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Endemicity of onchocerciasis in some Local Government Areas of Niger State

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Summary

The established method of justifying the need for ivermectin delivery to a community is the use of Rapid Assessment Method (RAM). This method involves the clinical examination of 50 adult males, who have been resident in the community for at least five years, for onchocercal nodules and leopard skin. The values obtained for these indices will guide the classification of such a community as being hypoendemic, mesoendemic or hyperendemic. Those that fall within mesoendemic and hyperendemic category onchocerciasis qualify for ivermectin delivery. This study was carried out to determine the endemicity level of onchocerciasis in 74 communities of 8 Local Government Areas (LGAs) of Niger state to justify their inclusion or otherwise in the ongoing state wide mass treatment for onchocerciasis using ivermectin. The communities were selected using the Geographical Information System (GIS) data and following the World Health Organization (WHO) guideline for RAM. A total of 3000 subjects were examined comprising of 2395 (79.8%) males and 605 (20.2%) females. None of the LGAs, based on overall prevalence for nodules qualify for mass treatment with ivermectin. However the study identified communities within some of these LGAs that were mesoendemic for onchocerciasis and thus qualified for mass treatment with ivermectin.

Keywords: *Onchocerciasis, endemicity, ivermectin, treatment,*

Résumé

L'utilisation de la méthode rapide d'évaluation (MRE) établie , justifie le besion de l'administration de l'ivermectine dans la communauté . cette étude était faite pour determiner le niveau l'endemicité de l'onchocercose dans 74 communautés de 8 districts(LGAs) de la province du Niger au Nigéria et le déployement de l'ivermectine. Les communautés étaient selectionnés en utilisant le systéme d'information géographique (SIG) et suivant le guide de l'organisation mondiale de la santé pour le MRE. Cinquante males residant d'au moins de 5 ans dans une communauté ont été examinés cliniquement pour des nodules d'onchocercose et la peau du léopard. Parmi un total 3.000 sujects examinés inclu , 2395 (79.8%) des males et 605(20.2%) des femeles. Les valeurs obtenues pour ces indices guideront sur la classification d'une telle communauté comme étant hypoendémique, mesoendemique ou hyperendemique. Ceux qui tomberont dans la categorie de l'onchocercose hyperendemique étaient qualifiés pour l'administration de l'ivermectine. Aucune des districts basée sur la prevalence totale des nodules étaient qualifiés pour le traitement massif avec l'ivermectine.

Introduction

Onchocerciasis affects 18 million people worldwide, 350,000 blind and 6 million cases of skin diseases. Onchocerciasis is the world's second leading cause of blindness. It causes chronic suffering and severe disability. The global incidence of new case of blindness is 40,000 annually with 120 million people at risk and 1.09 million Disability Adjusted Life Years (DALY) lost annually. Thirty five countries, 28 of which are located in tropical Africa and 6 in Latin America and Yemen are affected by the disease. Ninety nine percent of the infected people are found in tropical Africa [1-4].

Nigeria is the most endemic country in Subsaharan Africa and it accounts for one quarter of all onchocerciasis cases in Africa. About 23 million people are at risk while 3.3 million persons are infected, 1.3 million people are among those infected and 100,000 persons are blind [1, 5].

Onchocerciasis has been endemic in Niger State for a long time. The *Simulium* vector fly was first reported in Nigeria, from Kainji Lake area although this area was until recently, within Kwara State. Several epidemiological surveys on the disease had been carried out in the State since *Simulium* was first reported. For instance El-Zarka [6] reported a blindness rate of 6% obtained for 2,846 persons examined between 1969 and 1970 in the area. Latter studies show prevalence of 13.3% to 70.6% [7, 8]. Prevalence rate of up to 29.6% was later reported with blindness rate of 9% [9].

Ivermectin, the drug presently used nationwide for the control of the disease which is aimed at reducing morbidity and blindness was first launched in the State in 1991.

The distribution of ivermectin to affected communities has been an annual event in the State with gradual improvement in geographical coverage over the years.

The priority of onchocerciasis control programme is to bring control first to the most endemic communities, with the introduction of ivermectin, an effective microfilaricide donated by Merck & Co. Inc. However these most endemic communities need to be clearly identified while the endemicity status of the entire State needs to be determined to confidently justify the direction and strategy adopted for the disease control in the different parts of the State.

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Rapid Epidemiological Mapping of Onchocercia-sis (REMO) is a global tool for estimating the disease preva-lence and for identifying communities at greatest risk of infec-tion [10]. REMO is fast, non invasive, safe and does not pose a risk to Human Immuno Deficient Virus (HIV) or Hepatitis B virus infection as the case with the skin snipping, the method previously used for determining prevalence of infection but now discontinued. REMO is accepted in terms of socio-cultural and religious consideration [11,12]. A good relationship has been established between prevalence of on-chocercal nodules and skin microfilariae [13].

