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Investigating the Economic Implications of Malaria Among Pregnant Women in Owerri Municipal

*** Iwuamadi Miriam Yves Chioma[1], Eberendu.I. F[1] and Chinedu Eleonu P. O.[1]**
[1] Department of Public Health, Faculty of Health Sciences, Imo State University Owerri.

Corresponding author: Iwuamadi Miriam Yves Chioma
Department of Public Health, Faculty of Health Sciences, Imo State University Owerri.

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Abstract
This study examines the economic consequences of malaria in pregnant women in Owerri Municipal, Imo State, Nigeria, concentrating on the effects of the disease on household income and treatment expenses. Malaria continues to pose a substantial public health concern in Nigeria, particularly affecting pregnant women whose immune systems are weakened. To make maternal health outcomes better, we need to know how much malaria costs this group of people. The study utilised a cross-sectional design focussing on pregnant women receiving treatment at General Hospital Umuguma. Structured questionnaires were used to collect data. These questions asked for information about the household's socio-demographic background, the expenses of malaria treatment, and how the household dealt with the disease. The study sought to evaluate the direct and indirect expenses related to malaria treatment and to examine the impact of these costs on the economic stability of households. The results showed that a large number of people who answered the survey had to spend a lot of money on malaria treatment, which caused their household income to drop significantly. Many families said they had to use coping techniques like borrowing money, selling their assets, and relying on their social networks to deal with the financial stress. Direct costs, such as outpatient visits and prescriptions, were identified as significant factors contributing to the overall economic burden, in addition to indirect costs, which encompassed missed productivity and diminished household labour capability.This study emphasises the immediate necessity for focused public health initiatives that tackle the economic aspects of malaria in pregnant women. Suggestions include making it easier for people to get cheap treatment, encouraging preventive measures like giving them bed nets, and teaching more people about how malaria affects the economy. The study underscores the vital function of healthcare providers in executing methods that alleviate the financial impact of malaria, eventually seeking to enhance health outcomes for pregnant women and their families in Owerri Municipal. The ramifications of this study transcend individual homes, indicating that alleviating the economic burden of malaria may facilitate overarching enhancements in maternal health and economic stability within the community.

Keywords: malaria, pregnant women, economic implications, household income, treatment costs, coping strategies, public health, Nigeria, maternal health.

INTRODUCTION

Malaria is still one of the worst public health problems in the world, and pregnant women in sub-Saharan Africa are especially affected. Malaria significantly impacts maternal morbidity and mortality, particularly in endemic locations such as Nigeria. Pregnant women are more susceptible to malaria infection due to physiological changes that occur during pregnancy [1].

Malaria during pregnancy adversely impacts maternal health and carries significant economical consequences. Households that are affected by direct medical costs for treatment, as well as indirect costs like transportation, lost income, and time spent in hospitals, can be put under a lot of stress. This financial burden is made worse by the possibility of complications like anaemia, miscarriage, low birth weight, and even maternal mortality, all of which can lead to long-term economic instability for families and communities [2].

Owerri Municipal in Imo State, Nigeria, is a malaria-endemic location where pregnant women often get sick with the sickness. The financial burden of managing malaria during pregnancy at institutions such as State General Hospital, Umuguma, Owerri, introduces a significant aspect to this health issue. The total impact of these expenses on household economies requires a comprehensive examination of the economic consequences of malaria in pregnant women in this region. This study seeks to examine the magnitude of these effects, intending to furnish pertinent data that can guide health policy and intervention efforts to mitigate the financial strain on vulnerable people [3].

Malaria is a major source of poverty and slows down economic growth in sub-Saharan Africa, especially Nigeria. Pregnant women are more likely to get severe malaria because their immune systems change throughout pregnancy. Malaria can make existing inequities worse by keeping people in poverty, especially in places with few resources where getting medical care is hard. The financial effects go beyond just one home and might affect the whole community by lowering productivity and raising the need for healthcare services [4].

