KSÜ Tarım ve Doğa Derg 23 (1): 212-220, 2020
KSU J. Agric Nat 23 (1): 212-220, 2020
DOI:10.18016/ksutarimdoga.vi.610360

Household Health and Returns of Arable Crop Farming in Osun State, Nigeria

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ABSTRACT

The study examined the effect of household health on returns of arable crop farmers in Osun State, Nigeria. A multi-stage sampling technique was used to select 240 crop farmers from whom data were obtained from February to April 2019. Data collected were analysed with the aid of descriptive statistics and multiple regression analysis. The hypotheses were tested using paired sampled t-test. The result obtained showed that high proportion of the farmers were males with mean age of 44 years. Majority of the farmers were married and educated with mean household size of 8 persons. The average farming experience of respondent was 16 years with mean farm size of 2.28ha.They have average income of ₦258, 412.5k. The most common illness was malaria. The result showed that 42.1% of farm income was lost to treatment of illnesses. Majority of the people patronize traditional medication whenever they are sick. The variables that had negative and significant relationship with profitability in the model were age, household size, number of time ill, number of days lost and cost of treatment. Farm size and farming experience bore positive sign and had significant relationship with arable crop farmer's profitability at 1% 5% and 10% probability. The result of the t-test result showed that illness affect number of days worked, output, income and expenditure of farmers. It was recommended that more affordable health service providers should be provided to reduce cost.

Research Article

Article History
Received : 25.08.2019
Accepted : 10.10.2019

Keywords
Household
Illness
Output
Profit
Arable crop farming

To Cite: Gbigbi TM 2020. Household Health and Returns of Arable Crop Farming in Osun State, Nigeria. KSU J. Agric Nat 23 (1): 212-220, DOI:10.18016/ksutarimdoga.vi.610360

INTRODUCTION

Agricultural development is the foundation for economic growth and agricultural sector is the prime area of consideration for economic progress. An appraisal of the previous achievement of agriculture ever since the 70s in Nigeria undoubtedly contributed more than 30% of the gross domestic product (GDP) and employment of about 68% of the labour force compose of over 70% of the non-oil exports as well as providing over 80% of the food need of the nation(Adesugba and Mavrotas, 2016). However, food supplies come from the smallholder farmers and it has been noted that these farmers are prone to various welfare problems. One of these problems is their vulnerability to health risks. Good health cannot be overemphasized because the sustainability and viability of a nation's economy is mainly dependent on its vibrant health sector (Oteh et al., 2016).The principal aim of a good health care arrangement is to make sure that people have stress-free access to worthy care of the suitable kind in order to maintain and improve their health status. Similarly, a good health system should ensure that households are protected from incurring high health care expenditure that adversely affects their welfare. Observations show that agricultural production and productivity are linked to health status of those involved in farming. Healthy people are expected to have a higher level of human capital and would be more prolific than those without good health. Pitiable access to healthcare by the poor households is not only due to inadequate or absence of health facilities but also because of their low purchasing power evidenced by their earnings and expenditure patterns. This is due to the type of healthcare financing mechanism available (Banik, 2017). The outcome of health outlay on profitability can be stark among the arable crop farmers. Serious illnesses stereotypically upsurge medical outlays of household resulting a reduction in household income (Rashad and Sharaf, 2015; Naseer, 2016). At the household level, illness decreases labor efficiency of the farmers, increases health expenses and reduces the ability of households to accumulate assets (Babiarz and Yilmazer 2017; Oyedeji et al., 2016). Bloom et al., (2019) and Lu et al., (2017) established that the health of a population plays an important role in microeconomic and economic outcomes. Dupas and Miguel (2017) opined that poor health affects farmers

productivity and income. When the farm principal operator gets sick, agricultural systems will be affected. Musa (2018) opinions were that health capital could be affected by malaria fever, musculoskeletal disorders, HIV/AIDS, farm injuries, yellow fever, typhoid fever, schistosomiasis, diarrhea, respiratory diseases and skin disorders. These diseases make farmers to underutilize the available farm inputs for maximum performance. Health challenges negatively have an emotional impact on agriculture and economic development by reducing labor hours for economic activities, premature loss of young human resources and high cost of disease treatment which adds to the pecuniary encumbrance of households (Fiorella et al., 2017). Berry (2017) put forward that high costs, distance to health services, inadequate awareness of illness types are the limiting factors of adoption of preventive and control measures in Africa. Mitra et al., (2016) opined that farmers suffering from illness might be weak, unable to work, unable to provide for children and other dependents. This scenario adversely affects farm profit. The financial status of the agrarians must be taken into consideration when discussing issue related to health and agricultural production because poor health denies households of their productivity potential which is capable of affecting household disposable income and savings ability and investment activities. From the countries' perspective, poor health reduced economic productivity and labor force (Bevan, 2015). The consequence of this was low gross domestic product (GDP) and gross national income (GNI) respectively.

