships that individuals, businesses, or societies may face in the context of economic activities. Considering the economic burden of malaria as a percentage of the family budget, results range from 3.12% in India to 8.23% in Nigeria. Andrade *et al* (2022) Catastrophic health expenses due to malaria, measured as the household healthcare expenses exceeding a specified threshold of household income or household capacity to pay, ranged from 17.8% to 22.5% of families in Sudan, Mozambique, and Zimbabwe Mukaratirwa *et al (*2017). However, economic burden here includes, Hospital bill absenteeism leading

to unpaid work done, loss of earning from business transportation bills reduced productivity time lost to the disease and cost of mosquito net, insecticide and drug. These expenses incurred from the economic burden of malaria, encompass a wide range of healthcare-related costs associated with the prevention, diagnosis, treatment, and management of illnesses or medical conditions. Edeh, conducted a research on "Exploring dynamics in catastrophic health care expenditure in Nigeria" in 2020 and conducted that medical expenses remain high especially among the poor household Edeh,(2020). Therefore the cost hospital bill poses a great economic burden on pregnant women. Other economic burden of malaria in absenteeism leading to unpaid work done, loss of earning from time lost to the disease business, transportation bill, reduced productivity. Edeh *et al*, then suggested preventive measures.

Preventive measures in healthcare are interventions or actions taken to prevent the onset or progression of diseases and promote overall health and well-being. Preventive measures, such as bed nets, antimalarial prophylax are among others are designed to reduce the risk of illness, disability, or death and can be applied at various levels, including individual, community, and population levels. Andrade *et al* (2022). Furthermore, some studies have been carried out on knowledge and prevention of malaria among people who live in malaria endemic countries especially in Africa Munisi *et al* (2019) Andrade *et al* (2022). This calls for support on prevention, control and treatment of malaria especially for pregnant women.

However, in treatment strategy which includes Antimalarial Drugs (Artemisinin-based combination therapies (ACTs)), quinine and clindamycin, hospitalization and monitoring and blood transfusion. It's crucial for pregnant women to seek prompt medical attention if they experience symptoms of malaria, such as fever, chills, and flu-like symptoms. The fight against malaria is one of humanity's most significant public health successes. WHO (2017) recommends the same treatments for both *P. falciparum*and *P. vivax* infections in pregnant women.

The WHO also recommends treatment with primaquine after delivery to achieve cure and prevent relapses by eradicating *P. vivax* sequestered in the liver such as artemisinins, quinine and vaccines. Great progress was made in malaria control over the last two decades, resulting in a reduction in overall cases and deaths. Pregnant women still suffer from malaria disease in Nigeria, which is known to be an endemic disease throughout Nigeria with a seasonal transmission, the peak transmission of which is during the rainy season (April – October) followed by the dry season (November – March) Cyakubuet et al. (2019) the parasite disease disproportionately affects children and pregnant women compared to the rest of the prevention groups (Center for Disease Control and prevention (CDC, 2016). In addition the disease is transmitted throughout Nigeria with 97 percent of the population at risk of the infection especially for pregnant women Dawaki et al. (2016).

Pregnant women refer to females who are expecting a baby Chua et al. (2021a). During pregnancy, a woman's body undergoes various physiological changes to support the growth and development of the fetus. Pregnancy increases the risk of severe disease for women infected with malaria due to immune system suppression, Chua *et* al (2021b). This puts them at a three times higher risk of severe illness and a death rate close to 50% Chua *et* al. (2021a). The risk varies with the woman's age and the number of pregnancies. In areas with high malaria transmission rates, 25% of pregnant women are infected Lopez-Perez *et al (*2016). In the context of this study, pregnant women are those that attend antenatal in Obiyon Community, Esan North East, Edo State. Perceived psychosocial and economic burden of malaria in pregnancy among women of child bearing age in Obiyon Community Esan North East Edo State may have several effects economic status of individual.

Obiyon is a Community in Esan North East Local Government Area, Edo State of Nigeria. Esan North-East is amongst the 18 Local Government Areas that make up Edo State. Its headquarters are in Uromi/Uzea. There are three (4) health Obiyon Community in Esan North East Local Government Area, Edo State was chosen for this study because of the consistent illness among pregnant women which leads to psychosocial and economic burdens. Therefore, this study seeks to investigate the perceived psychosocial and economic burdens of malaria in pregnant women in Obiyon Community, Esan North East, Edo State.

The complications/problems experiences by women during pregnancy are numerous. These complications can involve the mother's health, the foetus's health, or both. Even women who were healthy before getting pregnant can experience complications. These complications may make the pregnancy a high-risk pregnancy. In this study, complications here are caused by mosquito bit (*Plasmodium falciparum*) which transfuse into the blood stream and form malaria.

According to Reddy et al (2023) malaria has been a serious health challenges especially the pregnant woman who suffers more severely than non-pregnant adults with about 3 to 4 times the risk of developing severe malaria and death. The numbers of pregnant women dying each year due to psychosocial and economic burdens of malaria is very alarming WHO (2020). This problem has led to attempts by government(s) and nongovernmental outfits to setup preventive measures for malaria. Regrettably, most pregnant women however ignore the dangerous effects of malaria on their health and that of their unborn child and this has contributed in the set back

of development in the Nation. Research has shown that the in pregnant women, the estimate of malaria are 3.5%, from 0.94 to 0.91 per 1000 of the population at risk during that same period.

WHO (2019) Despite the best efforts of governmental agencies in prevention, control and treatment of malaria, it is unfortunate that individuals still take the risk of exposing themselves for malaria. However, this is not a tolerable or acceptable situation owing to the fact that its impact on the lives and health of pregnant women is deplorable. Therefore, there is a need for this study in to investigate and research further into the perceived of psychosocial and economic burden of malaria in pregnant women.

Purpose of the study

The purpose of this study is to investigate the perceived psychosocial and economic burdens of malaria in the Obiyon community. This research aims to comprehensively understand how malaria affects not only the physical health of individuals but also their mental well-being, social interactions, and economic stability. By assessing the psychological impacts, such as stress and anxiety, as well as the economic consequences, including medical costs and lost productivity, the study seeks to highlight the broader implications of malaria on the community. The findings will inform the development of more holistic malaria control strategies and interventions that address both the psychosocial and economic challenges faced by the Obiyon community.

Objective of the study

The main objective of the study is to determine the perceived psychosocial and economic burden of malaria in pregnancy among women of child bearing age in Obiyon Amendokhian Community Esan North East Edo State and the study seek to:

(a) To assess the perceived psychosocial burden of malaria in pregnancy among women of child bearing age in Obiyon Community Esan North East Edo State.
(b) To assess the economic burden of malaria in pregnancy among women of child bearing age in Obiyon Community Esan North East Edo State.
(c) To ascertain the perceived effects of malaria in pregnancy in Obiyon Community Esan North East Edo State
(d) To assess the prevention and treatment of malaria among pregnant women in Obiyon Community, Esan North East, Edo State.

Research question

The following research questions were posed to guide the study:

(a) What are the perceived psychosocial and economic burden of malaria in pregnancy among women of child bearing age in Obiyon Community Esan North East Edo State?
(b) What are the economic burden of malaria in pregnancy among women of child bearing age in Obiyon Community Esan North East Edo State?
(c) What are the perceived effects of malaria in pregnancy in Obiyon Community Esan North East Edo State.?
(d) What are the prevention and treatment malaria among pregnant women in Obiyon Community, Esan North East, Edo State?

