Gashua Journal of Irrigation and Desertification Studies
Available online at www.gjidsfugashua.org.ng
Volume 2, Issue 2

ECONOMIC ANALYSIS OF MALARIA FEVER INCIDENCE ON FARMING HOUSEHOLDS IN OGUN STATE, SOUTHWEST, NIGERIA

Sanusi, S.O.

Department of Agricultural Economics and Extension, Federal University Gashua, P.M.B 1005, NguruRoad, Gashua, Yobe State, Nigeria.

sanusisaheed@yahoo.com, 08062965260.

Abstract

One of the setback facing farmers and agricultural production is inadequate availability of labour that could be due to debilitating factors such as ill health caused by disease outbreak of which malaria is the most prevalent in Nigeria. The study analyzed economic cost of Malaria on farming household in Odeda and Abeokuta North Local Government Area of Ogun State. One hundred and twenty (120) respondents were purposively selected for the study, with sixty (60) respondents from each of the Local Government Areas. Data were analyzed using descriptive statistics and arithmetic indices. It was found that the average prevalence rate of the disease was 36%. The rate of infection was higher for males (60%) than for females (40%) and that over 70% of the persons in the households (both male and female) in the economically active age group (18 years and above) were infected. On the average, each household incurred cost value at ₦16,075, ₦9,051.8, ₦12487.8 and ₦1899.9 on direct prevention, direct treatment, and indirect cost of the sick and other cost such as transportation, feeding respectively. Above all, 5.2% of household income was spent on Malaria prevention. Based on the findings, education and enlightenment programs are recommended for rural communities so as to help increase their awareness of vector control and mode of transmission of malaria. It can be backed up with the provision of anti-malaria drugs at subsidized rate as well as establishment of more primary health centers at the grassroots level.

Keywords: Economic cost, malaria, prevalence rate, household.

INTRODUCTION

Labour plays a crucial role in traditional agriculture that places great reliance on the use of hand- tools. According to Ogunfowora *et al*. (1975), over 90 percent of all farm operation is performed by human labour. Ordinarily, traditional farmers have depended on family labour for farm- work. The use of non-family labour is resorted into when family labour supply has become a constraint. According to Nwosu (1989), over 73 percent of labour employed on the family farm is provided by the farm family while non-family labour contributing 27 percent consist of paid labour and communal labour. The implication of the above analysis is that for cash trap farmers, who produce primarily for family consumption, high incidence of debilitating disease in the family can affect farm work adversely. It could even affect

farm size if the outbreak occurs at the beginning of cropping seasons especially for households that could not avoid cost of hiring labour. Labour supply and productivity is a critical variable in smallholder farming particularly in rural setting of Nigeria, which have been noted to be responsible for the bulk of agricultural output. Goodman *et al.* (2000) pointed out that the supply and productivity of labour are influenced by ill health that has a direct or indirect effect on a member of household.

In Nigeria, malaria is the most common cause of outpatient visits, and it consistently ranks among the three most common causes of morbidity and death (New Guideline Nigeria Bulletin of Epidemiology, 1991). Malaria as a disease have two far-reaching effects,the suffering (dis-utility) incurred by the sick person and income effect operating through a total or partial withdraw of labour from production. Itwas also reiterated by Sauerborn *et al.* (1991) that malaria epidemic often coincides with the peak period of production when labours are highly demanded. According to Aji *et al.* (2014), there are two economic consequences of household health care challenges, these are the cost of medical treatment and the loss in income due to labour supply and productivity reduction. Similarly, economic hardship family undergo can be classified into short term shock and long term shock (Global Health Action, 2014). The former has to do with loss of income due to cost of paying for drugs, decrease in wealth due to selling off assets to meet immediate needs and loss of revenue due to loss of working hours while the latter is concern with worsening economic conditions of the households if the sickness persist for long period.