Rapid Epidemiological Mapping of Onchocerciasis (REMO) was conducted in the State in 1994 as part of the nationwide REMO survey on the disease distribution. Since 1994 a number of REMO have been conducted in the State and the GIS map on the endemicity of the disease had been undertaken to refine it. REMO picture for Niger State is clearly defined for many of the 25 Local Government Area (LGAs) but not so for the 8 LGAs under study. This survey was therefore conducted to determine the onhocerciasis endemicity levels in these LGAs to provide data for refining the REMO data for the State and give a clear epidemiological picture of the dis-ease endemicity in the State and guide choice of strategy for ivermectin delivery where such is indicated.

Methpdology
Study area
The study area (Fig 1) comprised the following 8 LGAs of Niger state: Agwarra, Bida, Borgu, Edati, Gurara, Paikoro, Suleja, and Tafa. Niger State is situated in the middle belt of Nigeria and is known to be endemic for onchocerciasis. The State has a projected population of 3.2 million with the esti-mated 1,060,2220 at risk of blindness in 1,600 communities in 17 of 25 LGAs of the State. The population of communities selected for survey was 103,125. These communites are high risk communities with farming as their main occupation.

The National Prevalence Survey of 1988 on onchocer-ciasis classified Niger State as hyperendemic [14]. Further epidemiological study carried out nationwide using REMO in 1994 classified Niger state as hyperendemic [15].

Study communities
A listing of the communities to be surveyed in the selected 8 LGAs was computed from a recently produced GIS map on the State, following the river systems and in accordance with steps outlined [10]. The criteria used in selection of high risk com-munities included closeness to river banks, rapids or falls with preference given to isolated villages. The selection criteria also took into consideration high risk community in every 30-50 km distance and communities located at major tributaries. For every high risk village an alternative village was chosen with similar characteristics to the original choice. The alterna-tive village was surveyed when the original one chosen could not be located. For each high risk village or its alternative, a related secondary village located at least 10km further away from likely main sources of vectors was chosen. Members of the State Onchocerciasis Control Team (SOCT) mobilized the communities prior to the commencement of the survey.

Determination of endemicity status of cor
Rapid assessment (REA) was conducted communities. The rapid assessment met adopted by the National Onchocerciasis c (NOCP) for rapid identification of commu pose of prioritizing ivermectin distribution. veyed community, a sample of 30-50 male fa years of age, of long period of residency was examined for nodules. In communitie possible to capture the desired number o femals were included. Each individual w pose the lower limbs, which were visually e mentation (patches of complete pigment l 'spots' of normally pigmented skin centre licles). This depigmentation was categorize (L/S) and its occurrence or not on individu Data obtained from all individuals were used lence. Individuals were asked if they had body, which aided identification of those wi ing palpation. Every individual was howe palpated for onchocerca nodules. The loca ber of the nodules observed in these individu by age and sex. Each community was classi not for mass treatment with CDTI based on micity which was determined according to line, using the nodular rate.

Validation was carried out by a searcher in 4 LGAs representing 50% (Agwa and Paikoro) of the LGAs surveyed. A total were included in the validation.

Result
A total of 3000 subjects were examined compr males and 605 (20.2%) females in the 74 com It was necessary to substitute second line first line communities in 7% of the surveyed result of migration of entire community or in viduals to be examined.

Table 1: Number of individuals examined by L Area.

LGA	Males	Females
Agwarra	439	61
Bida	161	24
Borgu	714	36
Edati	245	41
Gurara	188	202
Paikoro	335	125
Suleja	48	17
Tafa	265	99
Total	2395	605

The prevalence of people with nod skin for both the survey and validation are gi all the 8 LGAs surveyed the nodular rate w ranged from 4.3% to 18.5%. Similar low rate

during evaluation (Table 2) however the differences between the survey and validation were not statistically significant (P>0.05). Prevalence of leopard skin was even lower than nodular rate in all the LGAs. It ranged from 0 to 5.6%

Table 2: Nodular and leopard skin rates by Local Government Areas (survey and validation)

LGA	Nodules *A/B x 100 (Prevalence)		Leopard skin *C/D x 100 (Prevalence)	
	Survey	Validation	Survey	Validation
Agwarra	8%	12.5%	2%	0
Bida	4.3%	-	0	-
Borgu	10.8%	15.2%	5.6%	8.6%
Edati	7%	-	0.7%	-
Gurara	13.3%	8.8%	2.8%	8.8%
Paikoro	8.3%	12.5%	1.5%	6.2%
Suleja	18.5%	-	0	-
Tafa	9.3%	-	0	-

*A - *Number of people found positive for nodules.*
B - *Total number of people examined*
C - *Number of people found positive for Leopard skin*
D - *Total number of people examined*

As shown in Table 3 none of the LGAs based on overall prevalence for nodules qualify for the CDTI treatment, although they qualify for passive treatment. However there are communities within some of these each LGAs that had nodular rate greater than 20% (Table 4).

