Farmers Utilization of Insecticide Treated Bed Nets for Malaria Prevention in Ahoada East Local Government Area, Rivers State, Nigeria

Franklin E Nlerum*

Department of Agricultural and Applied Economics/Extension, Rivers State University of Science and Technology, Nkpolu-Oroworukwo, Nigeria

Abstract

The study examined the utilization of insecticide treated bed nets for malaria prevention by rural farmers in Ahoada East Local Government Area of Rivers State, Nigeria. The sample size of the study was 100 respondents who were randomly selected from farmers in the area who benefited from the free distribution of the nets by Rivers State Government. The questionnaire was used in eliciting data from the respondents. Data were analyzed with percentage, mean score and multiple regression. Socio-economic result shows that the respondents on the average were 40 years old, earned monthly net income of N24,184.00 ($121.38) and spent 11 years in schooling. More results indicated that while the ownership of the net was as high as 71.73%, the actual utilization was as low as 28.27%. Result of multiple regression analysis indicated a multiple determination (R^2) value of 0.6333. Determinants of the utilization of the net were age, sex, occupation and educational level of the respondents. The two major constraints in the utilization of the net in the area were inadequate information and poor design and inconvenience of hanging. In order to improve the rate of utilization of the net in the area, the study recommends enhanced information which will lead to a better education of the beneficiaries. A better design which will reduce the inconveniences associated with hanging of the nets is also recommended.

Keywords: Farmers; Utilization; Insecticide; Treated bed nets

Introduction

Malaria exerts a significant health and economic burden on Nigerians. "According to the statistics of the Federal Ministry of Health [1]", malaria was responsible for 60% of out-patient visits to health facilities, 30% of childhood deaths, 25% of infant deaths and 11% of maternal death, and an estimated annual loss of 132 billion Naira, in the form of treatment and prevention costs, and loss of man-hours amongst other losses. Rivers State government in the south-south Nigeria distributed more than two million mosquito treated bed nets. The target of the State was to provide two nets to every household in the state of which farmers were among. Ownership as used in this study means all those who received the free nets. Utilization in other hand was used to describe all those who actually put the nets into continuous use. Recently, it has been shown that the use of insecticide-treated bed nets can reduce malaria morbidity by 50% to 60% and malaria mortality by 20% as indicated by Azondelon et al. [2].

Meaning of insecticide treated nets (Itns)

ITN is a form of personal protection that has been shown to reduced malaria illness, severe disease and death caused by malaria endemic regions according to the Centre for Disease Control and Protection [3]. Approximately, 40% of the world's population (mostly those living in the poorest countries are at the risk of malaria as indicated by Adogu and Ijemba [4]. Although bed nets form barrier against mosquitoes around people sleeping under them, bed nets treated with an insecticide are much more protective than untreated nets. ITN was introduced in Nigeria in the year 2000 as an effective means of preventing mosquito bites and malaria transmission as stated by Ukibe et al. [5]. In 2012, an estimated 627,000 people died of malaria in the sub-Sahara Africa according to Centre for Disease Control [3].

Effects of malaria on farmers

Malaria costs Africa more than 12 billion dollars annually and it slowed economic growth in African countries by as much as 1.3% per year as shown by Adebayo et al. [6]. When malaria attacks farmers, their health is hampered, resulting to the reduction of agricultural production. In the fight to increase food production in the tropics, farming communities suffer most from malaria according to the New Agriculturist [7]. This is because malaria effect on farmers leads to fever which results into incapacitation. The study of Oluwatayo [8] has shown that farmers who were susceptible to malaria infection suffered about 10 days of incapacitation.

