Original Research Paper

ECONOMIC EFFECTS OF MALARIA ON THE PRODUCTIVITY OF ARTISANAL FISHERS IN LAKE ONA, DELTA STATE, NIGERIA

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Abstract

This study investigates the effects of malaria-related factors on the productivity and income loss of artisanal fishers in Ona Lake, Delta State. For the study, 80 fishers were randomly selected and interviewed. A structured questionnaire was used to collect primary data from respondents. Collected data were analyzed with the aid of descriptive and inferential statistics. Ordinary least square technique of multiple regressions was adopted to establish relationships between productivity/income loss of fishers and malaria-related factors. The results of the study show about 72% of them to agree that malaria is the major health challenge affecting their income. The net income per fisher is \$40,000 per month and the rate of return on investment is 88%. It is shown in the study that the percentage income loss due to malaria attack is 16.03%. There was a significant difference (p < 0.05) in productivity of fisher with and without malaria attack. The results revealed that the income loss of the fishers significantly correlated with productivity, loss length of time of incapacitation, and cost of malaria treatment. Malaria intervention program by Delta State government and World Health Organization was recommended.

Keywords: Productivity loss; income loss; malaria; artisanal fishing; Lake Ona.

INTRODUCTION

Artisanal fishery is referred to as the extraction/ harvesting of fishery resources from coastal, brackish water, reservoirs, dams, lakes, and lagoons (Mapunda, 1993). It remains the most important source of fish in Nigeria. Fish is widely consumed across all geographical regions niches, religions and income groups in Nigeria (SLMAC, 2003). At present, a great gap exists between demand and supply of fish in Nigeria (CBN, 2008). With the increase in population, there will be a corresponding rise in demand for fish. Artisanal fishing is relevant in food security and poverty alleviations programmes of Nigerian government and thus relevant in realizing Millennium Development Goal (MDG) of poverty reduction. The fish sub-sector can be harnessed to meet its goal. But this production will depend on the capacity of the major actors such as the artisanal fisher folks. Eyo et al. (2006) reported that farmers' health status has a significant effect on their capacity to increase output, otherwise ill health could impact negatively on the number of hours spent on farm and amount of income earned.

Health risk and particularly malaria has some debilitating effects on the output and income through cost of health care, labour man days lost to malaria medication and physical weakness. Malaria disease accounts for as much as 40% of public health expenditure. The costs of coping mechanisms with the risk of malaria disease were excluded from previous studies, although they may significantly affect productivity and economic growth derivable from artisanal fishing sub-sector (Chima et al. 2002). There is need to determine the proportion of fisher's income that is lost to malaria treatment.

Furthermore, Opeolu and Oluwalana (2005)established a positive relationship between the health status and labour productivity of workers. To that extent, malaria predominates as a common health risk among artisanal fishers in lakes Ona. There is long term recurrent exposure of fishers to clinical and economical effects of disease. There is lack of empirical evidence on the effect of malaria on the productivity of artisanal fishers in the tropics, particularly, Delta State, Nigeria. Such evidence could be crucial in designing intervention and development programs that will improve the health status and productivity of artisanal fishers in this part of the tropics (Nigeria) This is the research gap that this study was designed to fill.

Specific objectives of the study were to:

i) assess the profitability of artisanal fishing in the study area;

ii) determine the effect of malaria on productivity and income loss of artisanal fisher folks in the study area.

Hypothesis 1: Malaria incidence has no significant adverse effect on productivity loss of artisanal fishers.

Hypothesis 2: Cost of malaria treatment, length of time of incapacitation and value of productivity loss has no significant adverse effect on the, income of artisanal fishers in the study area.

MATERIALS AND METHODS

Study Area, Sampling Technique and Data Collection

The study was conducted at Lake Ona which lies west of River Niger and has its source from the Utto spring. This Lake has three components, namely, Ona-Ododo, Ogbu and Obabala. The fishing communities around Lake Ona are located 8 kilometers from Asaba Metropolis, Nigeria. The bulk of the captured fishes are sent to Asaba and neighbouring towns for sale. As a result, Lake Ona is very relevant in the economy of the area. Systematic sampling technique was adopted to compose the sample for the study. The sample consisted of 80 respondents drawn from four fishing settlements, viz: Ugbaru, Anam, Isoko, and Ovugbara. Out of each settlement, 20 fishers were randomly selected and studied. Primary data used for the study were collected from the respondents with the aid of structured questionnaire and interview schedule.

