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The Determinants of Farmers Adaptive Capacities to Poverty Related Diseases along River Niger in Edo and Kogi States, Nigeria

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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ABSTRACT

Many of the diseases contributing to the disease burden in low-income countries are tightly linked to the debilitating conditions of poverty. At the global level, there are three primary poverty-related diseases (PRDs) acquired immune deficiency syndrome (AIDS), malaria and tuberculosis (TB). This study determining the determinants of farmers adaptive capacities to poverty related diseases along river Niger in Edo and Kogi States. Primary data were collected from respondents, multistage sampling technique were used to select respondents in Edo and Kogi States. Descriptive statistics, using the threshold concept for discrete variables results shows that land preparation pattern was the most used adaptive capacity to climate change in the study areas. The findings also show that gender, types of accommodation, sanitation, visit to hospital, amount spent on treatment, education

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and irrigation were the major determinants of climate change adaptation capacities to poverty related diseases. It was concluded that the major factors influencing adaptive capacities to poverty Related diseases were education, household size, off farming income, access to credit, distance to health Centre, cost of treatment, visit to hospitals and irrigation farming. The study recommends that to reduce effect of poverty related diseases, there is need for policy makers to engage communities when taking decisions relating to their health.

Keywords: Determinants; adaptive capacities; poverty related diseases.

1. INTRODUCTION

Poverty is a major cause of diseases and a barrier to accessing health care when needed [1]. Poverty and diseases are closely tied with each factor aiding the other (Stevens et al*.,* 2021). This relationship is financial, the poor cannot afford to purchase those things that are needed for good health, including sufficient quantities of quality food and health care. Diseases, in turn, is a major cause of poverty. This is partly due to the costs of seeking health care, which include not only out-of-pocket spending on care (such as consultations, tests and medicine), but also transportation costs and any informal payments to health care providers which can reduce farmer scares resource [2]. Poverty disease is a term sometimes used to collectively describe diseases, disabilities and health conditions that are more prevalent among the poor than among wealthier people. In many cases, poverty is considered the leading risk factor or determinant for such diseases and in some cases, the diseases themselves are identified as barriers to economic development that would end poverty [3].

At the global level, there are three primary poverty-related diseases (PRDs) acquired immune deficiency syndrome (AIDS), malaria and tuberculosis (TB). Developing countries account for 95% of the global AIDS prevalence, 98% of active tuberculosis infections and 90% of malaria deaths occur in sub-Saharan Africa [4]. Diseases of poverty kill approximately 14 million people annually [5]. For example, malaria attacks an individual on average of four times in a year with an average of 10 to 14 days of incapacitation in Africa [6]. On a global perspective, between 400 and 900 million of children under the age of five experience acute malaria annually in this malaria endemic region and this number may double by year 2020 if effective control measures are not implemented, Multilateral Initiative on Malaria, 2018. In 2017, an estimated US$ 3.1 billion was invested in malaria control and elimination efforts globally by governments of malaria endemic countries and international partners [1].

In terms of health, poverty includes low income, low education, social exclusion and environmental decay [4]. The poor within most countries are trapped in a cycle in which poverty breeds ill health and ill health breeds poverty (Adam, 2009). Many diseases that primarily affect the poor serve to also deepen poverty and worsen conditions (Wiggins, 2019). Poverty also significantly reduces people's capabilities, making it more difficult to avoid poverty related diseases [5]. Majority of the diseases and related mortalities in poor countries are preventable and treatable diseases for which, medicine and treatment regimens are readily available. Poverty is in many cases the single dominating factor in higher rates of prevalence of these diseases. Poor hygiene, ignorance in health-related education, non-availability of safe drinking water, inadequate nutrition and indoor pollution are factors exacerbated by poverty (Wiggins, 2019).

Poverty related diseases, is not only a health problem, it is also an economic problem. Diseases at the household level affect productivity of the people and their assets acquisition capacity. Households also frequently spend substantial share of their incomes and time on poverty diseases such as malaria prevention and treatment, as well as an effort to control mosquitoes [7]. The cost of prevention and treatment continue to consumes scarce households' resources. In addition, as some household members spend their productive time caring for those under disease attack, they themselves in turn seek rescue from the onslaught of the diseases [6]. Rural farmers unlike the fixed wage earners not only lose valuable working hours in treating the sickness but also lose income that would have been generated at this period. This poor health status thus directly affects the productive capacity of the households.

