

Perceived Economic Effects of Onchocerciasis Disease in Ebonyi State, Nigeria: Community Health Counselling Implication

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Abstract

Regardless of the control programme created in 1997 by the African Programme on Onchocerciasis Control in collaboration with Ebonyi State Government of Nigeria, the disease remains endemic. The main objective of this study was to investigate the perceived economic effects of onchocerciasis disease among affected residents in Ebonyi State, Nigeria. The cross-sectional survey research design was used to carry out the study. A structured questionnaire was used to elicit information from 3789 respondents. The results indicated that Onchocerciasis disease has had negative economic effects on affected individuals and families as it has led to unemployment ($\bar{x} = 3.29$), low income ($\bar{x} = 2.81$), loss of man hours ($\bar{x} = 3.78$) and the economic burdens of buying protective clothing ($\bar{x} = 3.27$). The study revealed that age, gender, level of education and occupation also exerted significant influence on the economic effects associated with the disease in Ebonyi State. Health education may be targeted at encouraging preventive measures against the transmission of Onchocerciasis disease in Ebonyi State, Nigeria.

Keywords: Economic Effects, Onchocerciasis Disease, Ebonyi State, Nigeria

INTRODUCTION

A chemotherapeutic approach via Mectizan (Ivermectin) distribution is the method applied to onchocerciasis control efforts in all the thirteen Local Government Areas of Ebonyi State, Nigeria^[1,2]. This approach, if combined with cheaper preventive measures like the use of insecticide for the control of the vector, the wearing of protective clothing, and health education has been shown to improve success in the control and prevention of the disease.^[3,4] The cost of one tablet of mectizan is 1 US dollars (USD) and is currently funded by donor agencies like the Bill and Melinda Gates Foundation.^[1] According to Mbanefo et al,^[5] donor agencies may withdraw their support at any time and the burden of payment for the drugs would have to be borne by the victims or sufferers along with their burden of visual impairment, blindness, and skin diseases which would still persist. The World Bank puts the 2007 income per capita of an average Nigerian at 1.5 USD.^[6] According to Ubachukwu et al^[7] onchocerciasis disease is a significant constraint to economic development as well as a

serious public health problem. Those who are sick with this disease are unproductive. People who are blind must have guides to lead them resulting in time and money loss for both. The burden of supporting blind men and women is a major socioeconomic problem.

Rather than contributing their development quota, victims of onchocerciasis, along with their personal aides, become mere consumers of goods and services. Some scholars have identified economic effects of this disease from different dimensions.^[8] found that farmers and those who work for them spend their money buying long cloths to cover their legs and hands in their farm lands to avoid or prevent the bite of the vector of onchocerciasis (black fly) during the peak period of the rainy season, they also spend more money to buy ointment, palm oil and kerosene to rub on their bodies to prevent vector bite, and the cost of labour is higher as a result of people not being willing to go to work around the farms that are heavily infected with the vector that causes the disease. All these activities reduces the financial status of individuals and communities.

A World Bank^[9] study also revealed socioeconomic consequences of onchocerciasis disease: blindness resulted in fewer able-bodied men/people left to tend fields, food shortages and economic collapse forced residents to abandon homelands in fertile river valleys, moving to hard-scrabbled highlands and forested areas that offered some protection from further infection. But then these farmers struggled with poor soil and water shortages on overcrowded lands. By all these means, onchocerciasis disease ultimately sent prosperous communities into poverty, increasing the number of people who are poor. The objective of this study was to investigate the economic effects of onchocerciasis disease in Ebonyi State, Nigeria. The economic effects of onchocerciasis among Ebonyians can be viewed in different dimensions such as: inefficiency in production, waste of reserved economy, lack of economic boom, waste of human strength cum time, and reduction of warfare.