Data Analysis Techniques

Data collected were analyzed using descriptive and inferential statistics. Profit equation was adopted to determine the net income of artisanal fishers in the study area. Labour loss of artisanal fisher was measured by loss of man day of labour of malaria sufferer. Loss in productivity of artisanal was determined as follow

Value of Productivity Loss (VPL) = The difference between the value of expected output and actual value of output of malaria victim.

Where:

Expected value: Monthly Revenue expected by fisherman under normal conditions $(\mathbb{N})^*$

Actual value of output: Monthly Revenue obtained with respect to malaria attack \mathbb{N})

The null hypothesis of no significant difference in productivity loss under normal and ill conditions was achieved by using Student's *t*-test.

Determinants of productivity loss were estimated by using Ordinary least square technique of multiple regression as presented below:

VPL = $\beta_0 + \beta_1$ INDVMP+ β_2 INCEXP + β_3 LTINCAP + μ Where:

VPL = Value of Productivity Loss (\mathbb{N})

INDVMP = Incidence of Malaria among members of household in a month.

INCEXP = Portion of income expended on malaria treatment.

 $\beta_1 - \beta_3 = \text{Coefficient of parameter estimates}$ $\mu = \text{Error term}$ =

RESULTS AND DISCUSSION

Income Analysis of Artisanal Fishing

The income analysis of artisanal fishing is presented in the summary statistics as follows > minimum income (\$ 32,000), maximum income (\$ 130,500), mean income (\$ 42,200).

The revenue derived from artisanal fishing activity is the product of the quantity of fish caught and the prevailing unit price in the market. The result of the study shows that the market price of fish ranges between 400 and \$500 per kg. The total revenue is \$45, 068.75 with total cost of \$5, 068.75 per fisher folk was reported in the study. Thus, the net income is determined as \$40, 000 per fisher. The return on investment (ROI) is 0.88 and rate of return is 88%. This indicates that every \$100 invested in artisanal fishing will yield a return of \$88 in the study area.

Percentage Income Loss of Malaria Infested Fishers

Analysis of Income loss of malaria infested fishers was carried out by determining the monthly income of fishers without malaria (Expected income) and the monthly income of malaria sufferers (actual income). Thus percentage income loss of malaria sufferer (fisher) was computed as:

Expected Income – Actual Income x 100 Expected Income 1

$$\frac{50,256.5-42,200}{50,256.5} \quad x \quad \frac{100}{1} = 16.03\%.$$

This result shows that 16.03% of income loss was due to malaria factor. This result implies that malaria is an inhibiting factor to income generation and welfare of fishers. Malaria is therefore a factor of poverty level among artisanal of fishermen in Lake Ona.

Productivity Difference with and without Malaria Factor

The productivity of fishers was evaluated under two scenarios – with and without malaria ailment. To that extent the income of the respondent was used as a measure of productivity. Student's *t*- test was adopted to test significant difference in productivity. The result is presented in Table1

Since the calculated *t*-value is greater than the critical *t*-value, the null hypothesis of no significant difference in productivity of fishers with and without malaria factor is rejected and the alternative hypothesis which says there is significant difference in productivity with and without malaria factor is accepted. This difference in income is the productivity loss due to malaria influence. The productivity loss is attributed to labour hours or man-day

^{*} note "N" is the symbol for national currency (Naira) in Nigeria.

	Mean Income (₦)	n	St. Deviation	DF	t.cal	t.tab	Remark
Without Malaria factor	50, 256.5	80	156.78	158	327.12	1.96	Sig.
With Malaria factor	42, 200.00	80	154.74				

Table1: Statistical Difference in Productivity Loss

lost by fishers due to malaria attack. Malaria must have created significant negative effect on the productivity and economic well-being of fisher folks in Lake Ona, Delta State, Nigeria. This result agrees with the earlier findings of Chima et al. (2003) that malaria could significantly affect productivity and economic growth in Africa.