Illness is able to fuel poverty situation of farmers in Edo and Kogi States along river Niger, Nigeria by inhibiting critical investment plans at the households' level; Productivity and income losses from diseases infection in this area is likely to linked with the growing poverty, among rural households. In trying to find possible solutions to the determinants of farmers adaptive capacities to poverty related diseases the following research questions will be addressed in this study: What are the factors influencing adaptive capacities to poverty related diseases in the study areas?

Global warming is likely to increase disease, death and injury from heat waves, floods, storms, drought, and fire expand the geographic range of malaria, HIV/AIDs and TB in the poor countries of the world [8]. Gaps in knowledge of determinants of adaptive capacity to poverty related diseases research is still in a rather primitive stage and many of the direct and indirect poverty related diseases have not been fully identified or understood. Hence, although a lot is known about the science of diseases, there remain many uncertainties of its potential impact on adaptive capacity of farmers. Yet, this message has failed to penetrate public discussions on health policies. At the moment, few studies that have considered poverty related diseases were at global perspective or regional aggregates. This research has narrowed it down to two States along River Niger in Nigeria for easy use by policy makers. Thus, this study is expected to add to the scanty knowledge in this area of research.

2. METHODOLOGY

The data were obtained through administration of questionnaire to elicit information from the respondents, on the socio-economic characteristics of the farmers such as age, marital status, gender, education, household size, farming experience, farmland size, the extent of awareness of poverty diseases, annual income, types of treatment used and various adaptation measures to poverty diseases. The researcher was assisted by trained enumerators from the State's Agricultural Development Programme to carry out data collection.

2.1 Methods of Data Analysis

Objectives were achieved using Multivariate Probit regression method to analyse the determinants of farmers adaptive capacity to poverty related diseases. This is because of the binary nature of the dependent variable. The model is stated as follows:

$$Y_i = \eta + \beta_i \sum_{i=1}^{n} Z_i + e_i \quad (1)$$

Y_i = Dependent variable
Y_1 = Malaria
Y_2 = HIV/AIDS
Y_3 = Tuberculosis
β_i = Estimated as the parameters, while
Z_i = are the explanatory variables as presented on Table 1.

Table 1. Explanatory variable influencing respondents, climate change adaptive capacity to poverty diseases

Variable	Definition and measurement	Expected sign
AGE.	Age (Years)	Positive
GED	Gender (male=1, female=0)	Neutral
MAR	Marital status (Married=1,0 otherwise)	Positive
TOA	Types of accommodation (Modern = 1, otherwise=0)	Positive
EDU	Education (Years)	Positive
EXP	Experience (Years)	Positive
ASD	Amount spent on drugs (Naira)	Negative
SOE	Sanitation of environment (yes=1, No=0)	Positive
OFFARM	Income obtained from off-farm business (Naira)	Positive
ACREDIT	Access to credit (Naira)	Positive
VTH	Visit to hospital (kilometres)	Negative

3. RESULTS AND DISCUSSION

3.1 Determinants of Farmers Adaptive Capacities to Poverty Diseases

The results of determinants of farmers adaptive capacities to poverty related diseases from multivariate probit model are presented in Table 2. The result in revealed that Chi Square value was 33.0 which implies that the entire model was significant at P<0.01 level probability. The result shows that off farm business and gender were statistically significant at P<0.05 and P<0.10 level affects malaria respectively. Which show that malaria tends to increases by 0.419 and 0.466 implying malaria occurrence increases with increased in off farm business and gender by 41.9% and 46.6% probability level respectively. The finding agrees with WHO [1] which reported that available evidence suggested that given equal exposure, adult men and women are equally vulnerable to malaria infection, except for pregnant women who are at greater risk of severe malaria in most endemic areas. The findings were also supported by Wiseman et al. (2016) who reported that malaria inhibits agricultural productivity such as ill-health or premature death of farmers, which leads to decrease in farm output. This decrease in output may discourage respondents from solely depend on farming for their livelihood, therefore engaged in off farm businesses activities.

Furthermore, the result revealed that experience was statistically significant at P<0.01 affects malaria. Which indicated that malaria is likely to decrease by 0.022 implies that malaria occurrence decreases with increased in experience by 2.2% probability level. This is in agreement with findings of White (2018) who revealed that people who have experienced cycles of malaria attacks will be able to tell the signs and symptoms of the diseases and build strong adaptive capacities.

