

Effect of malaria on rural household's farm income in Imo state-A case study of Umuna orlu and Umuagwo ohaji egbema village

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Abstract

Objective: Malaria is one of the commonest tropical diseases plaguing the African continent and the rural areas of the continent in particular, Hence this study was carried out to analyze the effect of malaria on the overall farm income of the rural households, the level of awareness and use of modern preventive measures of treating malaria in Umuna Orlu and Umuagwo Ohaji Egbema in Imo State.

Methods: Stratified random sampling procedure was employed for the research survey in which the first level of stratification involved the random selection of two local government area (L.G.A.) the second level of stratification was that of selection of 12 villages and the third level of stratification was the selection of 42 households each from the villages. A total number of 500 respondents were finally used for data analysis using both descriptive and multiple regression techniques.

Results: Low level of awareness (60%) use of modern preventive measures (20%), poor sanitary conditions and large household eight persons), were the major factors responsible for the high malaria incidence in the rural household. The increase in malaria incidence however had a significant effect on the health and farm income of the farmers through increase in the number of days of incapacitation of an average of 209 days and an income loss of N43, 020 during the days of incapacitation. The recommended policies arising from the economic implications of these empirical findings were that public enlightenment under the aegis of the "Roll Back malaria campaign" should be intensified in the rural areas in particular and treated mosquito bed nets provided at subsidized rates to rural households. Farmers on their part should keep clean environment.

Keywords: Incapacitation, malaria, rural households, farm income

1. Introduction

Among the major diseases that are common in Africa, malaria is one of the greatest threats facing by Africa today. It attacks an individual on average of four times in a year with an average of 10 to 14 days of incapacitation (Alaba & Alaba, 2002). Recent estimation, indicates that between 700,000 and 2.7 millions of people dies annually for malaria. Over 75% of these mortality focuses are African children (Multilateral Initiative on Malaria (MIM), 2002). In addition to its health effects, malaria became an obstacle to social and economic development.

According to recent estimates, the direct and indirect costs of malaria exceeded US \$ 2 billion in 1997 and this figure is likely to increase every year (Alaba & Alaba, 2002). Furthermore, on a global perspective between 400 and 900 millions of children under the age of 5 experiences acute malaria annually. In this malaria endemic region and that, this number may double by year 2020 if effective control measures are not implemented (Multilateral initiative on Malaria (MIM), 2001).

Malaria at the household level affects productivity of the people and their assets acquisition capacity. Households also frequently spend substantial share of their income and time on malaria prevention and treatment as well as an effort to control mosquitoes (Coluzzi, 1999). The cost of prevention and treatments consumes scarce households' resources. In addition, as some household members spend their productive time caring for those under malaria attack, they themselves in turn seek rescue form the onslaught of the disease (Mills, 1998).

Malaria therefore has a direct impact on households' income, wealth, labour productivity and labour market participation of both the sick and the caregivers. In terms of resource loss, households spend between \$ 2 and \$ 25 on malaria treatment and between \$ 20 and \$ 15 on prevention each month (Mills, 1998). As much as 13% of total small farming households' expenditure in Nigeria is currently being used in treating malaria, while many are simply too poor to pay for adequate prevention and treatment of the disease (WHO, 1999).

The loss to households may however be greater with the current trend in malaria resistance to traditional first-line drugs. Such loss has serious implication for poor household who are already malnourished, who live under pitiable condition and who constitute

over 65% of the nation's population (FOS, 1999).

Calculating the loss of productivity or productive potential resulting from sickness involves the application of some consensual economic principles. Earnings, which include wages, salaries and other remunerations other than transfers have been theoretically and generally accepted as an appropriate measure of workers productivity. Some pioneers on the empirical assessment of the impact of health status on productivity did so by relating health status to earnings and other income-generating potentials.

The American Association for the Advancement of science, 1991 claimed that approximately 80 – 85 % of the cases of population morbidity and mortality in sub-saharan Africa are attributable to malaria. The malaria problem has at least three dimensions-the health, the social and the economic dimensions. The health problem is evidenced by high malaria related mortality and morbidity in many African countries, Nigeria included. Malaria deaths in sub-saharan Africa amount to some 0-5 to two million deaths per year, with children accounting for 0.75 to one million of these deaths (Snow *et al.*, 1997, Okorosobo, 2000). The disease afflicts mainly pregnant women, young children, migratory populations and persons with little previous exposure to malaria attacks (Now *et al.*, 1997).

