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Malaria Treatment and Farming Households' Income Poverty in Lagos State, Nigeria

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ABSTRACT Malaria pandemic threatens economic, social and environmental sustainability throughout sub-Saharan Africa and the world at large. Malaria at the micro-level imposes two significant cost categories (morbidity and mortality costs) on households with the poor being disproportionately affected. This study empirically explores and analyzes the malaria morbidity, treatment burden and its economic effect on farming households' income in Lagos, Nigeria. Primary data was used and a sample of 150 farm households through a multistage sampling technique was drawn from the study. The data collected was analyzed using descriptive statistics and Multinomial logit regression. Location, educational level and total days of incapacitation were found to be significant to the agricultural households' choice of malaria treatment, seventy percent the respondents do not use modern preventive measures of malaria control, poor sanitary conditions, household size of 8, and riverine nature of the environment were some of the identified factors responsible for high malaria incidence in the study area. Malaria incidence however had significant effects on the households' health and income. The findings recorded an average annual income of ₦ 700,505.20k, income loss of ₦ 21,500 due to 13 days of incapacitation, ₦ 12,650 treatment cost and 5.3 percent annual income loss per malaria episode by a household member. The disease's impact on the agricultural sector is widely felt through its deepening effect on farming households' poverty status. A couple of multipronged approaches for tackling malaria shock and its poverty flaw were therefore recommended by the study.

INTRODUCTION

The global impact of malaria on human health, agricultural productivity, and general wellbeing is profound, and Africa has been particularly hard hit. In 2012, it was estimated that malaria resulted in 627,000 human deaths, although African children under the age of five years constituted the majority. Also in 2006, more than ninety percent of deaths from malaria occurred in the continent, where 45 of the 53 countries are endemic for the disease. Malaria costs Africa more than USD 12 billion annually, and it slows economic growth in African countries by as much as 1.3 percent per year (Asenso-Okyere et al. 2012).

Malaria is a health problem that is scientifically known to be caused from mosquito bites. The criticality of malaria illness evidenced through morbidity often shows the disease as a serious economic problem. There were an estimated 243 million cases of malaria in 2008, causing 863,000 deaths, eighty-nine percent of them in Africa (UN 2010). Also, in 2010, there were 219 million malaria cases leading to around 660,000 malaria deaths, mostly among African children (UNICEF 2013).

The World Health Organization estimates released in 2013 emphasized that there were about 207 million cases of malaria in 2012 (with an uncertainty range of 135 million to 287 million) and an estimated 627,000 deaths with most death incidents among children living in Africa where a child dies every minute from malaria (Organization 2014) . US (2013), as cited by Omotayo and Oyekale (2013), submitted that hundreds of millions of people living in sub-Saharan Africa are afflicted with malaria parasites, while about twenty-five percent of them may simultaneously experience one or more infections. It was further noted that economic costs of malaria to the country could be in the range of one to six percent of annual Gross Domestic Product (GDP).

Malaria according to the World Health Organization (World Health Organization 2012) is the second leading cause of death from infectious diseases in Africa, after HIV/AIDS. Its mortality effect was largely traced to poverty in the developing nations of Africa. Malaria is a major public health problem in Nigeria where it accounts for more cases and deaths than any other country in the world (UN 2010). The malaria factsheet opined that approximately half of

the world's population is at risk of malaria. Majority of malaria cases and deaths occur in sub-Saharan Africa. However, Latin America, Asia and to a lesser extent, the Middle East and parts of Europe are also affected.

Malaria is a serious health shock for over ninety-five percent of Nigeria's population with the poor bearing the brunt of the disease as they lack the purchasing power for adequate healthcare, and hence settle for all sorts of poor health seeking habits while the few remaining percent of the population live in the malaria free highlands. It attacks an individual on average of four times in a year with an average of 10 to 14 days of incapacitation (Alaba and Alaba 2009). Apart from the recent global economic downturn, malaria pandemic is another key impediment to the full achievement of the first and sixth Millennium Development Goals (MDGs). To recap the sixth goal, it is to combat HIV/AIDS, malaria and other diseases, which till date remain a mirage, to fully actualize.