LITERATURE REVIEW

Concept of malaria

Malaria is a mosquito-borne infectious disease of humans and other animals caused by protists (a type of microorganism) of the genus *Plasmodium*. It begins with a bite from an infected female mosquito, which introduces the protists via its saliva into the circulatory system, and ultimately to the liver where they mature and reproduce. The disease causes symptoms that typically include fever and headache, which in severe cases can progress to coma or death. Over the past two decades, malaria has persisted as a significant global public health challenge, particularly affecting low and medium-income countries, putting nearly half of the world's population at risk (Bennett *et al.,* 2017). In 2015, over 214 million estimated cases were reported, resulting in over 450,000 deaths worldwide, a figure that surprisingly rose to over 300 million cases in 2018 and approximately 230 million cases in 2019 (WHO, 2021; Aychiluhm *et al.,* 2020). Again, World Health Organization reports that in 2018, approximately 228 million new malaria cases were reported worldwide, with most of them in Africa (WHO, 2018). Despite a steady decline in the estimated number of deaths from malaria cases worldwide from over 730,000 in 2000 to over 400,000 in 2019, Sub-Saharan Africa (SSA) contributed over 90% of global malaria deaths in 2017, with over 260,000 being children under five years of age (UNICEF). By 2019, under-five deaths from malaria constituted over 60% of the total estimated deaths (WHO, 2021).

Malaria originates from Medieval Italian: mala aria — "bad air"; the disease was formerly called ague or marsh fever due to its association with swamps and marshland. Malaria is widespread in tropical and subtropical regions in a broad band around the equator, including much of Sub-Saharan Africa, mostly in Europe and North America, where it is no longer endemic, though imported cases do occur. Other *Plasmodium* species cause

infections in certain animals. Several mammals, birds and reptiles have their own form of malaria. *Plasmodium falciparum* and *Plasmodium vivax* are the predominant malaria parasites in different regions, with their distribution varying. In Ethiopia, 60% of cases are attributed to *Plasmodium falciparum* and 40% to *Plasmodium vivax*. In India, this ratio is estimated to be 10:7 (WHO, 2021). Conversely, Brazil, with over 60% of its 170 million people at risk of malaria residing in the American region, has *Plasmodium vivax* responsible for over 70% of cases, while *Plasmodium falciparum* contributes more than 25% (WHO, 2021). Notably, *Plasmodium falciparum* alone accounts for more than 95% of malaria cases in Nigeria.

Currently, *Plasmodium falciparum* in Nigeria is responsible for half of the global malaria burden, constituting about a quarter of all cases worldwide and a comparable proportion of overall malaria mortality (WHO, 2020). Nigeria was responsible for nearly 24% of all global malaria-related deaths in 2018 (WHO, 2020). The WHO, under the 'high burden to high impact' initiative, has sounded a 'wake-up call' emphasizing the necessity for urgent, targeted action, especially in Nigeria where WHO-estimated cases are on the rise rather than decreasing annually (WHO, 2019).

However, Nigeria was the only Sub-Saharan Africa (SSA) country that was to assisted in National Malaria Strategic Plan (NMSP), 2014–2020, aimed at reducing malaria-related mortality to zero by 2020 which led to an increase in studies focused on malaria among pregnant women (WHO, 2020). While these studies play a crucial role in making evidence-based healthcare decisions for malaria fever control in Nigeria and SSA, the scoping of this study deemed even more critical by investigating the perceived psychosocial and economic burdens of malaria in pregnant women in Obiyon, Esan North East, Edo State.

Malaria in pregnant women

Malaria during pregnancy can have serious consequences for both the mother and the developing foetus. The effects of malaria in pregnancy are particularly pronounced in areas where the disease is endemic. It can impact pregnancy with different kinds of ills for the mothers and the babies (Blair *et al.,* 2023). The infection can lead to anemia in pregnant women and destroy red blood cells, and the body's attempt to clear the infection can result in a significant reduction in hemoglobin levels, leading to anemia. (Cohee, 2018) Anemia poses risks for the mother's health and can contribute to fatigue and other complications. Pregnant women are more susceptible to severe forms of malaria, especially if infected with *Plasmodium falciparum*. Severe malaria can lead to complications such as organ failure, coma, and even death if not promptly treated which can also further affect the foetus (Bauserman *et al.,* 2019).

However, children born to mothers who had malaria during pregnancy may experience impaired cognitive development. The consequences of low birth weight and preterm birth, as well as exposure to the malaria parasite, can contribute to long-term developmental challenges (Caroline *et al.,* 2023). When weakens the immune system of pregnant women, making them more susceptible to other infections. This can have additional health implications for both the mother and the newborn .In regions where malaria is endemic; the burden of the disease during pregnancy is a significant public health challenge. Caroline *et al. (*2023). Limited access to healthcare, particularly in rural areas, can exacerbate the impact of malaria in pregnant women and their infants.

Most infections in pregnancy are asymptomatic, undetected, and untreated, leading to negative outcomes for both the mother and the foetus (Feleke *et* al., 2020). Women in their first and second pregnancies are the most vulnerable to *Plasmodium falciparum* infection (Dosoo *et al.,* 2020). This is due to increased immunity with more pregnancies. Severe malaria can lead to maternal death from complications such as hypoglycemia, cerebral malaria, and pulmonary oedema (Bauserman *et al.,* 2019). The burden of malaria during pregnancy also causes unwanted consequences, prolonged hospital stays, and psychological trauma for both patients and healthcare providers (WHO, 2020).
Pregnant women in Nigeria are particularly vulnerable to malaria infection due to various factors such as poor access to quality healthcare services, poverty, and demographic characteristics (Bello and Ayede, 2019).The burden of malaria is highest in rural areas, where access to health services is limited. The poverty rates in these areas make it challenging for pregnant women to access healthcare services and afford preventive measures such as insecticide-treated bed nets and antimalarial drugs (Aberese-Ako *et al.,* 2022). This lack of access to quality healthcare services also means that many cases of malaria go undiagnosed and untreated, leading to severe complications for pregnant women and their fetuses.

In addition, some researchers have found that demographic factors such as age, level of education, and occupation are significantly associated with malaria prevalence among pregnant women in Nigeria (Gontie, 2020). Younger pregnant women, those with low levels of education, and low-income occupations are more likely to be affected by malaria than their older, more educated, and higher-income counterparts (Mbachu, 2020). These findings emphasized the need for targeted interventions that consider these demographic factors to effectively control the burden of malaria among pregnant women in Nigeria. Despite efforts to reduce the burden of malaria in Nigeria, the disease remains a significant challenge, particularly among vulnerable populations such as pregnant women. Continued investment in malaria

prevention and control measures, including targeted interventions for pregnant women, is crucial to ensure the health and well-being of this vulnerable population. With these measures, the psychosocial and economic burden of malaria in pregnant women will be reduced if not eradicated.

Signs and symptoms of malaria

Malaria is a mosquito-borne infectious disease caused by parasites of the Plasmodium genus. The signs and symptoms of malaria can vary, and they typically manifest within a few weeks after a person is bitten by an infected mosquito. Healthline. Malaria: Causes, Symptoms, and Diagnosis Peter (2019). The severity of symptoms can range from mild to severe, and in some cases, malaria can be fatal. Symptoms usually occur between one to eight weeks after the initial mosquito bite. (This is the incubation period.) However, in some cases, depending on the type of plasmodium causing the infection, it can take up to a year before any symptoms start to show. The illness may start off with nonspecific flu-like symptoms. Other symptoms includes; Fever, Chills, Sweating, Headache, Muscle aches, Fatigue. Nausea, Vomiting, and can lead to severe complications like anemia if not treated promptly (Medicines for Malaria Venture 2020).