Malaria causes reduced farm labour according to Eboh and Okeibunor [9] because its attack leads to the death of farmers. Malaria also leads to financial insecurity in that its attack leads to increased expenditure on malaria treatment. In addition, malaria infection reduces the use of agricultural innovations as shown by GBC Health [10] because premature death of trained farmers from malaria hinders a further use of the acquired agricultural innovations. According to the World Health Organisation [11] there were 214 million new cases of malaria worldwide and 438,000 malaria deaths in 2015 with African as the most affected region. The economic burden of malaria on production efficiency among farmers in Oyo State, Nigeria was as higher as N7, 578.71 according to Adekunle [12].

The rational for the study was that, despite the free distribution of insecticide treated bed nets by the State government of which farmers were among the beneficiaries, malaria problem is still rampant among farmers in the study area. The goal of the study was therefore to know

*Corresponding author: Nlerum FE, Department of Agricultural and Applied Economics/Extension, Rivers State University of Science and Technology, Nkpolu-Oroworukwo, Port Harcourt, Nigeria, Tel: +234 903 885 8167; E-mail: frankezi@yahoo.com

why farmers still suffer the burden of malaria after receiving the free nets. The study objectives therefore analyzed the socio-economic characteristics of the farmers, determined the level of ownership and utilization and ascertained constraints to the use of the nets by farmers.

Research Methodology

According to the Federal Republic of Nigeria [13], malaria in Nigeria is transmitted by the vector specie called Anopheles mosquito with a very high rate of prevalence in the country. This study was conducted in Ahoada

East Local Government Area of Rivers State. Rivers State is located in the Niger Delta, south-south of Nigeria, and has a topography of flat plains netted in a web of rivers and tributaries as shown by the Rivers State Economic Summit [14]. Ahoada East Local Government Area is one of the 23 Local Government Areas of Rivers. It is in the West Senatorial District. The people are predominantly farmers.

Primary data for the study were obtained with a structured questionnaire which was designed by the researcher. The questions contained in the questionnaire elicited data to cover the objectives of the study. A trained enumerator for this purposed distributed and collected the questionnaire from respondents. The population of the study was made up of all farmers who received the free insecticide treated bed nets in the area. A sample size of 100 respondents was randomly selected from the list of farmers who benefited from the free nets in the Local Government Headquarters. Twenty farmers were drawn from each of the five randomly selected communities of the study area [15]. The communities were Abarikpo, Ihuaje, Odiabide, Ogbo and Ula-Ihuda. Data were analyzed with percentage, means of a Likert-type rating scale and multiple regression analyses using the Statistical Programme for Social Sciences (SPSS) version 15 and Excel, 2007. The scoring for constraints in the use of the bed net was done with a four point Likert- type rating scale. The points in the scale were very severe (4 points), severe (3 points), and averagely severe (2 points) not severe (1 point). A cut-off mean (mid-point) was obtained by adding 4, 3, 2 and 1 and dividing the sum by 4 to have 2.50, as used by Ugwoke [16]. Results showing means which were equal or greater than 2.5 were interpreted as severe constraints, while those with less than 2.50 were interpreted as not severe constraints.

Results and Discussion

The results in Table 1 show that 60.0% of owners of the free insecticide treated bed nets distributed by the state government in the study area were males, while females represented 40%. This finding indicates that more males benefited from this activity of the government than females. Married respondents represented a higher proportion of ownership of the insecticide treated bed nets with 43.0%. The age range of 30-40 years with 71.0% represented the highest age of owners of the treated mosquito nets. The mean age was 40 years. This mean age represented a very active age, showing that many who received the insecticide treated mosquito nets were in their active ages.

