Practice Points

Progress in dracunculiasis eradication in Oyo state, South-west Nigeria: a case study

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Abstract

Background: Dracunculiasis currently occurs in only 5 countries, Nigeria inclusive.

Objective: To study the prevalence and management of the guinea worm disease at the threshold of its eradication in Oyo state.

Methods: KAP questionnairres were administered to head of households and cyclopoid copepods in domestic water sources were identified and checked for infection. Prevalence of infection in the study population was monitored and reasons for continued transmission in the area ascertained.

Results: Fifty three cases were reported in study area in 2004 and 2005 but no cases in 2006. Five hundred headof households were interviewed in ten villages. 43.9% believe the disease is in the blood and further probing shows that 54.6% believe infection is due to inherited susceptibility. 51.8% used antibiotics for treatment while 37.1% used herbs.Boreholes, wells, treatment of ponds with Abate™, filter distribution and health education were interventions in place. Un-infected *Halicyclops korodiensis* and *Africyclops curticornis* were recovered from ponds.

Conclusion: Ignorance especially belief in inherited susceptibility, lack of sustained safe water sources and influx of infected immigrant farmers are major variables responsible for the continued presence of the disease in the state.

Keywords: Guinea worm, dracunculiasis eradication, cyclopoid copepods, Nigeria.

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Introduction

Dracunculiasis is a disabling , painful, debilitating, water-borne helminthic disease with multiple adverse consequences on health, agriculture, school attendance, and the overall quality of life of the affected communities. The disease predominates among the rural communities of many developing countries whose population depend upon unprotected water sources for drinking[1].

Its health, social, educational and economic cost to the individual, the household and the community which is considerable and it's transmission cycle are well documented[1,2] . Key intervention strategies to eradicate guinea worm are safe water supply, vector control using abate, health education and case management.

Besides the worm itself and the stagnant water/ copepods combination, the third element in the cycle of the disease is the human being. This is probably the key element, for without the people's cooperation and understanding none of the control strategies or intervention efforts will have much chance to succeed.

The guinea worm disease was targeted for elimination in several countries with the hope of global eradication before the end of the 1990s. In 1986 the World Health Organisation (WHO) designated dracunculiasis as the next disease scheduled to be eradicated by 1995 after smallpox. This eradication deadline was not met and WHO then hoped to certify eradication by 2005. At the 2006 World Health Assembly(WHA) in Geneva, the World Health Organisation(WHO) convened an informal meeting on the eradication of dracunculiasis and additional measures needed to stop transmission of the disease in all of the remaining endemic countries by the end of 2009 was discussed[3].

As of January 2008, the World Health Organization (WHO) had certified 180 countries free of dracunculiasis , 7 countries (not endemic for dracunculiasis -Angola, Cambodia, Democratic Republic of Congo, Eritrea Guinea, Somalia, South Africa)

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remain to be certified, 9 formerly endemic countries (Benin, Burkina Faso, Chad, Cote d'Ivoire, Ethiopia, Kenya, Mauritania, Togo, and Uganda) are in the pre-certification stage of eradication, and transmission of the disease currently occurs in only 5 countries (Ghana, Mali, Niger, Nigeria, and Sudan)[4].

This study aims to find out guinea worm disease prevalence and management at the threshhold of its eradication in Oyo state, Nigeria.

Methods

Studies were carried out in three guinea worm infected Local Government Areas(LGAs), Ibarapa north, Iseyin and Oorelope LGAs of Oyo state, south-west Nigeria. The three LGAs selected for this study were the most infected in the six LGAs infected in the state in 2004, 27 cases in Ibarapa North, 10 cases in Iseyin and 13 cases in Oorelope. The other three infected LGAs in 2004 not included in this study had 1 case each in two LGAs and 2 cases in the last one. Six villages, Igitele, Isale-oja, Isale-akao, Asunnara, Ayete and Oke-ola1 were randomly selected in Ibarapa north LGA (headquarters in Ayete) out of the ten with cases in 2004. The only two villages with cases ,Oniko and Ado Awaye in Iseyin LGA and the only two villages with cases, Adenko and Ologede in Oorelope LGA with headquarters in Igboho were included in the study. The inhabitants of these rural communities are mainly the Yorubas who are majorly farmers.

Prevalence of infection in the study population was monitored. A person was regarded as infected when the worm is or was seen protruding out of the affected area of the body. Information on infection status of study areas was also got from case report data from Global 2000 The Carter Center, south-west zonal office, Nigeria.

Questionnairre on the knowledge,attitude and practise(KAP) in the management of guinea worm disease was designed,pretested and standardised before final administration to the head of households(HOHs) in the LGAs. The HOHs were randomly selected from each village. The household is defined as the occupants of a house regarded as a unit sharing from a common purse. The questionnairre was used to record the demographic characteristics and infection history of respondents. Time of last infection was recorded.Source and treatment of drinking water, perception of the cause of infection,information on the medication used and the knowledge of the disease were also recorded. The safe drinking water sources were confirmed and inspected by researcher. The questionnairres were adminstered by researcher in the local language,Yoruba, and in the presence of Global 2000 field staff and village based health workers (VBHWs) who assisted in further explaining research questions. Cyclopoid copepods in all the ponds used for domestic water sources in study areas were identified and checked for infection using methods described by Falode and Odaibo[5].