Psychosocial burden of malaria in pregnant women

Psychosocial burden pertain to the mental and emotional aspects of an individual, this includes thoughts, emotions, cognitive processes, perceptions, and attitudes. These factors play a crucial role in shaping an individual's mental health, behaviour and responses to various situations. Many studies have been carried out by different scholars. However, in view of Bauserman *et al.,* (2019), malaria remains one of the greatest contributors to morbidity and mortality in areas with stable transmission, particularly in sub-Saharan Africa (SSA). Of the 25 million pregnant women in SSA countries at risk of malaria infection, an estimated 25% will have evidence of *Plasmodium falciparum* placental malaria at the time of delivery and 50% will have evidence of peripheral malaria in the blood during antenatal care follow-up. This high prevalence is due to the fact that pregnant women are at increased risk of contracting malaria compared with non-pregnant women of the same age (Amanda *et al.,* 2021). While malaria in pregnancy (MiP) contributes to approximately 10000 maternal and 200 000 fetal deaths (Amanda *et al.,* 2021). Pregnancy increases the risk of severe disease for women infected with malaria due to immune system suppression (Chua *et al.,* 2021). This puts them at a three times higher risk of severe illness and a death rate close to 50%. The risk varies with the woman's age and the number of pregnancies. In areas with high malaria transmission rates, 25% of pregnant women are infected (Chua *et al.,* 2021). Malaria during pregnancy can result in serious consequences for both the mother and the fetus, including intrauterine growth restriction, congenital malaria, low birth weight, abortion, and stillbirth. Symptoms and complications vary according to the level of immunity and the intensity of transmission in the area.

MiP is associated with increased risk of maternal anemia, restriction, low birth weight, preterm birth, and later malaria infection in offspring (Weckman *et al.,* 2019). Therefore, the main objective of this is to investigate the perceived psychosocial burdens of malaria in pregnant women of Obiyon community of Esan North East LGA of Edo State. However, the psychosocial burden of malaria in pregnant women includes placental malaria, depression, inflammation, preterm birth, and anxiety anemia and low birth weight. Placental malaria (PM) is associated with adverse outcomes such as low birth weight and preterm birth, which are risk factors for cognitive disorders (Andrea *et al.,* 2018). Studies have revealed that malaria parasite is one of the causes placental malaria. Hence, it can lead to the mitigation of flow of nutrients and oxygen to the developing foetus. (WHO, 2020). The placenta is an important organ that acts as an interface between the mother and her fetus. Placental malaria can alter nitric oxide bioavailability, and it may lead to host inflammatory responses. Either of these processes may result in poor placental development, leading to placental insufficiency when the placenta is unable to fully support the growth of the developing baby (Elphinstone *et al.,* 2019; McDonald *et al.,* 2018). The first trimester is associated with the highest risk of *Plasmodium*-infection especially in primigravid women (Tuikue *et al.,* 2019; Hounkonnou *et al.,* 2018).

Placental malaria early exposure (15 gestational weeks) was associated with reduced volume of placental transport villi and smaller surface areas for diffusion across the villi (Moeller SL *et al.,* 2019). Other abnormalities such as impaired development of placental vascular space and excessive syncytial knotting (Hounkonnou *et al.,* 2018). Aggregation of syncytiotrophoblast nuclei), increased fibrinoid necrosis areas and thickening of syncytiotrophoblast basal membrane have also been observed (Hounkonnou *et al.,* 2018). Critically, the timing of infection appears to determine the risks and severity of adverse birth outcomes. The timing of infection that resulted in such placental pathologies, however, is unknown. Ultrastructural studies showed the breakdown of syncytiotrophoblast integrity in regions associated with IEs. These abnormal changes to the placenta were associated with decreased birth weight (Moeller *et al.,* 2019). Inflammation has also been as one of the effects of psychosocial burden of malaria in pregnant women.

Inflammation is a reflection of cell damage caused by infection or physical injury or in the response of tissues to an antigenic challenge, and was first studied in relation to physical disease, but in recent years numerous clinical studies have established the presence of chronic low grade inflammation in major psychiatric disorders such as anxiety (IDCCP, 2017). Thus, cytokines have been associated with the pathogenesis of not only physical disorders such as malaria Eze and Agbo, (2019), but also with depression (Rache *et al.,* 2019). It has been argued that the inflammation is a central mediator by which psychological and physical stressors can contribute to the development of depression, as well as a bridge to systemic diseases. Unfortunately, approximately 25% of survivors develop neurocognitive and behavioral sequelae (Bruneel, 2019). Several studies have associated the most varied neurological sequelae, cognitive deficits and behavioural alterations, as well as predisposition to mental. Pro-inflammatory cytokines are elevated in depressed patients, and can cause somatic symptoms such as fatigue and appetite loss, decreased food intake and low birth weight (Eze and Agbo, 2019), is linked to an increased risk of preterm birth.

Preterm refers to the condition of being born before the completion of the full term of pregnancy. In medical terms, a preterm birth is one that occurs before 37 weeks of gestation (Elphinstone *et al.,* 2019). A typical pregnancy lasts around 40 weeks, with the due date calculated from the first day of the woman's last menstrual period. Malaria during pregnancy can contribute to preterm birth and other adverse outcomes. Preterm is one of the psychosocial effects of malaria MiP. When a pregnant woman is infected with malaria, particularly *Plasmodiumf alciparum*, it can lead to a condition known as malaria in pregnancy (MiP). MiP is associated with several complications, and one of the significant concerns is an increased risk of preterm birth. According to Chua *et al.,* (2021) MiP is also associated with preterm birth, where these babies are usually born small and have increased risk of mortality due to complications such as brain hemorrhage, sepsis, acute respiratory illnesses and perinatal asphyxia Surviving infants may develop life-long morbidities such as learning disabilities, which become obvious when the infant reaches school age (Brydges et. al. 2018). *Plasmodium* infection in both early and late pregnancies has been associated with preterm deliveries. A study from Malawi showed that earlier infection (before 24 weeks gestation) was associated with a higher risk of preterm delivery (Elphinstone *et al.,* 2019). It's important to note that while some women may report cognitive changes during pregnancy, these effects are typically mild and transient (Valentina *et al.,* 2020). If a pregnant woman experiences significant cognitive changes or has concerns about cognitive function, it is advisable for her to discuss these issues with her healthcare provider.

Andrea *et al.* (2018) stated that regular prenatal care, a healthy lifestyle, and open communication with healthcare professionals can contribute to overall well-being during pregnancy and an important parasitic infectious disease since antiquity, remains a significant public health problem, being responsible for estimated 229 million cases and 409.000 deaths worldwide annually (World Health Organization, 2020). It is caused by protozoa of the genus *Plasmodium* and is transmitted by the bite of the female Anopheles mosquito. Individuals with malaria treated with artesunate, a potent antimalarial treatment that promotes a rapid decline in parasitemia and recovery (Pamela *et al.,* 2022), still progress to death in about 15-25% of cases (Bruneel, 2019). The focus on cognitive function during pregnancy is an area of ongoing research, and the extent and nature of these effects are still being explored. Congnitive effects such as stress, anxiety among others can lead to anemia (Fredre, 2020). Anemia represents an additional psychosocial burden in pregnant women. In view of (Baig *et al.,* 2020), it is a medical condition characterized by a shortage of red blood cells (RBCs) or a decline in hemoglobin levels—a vital protein within RBCs responsible for transporting oxygen from the lungs to the body. According to the World Health Organization (WHO, 2019), anemia is a significant global public health issue, affecting over 1.62 billion people globally, with approximately 41.8% of pregnant women (56 million) experiencing varying degrees of anemia. Despite the worldwide prevalence of anemia, it is more commonly observed in developing countries (Parks, S. et al.). In Ethiopia, the prevalence of anemia among pregnant women ranges from 11.6% to 45.4% (Gebreweld & Tsegaye, 2018). Anemia, as a complication during pregnancy, has adverse effects on neonatal outcomes, including fetal anemia, stillbirth, and low and very low birth weight (LBW) (Mahmood *et al.,* 2019; Nair *et al.,* 2019; Baig *et al.,* 2020). Studies in Nepal indicate a 6.8 times higher risk of low birth weight among infants born to anaemic mothers (Baig *et al.,* 2020), emphasizing the association between maternal anemia and adverse birth outcomes such as low birth weight.

