



Effect of Malaria on Rural Households' Farm Income in Barkin Ladi LGA, Plateau State, Nigeria

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Abstract. The study was carried out to analyze the effect of malaria on rural households' farm income in Barkin Ladi Local Government Area, Plateau State, Nigeria. Data were obtained from a multi-stage random sampling of one hundred and sixty-five rural farming household heads through the use of a well-structured questionnaire. The data were analyzed using descriptive statistics and linear regression analysis. The descriptive statistics results showed that a majority of the respondents were male (73.9%), between the age brackets of 30 years and 49 years (70.3%), married (78.2%), educated (92.12%) and earned an income less than or equal to 200,000 Naira per quarter year (55.8%). The mean age, household size, estimated farm income and farm size were 41 years, 8 persons, 198,352 Naira per quarter year and 1.93 hectares respectively. The result of the regression showed that there was a significant effect of age ($\beta = 15.674$; $p < 0.05$), household size ($\beta = 8.897$; $p < 0.1$), farm size ($\beta = 1.016$; $p < 0.01$), periods of incapacitation due to malaria ($\beta = -0.894$; $p < 0.01$) and total income lost due to malaria ($\beta = -0.735$; $p < 0.01$) on total annual income of rural households in Barkin Ladi LGA, Plateau State, Nigeria. It was concluded that malaria had negative consequence on the rural households' farm income. It was recommended that there should be intervention programs should promote the awareness of about malaria and the measures to combat it for an effective prevention and control of the malaria.

Keywords: Nigeria, Malaria, rural households, farm income

1. Introduction

Agriculture remains the main source of livelihood for rural households in many developing countries and farm outputs continue to depend on the availability and quality of the labour force which sadly is hampered by health shocks and diseases (United States Agency for International Development. (USAID, 2015). Malaria remains one of the most disturbing parasite diseases in the world and its influence was more on poor and deprived households in Sub-Saharan Africa (SSA) World Health Organization (WHO, 2011). The global incidence of the disease is estimated at 300 million clinical cases annually resulting in over one million deaths. Malaria also accounts for a high number of adult morbidity in an endemic area. Evidenced abounds in the literature that malaria remains one of the harshest health problems globally particularly in developing countries (GHI, 2016).

Malaria and agriculture are closely related. This is because the agricultural environment provides suitable conditions for the breeding and survival of the mosquitoes which transmit the disease (WHO, 2011). Malaria influence agriculture through labour loss, decreasing productive time (labour time), loss of farming knowledge and skills in case of the death of a farmer and reduction in investment in agriculture due to high expenditures on malaria treatment and prevention (Ibrahim *et al.*, 2017). Despite the importance of labour to the sector, it is being negatively affected by malaria. The implication of this is that quality time is either lost as a result of

incapacitation from malaria or caring for family members affected. This has implications for on-farm labour supply and agricultural productivity. (Ibrahim *et al.*, 2017). Moreover, it has been recorded by past studies that the foremost community health problem in Nigeria is malaria and the main cause of sickness and death in Sub-Sahara Africa (WHO, 2014). It is estimated that the loss accrued to the malaria burden ranges from around 132 billion Naira. This is accounted for payments for treatment and prevention and economic loss for hours not worked and for time caring for the malaria-infected person (NPC, 2014). Malaria, therefore, has a direct impact on households' income, wealth, labour productivity and labour market participation of both the sick and the caregivers (Ajani & Ashagidigbi, 2008). Rural households unlike the fixed wage earners not only lose valuable working hours in treating the sickness but also lose the income that would have been generated during this period. This poor health status thus directly affects the productive capacity of the households. This in turn translates into an income loss and eventually poverty through the sick and the caregivers to the households (Alam & Mahal, 2014).

Lukwa *et al.*, (2019) reported that farmers' health status has a significant effect on their capacity to increase output, otherwise ill health could impact negatively the number of hours spent on the farm and the amount of income earned. Health risk and particularly malaria has some debilitating effect on the output and income through the cost of health care, labour man-days lost to malaria medication and physical weakness. Malaria leads to a loss of agro-cultural knowledge and skills especially if it kills an experienced farmer (Aram, 2021).

