
Full length

Effect of Onchocerciasis on Farming Activity in Oyo State, Nigeria

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Abstract

Onchocerciasis has a devastating effect on hyper-endemic area where almost every person is infected and half the population blinded before they die. The study was carried out to determine the effect of Onchocerciasis on farmers' health and the implication for sustainable food security in the infected and non-infected in the areas of Oyo State. It determined significant difference in the demographic characteristics of affected and non-affected farmers and identified the period in which they are more exposed to the disease. The farmers' level of awareness of preventive measures available to them was determined. A total of one hundred and fifty randomly selected respondents were interviewed. The field survey revealed that majority of the respondents in the infected and non-infected areas (62.2%) and 73.3%) respectively were males. Chi square test showed a significant relationship between sex of the respondents and the effect of onchocerciasis while there is no significant relationship in the age, marital status and educational background of the farmers and the effect of onchocerciasis. However, there is need to provide resources that will enable the farmers to farm most when the disease is not prevalent. Enlightenment programs on the prevention, care and management should be established. There should proper distribution of the drug, to all the farmers in the area through agricultural extension agent, so that the drastic effect of this disease will be reduced for sustainability of food security.

Key words: *Onchocerciasis, Farming, Farmers, Oyo State, Nigeria*

INTRODUCTION

Onchocerciasis is the third leading cause of blindness in Africa, and is caused by a parasitic worm *Onchocerca volvulus* which infect humans via the bite of the intermediate host, the blackfly, is *Simulium damnsum*. The disease has a devastating effect on hyperendemic area where every person will be infected and half the population blinded before they die. The epidemiological pattern of onchocerciasis varies considerably between geographical zones. While onchocercal blindness can be rampant in hyperendemic communities in the savannah belt north of the equator, there is often less damage to the eyes in forest villages with a comparable intensity of infection. A different situation is seen however in other areas in Africa. For instance, in

the Congo basin, severe blindness and less severe blinding onchocerciasis are found in both forest and savanna areas, while in East Africa, blindness is rare in both forest and savanna areas. It is believed that the explanation for this trend in part is the existence of various strains of *Onchocerca volvulus* with different degrees of pathogenicity (WHO, 1997; WHAT, 2001). The disastrous effect of ocular damage due to onchocerciasis is well known but the vector misery of skin lesions and their attendant itch have been largely overlooked in the past. It has recently been shown by a large multi-country study that the skin disease imposes a grave burden and the symptoms have important personal and psychosocial effects not only on the affected individual, but also on their families and communities. Skin lesions are important cause of stigma and seriously affect people's esteem

(Briege, et al. 1998). Riverblindness is a very incapacitating health problem, because in addition to partial or total blindness, it causes many skin and physical problems. However, the disastrous effect of ocular damage caused by Onchocerciasis is well known but the sheer misery of Onchocercal skin lesion and their attendant has been largely overlooked in the past. WHO/APOC (1997) revealed that the microfilaria are the main cause of the clinical manifestation of the disease. These include: dermatitis, resulting in very severe itching, depigmentation and atrophy of the skin and lymphadenitis of the genitals. He explained further that there is a growing evidence suggesting that Onchocerciasis is an important risk factor for epilepsy and dwarfism in certain areas. And that the most severe manifestation of Onchocerciasis are irreversible ocular lesion of both the anterior and posterior segment of the eye resulting in impaired vision and finally in total blindness.

Similarly, World Bank group (2001) reported that the manifestation of the disease include disabling itching, severe skin disease and after reported years of exposure, blindness. In addition, Dadzie (1997) also repeated that the disease is characterized by unbearable itching, loss of skin colour, rapid aging and bad looking skin disease and that the human toll of the disease is devastating due to the huge numbers of the blinds. With such high blindness rate, the burden of disease is overwhelming and threatens the economic survival of the village. Likewise Kio (1995) reported that the commonest signs and symptom of the disease include: itching, reactive skin disease nodules, and partial or total blindness but common observation in heavily infected communities are: leopard skin, palpable nodules, popular rash, lizard skin, hanging groins, scrotal elephantiasis and blindness. However, a large multi country study has recently shown that Onchocercal skin disease impose a grave burden and that the symptoms have important personal and psychological effects not only on the effected individual but also on their families and communities. The symptoms make it difficult for affected individuals to concentrate, work and interact socially. Onchocercal skin lesion is an important cause of stigma and seriously individuals are ostracized by the local community. (WHO/APOC 1997).