Low birth weight (LBW) serves as a crucial indicator for assessing public health problems related to long-term maternal malnutrition, malaria in pregnancy, and healthcare delivery systems. The World Health Organization (WHO, 2021) defines LBW as a newborn weight below 2500 grams. Globally, LBW affects 15 to 20% of births, with over 20 million occurrences annually, primarily in low-and-middle-income countries (Blencowe *et al.,* 2019). LBW is a major determinant of mortality, morbidity, disability in infancy and childhood, and long-term health outcomes in adult life. Maternal nutritional deficiency during pregnancy influences fetal development, impacting birth weight. The inadequate intake or storage of essential nutrients during pregnancy

can lead to adverse effects on both mothers and newborns (Woldeamanuel *et al.,* 2019), affecting birth weight. Low birth weight (LBW) serves as a crucial indicator for assessing public health problems related to long-term maternal malnutrition, health status, and healthcare delivery systems. LBW is a major determinant of mortality, morbidity, disability in infancy and childhood, and long-term health outcomes in adult life.

Globally, LBW remains a significant determinant of infant mortality and morbidity, carrying short- and long-term consequences into later life. LBW not only adversely affects individual functioning but also poses social and economic challenges for countries (Tiruneh *et al.,* 2020). In 2014, Ethiopia recorded 27,243 deaths, with LBW accounting for 4.53% of total deaths (Amhara, 2018.). However, the prevalence of LBW increased from 11 to 13% (Blencowe *et al.,* 2019), with a higher prevalence of 18% in Southern Ethiopia (EDHS, 2019). LBW infants face a 20 times higher likelihood of complications and mortality and are at potential risk for cognitive deficits, motor delays, cerebral palsy, behavioral issues (Amhara, 2018), and psychological problems (Mathewson *et al.,* 2017). In Nigeria, LBW affects about 5-6 million children every year. The incidence was 12.1% in Jos, 11.4% in Ogu and 16.9% in Maiduguri (Asim, Malik, Siddiqui, Nawaz and Ali, 2017). However, this can leads to anxiety and stress in pregnant women.

Anxiety and stress as a malaria diagnosis can lead to heightened anxiety and stress in pregnant women. Concerns about the impact of the disease on their health and the health of their unborn child can contribute to emotional distress. According to Dunkel, Schetter and Tanner (2022), anxiety, depression, and stress in pregnancy are risk factors for adverse outcomes for mothers and children. Anxiety in pregnancy is associated with shorter gestation and has adverse implications for fetal neurodevelopment and child outcomes. Anxiety about a particular pregnancy is especially potent. Chronic strain, exposure to racism, and depressive symptoms in mothers during pregnancy are associated with lower birth weight infants with consequences for infant development. These distinguishable risk factors and related pathways to distinct birth outcomes merit further investigation. This anxiety and stress is related to fear for the baby's well-being. The current psychosocial and economic burden on of malaria among pregnant women in Esan North in Obiyon is unknown. A prospective review of the psychosocial and economic burdens of malaria in pregnant women is necessary to provide updated evidence and information.

Economic burden of malaria on pregnant women

Economic burden is the financial impact and costs associated with malaria in Pregnancy (RE Elphinstone, · 2019). This concept encompasses both direct and indirect costs and is often used in the context of healthcare and public health to assess the economic implications of a specific issue. The economic burden on the health sector is substantial, posing a higher risk of death, illness, and non-communicable diseases shortly after birth (Woldeamanuel *et al.,* 2019) .Recommended strategies for MiP prevention in SSA by the World Health Organization (WHO), include insecticide-treated bed nets (ITNs) and provision of intermittent preventive treatment (IPTp) with sulfadoxine-pyrimethamine (SP) to all women from their second trimester of pregnancy (WHO, 2022). According to the latest World Malaria Report, the coverage of three (3) or more doses of IPTp (IPTp3+) is on average 32% in SSA (WHO, (2023). However, several burdens of malaria in pregnant women includes; difficult access to health facilities, sub-optimal quality of care and low availability of drugs Results from a meta-analysis described direct medical costs, acquisition of ITNs, and costs of drugs, diagnostic tests and registration fees, as important limitations to accessing malaria control tools in many SSA countries. Non-medical costs associated with routine antenatal care (ANC) visits, such as food, transport and opportunity costs of patients' time, pose additional burdens leading to poor ANC attendance and low IPTp uptake in several contexts (WHO, 2022). Nevertheless, available estimates on costs of treating and preventing MiP are outdated and only available in some specific contexts, compared to other malaria interventions (Conteh *et al.,* 2021).

Representative and detailed up-to-date costing estimates of malaria in pregnancy in SSA, are essential to conduct further economic evaluations of malaria interventions, inform policy decisions and improve allocation of resources in the region. The economic burden of malaria in pregnant women encompasses a range of financial and economic challenges associated with the prevention, diagnosis, and treatment of malaria during pregnancy which includes; Hospital bill absenteeism leading to unpaid work done, loss of earning from business transportation bill reduced productivity time lost to the disease and cost of mosquito net, insecticide and malaria drug.

Hospital Bills

Hospital bills refer to the costs incurred by individuals or households for healthcare-related goods and services. The financial impact of hospital bills for pregnant women affected by malaria is substantial. Treatment costs can be prohibitive, especially for those from low-income households. Research conducted by Yu et al., (2019). The expenses include antenatal care, diagnostic tests, medication, and in severe cases, hospitalization and treatment for complications such as severe anemia or preterm labour. Edeh, conducted a research on "Exploring dynamics in catastrophic health care

expenditure in Nigeria" in 2020, Yu et al. stated that hospital bill remain high especially among the poor household (Edeh, 2020). A study conducted in sub-Saharan Africa found that the average cost of treating malaria during pregnancy could range from $4 to $35 per episode, depending on the severity and healthcare setting. For many families living in poverty, such costs represent a significant financial burden, often necessitating the diversion of funds from other essential needs such as nutrition and education as indicated by Yu *et al.* (2019). Moreover, complications arising from malaria in pregnancy, such as maternal anemia, preterm birth, and low birth weight, can result in additional healthcare costs. According to Yu *et al.,* (2019), these complications often require extended hospital stays, specialized care for the newborn and follow-up visits, all of which increase the overall economic burden on the household. Despite some support from public health programs and international aid, many families still face considerable out-of-pocket expenses.

Absenteeism leading to unpaid work

Absenteeism from work refers to the frequent or habitual absence of an employee from their job. Malaria during pregnancy often necessitates significant time off work, leading to absenteeism and resulting in unpaid work. According to Andrade et al. (2022), this is particularly impactful for women in informal sectors or subsistence farming, where there is no provision for paid sick leave. Pregnant women affected by malaria may need to take extended periods off work to manage their health and undergo treatment, directly impacting household income. Also, in agricultural settings, the absence of a pregnant woman due to malaria can disrupt farming activities, reduce household food production, and increase food insecurity. The economic burden is compounded by the need for family members to compensate for the lost labor, often resulting in a redistribution of tasks that can affect overall household productivity. Andrade et al. (2022)

In formal employment sectors, the absence of a pregnant woman due to malaria can result in loss of wages if sick leave policies are inadequate. Even where sick leave is available, the extended periods of illness associated with malaria can exhaust allowable sick days, forcing women to take unpaid leave. This not only impacts the household income but also increases financial stress during pregnancy, a period when additional resources are typically needed.