Pregnant women with malaria frequently incur unforeseen medical expenses, potentially resulting in catastrophic healthcare costs. This is especially bad in places like Owerri Municipal, where many families are already having a hard time because they don't have enough money. For example, the cost of treating malaria could include things like consultation costs, lab testing, drugs, and hospitalisation in really bad instances. There are also big indirect expenditures, such travel fees to healthcare centres and delayed workdays, that make the economic strain even worse [5].

Additionally, the health hazards linked to malaria during pregnancy affect the unborn child as well, such as the chance of low birth weight, preterm birth, and a higher risk of death in newborns. These consequences not only lead to increased medical expenses for neonatal care but also impact the long-term economic prospects of families. Children born to mothers who experienced malaria during pregnancy may necessitate extended medical care, imposing additional financial burdens on households already facing the expenses of maternal care [6].

The economic burden of malaria on pregnant women can also have an impact on the health system, in addition to its effects on households. Healthcare facilities like the State General Hospital in Umuguma have to spend a lot of money on treating malaria in pregnant women, which often means taking money away from other important areas. This can put a lot of stress on healthcare systems, especially in places with few resources, making it harder for them to take care of other important health issues [7].

Malaria in pregnancy has similarly serious effects on the economy at the national level. A large part of Nigeria's health expenditure goes to treating and preventing malaria. The Nigeria Malaria Indicator Survey (2021) says that malaria is responsible for almost 60% of outpatient visits in the country. A large number of these cases are pregnant women. The cost of public health measures, like giving out insecticide-treated nets (ITNs) and antimalarial medications to pregnant women, makes the healthcare budget even tighter. This shows how important it is to have specific programs that help pregnant women and the general public deal with the financial cost of malaria [8].

Also, dealing with the economic effects of malaria on pregnant women will help Nigeria's overall growth in many ways. Healthier pregnancies lead to better outcomes for mothers and babies, higher productivity in the workforce, and lower healthcare expenditures, all of which can help the economy expand faster. Consequently, this study aims to elucidate the financial implications of malaria during pregnancy while simultaneously emphasising the prospective economic benefits that could be realised with efficient malaria prevention and control measures [9].

In this context, it is imperative to analyse the strategies employed by local institutions, including the State General Hospital in Umuguma, in addressing the economic implications of malaria in pregnancy. This study will evaluate the direct and indirect costs borne by pregnant women and investigate the overarching socioeconomic effects of malaria throughout the community. This research will provide useful insights into the economic consequences that might guide healthcare policies and actions designed to mitigate the financial burden of malaria on pregnant women in Owerri Municipal [10].

Even though malaria management efforts have come a long way, pregnant women in Owerri Municipal still have substantial health and financial problems because of malaria. Frequent hospital visits, medications, diagnostic testing, and missed income from being unable to work while sick all put a lot of stress on families and the community as a whole. Understanding the economic effects of malaria during pregnancy is essential due to the significance of pregnancy-related health for both maternal and child survival. Nonetheless, there exists a paucity of research particularly investigating these economic ramifications within the setting of Owerri Municipal, hence prompting this study [11].

This study aims to address the existing gap by methodically examining the economic costs of malaria among pregnant women at the State General Hospital, Umuguma, Owerri, and the subsequent impact of these expenditures on families and the broader society.

MATERIALS AND METHODS

Study Area

The research were conducted in Owerri Municipal, the capital city of Imo State, Nigeria. Owerri Municipal is a Local Government Area characterized by its urban setting, which combines both traditional and modern health practices.

Study Population

The study population consists of pregnant women aged 20 to 49 years residing in Owerri Municipal. This demographic is essential for the study as pregnant women are particularly vulnerable to malaria, which can lead to severe health complications for both mothers and their unborn children. The inclusion criteria will ensure that participants are currently pregnant and have resided in the study area for at least six months. By focusing on this specific population, the study aims to identify gaps in knowledge and practices related to malaria prevention and control, ultimately contributing to improved health outcomes.

Sampling Technique

A multi-stage sampling technique was employed to select participants from the population.