The finding however shows that age range of 50-60 was 7.0%, while that of those above 60 years was 5.0%. This result seems to indicate that as the age of respondents increases to 50 and upwards the interests shown in the use of the net decreases. Further results showed that 66.0% of the respondents were full-time farmers, while 34.0% were part-time farmers, showing that farming is the main livelihood source of the people in the study area. The result on the monthly farm net income range of N24,500.00–N32,000.00 with 51.0% was the highest for these respondents. The monthly mean income was N24,158.00

Characteristics	Frequency	Percentage %	Mean	Standard Deviation
Sex	-	-	-	-
Female	40	40	-	-
Male	60	60	-	-
Total	**100**	**100**	-	-
Marital Status				
Single	32	32	-	-
Married	43	43	-	-
Divorced	8	8	-	-
Separated	-	-	-	-
Widowed	17	17	-	-
Total	**100**	**100**	-	-
Age in years				
Below 30	-	-	-	-
30–40	71	71	40 years	0.61
40–50	17	17	-	-
50–60	7	7	-	-
Above 60	5	5	-	-
Total	**100**	**100**	**-**	**-**
Occupation				
Full-Time Farming	66	66	-	-
Part-Time Farming	34	34	-	-
Total	**100**	**100**	-	-
Monthly net income (in Naira)				
Less than 7,500.00	6	6	-	-
7,500 – 15,000	11	11	-	-
16,000 – 23,500.00	15	15	-	-
24,500.0032,000.00	51	51	24.158.00	0.78
Above 32,000.00	17	17	-	-
Total	**100**	**100**	-	-
Educational Status (Years of Schooling)				
Primary	14	14	-	-
Secondary	45	45	11.0 years	0.9
Tertiary	25	25	-	-
Non	16	16	-	-
Total	**100**	**100**	-	-

Source: Field survey, 2012. One dollar: N199.25 (Naira) as at october, 2015

Table 1: Socio-economic characteristics of insecticide treated bed nets in Ahoada East Local Government Area.

($121.39). This mean income shows that an average farmer in the area earned more than N18,000.00 which is the monthly minimum wage of civil servants in Rivers State. The mean income also connotes that farmers in the area were out of the poverty line which is below $1.00 per person per day by reason of the fact they earn about $4.05 per day. For educational attainment, secondary level was the highest with 45.0%. The mean number of years spent in schooling was 11 years, while as much as 16.0% of the farmers have not attempted any form of formal education. The low standard deviation for age (0.61), income (0.78) and educational level (0.90) shows the reliability of the socio-economic factors.

Table 2 shows that the highest ownership of insecticide treated bed nets was in Ogbo community with 98.0%. They also occupied the highest position in terms of utilization with 48.0%. This result showed a gap of as much as 50.0% between the ownership of the net and its utilization. Abarikpo community had 96.0% ownership and as low as 5.0% in utilization. This community was the least (5th position) in terms of utilization of the nets. The trend in the utilization of the treated bed nets in this study agrees with the study of Ukibe et al. [5] in Anambra State, Nigeria where out of the 60% of the respondents that owned

the treated net, 46% of them actually utilized it. The Anambra State respondents also left some gaps between ownership and utilization as with the findings of this study.

The result of the test of hypothesis in Table 3 shows that the linear function had the highest multiple determination (R^2=0.6333) and a reasonable number of significant variables. The linear function was therefore used for the interpretation of the result. The R^2 of 0.6333 indicates that about 63.33% of the variation in utilization of the net was accounted for by the joint action of the five socio-economic variables investigated. Consequently, the variables with significant coefficients were age (X_1), sex (X_2), occupation (X_5) and educational level (X_6). These four variables were considered as being important determinants in the utilization of insecticide treated mosquito bed nets among these respondents. This result agreed with the one of Sena et al. [17] that age of respondents was significant to utilization of ITNs in Ethiopia. F-ratio which was 0.6052 was significant. This meant that the combined effect of the independent variables played important role in the utilization of the nets.

Table 4 shows that the most severe (3.35) constraint to the utilization of the nets in this study area was inadequate educational information on how to make the best use of the nets. The finding agreed with the study of Teklemariam et al. [18] where lack of enough education was a constraint to the use of ITN by respondents. This constraint tends to imply that the nets were distributed to beneficiaries without adequate education on how to use them. The second severe constraint with the mean of 3.30 was poor design and inconvenience of hanging. This finding agreed with the study of Omotayo and Oyekale [15] which indicated that inconvenience in hanging was a constraint in the use of mosquito treated bed nets in Ido area of Oyo State, Nigeria. The third and fourth severe constraints to the use of the nets in this study area were distance to health centers for advice and inadequate health extension workers with the mean of 3.22 and 3.20 respectively. The results further shows that out of the eight constraints analyzed in this study, six of them had severe effects in the utilization of the treated bed nets in the area. These constraints would have been responsible for the high disparity between ownership and utilization of the net as identified in Table 2 of this study.