Data was analysed using descriptive statistics such as percentages and frequencies.

Results

A total of fifty-three (53) cases were reported in 2004 and 2005 in all the study areas,46 cases in 2004 and 7 cases in 2005(Table 1). However no cases were recorded in the period of this study,January to December 2006. Five hundred(500) head of households were interviewed in 10 villages in the three LGAs under study, 254/500(50.8%) males and 246/500(49.2%) females. Most of the head of households were between 41-60 years old(311/500(62.2%)).

Table 1 : Prevalence of guinea worm disease in study areas in Oyo state, Nigeria.

LGA	Villages	No infected (2004)	No infected (2005)
Ibarapa north	Igitele	2	0
	Isale Oja	1	0
	Isale Akao	7	0
	Asunnara	7	0
	Ayete	4	0
	Oke Ola	2	0
Iseyin	Oniko	4	0
	Ado Awaye	6	0
Oorelope	Adenko	2	5
	Ologede	11	2
Total		**46**	**7**

Source : Case Report Data, Global 2000 The Carter Centre,SW Zonal Office, Nigeria

Table 2 shows that 280/500(56%) had been infected before. It was gathered that 80.7% had their first infection as adults. 151/280(54%) of those infected before claimed to have had their last infection before 1990, 83/280(29.6%) were infected between 1991 and 2000 and 46/280(16.4%) between 2001 and 2005.

Majority (433/500(86.6%)) stated that they have a safe source of water. Boreholes and wells were the

safe sources of water. However,only 375/433(89.4%) claimed to fetch drinking water from the safe sources all the time out of those that have a safe source. When respondents were asked where they get drinking water from during the dry season, 375/500(75%) claimed to fetch from the borehole, 40/500(8%) from wells and 85/500(17%) from ponds. In the rainy season, 277/500(55.4%) claimed to fetch from boreholes, 21/500((4.2%) from ponds and 202/500(40.4%) from rain water collection. Majority(472/500(94.4%)) claimed their pond has been treated before while a small percentage (42/500(8.4%)) boil or filter drinking water.

Table 2: Reports of previous infections by heads of household in 10 villages, n=500

Village	No Examined n=50*	No Infected before (%)
Ado Awaye	*	22(44%)
Oniko	*	38(76%)
Oke Ola 1	*	26(52%)
Igitele	*	28(56%)
Isale Oja	*	44(88%)
Isale Akao	*	29 (58%)
Ayete	*	27(54%)
Asunnara	*	14(28%)
Adenko	*	20(40%)
Ologede	*	32(64%)
Total	**500**	**280(56%)**

Cloth and pipe filters supplied by Global 2000,The Carter Centre were used in the study area.Boreholes and wells were provided by the Local Government Authority, Global 2000 and Rotary Club.Global 2000 officers applied Abate™ to the ponds and educated the villagers with the help of VBHWs.The VBHWs assisted Global 2000 The Carter Center and Local Government health officials in distributing filters, treating ponds, treating infected people and educating villagers.

More respondents out of those infected before(123/280(43.9%)) believe the disease is present in the blood,while 113/280(40.4%) believe it is from infected water(Table 3). Most respondents (145/280(51.8%)) used antibiotics for treatment ,while 104/280(37.1%) used herbs. When respondents were asked what predisposes one to susceptibility,273/500(54.6%) stated inherited susceptibility and 483/500(96.6%) believe any age is most susceptible to guineaworm infection.Majority (477/500(95.4%) believe the disease can be prevented when asked the open-ended question on preventability and mentioned various correct preventable methods(Table 3).

Halicyclops korodiensis and *Africyclops curticornis* were the cyclopoid copepods found in the ponds in the study area (Table 4).

Table 3: Responses to some selected survey questions by respondents

Survey questions	Responses
What caused the guineaworm infection you had?	
Inherited in the blood	123(43.9%)
Infected water	113(40.4%)
Dont know	32(11.4%)
God's doing	12(4.3%)
Total	280(100%)
How did you treat?	
Antibiotics	145(51.8%)
Herbs	104(37.1%)
Shea butter	17(6.1%)
Palm oil	9(3.2%)
Nothing	5(1.8%)
Total	280(100%)
Why are some people susceptible to guineaworm infection?	
Inherited susceptibility	273(54.6%)
Use of bad water	186(37.2%)
Dont know	41(8.2%)
Total	500(100%)
What age is more susceptible?	
Any age	483(96.6%)
15+males and females	14(2.8%)
15+ males	2(0.4%)
15	1(0.2%)
15+females	-
Total	500(100%)
Can guineaworm infection be prevented?	
Yes	477(95.4%)
No	23(4.6%)
Total	500(100%)
Ways of preventing guineaworm disease	
Drinking good water	228(45.8%)
Drinking borehole water	104(20.8%)
Filtering all drinkable water	57(11.4%)
Praying to God	42(8.4%)
Boiling and filtering water	36(7.2%)
Treating infected people	33(6.6%)
Total	500(100%)

