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The Comparative Effect of Onchocerciasis on The People of the Northern and Southern Parts of Nigeria

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Abstract: Researchers have variously submitted that *Simulium damnosum*, the arthropod vector carrying the onchocerciasis parasite, breeds during the rainy season in the south western part of Nigeria. Since there is a difference in the climatic condition found in the northern part of Nigeria, we need to specially do a comparative study of situations in the North, as related to the disease, in terms of its causes and effects. This study investigated the differences in the North-South prevalence of onchocerciasis and the different types of the disease found in the North versus the South of Nigeria. The comparative strength (quality) of its impact and the spread of its impact. Local government records were accessed and a survey for presence of microfilariae in individuals carried out in Kaduna and Oyo states. Onchocerciasis in the north is more impactful health-wise and economically on the Northern population with higher frequency of occurrence of river blindness and a higher overall prevalence as well as in the productive age groups.

Key words: *Onchocerciasis* · Disease burden · Impact · Nigeria

INTRODUCTION

Onchocerciasis in Nigeria is known to be caused by a filarial nematode parasite, *O. volvolus*, transmitted by *Simulium damnosum*, an arthropod vector. Previous research has established that the presence and abundance of the vector *S damnosum sensu lato* (*s.l*) is directly related to the prevalence of the human disease [1]. *s.l* in West Africa have exhibited geographical variation depending on savannah or forest regions [2-4] and this has also been found to influence the type or form of the disease transmitted. The savannah vector populations transmit the blinding form onchocerciasis while the forest vectors transmit the form known as onchodermatitis [5, 6]. The forest strain of *O volvolus* was identified and the authors [7] cited various references that confirm the existence of two different strains in the two geographical regions. The disease is a disabling one that causes significant morbidity, psychosocial problems and reduced work especially in agricultural productivity in populations affected. About 37 million people in tropical Africa and 140,000 others in Latin America are infected with *O.volvolus* [8]. In Nigeria and many endemic countries onchocerciasis constitutes a major public health and socio-economic concern because of its dermal and ocular manifestations [9].

Four different species of S. Damnosum were recognized to be existing in Nigeria, including Fauna - S. Damnosum; theobald S. Sirbanum, which according to Vajime and Dunbar [10], exists in the guinea Savannah, different from the S. Damnosum, specifically known• in parts of the south west and the eastern rainforest regions. In terms of prevalence rate or biting rate, the rate fluctuates in the north depending on season, even getting to zero prevalence during the dry season [1]. During the rains however the flies are so abundant that they cover almost one-third of the entire Northern Nigeria and this has to do with the fact that the female fly can migrate about 400km [11, 12]. Given the high prevalence of the vector in the north and the very high bite rate compared to that obtainable in the south, it suggests that the rate at which the *Onchocerca* parasite is transmitted will be very high numerically in both the individuals and also in the general population. Based on these and other conditions,

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it is therefore most likely that the vector and the disease will present some different health and other social and economic consequences in the northern part of Nigeria as compared to its effects in the south.

MATERIALS AND METHODS

The states of Oyo and Kaduna were chosen as the states of comparison. A ten year retrospective study of local government records was carried out in 1998 and in 2008. A descriptive method of study with a systematic method of data collection which helps to easily compare and evaluate was adopted.

Procedure: Apart from taking records from local government secretariat about the effects of the onchocerciasis, we also adopted participatory procedure to gather our data. This procedure allows some levels of friendliness and trust between the respondents and the researcher to encourage the respondent to give honest information. Blood samples taken during the 1998 survey after obtaining informed consent from respondents were examined for the presence of microfilariae.

A cross-sectional survey was carried out in addition to the direct participatory method to obtain demographic data which include age, marital status, sex, occupation and level of literacy. Level of knowledge the people have about the disease in terms of the cause and effects, remedies and cure was also obtained.

RESULTS

In 1998, illiterates who can neither read or write constituted 90% of our respondents. The remaining 10% had some level of literacy not exceeding secondary level. Majority of the respondents could not associate the vector with their conditions or the disease and some believed it was from God. There was no significant difference in the statistics in 2008; however the effect of rural-urban migration was very obvious in Oyo state.

A marked difference in the level of the prevalence of the disease in the north versus the south was observed (Table 1).

More people in Kaduna than in Oyo were infected and the number totally incapacitated is also higher in the northern state with hardly any in the south. Major form of incapacitation found in the north is blindness (River blindness), whereas in the south only slight fever which took only few days to heal is experienced and the people went back to their farm works. In the north, the river blindness was total, turning people into perpetual beggars.

Table 2 shows the intensity of the effects of the parasite in the north as compared to that of the south in terms of the number of people affected by what type of diseases. Blindness does not occur in the south at all, while 35% of the people interviewed in Kaduna (North) have river blindness. Observation of the age of the frequency of each type of disease showed that the diseases that have the highest prevalence in the south are not the type that can strictly incapacitate the victims. The depigmentations in the south are only predominant among, the elderly who may not necessarily be found in any notable socio-economic engagement and even then, depigmentation does not really prevent socio- economic activity.