In Africa, studies by Onyema, and Nyenke (2019) also revealed negative effects of ill-health on real GDP growth. For example, Yamou and Molua (2018) used Ordinary Least Squares estimation methods to estimate the effect of poor health on production and farm labor availability in Southern Cameroon and reported that poor health of farm labor leads to loss of output due to work absenteeism that negatively affects economic growth. A similar approach was also employed to examine the wage and labor supply effects of illness in Nigeria and the results revealed that for one additional disabled day, the estimated impact on annual earnings is about 3% reduction (Olowogbon et al., 2019).

Several studies have also exposed that illness has led to considerable drains on homes that have a sick household member. These include loss of time from work by the sick person, time spent by other family members in caring for the sick fellow, loss of productivity, cost in the hunt for treatment (comprising transportation and medical attention), and untimely death.

Illness will result in loss of workdays or decrease worker ability, decrease innovation ability and capacity to discover different farming practices (Ha et al., 2016). They opined that the health of a farmer militate against farm performance and call for policy issues in Nigeria. Baranov and Kohler (2018) centered on the broad effects of illness on agricultural households, the result was only implied, not directly estimated. Studies that measured the direct effect of illness on agricultural production did not take into consideration the awareness of the hours of days of lost on farming due to health problems (DeVaro and Heywood 2017).

Effects of poor health on agricultural production is gaining a lot of attention in policy debates in recent times. Most of the debates were anchored on malaria on productivity. Scholars such as Achoja (2011) have also found that malaria have adverse effect on productivity of artisanal fishers. In Abia State, the socioeconomic effects of poor health on crop farmers is a rapid deterioration of the economy resulting to low standard of living (Iheke and Ukaegbu 2015). A study on illness effect on the welfare of arable crop farmers is deficient in the study area. Hence this study is to fill this knowledge gap in the literature.

The objective of this study was to present some empirical evidence of the effect of illness on the welfare of arable crop farmers in Osun State, Nigeria. The specific objectives were to:

i. describe the socio-economic characteristics of the farmers
ii. identify different health services providers patronized
iii. determine the effects of illness on the welfare of farmers

Hypotheses

i. There is no significant effect of illness before and during on the number of days worked
ii. There is no significant effect of illness on output before and during
iii. There is no significant effect of illness on income before and during
iv. There is no significant effect of illness on health expenditure before and during

MATERIALS and METHODS

Area of Study

The study was conducted in Osun State, Nigeria. Osun State lies between latitude 7°11North and 8°21 North and between longitude 3°56 East and 5°47East. The State comprises of three agricultural zones namely Iwo, Osogbo and Ife/Ijesa. Osun state lies within the tropics and has two dissimilar seasons, the dry and rainy seasons. The dry season is within November to mid-March while the rainy season begins in mid-March to October. It has a temperature of 22°C to around 35°C.The study covered six of the LGAs which include Ife North, Ife South, Ife East, llesa East, Orolu, Egbedore. They were preferred due to active participation in farming activities. The predominant

crops cultivated include sweet potato, yam, maize, vegetables, cassava, sesame, sorghum and groundnut.

Sampling Procedure and Data Collection Techniques

Multi-stage sampling method was used for this study. Firstly, four (4) local government areas involved in arable crop farming were purposively selected. Secondly, four communities were erratically picked from each of the LGAs making a total of sixteen communities. Thirdly, fifteen (15) registered arable crop farmers were randomly chosen from each of the sixteen (16) selected communities. This gave a sample size of two hundred and forty (240) arable crop farmers for the study. Primary data were collected from February to April 2019 with the aid of structured questionnaire.

Descriptive statistics, multiple regression model and t-test analysis were used in the analysis of data.