According to Olalekan et al. (2011), higher incidence of poverty profile in Nigeria's rural areas have been traced to shocks. Oyekale and Yusuf (2010) opined that some environmental problems are associated with agricultural production, high vulnerability to health hazards, which malaria is inclusive in this part of the world. Currently there is no licensed vaccine against malaria or any other human parasite. Malaria affects agricultural systems by affecting the health of the farm principal operators. Poor health due to malaria illness results in loss of work days or decreases workers' capacity, decreases innovation tendency and ability to explore diverse farming practices and as such, makes farmers capitalize on farm specific knowledge, which will not help in this present dispensation.

Malaria can therefore be said to have direct and indirect impact on the farmers' income, wealth, productivity and labor market participation of both the sick and the caregivers. This in turn translates into income loss and eventually poverty through the sick and the caregivers to the households. Directly, it affects physical strength and work days/hours available for farm work. Since agricultural productivity is dependent on physical strength and stamina, and therefore good health, it is more probable that malaria shocks directly affect worker productivity. Indirectly, malaria involves high medical expenditures and tends to deprive farming households of resources to invest in experimentations on improved practices and adoption of new technology.

The major objective of this study is to determine the cost implication of malaria treatment on the farming households' income (that is, income from both farm and off-farm activities) of the rural households in Lagos State, while the specific objectives are to access the malaria treatment choice adopted by households and their socio-economic characteristics, days of incapacitation, cost loss to malaria and ascertain the level of awareness of households' to modern preventive measures in the study area. This will add to existing literature on malaria in sub-Saharan and provide veritable platform for policy-making on necessary economic, social, public and health interventions. It was hypothesized in a null form that malaria treatment cost and choice does not significantly affect agricultural households' income poverty.

MATERIAL AND METHODS

Study Area

The study was carried out in the Epe local government area of Lagos state, Epe is a riverine region located on a slightly elevated land ranging between 30-60 meters above the sea level and bordering the shores of the Lagos and sheltered Lekki Lagoon (mangrove swamp forests). Based on 2006 National Population Census, Epe Local Government area has a total population of 323,634 people of which 153,360 were males (National Bureau of Statistics 2009). Epe local government lies about 89 km northeast of the city of Lagos. Peculiarly Epe is like other areas within Lagos, yet it is quite unique because it is a part of Lagos in the political context but closer to Ogun State geographically. The main occupation of the people is farming but fishing abounds in the riverine area of the local government. The local government area (LGA) yields substantial volumes of rice, cassava, oil palm, cocoa, plantains, banana, maize and ginger. The major rural communities under the Local Government are Epe, Ilara, Otta-Ikosi, Ejinrin, Eredo, Odoragunsen, Mojoda, Ibowon, Itoikin, Ketu, Odo-Ayandelu, Orugbo, Igbonla, Itaoko, Yegunda, Molajoyo, Okeegun, Erinmope, Iganke, Araga and Aferanet.

Sampling Procedure

The data was collected using a multistage sampling procedure. Stage one involved selection of Epe local Government out of the 57 LGAs in Lagos state. At stage two, three malaria holoendemic communities, that is, Epe, Ejinrin and Eredo were chosen. The communities were purposively selected because they constitute centers of massive water body, intensive traditional agricultural activities and some of their agricultural practices have potentials for promoting breeding of female anopheles mosquitoes, which are known as the major carrier of the malaria pathogen. The next stage was random selection of 50 households from each of the three selected communities (Table 1). Pre-tested structured questionnaires were administered to the respondents and the questions were translated into the local language (Yoruba) for proper understanding by the respondents. Data collected include socio-economic profiles, malaria incidence, treatment and its impacts on farm labor availability, allocation and treatment choices.

Table 1: Sample outlay design for the study

Selected community	*Respondent number*
Epe	50
Ejinrin	50
Eredo	50
Total	150

Source: Field survey

Method of Data Analysis

Multinomial Logit (MNL) Model of Respondents Choice of Malaria Treatment

The MNL model is employed to quantify the determinants of the factors influencing malaria treatment choice (healthcare provider, traditional treatment and combination) by smallholder farmers in the study area. This model was used because it is the standard method for estimating unordered, multi-category dependent variables. It also assumes independence across the choices, that is, it does not allow correlation or substitution between them (Wooldridge 2008). Instead of having two dichotomous alternatives (0,1) as in the bivariate probit, the multinomial logit has S possible states or categories that is, S = 0,1,2,3…S, that are exclusive and exhaustive. In this analysis, the three categories considered were given as (0) healthcare provider, (1) self-care, and (2) combination. The multinomial logit model does not treat these categories in any continuous order, and it is different from ordered or sequential logit/probit models. If there is a random sample of farmers 0,1,2,3…N, given three choice categories, s = 0,1,2, the Multinomial Logit model assigns probabilities *P* to events characterized as the respondents' in *s* categories. The vector of the characteristics of the nutrition is denoted by *s*. To estimate this model there was a need to normalize on one category, which is referred to as the reference state. The multinomial logit model for choice across S states (S= 0,1,2) can then be specified as:

$$Y_{(0,1,2)} = \delta 1X1+\delta 2X2+\delta 3X3+\delta 4X4+\delta 5X5\ldots+\delta 9X9+e$$