Furthermore, the disease also has personal and psychological effect not only on the affected, but also on their families and communities, affecting agricultural productivity. As the contributions of individuals to agricultural activities depend on their

health condition. Sridhar (1994) reported that *fadama* farmers' general welfare improved with their involvement in dry season farming but their health will also be affected with the incidence of water related diseases. Farmers' performance and participation in agricultural activities might be exposed to jeopardy if their health condition is poor.

METHODOLOGY

The study was carried out in Oyo State. It is situated in the tropics, which is in the South Western part of Nigeria. The state lies between latitude 7°N and 9°N of the equator and between longitude 2.5°E and 5°E of the prime meridian. The climate is tropical seasonally characterized by two peak wet season in the south and one peak wet season in the north. Oyo State has a population size of 3,489,000 and land area of 27, 140,000sq.km. Oyo state has 33 local government areas from which 5 Local Government Areas were used for the study and they are: Orire, Lagelu, Afijio, Egbeda and Olorunsogo Local government. It lies across the derived savanna in the north and rainforest in the south. Agriculture is the main traditional occupation of the people of the state. According to the Onchocerciasis section of Ministry of Health, Oyo State, there are twenty (20) local government areas where Onchocerciasis is prevalent and the remaining thirteen (13) are non-endemic. Multi-stage sampling technique was used for the study. Both male and female heads of households in the Infected and non-infected areas were selected using simple random procedure. Based on the local government areas that have been purposively identified as endemic, three (3) were selected from the twenty (20) using simple random procedure while two (2) LGAs were selected from the non-infected area. In the infected areas, the three LGA selected were: Orire, Lagelu and Olorunsogo LGA. One community was selected per ward in each LGA, making a total of three communities. From each community thirty households were randomly selected from which one respondent was interviewed from each household to give a total 30 respondents. Therefore 90 (ninety) infected respondents were interviewed. While in the non-infected areas, the two (2) purposively selected LGAs were: Egbeda and Afijio. From each LGA, one ward was selected from which one community was also selected and 30 households were randomly selected and one respondents were interviewed from each household as well. Therefore, 60 (sixty)

respondents were interviewed in the non-infected areas. This resulted to a total of one hundred and fifty (150) respondents being selected for the study eventually.

RESULTS

The demographic characteristics of the farmers considered in this study include: age, sex, marital status, years of farming experience, educational background, farm size and location of the farm. A very high proportion of the respondents both at the infected areas and non-infected areas (63.9% and 73.3%) are males while (36.1% and 26.7%) are females respectively.

With respect to the age of the respondents, majority (72.2%) and (64.9%) in the infected and non-infected areas respectively are between the middle age of 40-60 years which is in accordance with the report of Kio (1995) that revealed that the incidence of infection varies with age; and that the middle age, constitute 17.8 percent of the population in the endemic areas. Few of the respondents (27.8% and 35.1%) are between the ages of 20-39 while 5.6 percent and 3.3 percent are above 60 years in the infected and non-infected areas respectively. Besides, few females are either single (2.2%), divorced (1.1%) or widowed (6.2%) in the infected areas while in the non-infected areas divorced (1.7%) and widowed (8.3%). A very high proportion of the respondents (70.8%) and (80.6%) had between 16 and 31 years of farming experience in the infected and non-infected areas respectively. Few of the respondents (54.2% and 36.7%) had primary education and 20 percent and 23.3 percent had non formal education in the infected and non-infected areas respectively.