Ethical Consideration

Ethical approval was obtained from the Institutional Review Board (IRB) of Imo State University before initiating the study. All participants was informed about the research, including its purpose, potential risks, and benefits. Participation was voluntary, and participants were the right to withdraw at any point without penalty. Confidentiality was upheld by anonymizing data and securely storing questionnaires in locked facilities, ensuring that personal information is not disclosed. The study adhered to the ethical principles outlined in the Declaration of Helsinki.

Instrument for Data Collection

Data were collected using a structured, self-administered questionnaire developed specifically for this study. The questionnaire includes three main sections:

1. Demographic Information: This section gather data on participants' age, marital status, educational background, socioeconomic status, and number of pregnancies.
2. Knowledge Assessment: This section consists of multiple-choice questions and true/false statements designed to evaluate participants' understanding of malaria transmission, symptoms, and preventive measures.
3. Practices Related to Malaria Prevention: This section assesses self-reported practices concerning malaria prevention, such as the use of insecticide-treated nets (ITNs), adherence to prophylactic medication, and participation in health education programs. A Likert scale will be used to quantify attitudes toward malaria prevention measures.

A pilot study was conducted with a small group of pregnant women to refine the questionnaire's clarity, relevance, and comprehensiveness.

Validity

To ensure the validity of the instrument, a rigorous validation process was undertaken, which included both content and construct validity. Content validity was assessed by seeking input from experts in maternal and child health, public health, and epidemiology, who reviewed the questionnaire for relevance and comprehensiveness. Construct validity was evaluated through exploratory factor analysis after data collection to confirm that the instrument accurately measures the constructs of interest (knowledge, attitudes, and practices regarding malaria).

Reliability of Instrument

The reliability of the questionnaire was evaluated using Cronbach's alpha, which measures internal consistency. A pilot test was conducted with approximately 30 pregnant women from a similar demographic to identify any inconsistencies in the responses. A Cronbach's alpha coefficient of 0.70 or higher indicates acceptable reliability. This step is essential for ensuring that the questionnaire yields consistent results across different participants.

Method of Data Collection

Data collection were conducted at General Hospital Umuguma, Owerri, by trained research assistants who administered the questionnaire to participants in their communities. Participants were approached at health facilities, community centers, and during antenatal visits. Informed consent was obtained from each participant before data collection, with an explanation of the study's purpose, procedures, and the assurance of confidentiality. The questionnaires was distributed and collected in person to minimize misunderstandings and ensure high response rates.

Statistical Analysis

Statistical analysis was conducted using SPSS version 25. Descriptive statistics summarized demographic information and participants' knowledge, attitudes, and practices regarding malaria prevention. Inferential statistics was applied to explore relationships between variables, employing chi-square tests to assess associations between categorical variables and logistic

regression to identify predictors of knowledge and practices. The significance level was set at $p < 0.05$, allowing for the determination of statistically significant relationships.

RESULTS

Prevalence of Malaria Among Pregnant Women

The study collected data from 422 pregnant women in Owerri Municipal. The results show that malaria remains a significant health concern among pregnant women in this area. Of the 422 respondents, 156 women reported experiencing at least one episode of malaria during their current pregnancy. This represents a malaria prevalence rate of 37% among the sample population. This high prevalence points to the persistent challenge of malaria in the region, especially for vulnerable groups like pregnant women.

Table 4.1: Prevalence of Malaria Among Pregnant Women in Owerri Municipal

Category	Frequency	Percentage (%)
Experienced Malaria	156	37
Did Not Experience	266	63
Total	**422**	**100**

This data demonstrates that nearly 2 out of 5 pregnant women experienced malaria during their pregnancy, highlighting the urgency for better preventive measures.

Frequency of Malaria Episodes During Pregnancy

Among the 156 women who reported experiencing malaria, some had multiple episodes of the illness. Table 4.2 shows the distribution of malaria episodes per respondent.

Table 4.2: Frequency of Malaria Episodes During Pregnancy

Number of Episodes	Frequency	Percentage (%)
1 Episode	92	59
2 Episodes	39	25
3 or More Episodes	25	16
Total	**156**	**100**

The table reveals that most respondents experienced malaria only once during their pregnancy, but a notable percentage had multiple episodes, compounding the direct and indirect economic costs they incurred.