While illness occurs in individuals, it costs do not fall on individuals alone. In most study findings substantial amounts of costs would not have been captured in the analysis without treating the household as unit of analysis (Janzen, 1987). Janzen further view household as the 'therapy managing group' that made decisions regarding health care choice and allocation of time and financial resources. Both the cost of care and opportunity cost of time to cope with the illness,therefore, can only be understood in a household framework (Berman *et al.,* 1994). Nwosu (1989) emphasized the direct and indirect effect of a disease. The directeffect of a disease results when an active member of the household is prevented from working on the farm by the disease infection. The indirect effect of a disease results when an active member of the households is delayed or inhibited from working on the farm because he has to take care of other members of the families infected by disease. Similarly, Sauerborn *et al.* (1995) recognized financial costs and time costs of household illness. Financial costs include householdsoutlays for user fees, drugs, hospital admission, home treatment and transportation. The time costsis defined as the sum of the opportunity cost of wages forgone by the sick individual due to illness and the opportunity costs of household members time spent on treating or attending to the ill person or accompanying them for treatment.

This research work seek to emphasise the role that household labour plays in agricultural production and the problem imposed by disease infection like malaria on

them during farming activities. The primary essence of the research was to combine the direct, indirect and income cost of prevention and treatment of malaria by households in a single study as well as capture the prevalence rate of malaria infection in Ogun State, Nigeria.

METHODOLOGY

The study was carried out in Abeokuta and its environs (Egbaland) majorly Odeda and Abeokuta North Local Government Area of Ogun State. The study location, Egbaland lies between latitude $07^0$10'North and longitude $03^0$20'East covering about 222,891.60 hectares of land area. The location is categorize as tropical rainforest with average annual rainfall of about 21.2 meters (between 1500mm to 1800mm) which is bimodal in pattern having its peak in June and July.

Data for the study weregathered from Primary sources.The Primary data were obtained through interview method,personal observations and administration of structured questionnaire. Survey was initially carried out to identified the population. The population in the study area comprised of farmers who had at one time or the other have fallen ill due to malaria during the farming season and who solemnly depend to large extent on their household for supply of labour on their farms.

Purposive sampling procedure was used based on farmers illness record to select one hundred and twenty (120) crop farmers within the study area. Thirty respondents were selected from each of the four villages sampled,i.e., two villages in each local government area. The villages were Jagun and Papa in Odeda while Mamuko and Ikija village were considered in Abeokuta North Local Government Area.

Descriptive statistics (frequency and percentages) were used to describe some socio-economic variables of the respondents and the prevalence of malaria disease in the study area. Arithmetic indices were used to capture the cost (direct and indirect) incurred on malaria aversion. The model was developed by Sauerborn et al (1996) and adopted with little modification to capturedthe direct and indirect cost in this study. The modification is necessitated by the need to captured care takers and other treatment cost such as transportation and feeding that are not captured in the original sauerborn *et al.* (1996) model. The modified model isstated as follows;

Direct (financial) cost of treatment of malaria;

$F_i=\sum_{i=0}^{n}(Ft + Fo)$ ..... (1)

Direct (Prevention) cost of malaria

$Pi=\sum_{i=0}^{n}(P_M + P_{MR} + P_N)$ ..... (2)

Indirect (Time) cost of malaria

$T_i= \sum_{i=0}^{n}\{(Ts * as * w) + (Tc * ac * w)\}$ ..... (3)

Economic cost of malaria

$Ei=\sum_{i=0}^{n}(Fi + Pi + Ti)$ ..... (4)

Where; (All cost are in Naira₦)

F_i= total financial costs of health care in the last season

F_t= Costs incurred on treatment methods

F_o= other expenses such as transportation, subsistence, etc. incurred on malaria treatment.

P_i = Prevention cost of malaria by households

P_m= Costs incurred on Mosquito coil
P_{MR}= Costs incurred on Mosquito repellents
P_N= Costs incurred on Bed-net
T_i= Opportunity cost of time due to days of worklost during sickness (days of forgone production)
T_s= Time costs of the sick- person
T_c= Time costs of the caretakers.
N = number of malaria episode
a = age coefficient (Age coefficient represent the maturity level of the family member concerned. 18years and above computed as 1 and less than 18years asr 0.5)
s = related to the sick individual (represent the number of sick persons in a household)
c = related to the caretaker(s)(represent the number of those that take care of the sick person in a household)
w = daily wage rate
E = Economic costs of malaria in each household.
The man-day are estimatedby 0.75 man equivalent for women and 0.5 for children (Ogunfowora *et al.,* 1975).