The result revealed that most of the respondents (94.3% and 85.0%) have their farms located in the derived savanna in infected and non-infected areas respectively. However, majority of the respondents (61.0%) in the infected areas have their farms located in fadama areas. Also high proportion of them (76.7%) have their farms located less than 10 kilometers from the rivers, whereas in the non-infected areas very few of the respondents (39.0%) have their farms located in *fadama* areas and 31.6 percent have theirs located less than 10 kilometers from the rivers. However, about half of the respondents (57.6%) in the non-infected areas have their farms located in the plains. More than half of the respondents (68.4%) have theirs located more than 10 kilometers from the rivers while less than half the respondents (35.35%) have farms located on the

plains and few (23.5%) have theirs located more than 10 kilometers from the rivers in the infected areas.

Table 1:

Distribution of the selected characteristics of the respondents

Variables	Infected area	Non-infected area
Sex	Percent	Percent
Male	63.9	73.3
Female	36.1	26.7
Age		
20 – 29	10.0	5.1
30 – 39	17.8	30.0
40 – 49	32.2	28.3
50 – 59	34.4	33.3
Above 60	5.6	3.3
Marital status		
Married	88.4	90.0
Single	2.2	-
Divorced	1.1	1.7
Widowed	8.3	8.3
Educational attainment		
Non-formal education	20.0	23.3
Primary education	54.2	36.7
Secondary education	22.4	30.0
NCE/OND	2.4	8.3
B.sc	1.0	1.7
Experience in farming		
Less than 5 years	2.2	-
5 – 10	4.6	6.7
11 – 15	12.4	13.0
16 – 20	14.6	15.7
21 – 25	17.9	8.3
26 – 30	9.0	8.3
31 and above	39.3	48.0
Farm size		
- 1.99	35.6	40.1
2 – 3.99	55.6	37.0
4 – 5.99	6.7	16.5
6 – 7.99	1.1	5.0
8 – 9.99	1.0	1.4
10 and above		
Farm location		
Hill	3.5	3.4
Plain	35.5	57.6
Fadama (Swamp)	61.0	39.0

The findings revealed that a high proportion of the respondents (74.5%) in the infected areas have a farm size between 1.50-3.00 hectares of land, whereas 50 percent of the respondents in the non-infected areas have the same farm size range.

However, few of the respondents (26.7%) in the non-infected areas have a farm size of 4.00 hectares and above, while 8.9 percent of them in the infected areas have the same farm size.

Season in which the Diseases is more Prevalent

Majority of the respondents (95.56%) in the infected areas confirmed the fact that the vector, the blackfly, responsible for the transmission of the disease is common during the rainy season, even though they breed in fast flowing streams and rivers. Asserting that there is variation in the months in which it is prevalent. A very high proportion of farmers (95.6%) asserted that the vector is more common during the rainy season and the month of July and likewise, they are more exposed to the disease during that period than the dry season in which the incidence is low (Table 2).

Table 2:

Distribution of respondents based on the season onchocerciasis is prevalent for each farming activity in infected areas

Farming activities	Farming seasons		
	Rainy season %	Dry season %	Both %
Land Preparation	4.4	95.6	-
Land Clearing	3.3	93.3	-
Bed Preparation	81.1	14.4	1.1
Planting	93.3	1.1	5.6
Weeding	93.3	2.2	4.5
Watering	26.7	32.1	42.1
Harvesting	92.2	7.8	-
Processing	76.7	2.2	21.1
Piggery	-	-	2.2
Poultry	-	-	-
Cattle	-	-	-
Sheep/Goat	-	-	2.2
Fadama	20.4	1.9	77.8
Fishing	-	-	1.1
Pond Construction	26.9	10.4	62.7
Vegetable			
Fodder Crop	70		30.0
Harvesting			

However, most of the respondents (95.6%) and (95%) involved in land preparation and land clearing in the infected and non infected areas confirmed that they take place during the dry season. Whereas 93.3 percent of the farmers involved in weeding confirmed that the incidence of blackfly is high in the infected area during rainy season. The also study revealed that the incidence of blackfly is high during harvesting and processing in the infected areas, majority of the farmers (92.2%) and (76.7%) for the seasons respectively. This confirmed that the blackfly is

common during dry and rainy seasons. This is because of the location of the farmland. It was also observed that the period of land preparation and planting, majority of the respondents (67.8%) and (66.7%) said that the incidence of blackfly is moderate.