Loss of earnings from business

The impact of malaria in pregnancy extends to women who own and run businesses. For entrepreneurs, particularly those operating micro and small enterprises, the illness can lead to significant loss of earnings. Unlike salaried employees, business owners do not have the safety net of paid sick leave, and their absence can directly affect business operations and revenue. For instance, a woman running a small retail business or food stall may be unable to work due to malaria, leading to temporary closure of the business. This results in immediate loss of daily income and can damage customer relationships, potentially leading to long-term financial losses. Repeated episodes of malaria can disrupt business continuity, affecting profitability and growth, Pingbemi & Aso (2022).

Additionally, in cases where the woman is the primary caregiver and household manager, her illness can impact the overall economic stability of the household. The necessity to hire temporary help or reassign household duties among family members further strains financial resources. The cumulative effect of these disruptions is particularly severe in communities where women's income significantly contributes to household finances.

Transportation bills

The cost of transportation to and from healthcare facilities is another significant economic burden for pregnant women affected by malaria. In a study examined by Ebenezer & Dorothy, (2017), it was reported that many rural and remote areas, healthcare facilities are often located far from residential areas, necessitating travel over long distances. Transportation costs can include fares for public transport, fuel costs for private vehicles, or the cost of hiring a vehicle, especially in emergencies**.** Again, a study in Tanzania highlighted that transportation costs to seek malaria treatment during pregnancy could account for up to 30% of the total cost of accessing healthcare. For low-income families, these expenses are a major barrier to timely and effective treatment, potentially leading to delayed care and more severe health outcomes (Munisi iet al., 2019).

Repeated visits to healthcare facilities for follow-up care, medication refills, and management of complications related to malaria in pregnancy further escalate transportation costs. According to (Dorothy, 2019**),** these recurring expenses can accumulate, adding to the financial burden and impacting the household's ability to manage other essential needs.

Reduced productivity of an individual

Malaria in pregnancy significantly reduces productivity at both individual and household levels. The physical and cognitive impairments caused by the disease, including severe fatigue, anemia, and general malaise, hinder a pregnant woman's ability to perform daily tasks and engage in productive activities. This reduced productivity can affect household income and overall economic

stability (Jumbam *et al.,* 2020). In agricultural communities, reduced productivity due to malaria in pregnancy can lead to lower crop yields and food production (Jumbam *et al.,* 2020). This not only affects the household's food security but also its ability to generate income from surplus produce. In industrial and service sectors, decreased productivity can result in lower output and missed economic opportunities. Moreover, the economic burden extends beyond the individual to the household and community. Family members may need to take on additional responsibilities to compensate for the reduced productivity of the pregnant woman, which can affect their own productivity and economic activities. Ismail *et al* (2023) This redistribution of labour can strain household dynamics and exacerbate the economic burden.

Time lost to the disease

The time lost to malaria in pregnancy encompasses the period of acute illness, treatment, and recovery (Ipingbemi & Aso, 2022). For pregnant women, this translates into lost opportunities for personal and economic advancement. Time spent managing malaria and its complications can detract from other important activities, such as caring for other children, managing household tasks, and engaging in income-generating activities (Ipingbemi & Aso, 2022).

In educational settings, young pregnant women affected by malaria may miss significant amounts of schooling, impacting their academic performance and long-term educational outcomes. This can have far-reaching implications for their future earning potential and economic independence. Ismail *et al* (2023) stated that women who engaged in formal employment, time lost to malaria can affect career advancement opportunities, performance evaluations, and job security. In informal sectors, the time lost directly translates to loss of income, further exacerbating financial strain during pregnancy. Additionally, the caregiving burden often falls on other family members, particularly women, who may need to take time off from their own productive activities to care for the pregnant woman. This further compounds the economic impact, as it affects the overall productivity and economic well-being of the household.

Costs of mosquito nets

Mosquito nets, particularly insecticide-treated nets (ITNs), are a primary preventive measure against malaria. WHO (2019) The World Health Organization (WHO) recommends the use of ITNs to reduce malaria transmission. However, the cost of these nets can be a financial burden for many households in endemic areas. According to a study by White et al. (2015), the average cost of an ITN ranges from $5 to $10, including procurement and distribution expenses. While international donors often subsidize these costs, households may still bear expenses related to replacement and maintenance. Given that nets need to be replaced every 3-5 years, this recurring cost can be significant for low-income families (Usman *et al.,* 2015). A study among non-medical higher institution students on their knowledge and perception of malaria prevention at Ondo state, Nigeria reported that 33.4% of the women had an insecticide treated net, however, only 21.1% reported sleeping under the net (Ipingbemi and Aso, 2022). To achieve this, this study evaluated the economic burden of malaria on pregnant women (cost-of-illness) in Obiyon community in Esan North East of Edo State.

Costs of insecticides

Insecticides, used for indoor residual spraying (IRS) and treating mosquito nets, represent another significant expenditure in malaria control programs. The cost of IRS can vary widely depending on the type of insecticide used and the scale of the spraying program. For instance, the cost of DDT, a commonly used insecticide, is approximately $1.60 per house per year, while newer insecticides like pyrethroids can cost up to $5 per house per year (WHO, 2019). These costs are typically covered by national malaria control programs and international donors, but logistical and operational expenses can strain limited public health budgets. in Africa Munisi, *et al* and 2019; Jumbam *et al.,* 2020).

Costs of antimalarial drugs

Treatment of malaria requires effective antimalarial drugs, which can be a significant financial burden for both individuals and healthcare systems. The cost of artemisinin-based combination therapies (ACTs), the current first-line treatment for malaria, ranges from $0.50 to $2.50 per dose, depending on the specific combination and procurement mechanisms (Arrow, Panosian, & Gelband, 2014). For severe malaria cases requiring hospitalization, the costs can escalate dramatically. A study by Sicuri et al. (2019) estimated that the direct medical costs for treating severe malaria in children can exceed $100 per case, including hospitalization, medications, and supportive care.

In summary, the economic burden of malaria in pregnancy is multifaceted and profound, impacting individuals, households, and broader communities. Hospital bills, absenteeism leading to unpaid work, loss of earnings from businesses, transportation costs, reduced productivity, and time lost to the disease all contribute to the financial strain imposed by malaria. Addressing this burden requires comprehensive strategies that include effective prevention and treatment programs, improved access to healthcare, and policies

that support affected individuals and households. By mitigating the economic impact of malaria in pregnancy, we can improve health outcomes for mothers and infants, promote socio-economic development, and reduce poverty in malaria-endemic regions. With the present burden of malaria, estimating the economic implication would provide needed information for planning and evolving strategies to reduce the burden of malaria. To achieve this, this study evaluated the economic burden of malaria on pregnant women (cost-of-illness) in Obiyon community in Esan North East of Edo State in order to generate relevant information that is needed for planning and effective implementation of malaria case management among students' population. In addition, the study evaluated participants' knowledge on causes, treatment and practices of preventive measure against malaria and their treatment seeking attitude.