Therefore, the broad objective of the study was analyzed to determine effect of malaria on the rural household farm income in Barkin-Ladi Local Government Area, Plateau State, Nigeria, while the specific objectives examined the characteristics of rural households, ascertained the level of awareness of households to modern preventive measures, estimated the days of incapacitation and the income lost due to malaria illness and determined the effect of malaria on rural households' agricultural farm income.

The hypothesis of the study is stated in the null form as follows:

H₀₁: There is no significant effect of malaria on rural households' agricultural farm income.

2. Methodology

The study was carried out in Barkin Ladi Local Government Area in Plateau State, Nigeria. Its headquarters are in the town of Barkin Ladi (9°32'N 8°54'E). It has a land area of 1,141 km², an average amount of temperature ranging from 15.5°C to 18.5°C during the cold season and 27.5°C to 30.0°C during the hot season and the amount of rainfall in the area ranges from 1500mm to 2000mm per annum. The types of crops grown in the area include Irish potato, maize, guinea corn while the livestock reared include cattle, sheep, and goats.

Simple random sampling technique was used for the research survey. A random selection of four districts from fourteen districts in Barkin Ladi Local Government Area was done with two villages selected from each district. A total of one hundred and sixty-five rural household heads were randomly selected and interviewed. The information gotten was used for the data analysis.

Primary data was used with the aid of a well-structured open and closed questionnaire, oral interviews and physical observation. Descriptive statistics and regression analysis were used.

Mode of Specification

Regression analysis: the implicit form is as follows;

$$Y = f(X_1, X_2, X_3, X_4, X_5)$$

Where Y = Total annual income in Naira

X₁ = Age (Years)

X₂ = Household size (Members)

X₃ = Total farm size (Hectares)

X₄ = Total days of incapacitation due to malaria (Days)

X₅ = Estimated total income lost due to malaria (Naira).

3. Results and discussion

The result revealed that 73.9% of the respondents were male while about 26.1% were female. This finding re-validates the age-long dominance of men in agriculture. This agreed with the findings of Oluwatayo (2014) in his work revealed that a high proportion of the farming household heads were males. The result showed that about 70.3% of the respondents were between the age brackets of 30 years and 49 years. The mean age of the respondents is 41 years. This implied that most of the rural farming household heads were in their strong and active age and this finding was upheld with Ajani and Ashagidigbi (2008). The majority (78.2%) of the respondents were married. This could be attributed to

the concentration of the majority of rural farming household heads are within the marriageable age range of 26 years and 45 years (Oluwatayo, 2014). A majority (92.12%) of the rural farming household heads in the study area are literate. According to Oluwatayo, (2014), farmers’ literacy level helped to eradicate ignorance and promote the adoption of innovation. The educational status of an individual played a significant role when it comes to their health status as the most educated farmers are well equipped with both preventive and curative strategies when it comes to the ailment (Oyibo *et al.*, 2020). The mean household size of the respondents is 8 persons. Ajani and Ashagidigbi, (2008) reported that household size had implications for labour availability and could influence the likelihood of innovation adoption and this trend had been noticed by Adesugba and Mavrotad, (2016) as well. The Northern zone kept the largest household size perhaps for agricultural production since farmers in Africa mainly use family

labour in farm activities (Awoniyi *et al.*, 2018). The highest proportion of the respondents (55.8%) earned an income less than or equal to 200,000 Naira per quarter year. An estimated mean farm income of 198,352 Naira per quarter year was made by the households. This result implied that rural farming households may be forced out of farming as a result of the low income derived and/or use more customary methods of treating malaria such as the use of plant extracts and consulting traditional healers which attracts little or no cost to them. This outcome was established by Nwakwasi *et al.*, (2017). A mean farm size of 1.93 hectares was available for farming by the households in the study area. This is due to the problem of land fragmentation as a result of inheritance which is quite common in the part of the country. Oyibo *et al.*, (2020) revealed a pooled mean farm size of 1.5 hectares. These results are presented in Table 1.