Where,

$Y_{(0,1,2)}$ = Index (healthcare provider, self-care and combination)

Y = Choice of malaria treatment

X_1=Household size

X_2= Age

X_3=Sex

X_4= Marital status

X_5=Educational level

X_6=Knowledge about malaria

X_7=Treatment cost

X_8=Total cost of prevention

X_9= Total days of incapacitation

e = Error term

RESULTS AND DISCUSSION

Socio-economic Characteristics, Malaria Knowledge and Treatment Choice of Respondents

Distribution of some socio-economic characteristics of the sampled respondents is in Table 2.This shows that 88.67 percent of the sampled households were male, while only 11.33 percent were female, a high number of male over female household head was observed in the study area. In cases where there were female household heads, it was due to the fact that they were either widowed, divorced or single individual and this gender ratio is ideal for agricultural practice as the male respondents will have more strength for productivity since agriculture in the tropics is largely labor intensive. Also, the Table shows that majority of the house-

Table 2: Frequency and percentage distribution of respondents' socio-economic characteristics

Socio-economic characteristics	*Frequency*	*Percentage*	
Sex			
Male	133	88.67	
Female	17	11.33	
Total	150	100	
Age			
21-30	22	14.67	
31-40	32	21.33	
41-50	37	30.67	
51-60	46	24.67	
60-70	9	6.00	
71-80	4	2.67	Average
Total	50	100	Age = 43
Marital Status			
Single	20	13.33	
Married	113	75.33	
Widow	9	6.00	
Divorced	8	5.33	
Total	150	100	
Years of Education			
Primary education	19	12.66	
Secondary education	58	38.67	
Tertiary education	36	24.00	
No formal education	37	24.67	
Total	150	100	
Household Size			
1-5	47	31.33	
6-10	71	47.33	
>11	32	21.33	Average
Total	150	100	HHS = 8
Farming Experience			
< 5	8	5.33	
6-10	38	25.33	
11-15	35	23.33	
16-20	40	26.67	
> 25	29	19.33	Average
Total	150	100	= 17years
Households' Tribe			
Yoruba	98	65.33	
Igbo	13	8.67	
Hausa	17	11.33	
Others	22	14.66	
Total	150	100	

Source: Field survey

hold heads in the study area are middle-aged individuals who have the potential to productively engage in one agricultural activity or the other since the average age of households' head in the study area is 43 years.

More so, the Table shows that 75.33 percent of the household heads sampled were married, 13.33 percent were single while six percent and 5.33 percent widowed and divorced were recorded in the study area. Majority of the agricultural households survey are married categories. Poverty decreases as the level of education increases (World Bank 2001), and the Table further shows that 12.66 percent of the total household head samples only had primary education, 38.67 percent had secondary school education, twenty-four percent had tertiary education while 24.67 percent of the household heads had no formal education in the study area. It can be deduced that 62.67 percent of the sampled household heads in the study have basic education, which will in some ways help them in their farming enterprise.

In addition, the respondents' years of farming experience was averaged at 17 years, and this is a good thing as the wealth of experience by the farming households will help in their production activities in the study area. Also, 65.33 percent of the respondents were Yoruba, 8.67 percent were Igbo, and 11.33 percent of them were Hausa, while 14.33 percent fell into other tribal categories. Finally, the household size is a factor affecting the level of poverty incidence, depth and severity in rural farming households in Kogi State (Omonona 2001). An average household size of 8 was derived from the study, and this is a good source of readymade and back-up labor for farmers in the study area during the production stages especially the harvesting period, which is generally known as one of the most laborious periods of agricultural production. However, its negative impact is overcrowding and poor welfare of residents as supported by the findings of other researches (Mwabu and Thorbecke 2001; Mwabu 2002; Oluwatayo 2007) and that small-sized households are less prone to poverty than large-sized households because the income per capita (a measure of wellbeing status) of the former is usually larger than that of the latter.