Table 3 shows prevalence of the onchocerca parasites in the blood samples of respondents. The same number of respondents was examined in the two states and 63% were positive in Kaduna while only 25.8% were

Table 1: Records of prevalence of onchocerciasis in Oyo and Kaduna states (1998)

States	L.G.A Records	No of people incapacitated	No with light infection	Respondent sample size	%
Kaduna	5,400,000	300,000	2,400,000	55,000	16
Oyo	2,600,000	50	2,600	5,000	18

L.G.A (Local Government Area)

Table 2: Distribution of respondents by the kind of disease they have as a result of the parasite infection (1998) N = 1000

Diseases minor stage or full stage	Age of predominance	Oyo state		Kaduna state	
		Frequency	%	Frequency	%
Blindness	15-70yrs	00	00%	350	35%
Nodules	15-20	100	10%	200	20%
Depigmentation	50-80	400	40%	150	15%
Lichenification	40-50	190	19%	250	25.0%
Fever	All ages	400	40%	150	15%
conditions		1090	100%	1100	100%

Table 3:Prevalence of *Onchocerca volvolus* in different age groups in Oyo and Kaduna states (1998)

		States				
		Oyo		Kaduna		
Age (Yrs)	No of persons tested in each state	No of person with parasite	%	No of person with parasite	%	DF Difference
10 yrs	70	8	11.4%	43	61.1%	49.7%
11-20yrs	45	16	35.6%	28	62.2%	27.6%
21-30yrs	55	14	25.5%	32	58.2%	32.7%
31-40yrs	70	23	30.2%	42	60.0%	29.8%
41-50yrs	60	18	30.0%	35	59.0%	29.0%
51 above	30	06	20%	18	60%	40%
	330	85	25.8%	208	63.03%	37.23%

positive in Oyo State. The actual mean percentage difference of the presence of the parasite in people's blood in each of the two states was 37.23% more in Kaduna than in Oyo State.

Although the 2008 survey was not as intensive as that of 1998 due to the prevailing situation in the country local government records was not significantly different from that obtained in earlier and voluntary participation in the survey was negligible and demand for incentive high.

DISCUSSION

The WHO from their work on onchocerciasis observed that the skin disease has an important socio-cultural impact and people with the disease have low self esteem, experience isolation and worry that they will never marry while children are distracted in school due to constant itching. The eye disease (river blindness) in high risk areas resulted in poverty, famine and serious economic losses [13]. The socioeconomic importance of the disease was thus the main reason for the creation of the Onchocerciasis Control Programme in West Africa. Various authors have reported similar degrees of serious impacts of the clinical effects of onchocerciasis in man. Skin lesions have been a major socioeconomic burden in terms of disability adjusted years [14]. Visual impairment incapacitates and turns affected segment of the community into an economic burden and this along with dermatitis has been described as the greatest burden of onchocerciasis [15]. The fact that more people were found with symptoms or signs of the disease in Kaduna state indicate that the effect, burden and impact of onchocerciasis is more in the northern part of Nigeria than in the south. Numerous socio-economically viable youths were found blind and incapacitated in Kaduna and but not in Oyo state. The loss of viable man power in economic terms in Kaduna state is estimated to be much higher. The fact that a high percentage (60%) of respondents that were between the ages of 51 years and above also tested positive to the parasite is similar to what has been reported [16] and suggests a possible acquisition of the parasite at a younger age. The disease is a chronic one and age was confirmed to significantly affect the prevalence with infection increasing with advancing age in Nigeria [16]. The results of many studies reveal that onchocerciasis is usually a serious threat to public health and an impediment to socio-economic development in areas with high intensity and high endemicity of the disease such as we found in Kaduna state. In such places, blindness and serious visual impairment are common and mortality among the blind may be four times as high as among non-blind persons of the same age in the same community. As a result of debilitation and blindness, the infected person is unable to maintain for long any type of productive activity [17]. This situation was observed to have resulted in extreme poverty and the high numbers of beggars among affected segment of the community north.

However, although [9] considered the result of their work as evidence for the potential of onchocerciasis elimination in the two foci surveyed and enormous achievements in control of onchocerciasis in Africa has been attained; many scientists still had misgivings as to whether elimination with ivermectin is feasible in Africa, which has more than 99% of the global cases of the disease. According to some workers current filariasis control strategies are not entirely successful and filarial infection are on the rise. However, in the absence of availabilty of antifilarial vaccines, chemotherapy remains the mainstay for treatment of the diseases caused by filarial nematodes [18] There is the need to intensify control measures, public health education especially of the illiterates and treatment should also target all age groups.

Recommendation: More research is necessary on onchocerciasis in order to achieve complete elimination. The total loss of sight that has rendered a good percentage of the working age people unproductive is an economic drain on the society that must be combated. Efforts must be continued to control the arthropod vector to complement treatment of the disease by use of drugs. The populace need to be educated about how to protect themselves from the vector bites as it was observed during this research that the people generally make no effort to protect themselves from the vector especially in the northern part of the country.

CONCLUSION

After comparative analysis and other statistical survey, it is our finding that there are marked differences in the effects of onchocerciasis on people of the northern part of Nigeria than it is in the south. The quality of the disease, the spread of the disease and also the different types of diseases caused by the onchocerca parasite is also more in the north than the south.

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