Table 1: Characteristics of the respondents

Variables		Frequency	Percentage
Sex	Male	122	73.94
	Female	43	26.06
Age (Years) Mean = 41	<=30	20	12.12
	31-50	116	70.30
	>50	29	17.58
Marital Status	Not married	36	21.82
	Married	129	78.18
Educational Level	No formal education	13	7.88
	Primary	36	21.82
	Secondary	80	48.48
	Tertiary	28	16.97
	Adult education	8	4.85
Household Size Mean = 8	<=5	33	20.00
	6 to 10	85	51.52
	>10	47	28.48
Estimated Farm Income (Naira) Mean = 198,352 Naira/quarter year	<=200,000	92	55.76
	>200,000	73	44.24
Farm Size (Ha) Mean = 1.93Ha	<=2	91	55.15
	>2	74	44.85

In the regression analysis, the linear functional form gave the best fit and was chosen as the best functional form that explains the causal relationship between productivity proxy (farm income).and malaria prevalence, also proxy by the days’ frequency of malaria occurrences. Based on the consideration of statistical and economic criteria the results are presented below, the R-squared value is 0.691, showing that 69 percent of the variation in the dependent variable can be explained by the explanatory variables. This also showed that the model is a good fit for the data. Age, household size, farming size and income loss are found to be statistically significant factors affecting the productivity of rural farming households.

The coefficient of age (15.674) was positive and significant at the 5% level. This shows that age has a direct relationship with the rural farming households’ income. This implied that farm income increases with age up to a certain level. This is because age has a great influence in instilling a deep sense of dedication and responsibility in individuals. However, the older the rural farming households’ member becomes, the more the likelihood of susceptibility to malaria attack due to decreasing immunity against the disease (Oluwatayo, 2014). This is in line

with Oyibo *et al.*, (2017) who stated that individuals become less predisposed to malaria illness as they grow older. The households' size coefficient (8.897) was positive and significant at the 10% level. This means that household size has a direct relationship with their farm income. This implied that an increase in their households' size would lead to an increase in their productivity and output. This is because of the large household size in the study area which is still available to do the work despite some household members being infected with malaria or any illness. Also, labour is available to clear surrounding bushes and houses are safeguards against the breeding of malaria parasites. This is in line with Oyibo *et al.*, (2020), who stated that household size was positive and significant. Ochi *et al.*, (2015) reported that large household size and household labour may be less likely to predispose household heads to malaria illness since household members often supply the needed labour force for sanitary and farm work in a traditional agricultural setting. The coefficient of annual income (1.016) was positive and significant at the 1% level. This means a direct relationship with their farm income. This implied that annual income increases with an increase in the acreage of land cultivated. This agrees with the findings of Ajani and Ashagidigbi, (2008) in their work who stated that the farm size was positive and significant.

The coefficient of income loss (-0.735) was negative and significant at the 1% level. This means an inverse relationship. Thus, a unit increase in the income loss decreases the productivity of the rural farming households due to a decrease in annual farm income by 73.5%. This implied that income loss to malaria among rural farming households tends to be an economic burden and has widely reduced the efficiency of the rural farming households as there will be unproductive income diversification in which resources are diverted to treating the endemic disease. This is in line with Ogunniyi, Kehinde, and Adewuyi, (2015) in their work which stated that income loss has an inverse relationship with the productivity of rural farming households. Furthermore, Oyibo *et al.*, (2020) also stated that the income loss of farming households could lead to households reducing farm area and planting less labor-intensive crops.

Table 2: The effect of malaria on rural households' farm income

Variables	Coefficient	t-value
Constant	-5.343	-1.965
Age	15.674**	2.422
Household size	8.897*	1.761
Farm size	1.016***	8.688
Days of incapacitation	-0.894***	-0.166
Income loss	-0.735***	-4.671

Note: ***, ** and * significant at 1%, 5% and 10% levels of significance.
R-squared = 0.691; *Adj. R-squared* = 0.677

4. Conclusion and Recommendations

This study focused on examining the effect of malaria on rural households' farm income. The study found that malaria is a key health concern for many households in the study area, Nigeria. Malaria is a predominant cause of illness among rural households and therefore causes a major drawback in labour supply and eventually agricultural production. The number of workdays lost as a result of malaria illness poses a very serious threat to households members farming activities efficiency. Also, the direct and indirect costs of malaria tend to adversely affect productivity of the agrarian households in the study area.

Based on these, there should be interventions in form of mobilizing resources, formulating, implementing policies and programs that will promote awareness and measures that ensure effective prevention and

control of the malaria. Hospitals and clinics should also be easily accessible, readily available and affordable to the rural households to meet their health needs. Medication that can reduce the days of incapacitation should be intensified and made available to farming households at affordable prices to improve their quality of life and productivity.

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