METHODS

This study is part of a larger cross-sectional survey conceived by the first author and approved by the Department of Human Kinetic and Health Education, Nnamdi Azikiwe University, Awka, Nigeria. This study was done in accordance with the

Declaration of Helsinki. The study was carried out in Ebonyi State. Ebonyi State is located in the Eastern part of Nigeria and is bounded to the North by Benue State, to the East by Cross River, to the South by Abia State and to the West by Enugu State. The state lies between longitude 7°35' N and latitude 6°45' E. It experiences two seasons, rainy season (between April to October) and dry season (between November to March). The vegetation of the area is characterized by trees, shrubs, grasses and vegetative covers which are sparsely distributed. There are significant patches of swamp which form the basis of their agricultural activities. There are ponds, streams and other stagnant water bodies scattered all over the state. It has Ebonyi River, Eme, Esu and several others that cut across all the thirteen local government areas that make up the state. These rivers serve as the breeding sites of the onchocerciasis vector, *Simulium damnosum*. In most cases, the river serves as a major source of water they the rural populations use. The villagers utilize the water for most their home activities and for other purposes. Consequently to that regards, the villagers remained most vulnerable population of onchocerciasis. Worst of it, the people that live in the rural communities are faced with the most serious complicated agent of onchocerciasis otherwise known as river blindness. The study area is inhabited by farmers, businessmen and a few civil servants, but the majority is farmers who cultivate large quantities of rice, yam and cassava. The researchers used the cross-sectional survey research design. The population of this study was drawn from three health zones with a population distribution of people aged 10 years and above as follows: Abakaliki zone – 421,086 persons, Onueke zone – 421,000 persons and Afikpo zone – 405,572 people representing 51% of Ebonyi State population (estimated at 2,427,349 in 2011). The survey respondents were evaluated on the following variables: age, gender, area of residence, level of education and occupation. The sample size for this study was 3987. The sample size was ascertained using Yamene's formula. The instrument for data collection was a self-report structured questionnaire developed by the researchers. The questionnaire consisted of sections A and B. Section A sought information on personal data of the respondents. Section B contained four items addressing the economic effects of the onchocerciasis disease on people residing the region. The instrument was validated by five experts in Human Kinetics and Health Education., and one Medical Consultant. The reliability of the instrument was established through Split-Half method based on 60 selected households. Spearman's correlation coefficient reliability value of 0.71 was obtained from the analysis. In order to gain access to the respondents, a letter of introduction was presented in person to the respondents through their Head of Household. The respondents were encouraged to cooperate with the researchers and research assistants to enable them obtain the desired information. Thereafter, the researchers and

their assistants administered the questionnaire to all the households of those areas covered by the study. Twenty research assistants were duly trained for three hours on 10 consecutive days and were employed for the study. The training involved an explanation of the content of the questionnaire and the mode of responses to the assistants. The instrument was administered to the 3987 respondents on face-to-face basis. The researchers and assistants were available to explain any point which the respondents did not understand. All the 3987 copies of the questionnaire were filled and returned. Entry into the households was made through the households' heads by either the researchers or the research assistants. The returned copies of the questionnaires were cross-checked for completeness of responses. Copies of the questionnaire that had incomplete responses were discarded. Out of the 3987 copies of the questionnaire distributed, 3789 representing about 95% return rate, was used for data analysis. Data were analyzed using mean, t-test and analysis of variance (ANOVA). ANOVA and t-test statistics were used to for analysis of data at 0.05 alpha level.

RESULTS AND DISCUSSION

Table 1: Perceived Economic Effects of Onchocerciasis Disease among the people of Ebonyi State

Economic Effects	\bar{x}	SD	Dec.
Sufferers give up their job as a result of the disease	3.29	1.27	Agreed
Adults who suffer onchocerciasis disease have low income	2.81	1.24	Agreed
Sufferers of onchocerciasis lose man-hours	3.78	1.21	Agreed
Buying of protective clothes leads to economic loss	3.27	1.36	Agreed
Overall \bar{x}	3.29	0.92	Agreed

Table 1 shows that all the statements are economic effects experienced by people suffering from onchocerciasis disease in Ebonyi State. This is because each of the items obtained a mean score above 3.0 and having an overall mean score of 3.29. This implies that the respondents agreed that people suffering from onchocerciasis disease give up their job as a result of the disease, have low income, loose man-hour and that buying of protective cloths leads to economic loss. The standard deviations indicate that the responses cluster narrowly around the mean.