The result shows that of types of accommodation, education and sanitation of environment were statistically significant at P<0.05 and P<0.10 level affects HIV/AIDS. Which show that malaria tend to increases by 0.499, 0.313 and 0.080 implying HIV/AIDS occurrence decreases with increased in types of accommodation, education and sanitation of environment by 49.9%, 31.3% and 8.0% level of probability respectively. The finding agrees with the report of WHO [1] which affirmed that HIV/AIDS education is a common and well-proven intervention strategy for providing information on adaptive capacities to HIV/AIDS in communities especially the young people.

Furthermore, the result revealed that education was statistically significant at P<0.10 affects tuberculosis. Which indicated that tuberculosis is likely to decrease by 0.029 is implies that tuberculosis occurrence will decrease with increase in education by 2.9% level of probability. This finding agrees with Nankabirwa et al. [9] who affirmed that malaria infection is an important cause of school absenteeism among African children, which may affect their school performance.

Access to credit was statistically significant at P<0.01 affecting tuberculosis. This indicates that tuberculosis will likely increase by 0.774. this implies that tuberculosis will increase with increased access to credit with 77.4% level of probability. According to the WHO [1] which reported that in 2017, an estimated 1 million children became ill with tuberculosis and 230 000 children died due to fact that most people in rural areas are poor and lack funds to purchased curative and preventive drugs.

The result in Edo State, indicated that education and off farm business were statistically significant at p<0.01 and P<0.10 level of probability affecting malaria. This shows that malaria is likely to decrease by 0.009 and 0.498 respectively which implies that malaria occurrence will decrease with increased education and off farm business by 0.9% and 49.8% level of probability respectively. The findings were in agreement with Ansah et al. (2017) who reported that health education impacted positively caregivers' knowledge of malaria and their adaptive capacities to access antimalarial treatment when their children have fever.

The result further, revealed that gender was statistically significant at p<0.10 probability level affecting malaria. This indicate that malaria tends to increase by 0.033, implying that malaria occurrence will increase with increased in gender by 3.3% probability level. Evidence from some northern part of the Nigeria, indicates that restricted mobility of women as a result of traditional believes or region may also impede their attendance at primary health care clinics for malaria testing.

Table 2. Estimate of determinants of farmers adaptive capacities to poverty related diseases

	Pooled			Edo State			Kogi State		
Variables	**Malaria**	**HIV/AIDS**	**Tuberculosis**	**Malaria**	**HIV/AIDS**	**Tuberculosis**	**Malaria**	**HIV/AIDS**	**Tuberculosis**
Constant	0.5650	-1.1537**	-1.9064***	3.3089	-0.1474**	-2.3409***	0.5650	-1.1537**	-1.9064***
	(0.557)	(0.616)	(0.570)	(0.668)	(0.699)	(0.730)	(0.557)	(0.616)	(0.570)
Age (Years)	-0.0009	-0.0007	0.0119	-0.0128	-0.0024	0.0186	-0.0009	-0.0007	0.0119
	(0.008)	(0.010)	(0.009)	(0.133)	(0.010)	(0.011)	(0.008)	(0.010)	(0.009)
Gender	0.4654*	0.1636	-0.0669	0.0333*	0.1080	0.2388	0.4654*	0.1636	-0.0669
	(0.260)	(0.246)	(0.281)	(0.371)	(0.292)	(0.239)	(0.260)	(0.246)	(0.281)
Marital status	-0.01575	-0.1048	0.5181	-0.1358	0.0461	-0.0203	-0.01575	-0.1048	0.5181
	(0.114)	(0.137)	(0.126)	(0.175)	(0.142)	(0.162)	(0.114)	(0.137)	(0.126)
Types of	0.1276	-0.4993**	-0.3334	-0.2880	-0.2157**	-0.0994	-0.1276	-0.4993**	-0.3334
accommodation	(0.177)	(0.204)	(0.229)	(0.327)	(0.210)	(0.232)	(0.177)	(0.204)	(0.229)
Education (Years)	-0.0185	-0.0263*	-0.0295*	0.0115	-0.0242*	-0.0174*	0.0185	-0.0263*	-0.0295*
	(0.018)	(0.014)	(0.016)	(0.029)	(0.019)	(0.020)	(0.018)	-(0.014)	-(0.016)
Farming experience	-0.0220***	-0.0133	-0.0043	0.0095***	0.0041	0.0229	-0.0220***	0.0133	0.0043
(Years)	(0.075)	(0.008)	(0.010)	(0.011)	(0.010)	(0.010)	-(0.075)	(0.008)	-(0.010)
Amount spent on	0.0749	0.1716	-0.2329	-0.0521	0.1572	-0.2592	0.0749	0.1716	-0.2329
drugs (Naira)	(0.167)	(0.191)	(0.237)	(0.347)	(0.212)	(0.241)	(0.167)	(0.191)	(0.237)
Sanitation of	-0.1244	-0.3134*	0.1176	0.5029	-0.1587*	0.2175	0.1244	0.3134*	0.1176
environment	(0.169)	(0.179)	(0.223)	(0.169)	(0.202)	(0.223)	(0.169)	(0.179)	(0.223)
Off-farm business	0.4185**	0.0987	0.3294	0.4982**	0.0009	-0.2563	0.4185**	0.0987	0.3294
(Naira)	(0.183)	(0.207)	(0.251)	(0.307)	(0.253)	(0.291)	(0.183)	(0.207)	(0.251)
Access to credit	0.02388	0.0804	0.7739***	-0.4326	-0.0235	-0.7800***	0.02388	0.0804	0.7739***
(Naira)	(0.233)	(0.271)	(0.256)	(0.371)	-(0.259)	-(0.270)	(0.233)	(0.271)	(0.256)
Visit to spiritual head	-0.1804	-0.2885	-0.3090	0.0176	-0.2163	0.1160	-0.1804	-0.2885	-0.3090
(Kilometer)	(0.175)	(0.211)	(0.252)	(0.258)	(0.226)	(0.245)	(0.175)	(0.211)	(0.252)
Model chi^2	33.000			75.62			32.000		
Prob > Chi^2	0.0001			0.0000			0.0001		