Limitation of the study

The limitation of the study was that poor educational levels of some farmers made it difficult for them to fully respond to the questionnaire on their own. This limitation was however tackled with the use of trained enumerator who explained some parts of the survey instrument to fairly educated respondents.

Conclusion and Recommendations

The study has shown that there was a high disparity between ownership of the insecticide treated bed nets and actual utilization among farmers in this study area. The actual mean utilization of the net was as poor as 24.4%, while the mean ownership on the other hand was as good as 72.4%. Socio-economically, the recipients of the nets on the average were 40 years of age, had monthly net income of N24, 184.00 (Naira), and 11 years of schooling experience. The major constraints which were responsible for the poor utilization of the nets in this study area were inadequate information on how best to use the nets, poor design and inconvenience of hanging. In order to increase the rate of utilization of the nets by farmers in the area, the study recommends improved information delivery on how best to benefit from their use and improvement in design to reduce the inconveniences associated with their hanging.

Community	Ownership Percentage (%)	Ranking	Utilization Percentage (%)	Ranking
Abarikpo	96	2nd	5	5th
Ihuaje	45	5th	38	2nd
Odiabidi	66	3rd	37	3rd
Ogbo	98	1st	48	1st
Ula Ehuda	57	4th	36	4th
Mean	**72.4**	-	**25.4**	-

Source: Field survey, 2012. Multiple responses were allowed

Table 2: Percentage distribution of ownership and utilization of insecticide treated bed nets in the area (n=100).

Model Summary & Fitness	Parameters	Linear	Semi-log	Double-log
	Multiple R Square (R^2)	0.6333	1.455	-0.162
	F-ratio	0.6053*	0.1881**	0.725*
	P-value of the f-ratio	0.0044	5.4261	0.7344
Co-efficients estimates	Variables	70.17	4.2509	0.628
BO	Intercept	0.101 (-1.0)NS	-2.22 (0.32)*	-3.36 (-1.53)**
B1	Age (X_1)	7.65 (0.29)*	2.034 (-2.3)*	0.308 (-1.11)NS
B2	Sex (X_2)	0.52 (0.02)*	-0.64 (-0.10)*	-0.188 (-0.07)NS
B3	Marital Status (X_3)	2.91 (-0.11)NS	1.06 (-0.23)NS	(0.12)NS
B4	Income level (X_4)	11.01 (-0.42)NS	2.39 (-1.06)NS	0.38 (0.10)
B5	Occupation (X_5)	21.85 (0.85)**	3.08 (1.65)*	0.48 (2.1)*
B6	Educational Level (X6)	20.70 (0.81)**	2.73 (1.05)*	0.43 (1.5)*

Source: Field survey, 2012. Figures in parentheses are t-ratios: *=Level of significance at 0.05%, **=Level of significance at 0.01%, NS=Non significance

Table 3: Summary of multiple regression analysis of relationship between respondents' socio-economic characteristics and utilization of the treated bed nets.

Constraints	Total Score	Mean	Ranking	Decision
Cultural barrier and superstition	290	2.9	6th	Severe
Religious prohibition	160	1.6	8th	Not Severe
Feeling of suffocation	210	2.1	7th	
Inadequate educational information on use	335	3.35	1st	Not Severe
Inadequate health extension workers	320	3.2	4th	Severe
Distance to health centres for advice	322	3.22	3rd	Severe
Feeling of heat inside net	315	3.15	5th	Severe
Poor design and inconvenience of hanging	330	3.3	2nd	Severe

Source: Field survey, 2012. Cut-off mean=2.50

Table 4: Summary of mean distribution of constraints to utilization of insecticide treated mosquito bed nets (n=100).