Model Specification

Multiple regression model was used to determine the effect of illness on welfare of arable crop farmers. The model is specified as:

Y = f (AGE, GEN, HHS, EDU, FEXP, NOTI, NODL, COTFS, e) (1)

Where,

Y = profit as proxy for welfare (₦)
AGE = age of respondent (years)
GEN= gender (1= Male, otherwise =0)
HHS= household size (Number of persons)
EDU = educational level (years)
FEXP= farming experience (years)
NOTI= number of times ill (per month)
NODL= number of days lost due to illness (per month)
COTFS= cost of treatment for illness/month (₦)
e = error term

RESULTS and DISCUSSION

Socio-Economic Characteristics of Respondents

Gender of Respondent

The result as presented in Table 1, majority (65%) of the farmers was males while the remaining 35% were females. This indicated that arable crop farming is dominated by male farmers. This could be as a result of the tedious nature agricultural activities.

Age of the Respondent

Majority (34.2%) of the respondents fell between 46-55 years age bracket. This was followed by 27.1% of respondents between age brackets of 36-45 years. About 19.6% of respondents fell between 26-35 years age bracket. The result also showed that 15.8% of respondents were above 55 years. Only 3.3% of the respondents were 25 years old and below. The average age of the respondents was computed as 44 years. This implies that the respondents are still in their active age bracket to effectively carry out arable crop farming.

Marital Status of Respondent

The result disclosed that majority (72.1%) of respondents were married while 20% of respondents were single. About 4.6% and 3.3% of the respondents were widowed/er and divorced respectively. The result implies that the majority of respondents are married in the study area. This could contribute to labour availability for agricultural production.

Educational level of Respondents

The result showed that 10.8% of respondents had no formal education while the remaining 89.2% of respondents had formal education at varying degrees. Out of this 89.2% that had formal education, 27.1% of them attended primary school 43.3% attended secondary school while 18.8% had higher education. Educational level would enable them in their approaches towards treatment and prevention to patronize the best health facilities.

Household size of Respondents

The result displayed that majority (47.9%) of respondents had household size of 5-8 persons, followed by 32.5% of them who had household size of 9-12persons. About 13.3% had household size of 1-4 persons while only 6.3% of them had above 12 persons in their household. The mean household size was 8 persons. Increase in household size could enable healthy members to take care of the sick ones.

Farming experience of Respondents

The result revealed that majority (53.3%) of respondents had between 11-20 years of experience. This was closely followed by 25.8% of them having 10 years and below experience in arable crop farming. About 14.2% had between 21-30 years of farming experience. Moreover 5% and 1.7% of the respondents had between 31-40 years farming experience and above 40 years of experience. The average year of arable crop farming experience of the respondents was 16 years.

Farm size of Respondents

The result exposed that 66.3% of respondents had between 1-2ha of farmland, 28.3% of them had 3-4 ha while only 5.4% had 5-6 ha. The mean farm size of the respondent was 2.28 ha. This showed that farmers are smallholder farmers.

Income level of Respondents

The result showed that 32.5% of respondents had an annual income of ₦10,000-₦200,000, 30% of them had between ₦201,000-₦ 300,000 while 37.5% had annual income above ₦300,000. The average income of the respondent was computed as ₦ 258,412.5.

Table 1. Socio-Economic Characteristics of Respondents (N=240)

Variables	Frequency	Percentage (%)	Mean/mode
Gender			
Male	156	65.0	Male
Female	84	35.0	
Age (years)			
25 years and below	8	3.3	44 years
26-35	**47**	**19.6**	
36-45	**65**	**27.1**	
46-55	**82**	**34.2**	
Above 55	38	15.8	
Marital status			
Married	**172**	**72.1**	Married
Single	**48**	**20.0**	
Widowed	**11**	**4.6**	
Divorced	8	3.3	
Educational level			
No formal education	26	**10.8**	
Primary education	65	**27.1**	
Secondary education	104	**43.3**	Secondary
Higher education	45	18.8	
Household size			
1-4 persons	**32**	**13.3**	
5-8 persons	**115**	**47.9**	8 persons
9-12 persons	**78**	**32.5**	
Above 12 persons	15	6.3	
Farming experience			
10 years and below	**62**	**25.8**	
11-20 years	**128**	**53.3**	16 years
21-30 years	**34**	**14.2**	
31-40 years	**12**	**5.0**	
Above 40 years	4	1.7	
Farm size (ha)			
1-2ha	**159**	**66.3**	2.28 ha
3-4 ha	**68**	**28.3**	
5-6 ha	13	5.4	
Income level (₦)			
10,000-100,000	**22**	**9.2**	
101,000-200,000	**56**	**23.3**	
201,000-300,000	**72**	**30.0**	**₦** 258,412.5
301,000-400,000	**68**	**28.3**	
401,000-500,000	**16**	**6.7**	
Above 500,000	6	2.5	

Type of illness

In Figure 1 showed the percentage of respondents plague-ridden by malaria diarrhea and typhoid fever. The result revealed that 46% of them were infected by malaria only. About 23% of the respondents were infected by only typhoid fever, while about 9% of the respondents were affected by diarrhea only. However, the composition of respondents infected by more than one disease was about 10% for malaria and typhoid fever, 5% for typhoid fever and diarrhea, 4% for malaria and diarrhea and only 3% had malaria diarrhea and typhoid. The results showed that malaria was the most prevalent disease among farmers. This was closely followed by typhoid fever.