Effects of Malaria Related Factors on Income Loss of Fisher

 Ho_2 : Value of productivity loss, length of time of incapacitation and cost of malaria treatment does not have separate significant adverse effects on the income of fishers in Lake Ona, Delta State.

i.e. Ho_2 : b_1 , b_2 , $b_3 = 0$

In the regression model an attempt was made to identify which of the coefficients of the selected malaria related factors provides a statistically significant effect on the income loss of fishers contribution to the specified model. The significance of the parameter estimates as evaluated by t- test indicated that value of productivity loss (VPL), length of incapacitation (LTINCAP) and cost of malaria treatment significantly and positively affect, income loss of fisher folks in the study area.

The estimated regression equation is presented as: $Y_{Loss} = 2.18 + 3.025 \text{ VPL} + 1.107 \text{ LTINCAP} + 1.097 \text{ CMTRT} + \mu (1.124) (8.355)* (2.158)* (2.400)*$ $R^2 = 76\%$, R^2 (adj.) = 73%. F = 8. 686, * = Significant at 1%

Where

$$\begin{split} & Y_{Loss} = \text{Income loss (N)} \\ & \text{VPL} = \text{Value of productivity loss (N)} \\ & \text{LTINCAP} = \text{Length of incapacitation (days)} \\ & \text{CMTRT} = \text{Cost of Malaria treatment (N)} \\ & \mu = \text{Error term.} \end{split}$$

The R^2 value of 76% indicates that 76% variation in the income loss of fisher folks was explained by the joint effects of malaria related factors. The result further indicates that all the three explanatory variables were significant and entered the model with the expected signs, thus conforming to a priori expectation. The alternative hypothesis which states that the value of productivity loss (VPL), length of incapacitation (LTINCAP) and cost of malaria treatment (CMTRT), have significant adverse effects on the income loss of fishers is upheld. At this point, the relationship between income loss of fisher folks and individual malaria related factors is elucidated.

Value of Productivity Loss (VPL)

The value of productivity loss of fisher folks was significant (P < 0.05) and entered the model with a positive sign. This implies that there is positive relationship between income loss and value of productivity loss of fisher folks. Value of productivity loss (VPL) is the amount of revenue loss with respect to loss of labour man day under malaria attack. The result is in agreement with Ernst and Zibrak (1998) who reported that headache and body weakness as common health problems are associated with the productivity of farm workers. Opeolu and Oluwalana (2004) have earlier concluded in a separate similar study that good health will enhance productivity of farm workers.

Length of Incapacitation (LTINCAP)

The finding of this study indicates that the length of incapacitation of malaria sufferer has a positive and significant relationship with income loss of fisher folks (P < 0.05). The length of incapacitation is the length of time (days) that malaria sufferer (fisher) was economically inactive and could not go out for fishing. The positive coefficient of this variable is indicative of the fact that the fisher would lose some amount of income due to inability to fish for the period. The income that would have been earned for the period of incapacitation is lost. Thus there is the possibility of monthly income short fall.

Cost of Malaria Treatment (CMTRT)

This variable entered the model with a positive sign and is significant (P < 0.05). This result implies that increasing cost of malaria treatment will translate to more loss of the fisher income. This is even worse when many members of the family are infested with the disease. This will have an adverse effect on the already very low income of the fisher. The ultimate effect is a worsened poverty situation.

CONCLUSIONS

Artisanal fishers are important economic agents whose relevance cannot be over emphasized in Nigerian

economic growth. In order for Nigeria to record a significant breakthrough in fish supply through artisanal fishing and to achieve the Millennium Development Goals of food security and poverty alleviation, fishers must be healthy to enhance their productivity in Lake Ona, Delta State, Nigeria. This study has revealed that malaria factors such as incapacitation could reduce labour man day of a fisher who suffers from malaria. This could translate to productivity loss and loss of revenue, Also this study shows that the surveyed fishers spent sizeable portion of their already meager income on the treatment of malaria for themselves and members of their households. To that extent, malaria attacks both the body and money of sufferers. In this regard, it can be recommended that malaria related variables should be factored into the production and revenue functions of artisanal fishers folks. Also government should collaborate closely with WHO for malaria intervention programme in the study area.

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