Impact on Household Expenditures

A core objective of this study was to investigate how malaria during pregnancy affects household income. Data collected showed that malaria episodes led to increased out-of-pocket healthcare expenditures, lost income, and additional household costs, such as childcare and home assistance. The average medical expenditure per malaria episode was ₦12,000, while indirect costs related to lost wages averaged ₦5,000 per week for employed women. Table 4.3 provides a breakdown of these costs.

Table 4.3: Average Direct and Indirect Costs of Malaria Treatment

Cost Type	Average Cost (₦)
Medical Expenditures	12,000
Transportation	1,500
Lost Wages	5,000
Home Care Services	3,500
Total	**22,000**

The total average cost per malaria episode amounted to ₦22,000, creating a significant financial burden, especially for lower-income families.

Figure 4.1: Below further demonstrates the economic breakdown of costs incurred by families for each malaria episode.

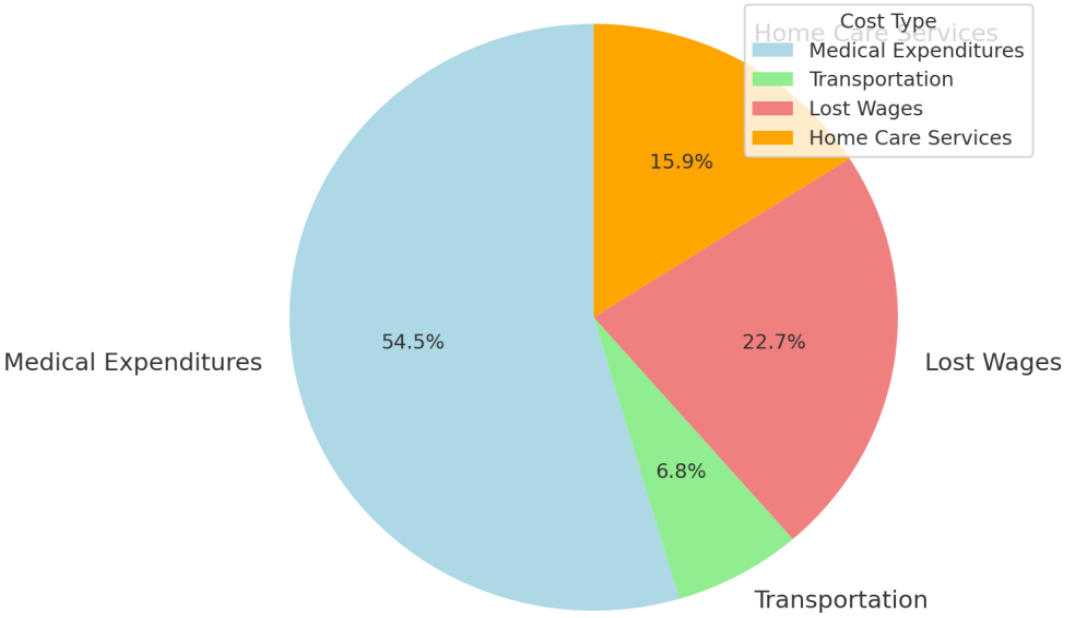

Figure 4.1: Economic Breakdown of Costs for Malaria Treatment

Reduction in Household Income

The study found that households where pregnant women experienced malaria reported an average income reduction of ₦15,000, compared to households without malaria. The economic toll on households was exacerbated by the need for recurrent expenditures, lost productivity, and an increase in debts, often requiring families to resort to borrowing or selling personal assets.

Figure 4.2: Illustrates this income disparity.