Table 2: Summary of ANOVA Values Testing the Hypothesis of No Significant Difference in the Perceived Economic Effects of Onchocerciasis Disease Based on Age

Sources of Variance	Sum of Squares	Df	Mean of Squares	F-cal.	F-crit
Sufferers give up their job as a result of the disease					
Between Groups	219.681	6	36.613	23.389*	2.10
Within Groups	5920.480	3782	1.565		
Total	6140.160	3788			
Adults who suffer onchocerciasis disease have low income					
Between Groups	146.008	6	24.335	16.180*	2.10
Within Groups	5688.144	3782	1.504		
Total	5834.152	3788			
Sufferers of onchocerciasis loose man-hour					
Between Groups	227.530	6	37.922	27.200*	2.10
Within Groups	5272.738	3782	1.394		
Total	5500.268	3788			
Buying of protective cloths leads to economic loss					
Between Groups	86.479	6	14.413	7.874*	2.10
Within Groups	6922.613	3782	1.830		
Total	7009.092	3788			
Overall economic effects					
Between Groups	89.012	6	14.835	17.906*	2.10
Within Groups	3133.354	3782	0.828		
Total	3222.366	3788			

Table 2 shows that the F-calculated value for each and overall economic effects of different age groups are greater than the F-critical value for df of 6 and 3782 at 0.05 level of significance. Since the F-calculated values of all the economic effects are greater than the critical values, it could be concluded that there is a significant difference in the mean responses among the respondents of different age groups on

the economic effects of onchocerciasis disease. The hypothesis of no significant difference in the mean ratings of the respondents on the economic effects of onchocerciasis disease according to age is therefore rejected. This implies that age exerts a significant influence on the economic effects of onchocerciasis disease in Ebonyi State.

Table 3: Summary of t-test Analysis between the Mean Ratings of Male and Female Respondents in the Perceived Economic Effects of Onchocerciasis Disease

Variables	N	\bar{x}	SD	t-cal.	Df	t-crit.
Sufferers give up their job as a result of the disease						
Male	1313	2.79	1.18			
Female	2476	3.56	1.24	18.450*	3787	1.960
Adults who suffer onchocerciasis disease have low income						
Male	1313	2.76	1.34			
Female	2476	2.85	1.19	2.087*	3787	1.960
Sufferers of onchocerciasis loose man-hour						
Male	1313	3.77	1.31			
Female	2476	3.79	1.15	0.755	3787	1.960
Buying of protective cloths leads to economic loss						
Male	1313	2.99	1.32			
Female	2476	3.42	1.36	9.372*	3787	1.960
Overall economic effects						
Male	1313	3.08	0.88			
Female	2476	3.41	0.93	10.618*	3787	1.960

* Significant at $p < 0.05$

Table 3 shows that each of the obtained t-values for most specific and overall economic effects of onchocerciasis except in 'sufferers of onchocerciasis loose man-hour' ($t\text{-cal.} = 0.755 < t\text{-crit.} = 1.960$) is greater than the t-critical value. However, since the overall obtained t-value is greater than the t-critical

value, the null hypothesis is therefore rejected for the economic effects of onchocerciasis disease. This implies that there is a significant difference between the mean ratings of male and female respondents on the economic effects of onchocerciasis disease in Ebonyi State.

Table 4: Summary of ANOVA Values Testing the Hypothesis of No Significant Difference in the Perceived Economic Effects of Onchocerciasis Disease Based on Level of Education

Sources of Variance	Sum of Squares	Df	Mean Squares	of F-cal.	F-crit
Sufferers give up their job as a result of the disease					
Between Groups	35.064	3	11.688	7.246*	2.60
Within Groups	6105.097	3785	1.613		
Total	6140.160	3788			
Adults who suffer onchocerciasis disease have low income					
Between Groups	323.120	3	107.707	73.793*	2.60
Within Groups	5511.023	3785	1.456		
Total	5834.152	3788			

Sources of Variance	Sum of Squares	Df	Mean Squares	of F-cal.	F-crit
Sufferers of onchocerciasis loose man-hour					
Between Groups	163.928	3	54.643	38.757*	2.60
Within Groups	5336.340	3785	1.410		
Total	5500.268	3788			
Buying of protective cloths leads to economic loss					
Between Groups	54.192	3	18.064	9.831*	2.60
Within Groups	6954.900	3785	1.837		
Total	7009.092	3788			
Overall economic effects					
Between Groups	88.492	3	29.497	35.626*	2.60
Within Groups	3133.874	3785	0.928		
Total	3222.366	3788			

* Significant at $p < 0.05$

Table 4 shows that the F-calculated value for each and overall economic effects according to level of education are greater than the F-critical value for df of 3 and 3785 at 0.05 level of significance. Since the F-calculated values of all the economic effects are greater than the critical values, it could be

concluded that there is a significant difference in the mean responses among the respondents of different levels of education on the economic effects of onchocerciasis disease. The hypothesis of no significant difference in the mean ratings of the respondents on the economic effects of onchocerciasis disease according to levels of education is therefore rejected.

