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EFFECTS OF BLACKFLY BITES AND MANIFESTATIONS OF HUMAN *ONCHOCERCIASIS* ON THE PRODUCTIVITY OF FARMERS

P. O. Ubachukwu and A. O. Anya
Department of Zoology
University of Nigeria
Nsukka

ABSTRACT

This study was designed to determine the effects of human onchocerciasis on the productivity of farmers from Nkpologu in Uzo-Uwani Local Government Area of Enugu State. Data for the study were collected through the use of semi-structured interview schedule. Frequency distribution and percentage were used in analyzing the data. The findings of the study indicated that (1) onchocerciasis had serious adverse effects on productivity of the farmers; (2) the onchocerciasis manifestation with the most serious adverse effects was blindness or serious visual impairment; (3) other manifestations of onchocerciasis such as presence of rashes, palpable nodules and leopard skin did not have significant adverse effects; (4) in addition to onchocerciasis manifestations, the bites of the blackfly vector of the disease also reduced the productivity of the farmers and (5) in terms of debility, onchocerciasis resulted in reduced labour input (work time) and labour output (labour efficiency). On the basis of these findings, it was recommended that (1) the control of the disease in this area by the use of the choice drug, Mectizan (Ivermectin) should be intensified by the control agents (WHO) under the African Programme for Onchocerciasis Control (APOC) in collaboration with the health care personnel in the area; (2) enlightenment campaigns on the aetiology and socio-economic effects of onchocerciasis be carried out in the area and (3) use of repellents against the blackfiles during farming should be encouraged.

Key words: Manifestations, onchocerciasis, productivity.

INTRODUCTION

Onchocerciasis is a debilitating disease. It rarely leads to death directly but when it results in death, the infection cuts off the individual's supply of labour years in the future. As a result of debilitation and blindness, the infected person is unable to maintain for long any type of productive activity. Incidentally, onchocercal blindness is mostly found among the working age groups and so such permanent disability through blindness or serious visual impairment withdraws the affected individual's potential supply of labour years requiring vision (Nwoke, 1992). There are records that in areas of high prevalence of *onchocerciasis* there also occur high rates of visual impairment resulting in blindness. The blind people are usually poverty stricken and have a lower life expectancy than normal people (*Vajime*, 1982). The implication of this is that community productivity is seriously affected.

Hamon and Kartman (1973) summarized the socio-economic impact of onchocerciasis as follows: blindness in 20% of the adult males reduces farming capacity below survival level, fertile river valleys become overcrowded with accompanying socio-economic consequences, fishing in infested rivers is avoided leading to loss of protein and the cost of protecting personnel engaged in developmental activities such as building dams becomes very high.

Nwoke (1986) and Nwoke *et al* (1987) added that the itching and rashes associated with onchocerciasis cause serious scratching which can be so severe as to cause loss of sleep. Also the various skin changes associated with the disease such as papular eruption, hypopigmentation and scaling, oedema and depigmentation have distressing effects on the life style of infected individuals.

Production of any given farm product can only be possible as a result of combining a number of factors or resources. Labour is an important resource in farm production process. In peasant farming communities, human labour requirements in the production process constitute between 50 and 65 percent of all farm operations (Olayide and Heady, 1982). Nkpologu is one of such peasant farming communities. Agricultural productivity may be defined as the index of the ratio of the value of total farm output to the value of the total inputs used in farm production. One of the objectives of the study of productivity is to find ways of increasing output per unit of input. Resource productivity is definable in terms of individual resource inputs or in terms of a combination of them. Thus, labour productivity can be defined as the ratio of total output to total inputs. Maximum labour productivity will imply obtaining the maximum possible output from the minimum set of input (Olayide and Heady, 1982).

In this study, the effects of human onchocerciasis on the productivity of farmers in terms of labour input (work time) and labour output (labour efficiency) were investigated. Specifically, the study was designed to:

1. ascertain the manifestation of onchocerciasis with the most serious adverse effects on the productivity of farmers;
2. determine in what ways these manifestations adversely affect productivity;
3. find out how the vector of onchocerciasis (blackfly) has affected productivity and
4. make recommendations based on the findings.

METHODOLOGY

Uzo-Uwani Local Government Area is in the forest-savanna-mosaic zone of Nigeria (Crosskey, 1981). The area is traversed by many rivers and streams which belong to the Anambra River System identified by Crosskey (1981) to be major breeding sites for the *Simulium* vector of human onchocerciasis. The people of the local government area have farming as their major economic activity, cultivating mainly rice yams and cassava.