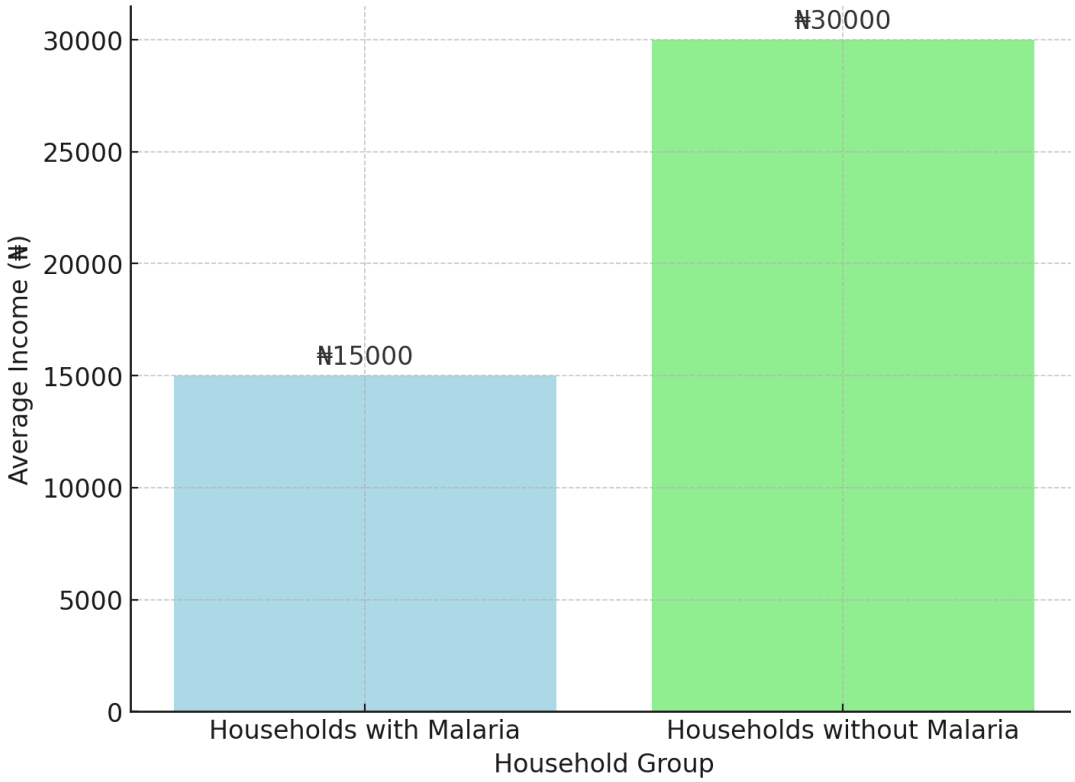

Figure 4.2: Comparison of Household Incomes

The data suggests that malaria significantly reduces household income and puts additional strain on already vulnerable populations.

Direct Costs

The direct costs associated with treating malaria in pregnancy at the State General Hospital, Umuguma, were substantial. These costs included medical consultation fees, diagnostic tests, medication, and transportation to and from the hospital. On average, the respondents reported spending ₦18,500 per malaria episode on direct medical expenses. Table 4.4 provides a more detailed breakdown of these direct costs.

Table 4.4: Breakdown of Direct Costs of Malaria Treatment

Cost Item	Average Cost (₦)
Consultation Fees	3,000
Laboratory Tests	2,500
Medications	9,500
Transportation	1,500
Other Costs (IV fluids, etc.)	2,000
Total Direct Costs	**18,500**

Indirect Costs

The indirect costs of malaria treatment, such as lost income due to illness and time spent seeking care, were equally significant. Respondents reported losing an average of 10 days of work or productive activity per episode, with a corresponding income loss of approximately ₦10,000. This further compounded the financial challenges faced by families.

Household Coping Strategies

The economic burden of malaria forced households to adopt various coping strategies, as illustrated in Figure 4.3.