Table 3 shows that 50.67 percent of the agricultural households cultivate less or equal to 2 hectares of land, thirty-two percent cultivated

Table 3: Distribution of farmers by the farm size cultivated

Farm size (Hectares)	*Frequency*	*Percentage*	
≤ 2	76	50.67	Average
3–5	48	32.00	Farm
6 –8	20	13.33	Size=
8–10	6	4.00	3.1Ha
Total	150	100	

Source: Field survey

3-5 hectares, 13.33 percent cultivated 6-8 hectares while four percent cultivated 8-10 hectares of land, the finding gave an average of 3.1 hectares in the study area, which means that the respondents are subsistent farmers. This is also in line with existing literature that farming households' small size of land cultivated could be as a result of poor health as poor health reduces the ability of farmers to operationalize changes in agricultural systems (Oluwatayo 2007).

An average day of incapacitation due to malaria in a year according to the study was 13 days per annum according to Table 4. This is actually similar to the findings on malaria by a study in the Oyo state of Nigeria, which recorded that the average number of workdays lost per malaria episode by productive adults in the agrarian households was 16 days (Alaba and Alaba 2009).

Table 4: Distribution of farmers by number of days of incapacitation due to malaria

Days of incapacitation/annum	*Frequency*	*Percentage*	
≤ 5	5	3.33	Average=
6 –10	37	24.67	13days
11 –15	62	41.33	
16 –20	42	28.00	
21 –25	4	2.67	
Total	150	100	

Source: Field survey

Table 5 explains the level of awareness and use of modern preventive measures (MPM) by farmers, it is interesting to note that thirty percent of the households were aware and use MPM in the study area, 48.67 percent of the respondents were aware but do not use MPM mainly because of economic, health and some other personal reasons. Dirty and unkempt environment was generally observed in the study area. Also, 21.33 percent of the agricultural households were not aware of modern preventive measures. There is a considerable improvement in the farmers' level of awareness about modern preventive measures of malaria but the purchasing power to execute it is the main challenge faced by rural farmers, more effort is needed by the WHO, Roll Back Malaria (RBM), and other initiatives to provide subsidized malaria preventive facilities to the poor farmers who economically bear the brunt of malaria burden.

Table 5: Farmers level of awareness and use of Modern Preventive Measures (MPM)

Level of awareness	*Frequency*	*Percentage*
Aware and use MPM	45	30
Aware /Doesn't use MPM	73	48.67
Not Aware	32	21.33
Total	150	100

Source: Field survey

The data in Table 6 is represented in and it shows respondents' treatment choices in the study area. From these results, 64.67 percent of the respondents used healthcare providers such as chemist, private, public hospitals, 29.33 percent used self-care through the use of herbal treatment, religious centers, traditional healers, hawkers and home nurses self-medication, consult pastors, imam when they fall ill of malaria while six percent of the respondents use a combination of the treatment means. Malaria treatment approach in the study area is still bad as there are still a large number of respondents using self-care and combination of any medication and some even believed malaria is an act of God, and this is largely due to their poor health knowledge and low-income level. In addition, some households often seek formal treatment for malaria after the failure of self-administered treatments (Kazembe et al. 2007).

Table 6: Distribution of respondents means of treatment

Treatment means	*Frequency*	*Percentage*
Health care providers	97	64.67
Self-care	44	29.33
Combination	09	6.00
Total	150	100

Source: Field survey

Table 7 shows the average cost expended by farming households on malaria per annum. The treatment cost is ₦12,650.00, total cost of incapacitation is ₦21,500.00, total cost of prevention is ₦1,975.00, and total loss due to malaria is ₦ 36,125.00 (addition of these three costs). More so, total food expenditure is ₦ 255,500.00, total non-food expenditure is ₦ 220,200.00 and the respondents are with an average income of ₦ 700,505.20 k/annum. This also implies that respondents lost 5.2 percent of their income per annum on malaria by just a household member.

This corroborates with previous findings in that the direction of causality of the economic impact of malaria may not necessarily be through uncultivated arable land and unavailable labor only, but also through lost capital and purchasing power (Malaney et al. 2004).