Effect of the Disease on the Performance of Farmers on each Farming Activities

This section looks at the extent at which the incidence of onchocerciasis affected the performance of the farmers on each farming activities. The study revealed that during the land preparation and land clearing periods, majority of the respondents (72.2%) confirmed that onchocerciasis have slight effect on their performance on the farm. In addition, a very high proportion of the respondents (76.74% and 70.18% in the infected areas that took part in harvesting and processing respectively testified that the effect of onchocerciasis on the farming activities is slightly. Nevertheless, half of the respondents (54.24%) in both infected and non-infected areas declared that the effect of the infection on their performance during their rainy season farming is high. However, the range between the respondents for and against the effect of the disease during weeding is 6.7 percent. About half of the respondents (46.6) said that the incidence is high while more than half (53.33) confirmed that it slightly affect their performance (Table 3).

Table 3:

Distribution of respondents based on the effect of the disease on their performance of each farming activity in the infected area

Farming Activities	Rating of effect		
	Greatly(%)	Slightly(%)	Low (%)
Land clearing	9.62	71.2	2.0
Land preparation	7.27	72.7	19.2
Bed preparation	48.78	51.22	-
Planting	36.00	64.00	-
Weeding	46.67	53.33	-
Watering	62.5	37.5	-
Harvesting	23.26	76.74	-
Processing	29.82	70.14	-
Piggery	-	22	-
Poultry	-	-	7.5
Sheep/goat	-	-	22
Fadama	54.24	45.76	-
Fishing	-	-	-
Pond construction	-	-	-
Vegetable production	39.73	58.90	-

Effect of the Disease on Labour Use -Pattern of the Farmers.

The survey revealed that in infected areas, 53.1 percent of the respondents hired labour because they are infected with disease especially during the peak period of the manifestation of the clinical sign. Pertaining to the labour use pattern, most of the respondents use both family and hired labour on their farms to reduce human drudgery. However, the labour use pattern depends on the farming activity being carried out. Majority of the respondents (87.8% and 63.3%) in the infected areas hired migrant workers to prepare and clear their land respectively. Likewise in the non infected areas, very high proportion of the respondents (86.75% and 85%) hired migrant workers for similar operations. In contrast, a very high proportion of the respondents both in the infected and non-infected areas use family labour for planting, weeding, harvesting and processing.

Effect of the Disease on Time-Use Pattern

When the time use pattern is compared to labour use pattern, it was deduced that even though there is close similarity between the labour use pattern and labour availability in both areas, there is a wide gap between the hour spent by the farmers in the infected area and non-infected areas for each farming activities. From the field survey, it was discovered that majority of the respondent (70.9% and 75%) in the infected areas spent between 1hour 31minutes to 3hours on land preparation and clearing respectively while in the non-infected areas, a high proportion of the respondents (75.65% and 64.58%) spent 4hours 30minutes to 6hours on these activities respectively. While very few of the respondents (2.4% and 8.33%) spent the same hours as the farmers in the infected areas. Similarly, less than half of the respondents (46.67% and 42.67%) involving in planting and weeding in the infected areas respectively spend between 1hour 31minutes to 3hours on their farms during these farming operations. Whereas in the non-infected areas, they spent between 3hours