Health service providers patronized

The result as presented in Figure 2 indicates that majority (45%) of respondent's patronized traditional medical center. This was followed closely by 26% who patronized general hospital (GH) whenever they are sick. About 12% of them who patronized private hospital (PH) to receive treatment whenever ill. About 8% and 7% of respondents visit community health center (CHC) and other centers for medical attention

whenever they are sick while only 2% of respondents visit the federal medical center (FMC) to consult a physician for treatment whenever they are not in good health.

Table 2 revealed that the respondents incurred 35% health expenditure was on malaria only. This was closely followed by 18% cost of treatment on typhoid only. About 13% was spent on malaria and typhoid by the farmers out of the total cost of treatment amount of ₦108,810. The mean income of respondents was ₦ 258,412.5 per farming season. This implies that the respondents lost 42.1% of farm income on different illnesses during the previous farming season. The result was also presented on the chart for clarity (Fig. 3).

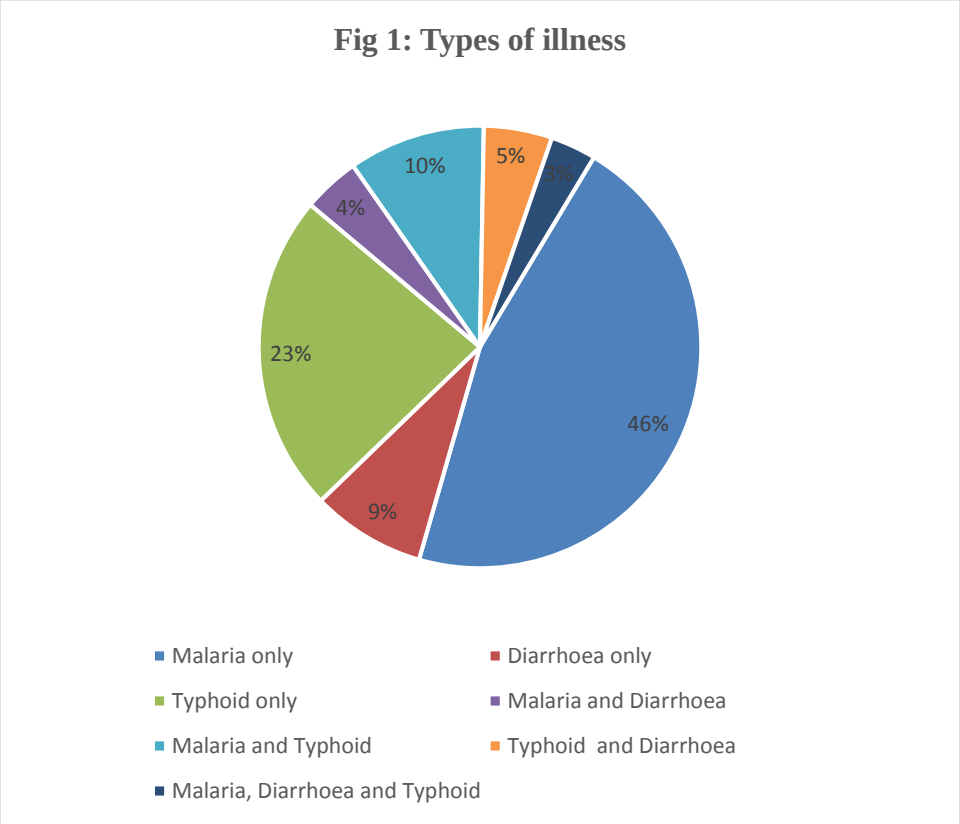

Figure 1. Types of illness