Table 5: Summary of ANOVA Values Testing the Hypothesis of No Significant Difference in the Perceived Economic Effects of Onchocerciasis Disease Based on Occupation

Sources of Variance	Sum of Squares	of Df	Mean Squares	of F-cal.	F-crit
Sufferers give up their job as a result of the disease					
Between Groups	109.301	5	21.860	13.712*	2.21
Within Groups	6030.860	3783	1.594		
Total	6140.160	3788			
Adults who suffer onchocerciasis disease have low income					
Between Groups	245.055	5	49.011	33.173*	2.21
Within Groups	5589.097	3783	1.477		
Total	5834.152	3788			
Sufferers of onchocerciasis loose man-hour					
Between Groups	270.474	5	54.095	39.130*	2.21
Within Groups	5229.794	3783	1.382		
Total	5500.268	3788			

Sources of Variance	Sum of Squares	Df	Mean Squares	F-cal.	F-crit
Buying of protective cloths leads to economic loss					
Between Groups	565.420	5	113.084	66.390*	2.21
Within Groups	6443.671	3783	1.703		
Total	7009.092	3788			
Overall economic effects					
Between Groups	192.666	5	38.533	48.114*	2.21
Within Groups	3029.700	3783	0.801		
Total	3222.366	3788			

Table 5 shows that the F-calculated value for each and overall economic effects of different occupation are greater than the F-critical value for df of 5 and 3783 at 0.05 level of significance. Since the F-calculated values of all the economic effects are greater than the critical values, it could be concluded that there is a significant difference in the mean responses among the respondents of different occupations on the economic effects of onchocerciasis disease. The hypothesis of no significant difference in the mean ratings of the respondents on the economic effects of onchocerciasis disease according to occupation is therefore rejected. This implies that occupation exerts a significant influence on the economic effects of onchocerciasis disease in Ebonyi State

The findings from this survey equally revealed that respondents that had the signs and symptoms of Onchocerciasis disease in Ebonyi State experienced some economic effects like giving up their jobs, low income, loss of man-hours and spend their money buying protective clothing that is an economic loss. All the items except low income obtained a mean score of 3.0 with an overall score of 3.29. The standard deviations indicate that the responses cluster narrowly around the mean. These confirmed economic effects by the respondents is similar to results found by several authors.^[5,9-16] These results are expected because in Ebonyi State sufferers of Onchocerciasis disease spend their money to buy protective clothing both to cover their bodies and protect themselves from vector bite.

Considering the respondents, the study used a questionnaire with a written instruction to guide the respondents, the fact that the study was not experimental in which case the researchers or assistants were unable to exert complete control over the responses of the respondents as a result the results may have some marginal errors. Everyday more research works are published on different aspects of the economic effects of onchocerciasis disease. However, more research works are needed for this disease which impacts marriage, and socio-demographic health issues. There should be a validation research on the demographic influence of onchocerciasis disease.

From the findings in this study, the economic effect seems to be high rated on Ebonyians. The assess decline in the state

food production level. Leading to importation of food such as rice and both government and infected individuals run deficiency as the reserved economy are being wasted without a return of appreciation to both side. An economic effect of onchocerciasis disease exerts a lot of tension, waste of human strength and time and economic burden on the sufferers and beyond. The implication is that if onchocerciasis disease continues, more economic tension will be created making the state uncomfortable place to live in and the lot numbers that government the state employed may stand out 65% chances of losing their jobs as the state may have more responsibility to be attended to. the additional burden of itching, skin disfigurement and the social stigma associated with onchocerciasis disease will not only be a source of distraction but major cause of embarrassment to women thereby leading to low productivity, reduced income, shame, feeling shy as already confirmed by this study. Again, this study has a lot of implication for public health and medicine. Onchocerciasis disease exerts a lot of pressure on public health. Sufferers encounter reduced productivity which leads to poverty. Poverty and ignorance are the major underlying social causes of diseases generally. Medicine and drugs are produced and procured for the treatment and cure of onchocerciasis disease. Resources in terms of money and manpower are required to manage the onchocerciasis disease. Health Education programmes should be encouraged to mitigate the deficiency resultants of onchocerciasis disease on Ebonyians and beyond.