The study was done in Uzo-Uwani Local Government Area which consists of 16 communities namely Umulokpa (headquarters); Nkume, Adaba, Ukpata, Nkpologu, Uvuru, Akpugo, Adani, Asaba, Igga, Ojjor, Ogurugu, Nimbo, Abbi, Ugbene-Ajima and Nrobo. In an epidemiological survey of the area, it was found to be endemic for onchocerciasis (Ubachukwu, 2001). One of the most endemic communities (Nkpologu) was purposively selected and used for the study.

Nkpologu is made up of two sections namely Nkpologu Centre made up of the real indigenes of the town and Nkpologu Nkpunator made up of people regarded as visitors to the town. Out of 14 clans that make up Nkpologu Centre, one was randomly selected for the study. Adults in this village were invited for a health talk. About 50 adults that responded were examined after the talk for manifestations of onchocerciasis. Out of this number, 20 adults with various manifestations of onchocerciasis were purposively selected for the study. The twenty respondents comprising eleven males and nine females showing signs of onchocerciasis were interviewed using a semi-structured interview schedule. The interview schedule was meant to collect information on the various ways *Simulium* flies and manifestations of onchocerciasis disturb their farm work in terms of labour input (work time) and labour output (amount of work done per unit time).

The responses to the various questions on the interview schedule were analysed using percentage and frequency distribution. An estimation of the economic losses incurred as a

result of *Simulium* bites and other onchocerciasis manifestations with their associated itching and scratching was also carried out, using computed estimates and projection. Information was obtained from individuals about the number of hours spent in the farm within a day and the estimated number of hours lost as a result of disturbance from onchocerciasis – related factors. From these data, the number of man-hours lost as a result of onchocerciasis and the wage earnings lost assuming the individual were to be involved in agricultural wage labour were calculated.

RESULTS

Socio-economic characteristics of the respondents

Entries in Table 1 show that 35% of the respondents fell within the age range of 30-39 years, 10% were between 40-49 years, 20% were between 50-59 years, while 35% were between 60-69. Table 1 also shows that majority (55%) of the respondents were males, while 45% were females. It can also be seen from this table that all the respondents (100.0%) were married and 95% had farming as their major economic activity, while 5% had teaching as their major economic activity.

The manifestations of onchocerciasis in the respondents

Table 2 indicates that 45.0% of the respondents had palpable nodules while the remaining 55.0% did not have. Majority (55.6%) of the respondents with palpable nodules were females, while 44.4% were males. It is also evident in Table 2 that 50.0% of the respondents had visual impairment, while the remaining 50.0% did not have. The respondents with visual impairment were mostly males (80.0%). Only 2 (10.0%) out of the 20 respondents had rashes and these two were females. Leopard skin showed in 7 (35%) of the respondents. Out of these 7, 6 (86.7%) were males, while only 1 (14.3%) was a woman.

Number of days spent on farming by the respondents in a week

Majority (75.0%) of the respondents went to farm 6 days in a week, 10.0% went to farm 5 days in a week, 10.0% worked for 4 days while 5.0% went to farm 3 days within a week (Table 3).

The arrival and departure times of the respondents in a working day

Table 4 indicates that 75% of the respondents started work in their farms between 7.00 and 8.00 a. m. in the morning; 10% started between 6.00 and 7.00a.m., while 15% started between 8.00 and 9.00a.m. Most of the respondents (45%) left the farms between 2.00 and 3.00p.m.; 20% left between 1.00 and 2.00p.m.; 15% left between 3.00 and 4.00p.m.; 10% left between 4.00 and 5.00p.m. while 10% left between 5.00 and 6.00p.m. It was also learnt from the respondents that those who stayed till evening (up to 6.00 p.m.) usually went on break between 12.00 noon and 1.00 p.m. and stayed for about 30 minutes to one hour resting under a shade or in a farmhouse.

Coping strategies used by the respondents against blackfly bites while farming

Table 5 indicates that while in the farms, most (73%) men coped with the bites of the blackfly by killing them or chasing them away, while most (89%) women coped with the bites of the blackfly by wearing clothes that cover their bodies. One may in addition to killing the flies use hydraulic fluid as repellent. On how many hours lost during farming in a day as a result of disturbance from *Simulium* flies and the itching and scratching associated with their bites and other manifestations of onchocerciasis, all (100.0%) the respondents agreed that they usually lost about one hour daily. They believed that they cultivated less than their full capacity as a result of such disturbances. Consequently, it is expected that their crop yields would also be less, other factors being constant.