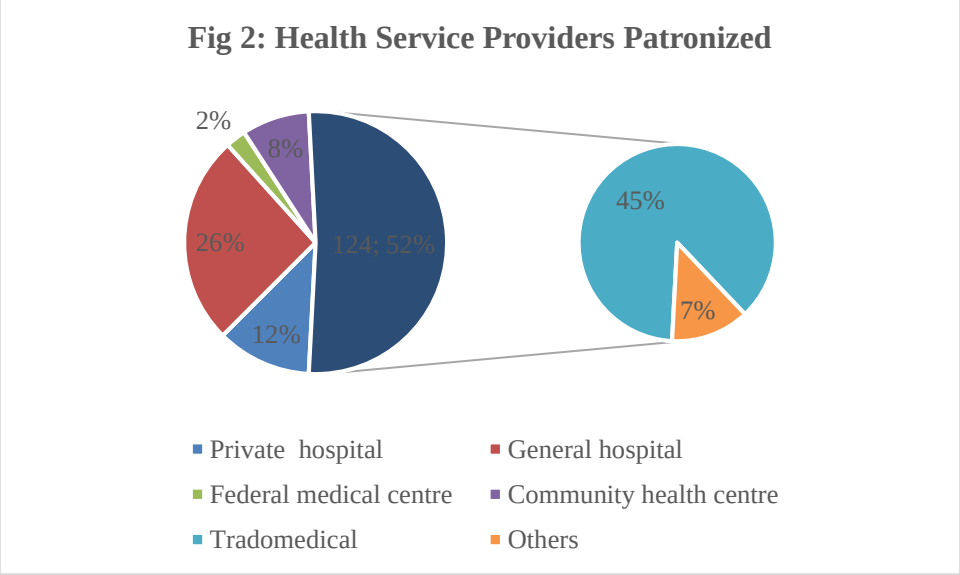

Figure 2. Health service providers patronized

Table 2. Cost of Treatment on illness by Respondents

Illness types	Amount spent (₦)	Percentage (%)
Malaria only	38700	35.0
Typhoid only	19480	18.0
Diarrhea only	9780	9.0
Malaria and Typhoid	13850	13.0
Malaria and Diarrhea	8600	8.0
Typhoid and Diarrhea	7400	7.0
Malaria, Typhoid and Diarrhea	11000	10.0
Total treatment cost	108810	
Total household mean	258,412.5	
Percentage income loss to illness		42.1

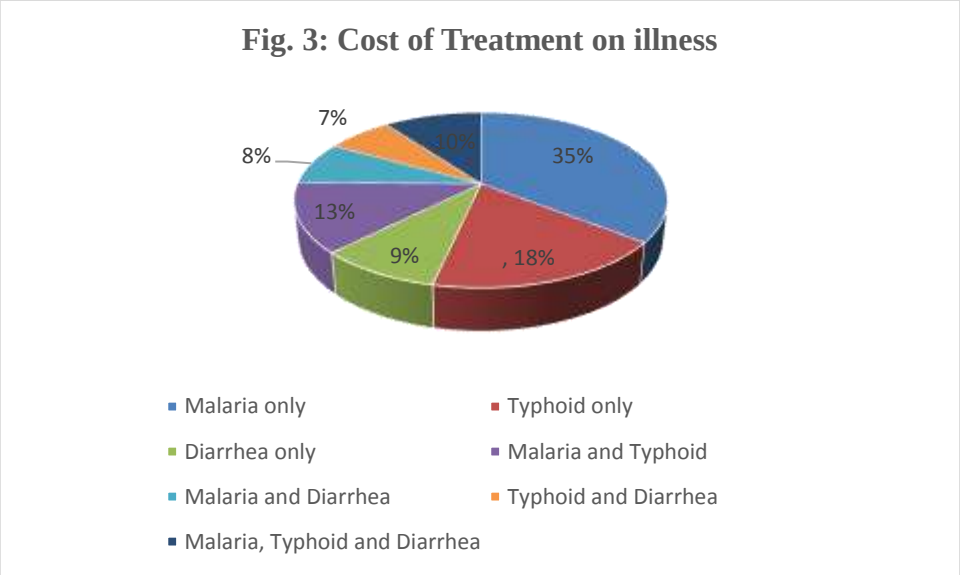

Figure 3. Cost of treatment on ilness

Factors Influencing Arable Crop Farmers Welfare

The regression analysis was carried out to determine the variables influencing arable crop farmers welfare in the study area. Based on the economic and statistical criterion, the linear model was chosen as the lead equation and the results are as presented in Table 3. The coefficient of determination R^2 value was 72%. This implies that 72% variation in arable crop farmers welfare was explained by the joint effect of the independent variables. The F-ratio was significant at 1% level of probability meaning that all the explanatory variables put together to explain the welfare of arable crop farmers.