Prevention and treatment of malaria in pregnant women

The symptoms and consequences of malaria during pregnancy can vary based on the severity of malaria transmission and the level of immunity acquired by individuals (WHO, 2015). In regions with moderate-to-high (stable) malaria transmission, where there is a steady prevalence pattern and the population often has high immunity, pregnant women tend to be less symptomatic during infection (WHO, 2015). However, prompt diagnosis and treatment, whether the infection is symptomatic or not, are crucial to prevent maternal anemia and low birth weight (LBW) in newborns (WHO, 2023). Malaria prevention and treatment are integral components of antenatal care, particularly in malaria-endemic regions like sub-Saharan Africa (SSA) (WHO, 2022). The World Health Organization (WHO) recommends the use of intermittent preventive treatment in pregnancy (IPTp) as a strategy. This involves administering a single dose of three tablets of the single-pill combination (SPC) of sulfadoxine-pyrimethamine (SP) during antenatal care visits. The IPTp-SP strategy is implemented starting in the early second trimester, with monthly doses until delivery. This approach, conducted under directly observed therapy (DOT) along with folic acid and iron supplementation, helps mitigate or prevent adverse maternal and fetal outcomes related to malaria (WHO, 2013; WHO, 2019). However, IPTp-SP is contraindicated for pregnant women who are HIV-positive and receiving cotrimoxazole prophylaxis in malaria-endemic regions of Africa.

METHODOLOGY

Research design

The research design of this study is a descriptive survey. According to Nworgu (2015), descriptive survey design are those studies which aim at collecting data on a given Population, and describes the data in a systematic manner pointing out the characteristic features or facts about that population. These studies are only interested in describing certain variables in relation to the population. The design is considered appropriate for the study because it will enable the researcher to make generalization concerning the population of the study on the perceived psychosocial and economic burden of malaria in pregnant women in Obiyon Community, Esan North East, Edo.

Study area

Obiyon is a Community in Esan North East Local Government Area, Edo State of Nigeria. There are three (3) health centre and one (1) hospital. . Obiyon Community in Esan North East Local Government Area, Edo State is chosen for this study because of the consistent illness among pregnant women which leads to psychosocial and economic burdens. Therefore, this study seeks to investigate the perceived psychosocial and economic burdens of malaria in pregnant women in Obiyon Community, Esan North East, Edo State.

Population

The population was all the registered pregnant women attending facilities in Obiyon community. Esan North Edo State (Table 1). There are four facilities in obiyon, two public and two private. The targeted population was one thousand one hundred and eight [1158] registered pregnant women between February -May 2024.

Sample size

The sample of the study consist of three hundred and eighty [380] registered women which were selected from the four facilities in Obiyon community, Esan North East Edo state. the study.

Sampling technique

Proportionate sampling

where

$(\frac{N_1}{N}) \times \eta$

Group 1 = $(\frac{N_1}{N}) \times \eta$= 0.345× 380 =131

Group 2 = $(\frac{N_2}{N}) \times \eta$= 0.259 × 380 =98

Group3 = $(\frac{N_3}{N}) \times \eta$= 0.223 × 380 =85

Group 4 = $(\frac{N_4}{N}) \times \eta$= 0.173× 380 =66

Ni = Number of individuals in Group

Table 1: List of selected healthcare facilities in Obiyon community in Edo State.

Name of the healthcare facilities	Population of Registered Pregnant Women for the Period of Four Months				
Months	**Feb**	**March**	**April**	**May**	
Obiyon Primary Health Centre	120	90	97	93	400
Awo Primary Health Centre Obiyon/Amedokhian	85	59	66	70	280
Oriaifoh medical centre	63	71	65	61	260
Amanfoh maternity home	49	64	57	48	218
Total					1158

Instrument for data collection

A researcher's developed structured questionnaire was used to collect data. The questionnaire is divided into five (5) sections which are as follows:

Socio demographics of the respondents

A. Perceived psychosocial burden of malaria in pregnancy among women of child bearing age in Obiyon Esan North East Edo State.
B. Perceived Economic Burden of malaria in pregnancy among women of child bearing age in Obiyon community.
C. Perceived effect of malaria during pregnancy among women of child bearing age in Obiyon Esan North East, Edo State.
D. Assessment of prevention and treatment strategies of malaria in pregnant women in Obiyon community Edo State.

Validity of the instrument

Content and face validity of the instrument were obtained through the judgment of two experts from the department of nursing. Their main task was to make careful judgment of the questionnaire and ascertain that the content for the instrument covers the objective of the study. They were required to check for appropriateness of each item in terms of suitability of the questionnaire items in the instrument and make necessary corrections. Their criticism and suggestions were used to produce the final version of the instrument for data collection.

Reliability of the Instrument

Split-half method will be used to establish the reliability of the instrument used for this study. Twelve (12) copies of the questionnaire will be administered to twelve (12) pregnant women in another health facility outside the facility that will be sampled for the study.

Ethical consideration

Ethical approval was obtained from the head of department of primary health care in Esan North East Edo state and Ethical committee at the College Health Sciences Igbinedion University Okada. Ethical principle according to Helsinki declaration was applied in this study which are:

Informed consent–This was essential for upholding ethical principles protecting participants right and maintain integrity in research.

Confidentiality–confidentiality is an important part of ethical consideration that respects individual's privacy 'build trust up holds professional standard and protecting sensitive information from unauthorized access or disclosure.

Anonymity– It is a condition being referred as anonymous or unidentified. In recent study or professional practice it means that identity of respondents, client or participants is kept undisclosed even to the researcher.

Method for data collection

The researcher collected letter of introduction from the Head, Department of nursing science through the project coordinator from the college of health sciences Igbinedion University, Okada in order to gain access to Esan North East primary Health Care coordinator of the local government. The Head of Department of primary health care at the Local Government gave approval to administered questionnaire to respondents at the facilities. After approval the researcher use four weeks to visit the selected health facilities for the study to seek for their response. Copies of the questionnaires were administered to the respondents each day and the completed questionnaires were collected on the spot with the help of trained assistant.

Method of data analysis

Data were analyzed using descriptive and inferential statistics.

Descriptive analysis- Is the use of mean, standard deviation, frequency and percentage.

Inferential analysis-chi square statistic which was used to test for the hypothesis at 0.05 level of significance.

RESULTS AND DISCUSSION

Data presentation and analysis

Data generated for this research were presented in frequency distribution tables with mean and standard deviation. The tables comprise of data gathered from the questionnaire for this study. The results of the study as presented in (Table 2) shows that survey sample comprised 380 respondents, with a diverse demographic profile.

Table 2: Demographic detail of the respondents.

Variables	N (380)	Percentage
Age		
15-19 years	52	13.7%
20-24 years	95	25.0%
25-29 years	147	38.7%
30 and above	86	22.6%
Total	380	100%
Marital Status		
Married	294	77.4%
Single	14	3.7%
Widowed	46	12.1%
Divorce	26	6.8%
Total	380	100%
Educational Level		
None	3	0.8%
Primary	21	5.5%
Secondary	237	62.4%
Tertiary	119	31.3%
Total	380	100%
Occupation		
Civil Savants	86	22.6%
Trader	97	25.5%
Farmer	194	51.1%
Others Specify	3	0.8%
Total	380	100%
Religion		
Christianity	277	72.9%
Islam	97	25.5%
Others Specify	6	1.6%
Total	380	100%

In terms of age, the distribution was as follows: 13.7% were aged 15-19 years, 25.0% were 20-24 years old, 38.7% were 25-29 years old, and 22.6% were aged 30 and above. Regarding marital status, the majority of respondents were married (77.4%), with single individuals comprising 3.7%, widowed 12.1%, and divorced 6.8%. In terms of educational attainment, 0.8% had no formal education, 5.5% completed primary education, 62.4% had secondary education, and 31.3% had tertiary education. Occupation-wise, the distribution was 22.6% civil servants, 25.5% traders, 51.1% farmers, and 0.8% in other specified occupations. In terms of religion, the majority identified as Christian (72.9%), followed by Islam (25.5%), with 1.6% identifying as other religions.

Research question one

What are perceived psychosocial burden of malaria in pregnancy among women of child bearing age in Obiyon Community Esan North East Edo State?