RESULTS AND DISCUSSION

Socio-economic characteristics of the respondents that were considered in the studyare summarised in Table 1. These include age, marital status, household size, educational level and gender. The table shows that farming are dominated by the male in the study area, and the proportion of the male farmers within age group of 46 and above (63.7%) was higher than economically active group of 18-45 years (31.3%).The reverse was the case for the female. The implication of this analysis is that productivity and efficiency of labour is likely to be adversely affected due to heavy dominant of farming operation by the aged (Goodman et al, 2000). The table reveals that most of the respondents are married with 72.5% of the male, and 70% of the female in this category. The meaning of this is that a strong family bond and large household size that will contribute meaningfully to production on the farm is expected to exist. Furthermore, majority of the respondents had a family size within the range of 4-6 household members (40% for the male and 47.5% for the female) in the study area. The family size was follow up by household size of 7-9. The implication is that the household sample had an substantial number of family labour to use on their farm if no external force or constraint disrupt the supply of labour. Above all, the data revealed that the level of literacy of farmers in the study area was low since those with no formal education accounted for the largest proportion in sex, 45% of the male and 57.5% of the female. The implication of this is that it could affect their level of hygiene and, therefore, the understanding of transmission of malaria.

The prevalence and trend of infection of malaria in the study area is shown in Table 2. Males are mostly affected accounting for 60% of the total infection. This trend could be because most of the farming activities are carried out by males in most households, who would be expose to a lot of drudgery exercise and could be easily infected in the process. Similarly, malaria infection is more pronounced among economically active age group with 47.6% of the male and34.7% of the female affected in the study area. This shows that more than 70% of the households working age were infected at one time or the other, and this could affect labour

availability and their productivity. Overall, 36.9% households members suffered from malaria attacked during the season when the interviewed was carried out in the study area.

The distribution of households in the study area was based on the preventive methods used to reduce malaria effect and the average estimated annual expenditure incurred is stated in Table 3. Most of the households' used mosquito coil resulting in 52.7% of the respondents that sought prevention through this means in the study area. None of the households in the area used bed net solely as a method of prevention although 9.2% uses the method in combination with mosquito coil and repellents. The implication of the preceding analysis is that most households sought preventive measure through mosquito coil due to its affordable price, and it is readily available. Though the bed net may be costly, its non-usage may not be due to this only, but it was newlyintroducedinto the state as at the time of this survey. Therefore, only five households used it in combination with mosquito coil and repellents.

The principal method of seeking treatment in the study area was through Hospital/Chemist (53.4%) as revealed in Table 4. The average cost incurred per household for hospital treatment was estimated at ₦4533.3 while the average cost expended per household irrespective of the methods used was ₦9051.8 in the study area. The reason for the predominance of chemists may be because it has become common practice to purchase anti-malaria drugs in local shops or chemists because of its accessibility and low cost of drugs in such an arena. This result was contrary to result of research carried out in Bangladesh by Haque *et al* (2013) in which the primary strategy for treatment was that 92.7% of respondents used of unqualifiedhealthcare providers such as village doctors, drug stores, homeopath and spiritual healers of the respondents. The reasons for these include the unqualified health workers that were available throughout the day, sick persons could negotiate their payment,and medicine could be bought on credit.

The distribution of households incurring other expenses through means such as transportation, subsistence,etc. during infection periodare revealed in Table 5. A total of Thirty-ninehouseholdsrepresenting 56.6% of the households sampled spent much on mobility. The estimated average cost of ₦552.3 was on transportation alone. The scenario may be explained by the fact that most of the households surveyed lived far from medical centres, therefore, the need to transport themselves to these centres in order obtain the necessary treatment.

The indirect cost of malaria due to days of work lost by the sick and the caretakerare shown in Table 6.The average cost expended per household member on malaria due to days of work lost was ₦12487.8. The number, as well as the cost incurred on day lost by adult male, represent the major proportion. The implication of the above is that if the adult male who were supposed to be the key labour on the farm were incapacitated, it would result to reduction in labour supply in the farm and, hence reduction in productivity. Similarly, the total average cost expended per household member on malaria due to days of work lost by the caretaker was ₦14348.1, while the average cost per adult male, adult female

and children were ₦19625, ₦13931.3 and ₦8350 respectively. The reason the adult females were also victim of this loss was due to their care for the incapacitated members of the household are not surprising. It may be attributable to their naturally endowed caring attitude and the belief that it was part of their domestic activities to take cognisance of family health.