Table 7: Distribution of cost categories of farming households' income poverty

Cost categories	*Average cost per agricultural household (₦)*
Total cost of incapacitation	21,500.00
Total cost of prevention	1,975.00
Treatment cost	12,650.00
Total cost (loss) due to malaria	36,125.00
Total non-food expenditure	220,200.00
Total food expenditure	255,500.00
Total household income (off farm+farming income)	700,505.20

Source: Field survey

Malaria Shock, Income Poverty and Households' Poverty Status

Income poverty is an economic term, which describes a person or family who lives on or below the minimum acceptable way of life as a result of poor income generation. It is a term that is peculiar with the rural households who are perpetually stigmatized with low-income attributes. This study finds out that malaria burden actually increase the households' poverty as an event of malaria episode gulps ₦ 36,125 or better still, 5.2 percent of annual household income per household member per annum. Also, given the average household income of ₦ 700,505.20/annum from both farm and off-farm activities, it implies that an household makes ₦ 58,375.43k per month and if this should be divided by the mean household number, which was given as 8 by this study, it connotes that malaria shock deepens the households' poverty as their per capita income goes below the World Bank bench line of USD 1.25 (₦250) per day.

However, malaria morbidity cost implication put majority of the rural farmers below the benchmark with varying degrees of poverty determined by the frequency of the pandemic within the family circle. This is in line with WHO's (World Health Organization 2012) malaria factsheet report, which opined that malaria remains inextricably linked with poverty and the highest malaria mortality rates are being seen in countries that have the highest rates of extreme poverty (proportion of population living on less than USD 1.25 per day).

Factors Explaining Households' Malaria Treatment Choice

Table 8 shows that the multinomial logit regression analysis was carried out to determine the preferred malaria treatment choices (self-care, healthcare provider and combination of both) in which "combination of both" stood as the reference state, and the following observations were inferred. It was observed that factors that make households to choose self-care (for example, herbal treatment, religious centers, traditional healers, hawkers and home nurses) are sex, treat-

Table 8: Multinomial logit regression of respondents' treatment choice

Variables	*Self-care coefficient*	*p>|z|*	*dy/dx*	*Health care provider*		
				Coefficient	*p<|z|*	*dy/dx*
HHS	.3660589	0.134	.0014801	-1.119064	-0.547	-.0027807**
Age	.0747161	0.158	-.0000401	.0846543	0.045	.003029**
Sex	-2.234304	0.084	-.00703*	-1.238396	0.210	-.0341929
Treatment cost	3.957608	0.027	-.0245**	-1.512746	0.256	-.0249194
Location	-38.6197	1.000	-.0771991	-3.507455	0.081	-.3920***
Marital status	-3.853916	0.105	-.0246**	-2.980139	0.132	-.00236**
Educational level	-5.4437	0.004	-.0098***	-3.232061	0.030	-.27008**
Severity of illness	-4.024008	0.066	-.00966*	-1.08475	0.524	-.0451705
Waiting time	-3.492184	0.112	-.0058511	-1.894471	0.294	-.1357199
Tribe	-1.443181	0.272	-.007997*	1.636802	0.104	0.052329
Total day of incapacitation	-.2557263	0.024	-.0047**	-.1819342	0.053	-.059***
Constant	4.639061	0.152		3.182275	0.233	

*significant @ 10%,**significance @ 5%,***significance @ 1%
Source: Field survey

ment cost, marital status, educational level, severity of illness, tribe and total days of incapacitation. Treatment cost was observed to have a positive relationship with the respondents' choice of self-medication. In other words, the higher the treatment cost, the higher the tendency to go for self-medication by the respondents. It was observed that sex, marital status, educational level, severity of illness and total days of incapacitation were negatively significant with the respondents' choice of self-care approach of treating malaria. This implies that the sex and marital category, which a respondent belongs to is significant but has a negative relationship with the choice of self-care method. Also, the higher the educational level of respondent, the lesser his or her flair for choice of self-care, and this comes up as a result of the fact that education enlightens and makes one have better knowledge about health and its importance. In addition, severity of illness was observed to establish a negative and significant relationship with choice of self-care method in the study area in that the less severe the illness, the more the respondents' tendency to go for self-care alternatives, and this happens because most will ordinarily think the initial symptoms were because of the day-to-day activities, especially the labor-demanding nature of agricultural enterprises, thereby taking any medication in their reach.