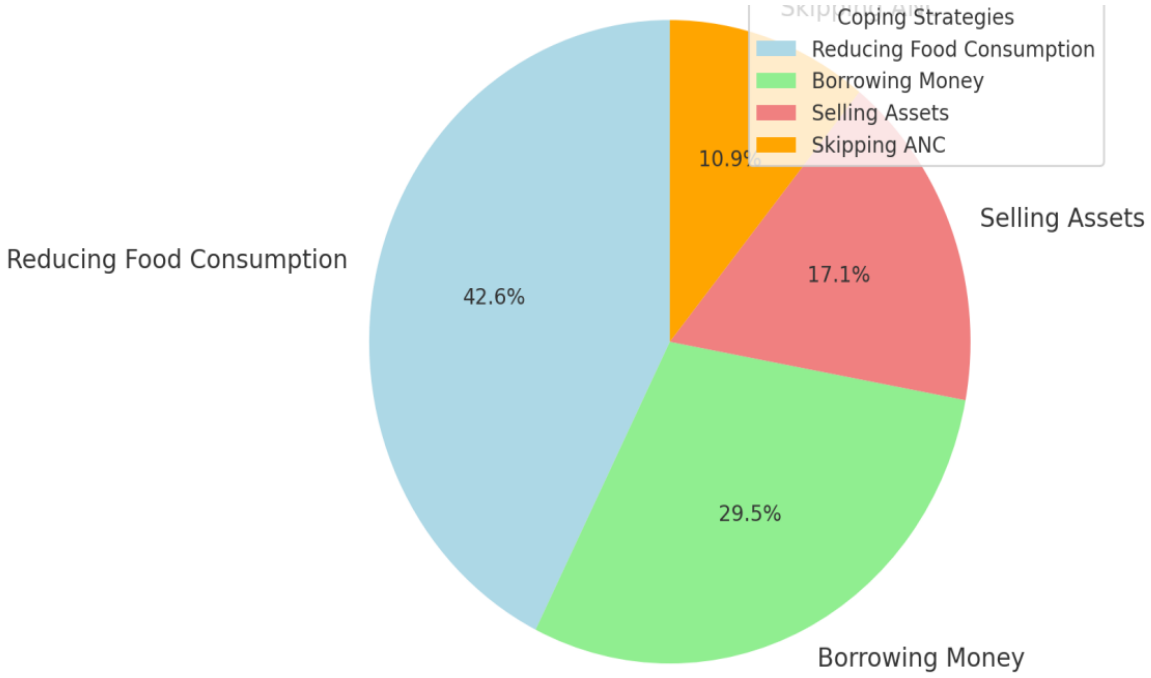

Figure 4.3: Household Coping Strategies due to Malaria-Related Financial Stress

The most common coping mechanisms included:

- Reducing food consumption (42.6%)
- Borrowing money from relatives or neighbors (29.5%)
- Selling household assets (17.1%)
- Skipping routine antenatal care to save on medical costs (10.9%)

These findings suggest that malaria is not only a health burden but also has deep-reaching socio-economic consequences for families.

Impacts on Food Security

Over half of the respondents reported cutting back on their food budgets to cover the cost of malaria treatment. This reduction in food security could have significant implications for maternal and child health, especially given the nutritional demands of pregnancy.

Health-Seeking Behavior Changes

Some households reported postponing or skipping essential antenatal care appointments to afford malaria treatment. This is concerning, as it could increase the risk of pregnancy complications. Table 4.5 shows the percentage of women who skipped antenatal care due to malaria-related expenses.

Table 4.5: Antenatal Care Appointments Missed Due to Malaria

Frequency of Missed ANC Visits	Frequency	Percentage (%)
Missed at least 1 ANC Visit	60	14
Did Not Miss	362	86
Total	**422**	**100**

Discussion

The results suggest that malaria is still a big problem for pregnant women in Owerri Municipal. Malaria during pregnancy often needs medical care that many families can't afford. The direct expenditures of treatment, like doctor's visits, diagnostic testing, and anti-malarial medications, put a lot of strain on household resources. Additionally, a lot of these families are already having trouble with money, which makes the economic problems caused by malaria even worse. This substantiates the assertion that malaria, particularly among susceptible populations like pregnant women, exacerbates poverty in malaria-endemic areas[12].

Indirect expenditures related to treating malaria in pregnant women also have a big effect on the economy, in addition to direct costs. These indirect costs include the cost of getting to and from the hospital and the loss of productivity for the woman and other family members. Carers often have to give up their own jobs to take care of sick people, and women often miss out on key job chances while they are sick and getting treatment. This leads to a big drop in the family's total income, which makes the economic burden much worse [13].