Table 1: Socio-Economic Characteristics of the respondent (n=20)

	Variables	Categories	No	Percentage
1	Age	30-39	7 (2m, 5F)	35.0%
		40-49	2 (1m, 1F)	10.0%
		50-59	4 (2m, 2F)	20.0%
		60-69	7 (6m, 1F)	35.0%
2	Sex	Male	11	55.0%
		Female	9	45.0%
3	Marital Status	Single	0	0.0%
		Married	20	100.0%
4	Major economic activity	Farming	19	95.0%
		Teaching	1	5.0%

Table 2: Manifestations of Onchocerciasis shown by the respondents (n=20)

Manifestation	Present/ Absent	No	Sex		Percentage
			M	F	
Palpable nodules	Present	9	4	5	45.0%
	Absent	11	7	4	55.0%
Visual Impairment	Present	10	8	2	50.0%
	Absent	10	3	7	50.0%
Rashes	Present	2	0	2	10.0%
	Absent	18	11	7	90.0%
Leopard Skin	Present	7	6	1	35.0%
		13	5	8	65.0%

Table 3: Number of days spent on farming by the respondents in a week (n =20)

No. of Days	*No. of Respondents*	*Sex*		*Percentage*
		M	*F*	
6	15	9	6	75.0%
5	2	1	1	10.0%
4	**2**	1	1	10.0%
3	1	0	1	5.0%

Effects of the manifestations of *onchocerciasis* on work output

Majority (85%) of the respondents reported that the most disturbing manifestation was impaired vision (Table 6) but except one is totally blind, the disease does not stop them from going to farm, but reduces the amount of work they can do within their work time and the quality of work done. For example, a visually impaired person can mistakenly uproot crops in place of weeds. The other disturbing manifestations were itching, (5.0%) rashes (5.0%) and leopard skin (5.0%), which resulted in scratching.

As at March 2000, the average daily wage for hired labour was N300.00 and the labourer worked in the farm for about 6 hours. This brought the wage to N50.00 per man-hour. For a farmer to lose one man-hour per working day as a result of disturbances from blackfly bites, itching and scratching meant a loss of N50.00 per working day. In a farming season which spans through a minimum of 5 months and with a loss of about 26 man-hours per month, the loss per man per farming season would amount to about N6,500.00. In a community, this amounts to a huge economic loss for a wage labour.

DISCUSSION

Human onchocerciasis seriously hinders economic activity especially in areas that are mainly agricultural (Hamon and Kartman, 1973; Bradley, 1976; Nwoke, 1990; 1992). According to Nwoke (1990), *onchocerciasis* affects the effective supply of labour in three ways (i) as a cause of death, it removes the individual's supply of labour years in the future (ii) as a result of permanent disability through blindness and serious visual impairment, onchocerciasis withdraws the individual's potential supply of labour years to activities requiring vision and (iii) partial visual impairment and/or other non-disabling manifestations may also reduce the efficiency of labour days worked. He also reported that as a result of so many people suffering from onchocercal blindness, there is loss of a huge number of potential working days. The present study on the effects of human *onchocerciasis* on the productivity of farmers confirms these observations. Kim *et al* (1997) reported that the human toll of the disease is devastating due to high numbers of blind people and the constant itching which affects productivity. Infected persons have difficulty tending to their jobs. According to the report, a recent study at Ethiopia's second largest coffee plantation revealed that those infected with Onchocercal Skin Disease (OSD) were 15% less productive than those not infected. Additionally, when the head of a household has severe OSD, the risk for a child to stop attending school is twice as high. People who become blind due to onchocerciasis die 12 years prematurely, on average. Studies on the effects of other diseases such as malaria on productivity (Eboh and Okeibunor, 1997) also showed that the work time and efficiency of labour are adversely affected by such disease as a result of both morbidity (complete disability) and debility (partial disability).