*Standard errors in parentheses, *p<0.10 level of significance, **p<0.05 level of significance, ***p<0.01 level of significance.*
Source: Field survey, 2017

Furthermore, the result revealed that type of accommodation, education and sanitation of environment were statistically significant at p<0.05 and p<0.10 level of probability affecting HIV/AIDS. This shows that HIV/AIDS infection is likely to decrease by 0.22, 0.24 and 0.16 respectively, which implies that HIV occurrence will decrease with increased in type of accommodation, education and sanitation of environment by 22%, 2.4% and 16% level of probability respectively. The result also revealed that access to credit was statistically significant at p<0.10 level of probability affecting tuberculosis. This shows that tuberculosis tends to increase by 0.78, implying that tuberculosis occurrence will increase with access to credit by 78% probability level.

The result in Kogi State, revealed that gender was statistically significant at p<0.10 level influence malaria. This shows that malaria will likely increase by 0.46, implying that malaria occurrence will increase with increased in gender by 46% probability level. This finding is in agreement with Reuben [10] who reported that in some societies, men have a greater occupational risk of contracting malaria than women if they work in mines, fields or forests at peak biting times, or migrate to areas of high endemicity for work. similar findings were also reported by Vlassoff et al. (2019) that women who get up before dawn to perform household chores may also be exposed to mosquitoes and consequently to malaria infection [11-13].

Furthermore, the result revealed that education and off farm income were statistically significant at p<0.01 and p<0.10 level affecting malaria. This shows that malaria tends to increase by 0.22 and 0.418, which implies that malaria occurrence will increase with increased in off farm business and education by 2.2% and 41.8% probability level. This finding was in line with [1] report that malaria is a preventable disease, nearly every minute, a child under five dies of malaria. Education can serve as a gateway of teaching the effect and prevention measures that can be carried out.

The result also, revealed that type of accommodation, education and sanitation of environment were statistically significant at P<0.01 and p<0.01 probability level affecting HIV/AIDS. This shows that HIV/AIDS is likely to increase by 0.499, 0.026 and 0.313 implying that HIV/AIDS occurrence will decrease with increased in type of accommodation, education and sanitation of environment by 49.9%, 2.6% and 31.3% probability level respectively.

Education was also and statistically significant at p<0.10 level affecting tuberculosis. This shows that tuberculosis is likely to increase by 0.029, implying that tuberculosis will decrease with increase in education by 2.9% probability level. Access to credit was and statistically significant at p<0.01 level of probability affecting tuberculosis. This shows that tuberculosis tends to increase by 0.29 implying that tuberculosis increases with increased in access to credit by 29% probability level.

4. CONCLUSION

Based on the empirical evidence emanating from this study, it was concluded that education, farming experience, off farm income, access to credit and sanitation of environment were the determinants of the adaptative capacities to poverty related diseases by respondent in the study area. It was recommended that farmers should be educated on the causes of poverty related diseases.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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