The coefficient of age (-1.121028) was negative and statistically significant at 10% probability level. This implies that increase in age will lead to a corresponding decrease in the profit of arable crop farmers. This may possibly be due to accumulated exposure to health risks causing further illness in old age.

The coefficient of household size (-0.5970152) was negative and significant at 10% level of probability, this means that an increase in household size will lead to a corresponding decrease in the profit of arable crop farmer.

The coefficient of farming experience (0.6908589) was positive and highly significant at 1% probability level. This implies that a unit increase in farming experience will lead to the same increase in the profit of arable crop farmers in the study area. The coefficient of number of times ill (-65.65998) was statistically significant at 1% probability level but this variable was negative. This means that increase in the number of times ill by the respondents will lead to a corresponding decrease in the profit generated by the respondent in the study area.

The coefficient of days lost (-75.69445) was negative and significant at 5% level of probability. The implication is that a unit increase in the number of days lost as a result of illness will lead to a corresponding decrease in the profit of the arable crop farmers. This finding agreed with Onuche et al., (2014) that number of days lost to malaria illness by household had a negative and significant effect on agricultural crop production. The coefficient of cost of treatment (-0.0069595) was highly significant and negative at 1% probability level. This implies that increase in cost of treatment will lead to a

corresponding decrease in the profit of arable crop farmers in the study area. The result agrees with Ibitoye et al., (2016) that cost of treatment reduces profit realized from farming.

The coefficient of farm size (11.22112) was positive and significant at 5% level of probability. This implies that a unit increase in farm size will lead to a corresponding increase in the profit of arable crop farmers in the study area. The regression coefficient of gender (5.758247) was positive and statistically not significant, implying that gender has no statistical effect on the profit of arable crop farmer in the study area. The coefficient of educational level (-5.906719) and cost of planting material (-0.0000203) were negative and statistically not significant, implying that educational level and cost of planting material has no significant effect on the profit of crop farmers in the study area.

Table 3. Factors Influencing Arable Crop Farmers Profitability

Variables	Linear	Semi log	Exponential	Double log
Age	1.121028 (-1.70)*	20.62139 (-0.82)	0.0600592 (-1.47)	1.075318 (-1.30)
Gender	5.758247 (0.53)	0.6854929 (0.35)	0.254223 (0.38)	-0.0506489 (-0.78)
Household size	-0.5970152 (-1.87)*	5.909782 (0.68)	-0.0553224 (-0.36)	-1821672 (-2.86)**
Educational level	-5.906719 (-1.04)	1.096924 (0.10)	-0.7083926 (-2.01)**	-0.382418 (-1.04)
Farming experience	0.6908589 (7.24)***	92478.52 (3.26)***	0.0014914 (0.01)	0.2477243 (1.70)*
Numbers of times ill	-65.65998 (-3.64)***	-4.957981 (-2.48)**	-0.0001816 (-3.16)***	-100964.1 (-3.63)***
Numbers of days lost	-75.68445 (-2.32)**	-221189.6 (-5.00)***	-11.54886 (-28.00)***	-0.2002922 (-2.05)**
Cost of treatment on illness	-0.0069595(-6.40)***	-5.82548 (-8.80)***	-0.0008412 (-11.86)***	-0.6891484(-31.71)***
Farm size	11.22112 (2.19)**	30.3676 (3.06)***	-0.160898 (-0.50)	215922.9 (4.88)***
Cost of planting material	-0.0000203 (-0.01)	-3.624348 (-0.51)	0.0000503 (0.35)	-0.0033058 (-0.01)
Constant	29.5716 (7.47)***	-51.01671 (-0.48)	-5.100377 (-2.21)**	-5.267109 (-1.52)
R^2	0.7206	0.5756	0.7179	0.9421
F-ratio	17.82	10.44	19.60	125.18

***, **, and * =significant at 1%, 5%, and 10% probability level respectively. Figures in parentheses are the t-values

T-Test on Differences in Variables Before and During Illness by arable crop farmers

Paired samples t-test is a type of analysis that tests whether there are significant differences between variables especially during illness. There were four variables of interest which were number of days worked, output, income and expenditure. These variables were compared between two periods. Period 1 represents the period of illness and Period 2 which is the period before farmers get sick.

The paired samples statistics Table 4 shows differences in means on the number of days worked, output, income and expenditure during and before illness. The result shows that the mean number of day worked before illness was 11.6134 which decreased to 1.6723 during illness. The mean difference between before and during illness was 9.94118 with a standard error of 0.72822.The paired t-test result showed that this is statistically significant at 1% probability level. This implies that the farmers experience a decrease in number of days worked after been sick. This suggests further that the farmer lost an average of 9 days per farming season.