The proportion of the aversion methods vis-a-vis direct prevention, treatment, indirect cost and other cost on the average income accruing to households in the study areaare shown in Table 7. The survey revealed that 5.21 % of the income realisable was spent on malaria aversion with most incurred on indirect cost due to work days lost by the sick and the caretaker followed by direct treatment of malaria by the households sample.

CONCLUSION AND RECOMMENDATIONS

From the findings, the rate of infection is highest among the males within productive and vital age group 18 years and above that provide labour on the farm. This condition certainly does not favour agriculture particularly in developing countries like ours that places prime reliance on human labour (family labour) and hand tools. Though series of attempt are being made by various organisation both government and non-government to minimise and control malaria infection in Nigeria as a whole and the state, in particular, the impact is yet to be felt positively in some villages.Furthermore, the result of the analysis in this study provide ample evidence of the significant and tremendous loss due to cost (direct and indirect) by households as a result of malaria infection.Based on the findings of the study,the following recommendations are made; Enlightenment campaigns and education programmes should be organised for the rural dwellers on vector control methods. The government should establish additional health centers at the local level. It will stand to reduce huge amount of money spent by households on transportation. More importantly, anti-malaria drugs, repellents and bednets should be made available to the citizens at the grassroots particularlyfor farmers free of charge. The reason isthat rural farmers play crucial role in determining food basket of the nation.

ACKNOWLEDGEMENT

My sincere appreciation and gratitude goes to Professor A. O. Dipeolu for his tremendous support, constructive criticism and careful supervision accorded to me throughout the stages of this research work and without whom this work would not have been a success.

REFERENCES

Berman, P., Kindle, C., and Bhattarcharya, K. (1994). The Household Production of Health, Integrating Social Science Perspective on micro-level health determinants.*Social Science and Medicine38:205*

Budi, A., Suzanne, Y., and Sauerborn, R. (2014). The Economic Impact of the insured patients with severe chronic and acute illnesses: a qualitative approach. *Global Health Action. 7(1) 1-11*.

Global Health Action (2014) 7: 22526. http://dx.doi.org/10.3402/gha.v7

Goodman, C., Coleman, P., and Mills, A. (2000). Economic Analysis of Malaria Control in Sub-Saharan Africa. Global Forum for Health Research.

Haque, M., Budi, A., Azam Malik, A., Suzanne, Y., Louis, V., and Sauerborn, R. (2013). Health Coping Strategies of the people Vulnerable to Climatic Change in a resource-poor rural setting in Bangladesh. *BMC Public Health. 13(1): 565*

Janzen J.M (1987): Therapy Management: Concept, reality,andProcess. Medicine Anthropology University of California Press, Berkeley.

Nwosu A. C. (1989): Economic Aspects of the connection between Agricultural Production and Guinea worm infection.*Nigeria Journal of Parasitology Supplement,24-33*

Ogunfowora O, Essang S. M and Olayide S. O (1975) Resource Productivity in Traditional Agricultural Division in Kwara State. Rural Development Paper No. 16. University of Ibadan.

Sanusi, S. O. (2002). Economic Costs of Malaria on Farming Households in Odeda and Abeokuta North Local Government Area of Ogun State. An Unpublished B. AgricThesis, Department of Agricultural Economics and Farm Management, Federal University of Agriculture, Abeokuta. Pg 68.

Sauerborn, R., Ibrango, I., and Nouglara, A.(1995). The economic costs of illness for Rural Households in Burkina Faso. *Tropical Medicine and Parasitology. 46 (1): 54-6*

Table 1: Socio-Economic Characteristics of the Respondents

	Total Figure			
	Male		Female	
Age in Years	Freq	%	Freq	%
≤ 18	4	5	8	20
18-45	25	31.3	20	50
≥ 46	51	63.7	12	30
Marital Status				
Single	16	20	2	5
Married	58	72.5	28	70
Widowed	3	3.8	4	10
Divorced	3	3.8	6	15
Household Size				
1-3	16	20	8	20
4-6	32	40	19	47.5
7-9	20	25	10	25
≥ 9	12	15	3	7.5
Educational Level				
No formal Education	36	45	23	57.5
Primary School	20	25	10	25
Secondary School	18	22.5	5	12.5
Tertiary School	6	7.5	2	5