Furthermore, the respondents' tribe was shown to be negatively significant to the preference for self-medication while days of incapacitation also were observed to be negative and significant with the choice of self-care alternative in the study area. That is, days of incapacitation increases with the choice of self-care alternatives, this is scientific and logical in all spheres as the choice of self-medication is not ideal for treatment of malaria in order to prevent the mortality consequence that might come up as a result of that. In the same vein, some significant factors that determine the choice of healthcare providers (that is, government hospital, private hospital, clinic and chemist) in the study area. The significant factors that determine the respondents' choice of healthcare provider in the treatment of malaria were household size (HHS), age, location, marital status, educational level and total days of incapacitation. It was observed that the respondents' age is significantly positive while location, respondents marital status, educational level, household size and total days of incapacitation were negative and significant to choice of healthcare provider for malaria treatment. This implies that older respondents choose any of the healthcare providers than the younger farmers, this is logical because older farmers need more medical attention than the younger folks in the study area, as agriculture is a labor-demanding venture. On the other hand, there is a significant and negative relationship between respondents' location and the choice from the healthcare alternatives, that is, the farther the respondents residence to the healthcare provider, the lesser the tendency to consult such healthcare providers in the study area.

In addition, there is a negative relationship between the healthcare treatment choice and the respondents' marital status and household size in the study area in that the higher the family size, the lower the chances of consulting healthcare service providers, and this can be largely traced to lack of adequate funds, as a higher family size increases poverty level of households. It was observed that the educational level of respondents has a negative relationship with the choice of healthcare provider in the study area. Higher number of healthcare providers makes the more educated doubt their services and hence, they go for another alternative of malaria treatment. Finally, the total days of incapacitation was recorded to be negatively significant to the selection of healthcare providers in the study area, and this implies that the more reduced the chances of selection of healthcare service, the higher the days of incapacitation due to malaria. Reduced chances of selecting any of the healthcare alternatives could largely be traced to lack of adequate purchasing power to pay bills, which invariably make them settle for any cheap alternative therefore leading to increased days of incapacitation by malaria.

CONCLUSION

Malaria is inextricably linked with poverty as it hits deep into the financial base of both, victims and caregiver(s) at every period in time. Malaria shock was established to disproportionately worsen the situation of rural farmers from their usual income poverty status to deepening their poverty status. Ill health from malaria caus-

es reduction in use of inputs, decrease in area planted (stocking density of livestock), changes in agricultural patterns, loss of agricultural knowledge (in case of mortality) and decline in farm output. The impact of poor health of the agricultural workforce as one of the major causes of chronic malnourishment (food insecurity) in sub-Saharan Africa. It shows how evil malaria is to the farmers as they rarely command serious economic value during those days. Unfortunately, agricultural practices and projects also increase the spread of malaria. Efforts to address the disease and improve agricultural development must take this two-way relationship into account. The study confirms improvement in level of awareness of malaria but no improvement in the use of modern preventive measures of malaria, as thirty percent of the respondents were aware and use modern preventive measures, 48.67 percent of them were aware but do not use modern preventive measures while 21.33 percent of the respondents were not aware and do not use modern methods of malaria prevention. In other words, it can be said that there is awareness of malaria but seventy percent of respondents cannot still afford modern preventive measures against mosquitoes that cause malaria. Furthermore, it was observed that increase in malaria incidence increases days of incapacitation, which in turn reduces the respondents' annual income by five percent with each treatment of malaria shock by a household member. More so, sex, marital status, educational level, severity of illness, tribe, treatment cost and total days of incapacitation were significant with the respondents' choice of self-care approach of treating malaria while household size (HHS), age, location, marital status, educational level and total days of incapacitation were significant to the households' preference for a healthcare provider. Finally, there is a significant reduction in the productivity and also the income (and welfare) of the farmers, although households with higher income were able to seek treatments from distant hospitals, which are far better in terms of service delivery.

RECOMMENDATIONS

This study therefore recommends a multipronged approach for tackling the malaria morbidity and its poverty consequence through:

- Reduction of taxes on agricultural produce should be encouraged by formulating and implementing workable agricultural policy that will address this.
- Mosquito nets and other commodities such as insecticides and efficient anti-malarial medication should be distributed to rural households, from time to time, as this will significantly reduce the economic burden of the malaria pandemic in rural areas where agriculture is being practiced.
- Hospitals, clinics and chemists should also be easily accessible, readily available and affordable to the poor farmers in order to meet their health needs or better still, free malaria treatment for rural farmers at all time
- Continuous high-level political commitment and mobilization of resources are required to apply the effective tools, medicines and control strategies already.

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