Preventive Measures of the Disease

From the survey, majority of the respondents (97.8%) declared that they are aware of the preventive measure against the infection in the infected areas. Furthermore, majority of the respondent (94.4%) in the infected areas are infected with the disease and manifest the following clinical signs: skin lesion, leopard skin, skin rashes, and partial blindness. Pertaining to the preventive measures used by the respondents,

a very high proportion of the respondents (96.7%) wear long clothing to farms covering their legs and hands to prevent being infected by the disease through bite from the blackfly. Very few of the respondents (16.7%), use insect repellent. None of the respondents in the area use chemicals to destroy the breeding place of the vector. Nevertheless, 52.2 percent and 21.7 percent of the respondents use other preventive measures such as applying kerosene on their body after having their bath and rubbing their body with rob ointment and palm oil. These they said reduce itching of the skin and prevent skin infection. Majority of the respondents in infected areas (88.9%) testified to the fact that they wear long clothing, and use rob ointment, palm oil and kerosene on their body when the blackfly is more common especially during the rainy season on daily basis Table 4.

Table 4:

Distribution of respondents based on preventive measures (N= 90)

Preventive measure	Yes		No	
	No.	%	No.	%
Wearing of long clothing	84	96.7	2	3.3
Use of insect repellent	6	16.7	80	83.3
Destruction of vectors	-	-	-	-

A very high proportion of the respondents (94.4%) in the infected areas declared that they are infected with disease. Furthermore, 82.35 percent of the respondents in the infected areas confirmed that they have been infected with the diseases between 2-5years (Figure 1). However, majority of the respondents infected with the disease disclosed that they use drug and herbs while 12.2 percent said they use herbs, drug, and visit the hospital.

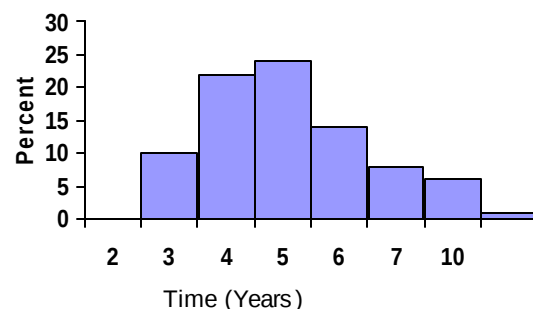


Figure 1: Distribution of respondents showing the years of infection

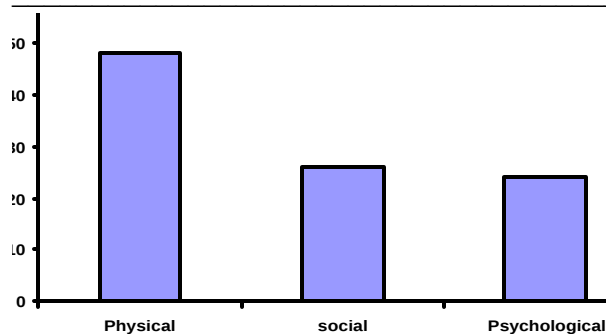


Figure 2:
Distribution of respondents based on the effect of the disease on their personality

The study revealed that the disease has effect on the farmers, physically (48.4 %), socially (28.89 %) and psychologically (26.67 %). These invariably affect their concentration both at work in the farm and their social interaction.

Table 5:

Relationship between the socio-economic characteristics of farmers and the effect of Onchocerciasis

Variables	Degree of Freedom	χ^2	P
Sex	2	12.939	0.02
Age	10	12.901	0.23
Religion	2	0.659	0.72
Marital status	6	3.449	0.79
Education	10	5.422	0.86

Table 7:

t-test for the equality of means on the effect of Onchocerciasis on labour and time use patterns and involvement in farming activities.

Variables	t	pdf	P(2 tailed)	Means difference
Involvement in farming activity	-3.802	148	0.000	-1.1556
Labour use Pattern	-0.591	136	0.556	-5.5983
Time use pattern	11.464	146	0.000	-14.5116

Table 6 shows that Chi square test indicated a significant relationship between sex of the respondents and the effect of onchocerciasis. However, there is no significant relationship between the age, religion, marital status and educational background of the farmers and the effect of onchocerciasis.

There is no significant difference between the labour uses patterns of farmers in infected and

non-infected areas. But significant difference existed between involvement in farming activity and time use pattern.