The (Table 3) presents the mean and standard deviation of the psychosocial burden of malaria in pregnancy among women of childbearing age in Obiyon Community, Esan North East, Edo State. The criteria used for assessment include preterm birth (Mean = 4.30, Std. Deviation = 0.646), anxiety about the health of the mother and child (Mean = 4.59, Std. Deviation = 0.767), fear of complications or death (Mean = 4.53, Std. Deviation = 0.857), low birth weight (Mean = 4.19, Std. Deviation = 0.964), anemia (Mean = 4.06, Std. Deviation = 0.756), inflammation (Mean = 3.11, Std. Deviation = 0.547), disruption to daily life activities (Mean = 3.19, Std. Deviation = 0.814), and stillbirth (Mean = 3.36, Std. Deviation = 0.709). All criteria show scores above the acceptance threshold of +3.0, indicating a significant psychosocial burden of malaria during pregnancy in this community.

Research question two

What are the perceived economic burden of malaria in pregnancy among women of child bearing age in Obiyon Community Esan North East Edo State?.

Table 4 presents the mean and standard deviation of the economic burden of malaria in pregnancy among women of childbearing age in Obiyon Community, Esan North East, Edo State. The economic criteria assessed include hospital bills (Mean = 3.30, Std. Deviation = 0.921), absenteeism leading to unpaid work (Mean = 3.07, Std. Deviation = 0.910), lost earnings from business (Mean = 3.10, Std. Deviation = 0.916), transportation costs (Mean = 3.55, Std. Deviation = 0.936), reduced productivity (Mean = 3.60, Std. Deviation = 0.958), time lost to the disease (Mean = 3.08, Std. Deviation = 0.832), cost of mosquito nets (Mean = 3.55, Std. Deviation = 1.351), cost of insecticide (Mean = 3.01, Std. Deviation = 0.811), and cost of malaria treatment drugs (Mean = 4.33, Std. Deviation = 1.602). All criteria exhibit scores above the acceptance threshold of +3.0, indicating a substantial economic burden of malaria during pregnancy in this community, affecting various aspects of financial stability and productivity among women.

Research question three

What are the perceived effects of malaria during

Table 3: Mean and standard deviation of the psychosocial burden of malaria in pregnancy among women of child bearing age in Obiyon Community Esan North East Edo State.

Item Statements	Criteria	Mean	Std. Deviation	Decision
Preterm birth	+3.0	4.30	0.646	Accepted
Anxiety about the health of the mother and child.	+3.0	4.59	0.767	Accepted
Fear of complications or death	+3.0	4.53	0.857	Accepted
Low weight birth	+3.0	4.19	0.964	Accepted
Anemnia	+3.0	4.06	0.756	Accepted
Inflammation	+3.0	3.11	0.547	Accepted
Disruption to daily life activities	+3.0	3.19	0.814	Accepted
Still birth	+3.0	3.36	0.709	Accepted

Table 4: Mean and standard deviation of the economic burden of malaria in pregnancy among women of child bearing age in Obiyon Community Esan North East Edo State.

Item statements	Criteria	Mean	Std. Deviation	Decision
Hospital bill	+3.0	3.3	0.921	Accepted
Absenteeism leading to unpaid work done	+3.0	3.07	0.910	Accepted
Loss of earning from business	+3.0	3.10	0.916	Accepted
Transportation bill	+3.0	3.55	0.936	Accepted
Reduced productivity	+3.0	3.60	0.958	Accepted
Time lost to the disease	+3.0	3.08	0.832	Accepted
Cost of mosquito net	+3.0	3.55	1.351	Accepted
Cost of Insecticide	+3.0	3.01	0.811	Accepted
Cost of drug for malaria treatment	+3.0	4.33	1.602	Accepted

Table 5: Mean and standard deviation on the effects of malaria during pregnancy among women of child bearing age in Esan North East Edo State.

Item statements	Criteria	Mean	Std. Deviation	Decision
Malaria during pregnancy leads to severe health complications for the mother.	+3.0	3.05	0.904	Accepted
Malaria in pregnant women can negatively affect the health of the unborn baby.	+3.0	3.23	0.953	Accepted
Malaria during pregnancy increases the risk of maternal mortality in this community.	+3.0	3.13	0.965	Accepted
Pregnant women with malaria are more likely to experience complications such as preterm labor or miscarriage.	+3.0	4.15	1.266	Accepted
The cost of treating malaria during pregnancy places a significant financial burden on families.	+3.0	3.44	0.992	Accepted
Contracting malaria during pregnancy causes significant emotional stress and anxiety for the expectant mother.	+3.0	4.21	1.345	Accepted
Malaria in pregnancy severely disrupts the daily activities and responsibilities of the affected women.	+3.0	3.23	1.266	Accepted
Pregnant women with malaria often require frequent visits to healthcare facilities, which can be burdensome.	+3.0	3.26	0.952	Accepted
Malaria during pregnancy can lead to poor nutritional status for both the mother and the unborn child	+3.0	4.80	1.345	Accepted
Pregnant women with malaria face social isolation and stigma in the community	+3.0	3.29	1.266	Accepted

pregnancy among women of child bearing age in Esan North East Edo State?

Table 5 outlines the mean and standard deviation of the effects of malaria during pregnancy among women of childbearing age in Esan North East, Edo State. The criteria examined include severe health complications for the mother (Mean = 3.05, Std. Deviation = 0.904), negative impacts on the health of the unborn baby (Mean = 3.23, Std. Deviation = 0.953), increased risk of maternal mortality (Mean = 3.13, Std. Deviation = 0.965), likelihood of complications like preterm labor or miscarriage (Mean = 4.15, Std. Deviation = 1.266), financial burden on families due to treatment costs (Mean = 3.44, Std. Deviation = 0.992), emotional stress and anxiety for expectant mothers (Mean = 4.21, Std. Deviation = 1.345), disruption of daily activities (Mean = 3.23, Std. Deviation = 1.266), frequent healthcare visits (Mean = 3.26, Std. Deviation = 0.952), poor nutritional status for both mother and child (Mean = 4.80, Std. Deviation = 1.345), and social isolation and stigma (Mean = 3.29, Std. Deviation = 1.266). All criteria demonstrate scores above the acceptance threshold of +3.0, highlighting the multifaceted and profound impact of malaria during pregnancy on health, socio-economic aspects, and emotional well-being within this community.

Table 6: Mean and standard deviation on the preventive/treatment strategies of malaria in pregnant women in Obiyon Community, Esan North East, Edo State.

Item statement	Criteria	Mean	Std. Deviation	Decision
The use of insecticide-treated bed nets	+3.0	3.01	0.444	Accepted
Intermittent preventive treatment (IPTp) with antimalarial drugs	+3.0	3.47	0.758	Accepted
Early and regular attendance at antenatal care (ANC)	+3.0	3.06	0.677	Accepted
Promoting community-based health education programs on malaria prevention and management.	+3.0	4.12	0.856	Accepted
Traditional or herbal remedies.	+3.0	4.32	0.975	Accepted
The access to quality healthcare services.	+3.0	4.35	0.875	Accepted
Eating fruits and vegetables	+3.0	4.15	0.813	Accepted
Living in a clean environment	+3.0	3.35	0.853	Accepted

Research question four

What are the preventive/treatment strategies of malaria in pregnant women in Obiyon Community, Esan North East, Edo State.?