The result revealed that the mean output from farming activities before the farmer get sick was 2557.1429kg while during illness the mean output was 1638.3193kg. The mean difference between before and during illness was 918.82353kg with a standard error of 72.00084. The paired t-test result showed that this is statistically significant at 1% probability level. This implies that farmers had more farm output before illness than during illness. The result further infers that the farmer lost an average output of 918kg per farming season. The results indicate that the mean income generated from the sales of farm produce before illness was ₦15269.0756 while the mean income during illness was ₦5028.5714. The mean difference between before and during illness was ₦10240.50420 with a standard error of .₦854.55996. The result further explained that the farmer lost a mean income of ₦854 per farming season. The paired t-test result showed that this is statistically significant at 1% probability level. This implies that the farmers had more farm income before illness than during illness. The expenditure is another important factor that explains the quality of farming. The result showed that the mean expenditure of the farmer before illness was ₦ 8767.2269 which increases to ₦ 72914.2857 during illness. The mean difference between before and during illness was ₦64147.0588 with a standard error of ₦3662.25266. The paired t-test result showed that this is statistically significant at 1% probability level. This implies that farmers incurred more expenditure for treatment of illness during illness than before illness.

This is to say that as illnesses persist, number of absenteeism increases, output and income could decrease accordingly as expenditure on treatment of illness by farmer increases.

On the whole, illness has made and continues to make

significant negative impact on farmers productivity and thereby reducing their profitability. This implies that illness has not brought about any improvements in the number of days worked, output, income and expenditure of farmers in the study area.

Table 4. Paired Sampled Statistics on effect of selected variables before and during illness of respondents

Paired	Variables	Mean	Mean difference	Std. error	T	Df	Sig(2-tailed)
Pair 1	Number of days worked 2-	11.6134	9.94118	0.72822	13.651	238	0.000
	Number of days worked 1	1.6723					
Pair 2	Output 2	2557.1429	918.82353	72.00084	12.761	238	0.000
	Output 1	1638.3193					
Pair 3	Income 2	15269.0756	10240.50420	854.55996	11.983	238	0.000
	Income 1	5028.5714					
Pair 4	Expenditure 2	8767.2269	-64147.0588	3662.25266	-17.516	238	0.000
	Expenditure 1	72914.2857					

CONCLUSION

Illness is both a health and economic problem that has eaten deeply into the financial base of its victims. Causes of illness have become a severe threat in Africa, especially in rural areas because of low level of awareness and low usage of modern preventive measures. The result showed that 42.1% of farm income was lost to treatment of illnesses. The policy variables that affected welfare of arable crop farmers were age, household size, farming experience, number of times ill, days lost to farming due to illness, cost of treatment, farm size, gender and educational level. The result of the t-test showed that they had less number of day worked, output, income and high expenditure during the period of illness. Traditional medical centers were mostly patronized probably because of low treatment cost. The findings consistently pointed at inability to seek effective health services due to low income level. It is recommended that more affordable health service providers should be provided by government to lessen the burden of illness and expenditure on arable crop farmers this will go a long way to increase productivity and welfare of the arable crop farmers.

Statement of Conflict of Interest

Author have declared no conflict of interest.

REFERENCES

Achoja FO 2011. Economic Effect of Malaria on the Productivity of Artisanal Fishers in Lake Ona, Delta State, Nigeria. Agricultura Tropica et Subtropica, 44(4): 219-222.

Adesugba M, Mavrotas G 2016.Youth Employment, Agricultural Transformation, and Rural Labor Dynamics in Nigeria. IFPRI Discussion Paper No. 1579. Available at SSRN: https://ssrn.com/abstract=2884934accessed 17th August 2019.

Babiarz P, Yilmazer T 2017. The Impact of Adverse Health Events on Consumption: Understanding the Mediating Effect of Income Transfers, Wealth, and Health Insurance. Health Economics, 26(12):1743-1758.

Banik B 2017. Barriers to Access in Maternal Healthcare Services in the Northern Bangladesh. South East Asia Journal of Public Health, 6(2): 23-36.

Baranov V, Kohler HP 2018.The Impact of AIDS Treatment on Savings and Human Capital Investment in Malawi. American Economic Journal: Applied Economics, 10(1):266-306.

Berry E 2017. *Factors Influencing the Utilization of Intermittent Preventative Treatment for Malaria in Pregnant Women in the African Region: A Literature Review*. Master Essay, submitted to the Graduate Faculty of Infectious Diseases and Microbiology University of Pittsburgh.