The organization of African unity says that by the year 2000, it would have cost African economy \$ 3.6 billion in a year because of working hours lost and the cost of treatments. Rural households unlike the fixed wage earners not only lose valuable working hours in treating the sickness but also lose income that would have been generated at this period. This poor health status thus directly affects the productive capacity of the households. This in turn translates into income loss and eventually poverty through the sick and the caregivers to the households.

2. Methodology

2.1 Study area

The study area is Umuna and Umuagwo in Imo State, Nigeria. According to 2006 population census Umuna had the total population of 20,500 people and Umuagwo had the total population of 18,700 people. The people of Umuna and Umuagwo are mainly smallscale farmers with significant proportion of the farmers engaging in secondary occupation such as hunting, trading artisan, civil service jobs etc. Farmers in the areas grow mainly food crops such as maize, cassava, yam, vegetables, coco-yam, potato, melon. They also engage in the cultivation of some cash crops like, Bitter Kola, palm fruit, bread fruit, cocoa.

2.2 Method of data collection

Simple random sampling technique was employed for the research survey. The villages was divided into 6 wards each based on the geopolitical location namely: Umuehi, Umueze-nwere, Umuturu, Unudukwo, Ummogbuanu, and Umunguma for Umuagwo and Umuna is divided into Ebenator, Umusasa, Amaorji, Ebenese, Amaorie, and Ezedike.

Forty two (42) farming households were therefore randomly selected in each town to make a total of 500 respondents. Structured and systematically drawn questionnaires as well as personal interviews were the data collection instruments. Data were collected on the socio-economic characteristics and also on malaria incidence as it affects rural household's health and their agricultural labour productivity.

2.3 Regression analysis for effect of malaria on agricultural productivity

In the regression analysis, the total income of the respondents represents the dependent variable (Y) i.e.

YA = total annual income of respondent in Naira

AGE = Age in years

HHS = Household size

FM = Farm size in hectares

TDA = Total days of incapacitation

FDE = Food expenditure in Naira

NFE = Non-food expenditure in Naira

YT = Total income lost due to malaria in Naira.

The implicit function is thus stated as:

YA = F (AGE, HHS, FSM, TDA, FDE, NFE, YT)

The different functional forms fitted were semi-log double log, exponential and linear, and eventually, the best functional form was chosen on the basis of number of significant variables, signs of the coefficients, value of coefficient of determination (R^2 or R^{-2}) F value or economic reasoning and expectation.

3. Results and Discussion

Socio-economic characteristics of the sampled respondents were presented as name, age, household size, farm size cultivated and annual income from farming activities and the total number of days that farmers were incapacitated from their farm work due to malaria infection. The result of the analysis shows that the average age of the farmers was 39 years, mean household size was 8 persons and the average farm size was one 4 hectares signifying that the farmers are small scale and they use traditional tools in their farming activities. The average annual farm income was N112, 245 (equivalent to N9,353.75 per month) while the average days of incapacitation from farm work was given as 209 days in a year. All these were illustrated in tables 1, 2, 3, 4 and 5.

Table 1. Distribution of farmers by age

Age in years	Frequency	Percentage
0-20	15	3
21-30	50	10
31-40	230	46
41-50	140	28
51-60	55	11
61-70	5	1
71- above	5	1
Total	500	100
Average	39 years	Std dev. = 13.70

Table 2. Distribution of farmers by household size

Household size	Frequency	Percentage
0-5	85	17
6-10	310	62
11-15	100	20
16-20	5	1
Total	500	100
Average	8 persons	Std dev. = 4.866

Table 3: Distribution of farmers by the farm size cultivated

Farm size	Frequency	Percentage
0-2	105	21
3-5	335	67
6-8	60	12
Total	500	100
Average	4 hectares	Std. dev = 1.050

The implications of these on the objectives of the study are:

- A large percentage (78%) of the farmers are still within the very active productive age group in which their farm productivity age group should be relatively high, given a healthy living condition devoid of malaria and other productivity diminishing problems.
- The average household size is 8 persons: This has implication for labour provision on the farm meaning increased productivity but its negative impact of overcrowding of residents in the home. One of the causes of high incidence of malaria is environmental stress and overcrowding causes this illness.
- The average annual farm income of N9, 353.75 indicates very poor earning situation of the farmers signifying an earning of

less than \$3.00 per day.

Table 6 and 7 tells the story about the use of modern preventive medicine and the level of awareness of farmers about the availability of modern preventive medicine. It is interesting to note that 80 percent of the farmers use none of the modern preventive medicine and 40 percent of the farmers are not aware that there are modern ways of preventing malaria. This has implication on preventive and curative step taken to curb the infection of the illness in the study area and to think of the fact that in this millennium. Some set of people are still ignorant of preventive and curative measures suggests that deaths to this illness may still be regarded as an act of God. This does not justify the huge sums of money spent on the “Roll Back Malaria campaign.