Onchocerciasis hinders economic activity especially farming in Uzo-Uwani Local Government Area in various ways such as disturbance by the blackfly vector of the disease during farm work, through itching and scratching caused by the blackfly bites or by the presence of rashes alone or resulting from the presence of palpable nodules, through body pains especially waist pain and through visual impairment and blindness. According to the farmers interviewed, the most disturbing aspect of onchocerciasis is impaired vision and blindness. Blindness hinders a person permanently from agricultural activities and makes the person an economic liability. This leads to loss of the affected individual's potential supply of labour years requiring vision as Nwoke (1992) reported. Blindness leads to loss of income for the family of the blind person as most of the time; the blind person is the bread winner of the family. In addition, the blind becomes a socio-economic burden to the other members of the family, as he/she needs to be cared for instead of caring for others. The children, especially girls are forced to drop out of school in order to care for

Table 4: Time of arrival and departure of the respondents from the farm in a working day (n=20)

Variable	Time	No. of Respondents	Sex		Percentage
			M	F	
Time of arrival	6.00-7.00a.m.	2	2	0	10.0%
	7.00-8.00a.m.	15	8	7	75.0%
	8.00-9.00a.m.	3	1	2	15.0%
Time of departure	1-2.00p.m.	4	1	3	20.0%
	2-3.00p.m.	9	6	3	45.0%
	3-4.00p.m.	3	1	2	15.0%
	4.5.00p.m.	2	1	1	10.0%
	5-6p.m.	2	2	0	10.0%

Table 5: Coping Strategies by the respondents against blackflies in the farm (n = 20)

Coping Strategy	No. of Respondents	Sex		Percentage
		M	F	
Killing or chasing away flies	9	8	1	45.0%
Cover body well	11	3	8	55.0%

Table 6: Opinions of the respondents on the most disturbing manifestation of onchocerciasis (n = 20)

Manifestation	No. of Respondents	Sex		Percentage
		M	F	
Itching	1	0	1	5.0%
Rashes	1	0	1	5.0%
Nodules	0	0	0	0.0%
Lizard Skin	0	0	0	0.0%
Leopard Skin	1	1	0	5.0%
Impaired Vision/blindness	17	10	7	85.0%

the blind. Serious visual impairment, on the other hand, does not lead to complete disability (morbidity) from farm work as blindness but reduces the working efficiency of such a person and at times leads to counter-production as when a farmer removes crops in an attempt to remove weeds especially in rice-cultivating areas. The presence of a large number of nodules, especially around the hip to a large extent also hinders the farmer from farm work. This problem is, however, not as serious as blindness which leads to complete withdrawal and dependence. Onchocerciasis therefore leads to both morbidity and debility resulting in complete loss of productive years and reduction in labour input (work time) and labour output or labour efficiency (amount of work per unit time) respectively. The bites of *Simulium* in the farms reduce the time a farmer effectively puts into farm work. The farmers usually use plant branches to kill or chase away the blackflies and the consciousness of their presence is also disturbing. In addition, the itching and scratching from the wounds caused by *Simulium* bites and onchocerciasis rashes disturb farm work.

As reported in the results, the average daily wage for hired labour in the studied community, Nkpologu, is N300.00 and the hired labour works for about 6 hours. The average wage comes to N50.00 per hour. From the responses during interviews, it can be estimated that most farmers lose an average of 1 hour per working day as a result of disturbance from *Simulium* flies, itching and scratching of the bites and the rashes. It means, therefore, that they lose on the average about N 50.00 every working day and for the 5 months of farming within the year, each farmer may be losing about 26 man-hours a month and 130 man-hours for the 5 months. This implies a loss of about 21.7 man-days equivalent to about N 6,500.00 per farmer per year. When this is calculated for all the farmers in the community, the economic losses from *Simulium* bites, itching and scratching could be enormous.

CONCLUSION

The study has shown that blackfly bites and manifestations of onchocerciasis reduced productivity of farmers in the study area. Onchocerciasis-related factors cause people to become economic burdens through blindness or serious visual impairment. This can be in terms of loss of income and absolute dependence on the other members of the family. Most of the time, this dependence leads to the children, especially girls, dropping from school to lead the person about. There is, therefore, a serious need to reduce these economic losses by combating this apparently non-fatal disease, human onchocerciasis.

This can be achieved through the co-operation of all health agencies such as zonal Ministry of Health, African Programme for Onchocerciasis Control (APOC) and non-governmental development organizations interested in health. These should undertake enlightenment campaigns on the disease and its effects especially blindness. They should also see to a more effective distribution of Mectizan, which is the choice drug for treatment of onchocerciasis. Again, they should sponsor researches on the best repellents against the blackflies and distribute these repellents to the farmers. In these ways, transmission of the disease can be blocked and the existing manifestations treated.

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