Biography of Author

Dr. Franklin Eziho Nlerum, has a Ph.D. in Rural Sociology and Development. His research interests are in Agricultural Extension, Rural Sociology and Rural Development. Currently, he is a Senior Lecturer. He has worked in Rivers State Agricultural Development Programmed as a Block Extension Supervisor, Subject Matter Specialist (Agronomy/Plant Protection) and an Assistant Director of Agriculture. He has published over 40 papers in both local and international journals. He is an Editorial Board member of Pyrex Journals (Journal of Agricultural Extension and Rural Development) and he is also a member of some professional bodies in his field of research interest.

References

1. Federal Ministry of Health (2009) "National Malaria and Vector Control Division". Annual Report 2008. Abuja, Nigeria.

2. Azondelon R, Gnanguenon V, Oke-Agbo F, Housevoessa S, Green M, et al. (2014) "A tracking tool for long-lasting insecticidal (mosquito) net: In 2011 national distribution in Benin", Parasite and vectors.

3. Center for Disease Control and Prevention (2015) "Insecticide treated bed nets".

4. Adogu POU, Ijemba C (2013) "Insecticide treated nets possession and utilization among pregnant women in Enugu, Nigeria: A descriptive cross-sectional study". JNSR 3: 40-47.

5. Ukibe SN, Mbanago JI, Ukibe NR, Ikeakor LC (2013) "Level of awareness and use of insecticide treated bed nets among pregnant women attending ante-natal clinics in Anambra State, South-Eastern Nigeria". JPHE 5: 391-396.

6. Adebayo O, Olagunju K, Adewuyi SA (2015) "The impact of malaria disease on productivity of rural farmers in Osun State, Nigeria. Studia, Mundi-Economics 2: 86-94.

7. New Agriculturist (2015) "Points of View: Malaria and agriculture".

8. Oluwatayo IB (2013) "Socio-economic burden of malaria on productivity of rice farmers in rural south-west, Nigeria". MJSS 5: 175-185.

9. Eboh EC, Okeibunor JC (2005) "Prevalence and impacts of farm household labour uses and productivity in the irrigated rice production system of Omor community, Nigeria". Tanzania Health Research Bulletin 7: 7-15.

10. GBC Health (2012) "Linkages between malaria and agriculture".

11. World Health Organisation (2015) "Fact sheet: World malaria report 2015".

12. Adekunle SW (2013) "Economic burden of malaria and production efficiency among farming households in Oyo State, Nigeria". IJRSR 4: 1467-1650.

13. Federal Republic of Nigeria, Nigeria malaria indicator survey (2010)" Final report, National Population Commission, Abuja, Nigeria, 2012.

14. Rivers State Economic Summit (2001) "Report on First Rivers State Economic Summit Committee, Port Harcourt" April 21st – 3rd May.

15. Omotayo AO, Oyekale AS (2013) "Effect of Malaria on farming households' welfare in Ido Local Government Area of Oyo State, Nigeria". JHE 14: 189-194.

16. Ugwoke FO (2005) "Constraints in implementing the agricultural sector employment programme of National Directorate of Employment in Enugu State, Nigeria. Global Approaches to Extension Practice 14: 55-63.

17. Sena LD, Deressa WA, Ali AA (2013) "Predictors of Long-lasting insecticide-treated bed net ownership and utilization. Evidence from community-based cross sectional comparative study, Southwest, Ethiopia". Malaria J 12: 1-9.

18. Teklemariam Z, Awoke A, Desie Y, Weldegebreal F (2015) "Ownership and utilization of insecticide-treated nets for malaria control in Harari National Regional State, Eastern Ethiopia". Panafrican-Med-J 21: 1-9.