CONCLUSION

The economic tension in all the thirteen local government areas of Ebonyi is a concern to the researcher. The situation has taken different measure like in March 2015, the state dissolved all the elected political chairmen and councilors including ward leaders claiming that the state has no money to fund the said bodies. The few civil servants of the state has suffered the same fate of being paid half pin in the name state insufficient fund, in which is attributed to high level of viral diseases observed in the state. There is more urgent need for government of the state to embark on serious awareness campaign as means of educating her subjects on the economic effects of onchocerciasis disease. There is still need to

improve people's attitude towards the disease and improve disease awareness through appropriate health education and counseling throughout the whole local government areas of the state, so that they will be aware of the disease and adjust expectedly for their economic boom in order to improve standard of living of people in that environment.

REFERENCES

- [1] Akinbo FO, Okaka, CE. Prevalence and socio-economic effects of Onchocerciasis in Ovia north/east local government area, Edo State, Nigeria. *Rivista Di Parassitologia*, 2005; 66(3), 215.
- [2] Amazigo UO. Detrimental effects of Onchocerciasis on marriage age and breast-feeding. *Tropical and Geographical Medicine*, 1994; 46(5), 322-325.
- [3] Barlow R. *The Economic Effects of Malaria Eradication*. School of Public Health, University of Michigan; 1968.
- [4] Samba, E.M. (1994). *The Onchocerciasis Control Programme in West Africa. An Example of Effective Public Health Management*. Geneva: World Health Organization.
- [5] Mbanefo EC, Eneanya CI, Nwaorgu OC, Oguoma VM, Otiji MO, Ogolo BA. Onchocerciasis in Anambra State, Southeast Nigeria: clinical and psychological aspects and sustainability of community directed treatment with ivermectin (CDTI). *Postgraduate Medical Journal*, 2010; 86(1020), 573-577.
- [6] Okoro N, Nwali UN, Nnamdi OA, Innocent OC, Somadina OC, Shedrack EO. The prevalence and distribution of human onchocerciasis in two senatorial districts in Ebonyi State, Nigeria. *American Journal of Infectious Diseases and Microbiology*, 2014; 2(2), 39-44.
- [7] Ubachukwu PO, Anya AO. Effects of blackfly bites and manifestations of human onchocerciasis on the productivity of farmers. *Agro-Science*, 2001; 2(1), 9-16.
- [8] Meludu NT, Ajayi OO. Effect of Onchocerciasis on Farming Activity in Oyo State Nigeria. *African Journal of Biomedical Research*, 2005; 8, 143-148.
- [9] World Bank. *Onchocerciasis disease and mortality in sub-Saharan Africa*. 2006. Retrieved from <http://www.ncbi.nlm.nih.gov/books/NBK2287/>
- [10] World Bank. *World Bank economic rating*. New York: World Bank; 2007.
- [11] Evans TG. Prevalence of Onchocerciasis. *Bulletin of the World Health Organization*, 1995; 73(4), 495-506.
- [12] Etya'ale DE. Vision 2020: Update on Onchocerciasis. *Journal of Community Eye Health*, 2001; 14, 19-21.
- [13] Meludu NT, Ajayi OO. Effect of Onchocerciasis on Farming Activity in Oyo State Nigeria. *African Journal of Biomedical Research*, 2005; 8, 143-148.
- [14] Okoye IC, Onwuliri CO. Epidemiology and psychosocial aspects of onchocercal skin diseases in northeastern Nigeria. *Filaria Journal*, 2007; 6(1), 15.
- [15] Wogu MD, Okaka CE. Prevalence and socio economic effects of Onchocerciasis in Okpuje, Owan West Local Government Area, Edo State, Nigeria. *International Journal of Biomedical and Health Sciences*, 2008; 4(3), 113-119.
- [16] Alonso LM, Murdoch ME, Jofre-Bonet M. Psychosocial and economic evaluation of Onchocerciasis: A literature review. *Social Medicine*, 2009; 4(1), 8-31.