DISCUSSION

In this part of the country, it is not surprising to notice male dominance in agriculture because in rural families males are usually the breadwinners and they are the ones who acquire and cultivate land. The females only take active part in harvesting, processing, transportation and selling of farm produce. This can be supported by the findings of Gemade and Dipeolu (1983); Nnagi and Ozor (2001) on onchocerciasis which revealed that more males are involved in farming in the infected area than females due to greater exposure of these males in the farms while the females are usually confined to domestic duties within the house. This shows that there is a significant relationship between sex roles and the effect of the disease. However, this result despite that majority of the respondents had little educational background. But there is no significant relationship between education, age and the effect of onchocerciasis. This means that the disease can affect any body irrespective of the age and educational level so far you are living in an endemic area. The result also shows that since farmers in this area are elderly, thus, the reason why most of them had long years of farming experience between 16 and 31 years above and are between the ages of 40 and 60 years. Therefore, it can be deduced from these findings that even though most of the respondents in the infected areas and non-infected areas have their farms located in the savanna belt of the state, the location of the farm in respect to the distance from the river and areas determine the incidence of the disease in the areas. Since, literature revealed that the disease is common in areas with fast flowing streams and along river areas across the savanna belt, it is not surprising that most of the respondents infected with the diseases are those having farms located in fadama and rivers. Moreover, the farm location also has effect on the farm size. The study revealed that the farmers in the non-infected areas acquired more hectares of land than those in the infected areas. However, more of these farmers were involved in *fadama* farming in the non-infected areas than the infected areas, the reason being that most of their farmlands are located close to the river and in swampy areas. The explanation can be supported by that of Holmes (1998) which states that disease incidence may also prevent the agricultural use of

certain areas or limit it to certain time of the year apart from the fact that it affects productivity when this is cross referenced with the season in which the disease is more prevalent. The result revealed that most farmers who were involved in *fadama* farming in the infected areas practices them during the dry season when the incidence of the diseases is minimal

From this study, the respondents in the infected areas asserted that the incidence of blackfly during land clearing and preparation is low due to the fact that those activities usually take place during the dry season, when rain is about to commence. However, it can be deduced from these findings that eventhough some activities are carried out during the rainy season, when the risk of infection is high, the incidence rate is either low or medium. This could be as a result of the rainfall distribution pattern in different areas not being the same, and this is why some areas are still non-endemic while others are either, hyperendemic, mesoendemic or endemic. The result revealed that the respondents in both the infected and non-infected areas are aware of the vector, the blackfly, which transmits the diseases and the disease itself, while most of the respondents are aware of the local preventive measure. However, several studies revealed that the incidence of the disease is across the savanna areas of Nigeria and since both areas fall into this category, this shouldn't be surprising. The t-test also showed a significant difference between time use patterns and involvement of farmers in farming activities, but no significant difference existed between the effect and labour use patterns of the farmers in the infected and non-infected areas. The implication of this finding is that Onchocerciasis does not have affect on the labour use pattern. This shows that the farmers still go to farm despite the fact that they are unhealthy but the number of hours they put in and the involvement in farming activities reduced for the farmers in the infected areas.

CONCLUSION

Poor health condition reduces farmers' ability and capacity to function properly which contributes to reduction in production. Therefore, farmers' performance and participation in agricultural production activities in general might be exposed to jeopardy. The physical, social and psychological conditions of the farmers are affected and as such concentration and social interaction will be seriously affected. It is very clear from this study that the disease is more prevalent in rainy season.

Therefore for sustainability of agricultural production and enhancement of income and

standard of living of the farm families the following recommendation is made:

1. Government should involve the extension agents for advices in the programme because they have more contact with farmers and they also know their problems
2. Local government Chairmen should encourage Community Directed Treatment Invermectin Distribution; through giving of incentive such as cash, e.t.c.
3. Government should also adopt the method of eliminating the intermediate host by killing the larvae especially during rainy season.
4. Dry season farming should be encourage through provision of irrigation

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