Table 6 presents the mean and standard deviation of preventive and treatment strategies for malaria in pregnant women in Obiyon Community, Esan North East, Edo State. The criteria assessed include the use of insecticide-treated bed nets (Mean = 3.01, Std. Deviation = 0.444), intermittent preventive treatment (IPTp) with antimalarial drugs (Mean = 3.47, Std. Deviation = 0.758), early and regular attendance at antenatal care (ANC) (Mean = 3.06, Std. Deviation = 0.677), community-based health education programs on malaria prevention (Mean = 4.12, Std. Deviation = 0.856), traditional or herbal remedies (Mean = 4.32, Std. Deviation = 0.975), access to quality healthcare services (Mean = 4.35, Std. Deviation = 0.875), consumption of fruits and vegetables (Mean = 4.15, Std. Deviation = 0.813), and living in a clean environment (Mean = 3.35, Std. Deviation = 0.853). All criteria demonstrate scores above the acceptance threshold of +3.0, indicating that these strategies are perceived as effective in preventing and managing malaria during pregnancy in the community. Community-based education and access to healthcare services are particularly highlighted as crucial aspects of the preventive measures.

The psychosocial burden of malaria during pregnancy among women of childbearing age in Obiyon Community, Esan North East, Edo State, is profoundly influenced by demographic variables such as age, marital status, educational level, and occupation. Elevated mean scores across critical criteria such as anxiety about maternal and child health fear of complications or mortality, and concerns over adverse outcomes like preterm birth and low birth weight highlight the substantial psychosocial impact within the community. Educational attainment and health literacy play pivotal roles in shaping this burden, affecting knowledge and awareness about malaria prevention and management, as noted in Emmanuel's research (2023). Moreover, studies by Heng (2021) and Kerryn et al. (2017) underscore the significant association between malaria during pregnancy and adverse birth outcomes, including stillbirths and low birth weight, emphasizing the complex health risks and psychosocial distress faced by pregnant women in this region. Jugha et al. (2023) further illuminate the compounding effects of malaria and undernutrition, exacerbating health challenges among pregnant women in Obiyon Community. These findings underscore the need for targeted interventions that consider demographic factors to effectively alleviate the psychosocial burden of malaria during pregnancy in this community. The economic burden of malaria during pregnancy among women in Obiyon Community, Esan North East, Edo State, is compounded by various demographic variables including age, marital status, educational level, and occupation, which influence financial strain and productivity loss. Elevated scores across economic indicators such as hospital bills, absenteeism leading to unpaid work, lost earnings from businesses, transportation costs, reduced productivity, time lost due to illness, and expenses related to preventive measures and treatment highlight significant financial impacts exceeding the threshold of +3.0. These economic pressures directly affect the financial stability and livelihoods of women in the community. Studies by Oyegoke Abiodun Adedeji et al. (2023), Chijioke-Nwauche et al. (2020), and Onyia et al. (2020) underscore the direct and indirect costs associated with malaria during pregnancy, emphasizing the critical role of demographic factors in exacerbating these burdens. Furthermore, research by Alessandro et al. (2018) and Al Khaja et al. (2020) explores challenges in treatment guidelines and drug efficacy, which contribute to the overall economic burden and health outcomes for pregnant women affected by malaria in sub-Saharan Africa. These findings underscore the need for targeted interventions that consider demographic variables to mitigate the economic impact of malaria during pregnancy in this vulnerable population.

The effects of malaria during pregnancy among women of childbearing age in Esan North East, Edo State, are profoundly influenced by demographic variables such as age, marital status, educational level, and occupation, which intersect with various health and socio-economic dimensions. Severe health complications for mothers,

including anemia, inflammation, and the risk of maternal mortality, underscore the critical health impacts. These outcomes, coupled with negative effects on unborn babies such as low birth weight and developmental issues, highlight the multifaceted challenges faced by pregnant women.

The heightened risks of complications like preterm labor or miscarriage, exacerbated by factors like inadequate healthcare access and nutritional deficiencies, further underscore the vulnerability of this population. Beyond health impacts, the economic burden of malaria during pregnancy, including high treatment costs and reduced productivity due to illness, intensifies financial strain for families. Psychosocially, emotional stress and anxiety among expectant mothers, compounded by social isolation and stigma associated with the disease, contribute to a complex web of challenges.

Studies by Jugha et al. (2023) and Heng (2021) underscore these interconnected health and socio-economic implications, emphasizing the need for tailored interventions that consider demographic factors to effectively mitigate the adverse effects of malaria during pregnancy in affected communities.

Preventive and treatment strategies for malaria in pregnant women in Obiyon Community, Esan North East, Edo State, are crucial for addressing the impact of the disease on maternal and fetal health, particularly when considering demographic variables such as age, marital status, educational level, and occupation. Effective measures like the consistent use of insecticide-treated bed nets and intermittent preventive treatment (IPTp) with antimalarial drugs are widely recognized and score above the acceptance threshold of +3.0, indicating community acceptance and effectiveness. Early and regular attendances at antenatal care (ANC) services, bolstered by community-based health education programs focusing on malaria prevention, are pivotal in ensuring timely diagnosis and treatment. Access to quality healthcare services is essential, especially for demographic groups facing barriers such as lower educational attainment or rural residence.

The community's emphasis on consuming nutritious diets and maintaining a clean environment complements these efforts, supporting overall health and immune function. While traditional or herbal remedies are prevalent, their integration into formal healthcare practices reflects community preferences and cultural practices. Studies by Stephen et al. (2022), Al Khaja et al. (2020), and Alessandro et al. (2018) underscore the importance of evidence-based approaches tailored to demographic factors to effectively prevent and manage malaria during pregnancy in sub-Saharan Africa, highlighting the need for comprehensive, culturally sensitive strategies to address the diverse needs of pregnant women in Obiyon Community.

Conclusion

The studies conducted in Obiyon Community, Esan North East, Edo State, provide compelling evidence of the significant and multifaceted impact of malaria during pregnancy. Across psychosocial, economic, health, and socio-cultural dimensions, malaria exacerbates health risks for mothers and unborn babies, increases economic strain on families, and heightens psychosocial stress and stigma within the community. Statistical data underscore the elevated risks of severe complications such as maternal mortality, anemia, and adverse birth outcomes like low birth weight among infants born to affected mothers. Furthermore, the economic burden of malaria is palpable, with substantial healthcare costs and lost productivity further impacting household finances and stability.

The findings reveal that malaria during pregnancy exerts a profound impact on women in Obiyon Community, Esan North East, Edo State, affecting them across psychosocial, economic, health, and socio-cultural dimensions. Demographic variables such as age, marital status, educational level, and occupation significantly influence the extent and nature of these burdens. Health-wise, malaria increases the risk of severe complications for both mothers and unborn babies, contributing to maternal mortality, anemia, and adverse birth outcomes like low birth weight. Psychosocially, affected women experience heightened anxiety, emotional stress, and social stigma associated with the disease. Economically, malaria leads to substantial financial strain through increased healthcare costs, lost productivity, and other related expenses.

Recommendations

1. Targeted Interventions: Tailored interventions addressing demographic disparities should be prioritized. This includes enhancing access to quality healthcare services, particularly for vulnerable groups with lower educational attainment and rural residency.
2. Health Education: Community-based health education programs focusing on malaria prevention and management should be intensified. Emphasis should be placed on early ANC attendance, consistent use of insecticide-treated bed nets, and IPTp to reduce malaria incidence and its adverse effects.
3. Integrated Approaches: Integrating traditional practices with evidence-based healthcare approaches can improve acceptance and adherence to preventive measures and treatments within the community.
4. Policy and Resources: Policymakers and healthcare providers should allocate resources towards improving healthcare infrastructure, ensuring availability of antimalarial drugs, and strengthening health systems to better support pregnant women.

5. Research and Monitoring: Continuous research into the efficacy of preventive measures and treatments, as well as monitoring of demographic trends in malaria prevalence and outcomes, is essential for adapting interventions to evolving community needs.

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