Table 4 : Cyclopoid copepod types and distribution in ponds in study area

Village	Pond	Spp of Cyclops	Av.No/5L
Ado Awaye	Iya Sango	*H.Korodiensis*	4
Igitele	Ehin-ile	*H.Korodiensi*	5
Oniko	Idiya	*H.Korodiensis*	11
Isale Akao	Ofumu	*H.Korodiensis*	2
Isale Oja	Akinteye	*H.Korodiensis*	3
Ologede Adenko	Ologede	*Africanus corticornis*	17
Asunnara	Afuyeke	*H.Korodiensis*	9
Oke Ola 1	Ehinle	*H.Korodiensis*	2
Ayete	Afuyeke	*H.Korodiensis*	8

Discussion

Study villages have had a long experience of guinea worm infection which is evident in the fact that 56% of the respondents had been infected before and 54% of those infected before claimed to have had their last infection before 1990. Results also show that infection persisted till 2005, 16% had last infection between 2001-2005. Some respondents claimed that the worms are still present in their bodies causing them pains.

This study further shows the efficiency of eradication measures in reducing the guinea worm disease.The disappearance of infection in the study areas can be attributed mainly to the provision of safe drinking water sources, 86.6% respondents had a safe source of water. The efficiency of safe water sources in eradication was also evident in studies by Udonsi[6] and Edungbola[7].

However it was observed that safe sources of water were inadequate or non-functional in densely populated villages in Ibarapa North and Oniko. In Oniko village where the three boreholes were non-functional,the pond remained the only source of water. Igitele and Isale Akao villages queued up for borehole water,which means the borehole water was not sufficient for villagers. So also only 89.4% of those with safe sources of water used these sources for drinking water all the time and more respondents 85/500(17%) fetch from the ponds in the dry season than in the rainy season 21/500(4.2%). These situations were also prevalent in guinea worm infected villages in studies by Falode and Odaibo[8] where villagers resorted to abandoned ponds.

Filtering and boiling are cumbersome,time consuming and expensive procedures for villagers. Filtering might cease when they do not get supplies of filters from the Global 2000,The Carter Centre.There is therefore the need for the sustainance of continued availability of accessible good clean water in these areas. So also the lack of maintainance of these safe sources may bring about a resurgence of the disease if it is imported into the area.

Some (43.9%) of the respondents still believe that guinea worm infection is in their blood. Further probing revealed that 54.6% believe that infection is due to inherited susceptibility.However,except for the 8.4% that believed that prayers is the only way of prevention,others mentioned drinking borehole water,filtering and boiling drinking water and treating infected ones as preventive measures.The mentioning of these correct preventive methods despite their strong belief in inherited susceptibility shows that villagers have been health educated. This strong belief in inherited susceptibility might make them resort to ponds at the slightest scarcity of good clean water from boreholes and properly constructed wells.

Health education is very important for the success of every component of the intervention strategies and it is a continous process.For instance,it was observed that in the villages under study, villagers were educated about Abate™ to enable the villagers accept the treatmentof their pond with abate. They were also educated on the use and how to use filters and the need to use safe sources of water for drinking. The combination of both education and implementation of measures to provide safe water has been shown to be effective in the reduction of the disease in previous studies[9,10]. If health education succeeds in changing people's behaviour,they will be less likely to revert to unhealthy habits when technology fails,such as when the pump breaks down or when there is no other source of water except pond[8].

A very promising strategy to control dracunculiasis is the application of Abate™ to suitable sources of water. VBHWs were trained in each village by Global 2000 field staff to treat their ponds on a monthly basis. As noted by Morenikeji *et al*[11],proper application of the potent abate will go

a long way in ensuring the eradication of guineaworm diseases. Amali[12],reported a reduction of more than 90% in the number of cases in Ebonyi and Oziba in 1999/2000 due to intensified abate treatment of the ponds in these areas.

Imported cases might be an issue in Ologede where there are Igedes who are immigrant farmers from Benue State,the state which recorded the highest number of cases in 2003 in Nigeria[13].These immigrant farmers might be the source of infection for Ologede and Adenko villages since the two villages share a pond.

Ponds,which have been identified as the ideal source of dracunculiasis transmission[14,15,16],were sampled in this study and *Halicyclops korodiensis* and *Africyclops curticornis* were recovered from ponds.No infected cyclops were found.This is due to the lack of infection in the human population and the treatment of the pond with abate. The application of abate to pond was also found to reduce the density of the cyclopoid copepods population in a study by Falode and Odaibo[5].

Conclusion

It is evident that villagers still hold on to their longheld view of inherited susceptibility or they do not know how infection is acquired despite health education. Inspite of the misconception, majority understand how to prevent infection and a large percentage have a safe source of water. However many still drink from ponds in the dry season when water level in wells is low, where they have to queue for borehole water and in areas with non-functioning boreholes.There is therefore the need for sustained, maintained, accessible safe water sources in all areas especially to guard against importation and spread of disease by immigrant farmers.

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