Table 4. Distribution of farmers by annual farm income

Annual income (N)	Frequency	Percentage
0 – 100,000	255	51
101,000 – 200,000	185	37
201,000 – 300,000	55	11
301,000 – 400	5	1
Total	500	100
Average	= N112,245	Std dev. = N38,364.16

Table 5. Distribution of farmers by number of days of incapacitation due to malaria

Days of incapacitation	Frequency	Percentage
0-15	25	5
16-20	205	41
21-25	200	40
26-30	105	13
31-35	5	1
Total	500	100
Average	209 days	Std dev = 1.072

Table 6. Distribution of farmers on the use of modern preventive measures

Use of preventive measures	Frequency	Percentage
Modern	100	20
None	400	80
Total	500	100

3.1 Regression analysis for effect of malaria on agricultural productivity

For the regression analysis, linear functional form gave the best fit and was chosen as the best functional form that explains the causal relations between productivity proxy (farm income) and malaria incidence, proxy by the days of incapacitation. Based on the consideration of statistical and economic criteria the results are presented below.

From the implicit function given above, the R squared value is 0.910, showing that 91% of the change that occurred in the dependent variable can be explained by the explanatory variables. This also shows that the model produces a good fit for the data.

Farm size, food expenditure, non-food expenditure and total income lost due to malaria are statistically significant at five percent while household size is statistically significant of 10 percent. However, age and days of incapacitation are not statistically significant at 15 percent in explaining the variation in the annual income realized from the farm, which is a proxy, used to measure productivity of farmers.

However, the positive beta coefficient of age implies that farmer’s income decreases with increase in age. This is expected because productivity of farmers decreases as they approach old age because of loss of agility and strength. The negative beta coefficient of household size is also expected as increase in household size increases expenditure and this decreases farmer’s annual income.

Annual income also decreases with increase in days of incapacitation because the more the number of days, the greater the loss incurred during treatment and the lesser the annual income.

Table 7. Level of awareness of modern preventive medicine

Level of awareness	Frequency	Percentage
Aware	300	60
Not aware	200	40
Total	500	100

Table 8. Linear regression functional form showing the effect of malaria illness on the farm income of farmers.

Variables	Coefficients
AGE	0.230
HHS	-1.244
FMS	0.15
TDA	0.128
FDE	0.797
NFE	0.849
Yt	1.277

YA=0,230 AGE - 1.244 HHS + 0.15FMS + 0.128TDA + 0.797 FDE + 0.849 NFE + 1.277 Yt.
R2=0.910;R=0.954

Also, farm size has a positive beta coefficients indicating that annual income increases with increase in acreage of land cultivated. The positive beta coefficients of food and non-food expenditure show increases. This is expected because the greater the income of the farmers, the more they tend to spend on food and non-food items. Lastly, total income lost due to malaria also has a positive beta coefficient, which means that as income increases; income lost due to malaria also increases. This is true because high-income earning farmers tend to lose more of their income due to better treatment they seek which attracts high cost, and because of income lost during the period of incapacitation, which tends to be more compared to the low income-earning farmers.

4. Conclusion

Malaria is both a health and economic problem eating deeply into the financial base of the victims or the caregivers. Malaria has become a menace in Africa, especially in rural areas because of low level of awareness and use of modern preventive measures against mosquitoes that causes malaria.

Apart from this, large household size, which is a common feature of rural people, has been a cause of increase in malaria incidence. Families with large household size usually have low income, which in turn increases their poverty status the use of preventive measures and proper treatment of malaria cases thus become almost impossible. In addition to this, poor sanitary condition of farmers is also one of the major causes of high malaria incidence in the rural areas.

Furthermore, increase in malaria incidence increases days of incapacitation, this in turn increases the total income that is lost due to malaria, and finally there is a significant reduction in the productivity and also the income of the farmers. Health risks and poverty thus become a vicious cycle in the rural areas.

5. Recommendations

- There should be interventions in form of mobilizing resources, formulating and implementing policies and programmes that will promote awareness and measures that ensure effective prevention and control of the pandemic disease.
- Hospitals and clinic should also be easily accessible, readily available and affordable to the farmers in order to meet their health needs.
- Medication that can reduce the days of incapacitation should be intensified and made available to farmers at affordable prices in order to improve the quality of life and productivity of farmers.

6. References

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