The research also uncovered a psychological aspect to this economic strain. Women who could not afford proper malaria treatment frequently experienced guilt and stress, concerned about their health and the financial stability of their families. These findings align with prior research indicating the extensive effects of malaria on both physical health and mental and emotional well-being [14].

The study also looked at how malaria affects family income, and the results are clear. Pregnant women, particularly those engaged in informal labour sectors like petty dealing or daily wage employment, were especially susceptible to income loss. Absences due to illness led to lower wages. Some of the women in this study said that their overall income went down during pregnancy because they had to get treatment or rest because of malaria symptoms. Moreover, in households where additional family members had to take leave from work to care for the pregnant women, the economic repercussions were exacerbated [15].

Additionally, the research underscores that women from lower-income households encounter more significant economic difficulties. For these families, the extra cost of getting to and from the hospital or even buying basic malaria treatments can be very high. It is evident that socioeconomic position significantly influences a family's ability to manage the economic burdens imposed by malaria during pregnancy [16].

Pregnant women who went to General Hospital Umuguma for malaria treatment had to pay both direct and indirect fees. As already said, the direct costs included medical bills, prescriptions, and lab testing. These prices were mostly the same, but they changed depending on how bad the malaria infection was and what kind of treatment was needed. For severe cases that necessitated hospitalisation, costs rose dramatically, placing a greater burden on families [17].

Indirect costs, which are commonly ignored in economic studies of disease, were just as high. These were the time it took to get to the hospital, the cost of getting there, and the time missed from work. For other families, the cost of getting to and from the hospital was a big percentage of their total costs, especially for those who lived far away. The research found that these indirect expenses were often hard to plan for and hard to foresee, which made it even harder for the families involved to organise their finances [18].

One of the main results is that the total expenditures, both direct and indirect, put a lot of stress on families. This could cause them to put off treatment or choose less effective treatments to save money. In some circumstances, women chose traditional treatments because hospital care was too expensive. This could have long-term health effects on both the mother

and the unborn child. This highlights the necessity for better accessible healthcare services, especially for at-risk groups such as pregnant women [19].

The results of this study have significant ramifications for public health policy, healthcare delivery, and economic support systems in malaria-endemic regions such as Owerri Municipal. Malaria puts a lot of stress on pregnant women and their families; therefore, we need to act quickly to lower both the number of cases and the costs it causes.

The substantial economic repercussions of malaria on pregnant women indicate that current malaria prevention and treatment initiatives in Owerri Municipal may require expansion. More money needs to be spent on preventive measures like giving out insecticide-treated bed nets (ITNs) and giving intermittent preventive treatment (IPT) during antenatal care visits. These steps can greatly lower the number of pregnant women who have malaria, which will help with the costs of treating the disease [20].

The study also shows how important it is to make malaria treatment less expensive. To ease the financial strain on pregnant women, it might assist to lower their out-of-pocket costs by giving them subsidies, free services, or health insurance plans. Such regulations would also motivate women to pursue prompt and suitable medical care, thereby diminishing the risk of severe disease and additional economic losses [21,22].

The indirect costs of malaria, especially the loss of household income, show how important it is to have social protection mechanisms in place to help disadvantaged families. Conditional cash transfers or other types of financial aid could help pregnant women and their families make up for the money they lose, especially if they work in the informal economy [23]. The psychological ramifications of financial stress, as delineated in this study, underscore the necessity of incorporating mental health services into antenatal care programs. Offering emotional and psychological assistance to pregnant women experiencing financial hardships may enhance their general well-being and resilience in managing the economic obstacles associated with malaria [24].

Final Thoughts

Malaria among pregnant women in Owerri Municipal continues to have serious effects on the economy, hurting both direct medical costs and the overall income of households. Malaria's economic impact not only limits women's access to treatment but also hinders their participation in income-generating activities, so imposing a substantial strain on their families. This study finds that to lessen the economic impact of malaria on pregnant women, we need a mix of preventive interventions, better access to inexpensive healthcare, and financial help for families who are at risk. Policy initiatives have to concentrate on diminishing the prevalence of malaria and mitigating the financial burdens associated with the condition, especially during pregnancy.

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