Bevan S 2015. Economic Impact of Musculoskeletal Disorders (MSDs) on Work in Europe. Best Practice and Research Clinical Rheumatology, 29(3):356-373.

Bloom DE, Canning D, Kotschy R, Prettner K, Schünemann JJ 2019. Health and Economic Growth: Reconciling the Micro and Macro Evidence. NBER Working Paper Series. National Bureau of Economic Research Cambridge.

DeVaro J, Heywood JS (2017).Performance Pay and Work-Related Health Problems: A Longitudinal Study of Establishment. Industrial and Labour Relations Review, 70 (3):670-703.

Dupas P, Miguel E (2017). Impacts and determinants of health levels in low-income Countries. Handbook of Economic Field Experiments, 2: 3-93.

Fiorella KJ, Milner EM, Salmen CR, Hickey MD, Omollo DO, Odhiambo A, Mattah B, Bukusi EA, Fernald LCH, Brashares JS 2017. Human Health Alters the Sustainability of Fishing Practices in East Africa. Proceedings of the National Academy of Sciences of the United States of America, 114(16): 4171-4176.

Ha TM, Boseh OJH, Nguyen NC 2016. Establishing an Evolutionary Learning Laboratory for Improving the Quality of Life of Vietnamese Women in Small-Scale Agriculture: Part II – Systemic Interventions. Systems Research and

Behavioural Science, 33(3):341-359.

Ibitoye SJ, Shaibu MU, Sanda ME, Ajayi B 2016. Effect of Malaria on Farm Household Income in Ifedore Local Government Area of Ondo State, Nigeria. International of Journal of Agricultural and Rural Development, 19(1):2386–2391.

Iheke OR, Ukaegbu, HI 2015. Effect of Poor Health and Farmers' Socio-economic Variables on Total Factor Productivity of Arable Crop Farm Households in Abia State, Nigeria. *Nigerian* Journal of Agriculture, Food and Environment, 11(3):141 -146.

Lu ZN, Chen H, Hao Y, Wang J, Song X, Mok TM 2017.The Dynamic Relationship Between Environmental Pollution, Economic Development and Public Health: Evidence from China. Journal of Cleaner Production, 66:134-147.

Mitra S, Palmer M, Mont D, Grace N 2016. Can Households Cope with Health Shocks in Vietnam? Health Economics,25 (7): 888-907.

Musa UK 2018. Assessment of House to House Inspection Manual in the Control of Sanitation Related Diseases in Gombe Metropolis. A Ph.D Dissertation submitted to the Department of Environmental Health Science Kwara State University Malete, Nigeria.

Naseer S 2016. Health and Empowerment: A Sociological Study of Women in Aligarh City. A Ph.D Thesis Submitted to the Department of Sociology Aligarh Muslim University, Aligarh, India.

Olowogbon TS, Babatunde RO, Asiedu E 2019.How Can Inclusive Agricultural Health Policy Intervention Promote Shared Agricultural Productivity in Nigeria? Evidence from Randomized Control Trial. NBER Working Paper Series Nber Working Paper No. 26043. National Bureau of Economic Research Cambridge.

Onuche U, Opaluwa HI, Edoka MH 2014. Ill health and Agricultural Production: Evidence from Kogi State of Nigeria. African Journal of Food, Agriculture, Nutrition and Development, 14(1):8489-8503.

Onyema JI, Nyenke CU 2019. Health Care, Health Status and Labour Productivity in Nigeria. KIU Journal of Social Sciences, 5 (2):49-58.

Oteh OU, Nwachukwu IN, Nwachukwu CS 2016. Measuring Solvency and Its Determinants among Small and Medium Agribusiness Enterprises in Imo State, Nigeria. Journal of Agribusiness, 34(2):165-180.

Oyedeji OA, Ukemenam MN, Mohammed AB, Ojediran EO 2016. Effect of Out-of-Pocket Health Expenditure on the Welfare of Rural Households in Kwara State, Nigeria. International Journal of Health Economics and Policy, 1(1, 2):1-5.

Rashad AS, Sharaf MF 2015. Catastrophic and Impoverishing Effects of Out-of-Pocket Health Expenditure: New evidence from Egypt. American Journal of Economics, 5: 526-533.

Yamou TA, Molua EL 2018. Impact of Poor Health of Maize Farmers on Farm Performance in Southwestern Cameroon. American Journal of Public Health Research, 6(3): 155-159.