Source: Field Survey, 2001*

NOTE*This study was carried out before Fadama Project and it scope was therefore outside Fadama

Table 2: Prevalence of malaria among farming households

Prevalence of malaria by Gender	Number of Infected	% Infected
Male	102	60
Female	68	40
Prevalence of malaria by Age Groups		
Male: ≤ 18	20	11.8
≥ 18	81	47.6
Female: ≤ 18	10	5.9
≥ 18	59	34.7
Prevalence of malaria by household population		
Population of person in household sample 461	170	36.9

Source: Field Survey, 2001

Table 3: Preventive Methods Used by Household

Methods	Households Number	Annual cost incurred (₦)	Average cost/households (₦)	%
Mosquito Coils (MC)	29	10,580	364.8	52.7
Mosquito repellent	2	3,480	1,740	3.6
MC/MR	19	35,190	1,852.1	34.5
MC/BN*	3	18,120	6,040	5.6
MR/BN	1	6,780	6,780	1.8
MC/MR/BN	1	7,270	7,260	1.8
Total	55	81,420	1480.2	100

Source: Field Survey, 2001.

*BedNet are purchased at local market. Free net were not available as reported by respondents.

Table 4: Cost incurred by households on Treatment methods

Methods	Households Number	%	Annualcost incurred (₦)	Average Cost/ households(₦)
Hospital(H)	6	8.2	27,200	4,533.3
Chemist(C)	12	16.4	34,900	2,908.3
Hometreatment(HT*	2	2.8	3,000	1,500
H/C	39	53.4	441,180	11,312.3
H/HT	2	2.8	17,400	8,700
C/HT	6	8.2	46,800	7,800
H/C/HT	6	8.2	90,300	15,050
Total	73	100	660,780	9,051.8

Source: Field Survey, 2001

*Home treatment refers to treatment received at home by the used of contortions or local treatment by native doctors.

Table 5: Other Cost Incurred by Households on Malaria Treatment

Methods	No of households	%	AnnualCost Incurred (₦)	Average cost per households (₦)
Transportation T	39	56.6	21,540	552.3
Subsistence S*	3	4.3	6,900	2,300
Miscellaneous M	…..	…..	……	……
T/S	21	30.4	70,080	3,380
T/M	4	5.8	13,850	3,462.5
T/S/M	2	2.9	17,820	8,910
Total	69	100	131,090	1,899.9

Source: Field Survey, 2001

Note* Subsistence refers to cost associated with feeding or diet related during malaria infection period while miscellaneous are other cost outside food and transportation. Miscellaneous cost were never incurred alone by an of the households

Table 6: Indirect Cost of Malaria due to days of Work Lost

Days of work lost by the sick	Adult Male	Adult Female	Children	Total
No of household members	81	59	30	170
Day lost/Member	76.5	74.5	59.5	205.7
Age Coefficient	1	0.75	0.5	
Wage rate*	250	250	250	250
Time Cost	1449900	824156.3	223500	2497556
Average Cost	17900	13968.8	7450	12487.8
Days of work lost by the Caretaker of the sick				
No of household member	21	50	15	86
Day lost/Member	78.5	74.3	66.8	219.6
Age Coefficient	1	0.75	0.5	
Wage rate	250	250	250	
Time Cost	412125	696562.5	125250	1233937.5
Average Cost	19625	13931.3	8350	14348.1

Source: Field Survey, 2001

Note* Wage rate was the same in value term; that is 250 but different in absolute term because wage rate is multiply with age coefficient to estimate the actual wage that accrued to each member of the household

Table 7: Proportion of Income on Spent on Control methods

Source	Average Income/ Annum ₦	Average cost on Direct Prevention ₦ (a)	Average cost on Direct Treatment ₦ (b)	Average cost on Indirect ₦ (c)	Average Other Cost ₦ (d)	Total (a+b+c+d)
Average per household(₦)	480000	1607.5	9051.8	12487.8	1899.9	25047
% of Average incomeon Aversion	Average Income/ Average cost	0.33	1.89	2.60	0.39	5.21

Source: Field Survey, 2001