Table 3: Nodular and leopard skin rates by Local Government Areas

LGA	Surveyed			Qualified for CDTI	Prevalence Range	
	No Commu nities	Popula tion	No examined		N	L/S
Agwarra	10	15800	500	Not qualified	0-26	0-10
Bida	5	13050	185	Not qualified	0-26.9	0
Borgu	17	13300	750	Not qualified	0-26.3	0-18.4
Edati	6	3300	286	Not qualified	0-16	0-2
Gurara	10	12850	390	Not qualified	0-29.5	0-4.5
Paikoro	12	24900	460	Not qualified	0-15.6	0-9.3
Suleja	2	850	65	Not qualified	14.7-22	0
Tafa	12	19075	364	Not qualified	0-16.7	0

N   Nodules
L/S   Leopard skin
CDTI   Community directed treatment with Ivermectin
Criteria for mass treatment
• Urgent -Leopard skin rate 20%: nodular rate 40%
• Highly desirable - Leopard skin rate 20-30%: nodular rate 20-39

The 4 LGAs of Agwarra, Borgu, Gurara and Suleja have communities that are qualified for CDTI based on their nodular rates, Borgu LGA had 3 out of 17; Gurara 2 out of 10 and the remaining 2 LGAs 1 community out of 10 and 2 communities respectively that are qualified for CDTI (Table 3).

Out of the 74 communities surveyed in these LGAs, the clinical manifestation of onchocerciasis, ie nodules and leopard skin, were not seen in 8 communities. One each of these were located within Agwarra, Borgu, Bida and Paikoro with two each located within Tafa and Edati LGAs.

Table 4: Nodular and leopard skin rates for communities qualified for community directed treatment with ivermectin

LGA	Community	Popu lation	Number examined			Prevalence	
			*M	**F	Total	Nodule	L/S
Agwarra	Cuteku	2500	50	-	50	26%	4%
Borgu	Lesu	100	17	21	38	26%	13%
	Chegu/ Leaba	242	37	1	38	26.3%	18.4%
	Koro	865	50	-	50	22%	14%
Gurara	Gwacipe	1000	19	25	44	29.5%	4.5%
	Kwaka	2000	25	25	50	24%	4%
Suleja	Zariyawa	250	23	8	31	22.6%	-

*   Male
**   Female

However there are few communities within some of these LGAs that qualify for CDTI, based on the data obtained. These comprise Cuteku in Agwarra LGA, Lesu, Chegu/Leaba and Koro in Borgu LGA, Gwacipe and Kwaka in Gurara LGA and Zariyawa in Suleja LGA.

Fig. 1: The study area - Local Government Areas

Discussion

REMO a tool developed by TDR in 1993 forms the basis for identification of communities for the distribution of ivermectin since it helps to rapidly identify hyperendemic communities for prioritizing control effort. A good relationship has been established between the classification of onchocerciasis endemicity based on skin snip data and the classification by rapid assessment methods, especially nodule palpation [13, 16]. REMO is an important step in the planning process for onchocerciasis control [17].

Work carried out in the past in the forest region of Cameroon as well as in Babana area of Kwara State [18, 19] pointed out the usefulness of leopard skin as an important

diagnostic feature. However the prevalence of leopard skin appears not useful in determining endemicity level as observed in these study communities and is also the view of WHO and other workers since the manifestation may not always be presented in onchocerciasis endemic communities areas. Clearly, the use of nodules is a reliable diagnostic feature which has been used for the present assessment of endemicity of onchocerciasis in the study area.

    The finding in this study which showed that nodular rate recorded for all surveyed LGA were below 20% indicate that these are hypoendemic for onchocerciasis. This is in accordance to WHO guideline on community classification for this disease. As such the strategy for ivermectin delivery should be passive and clinic based. Those communities where no manifestation of nodules and leopard skin was recorded have no need for treatment. The 7 communities within the 4 LGAs of Borgu, Agwarra, Gurara and Suleja that had nodular rate of 20% or above are qualified for CDTI and steps should be taken to implement this in these specific communities and surrounding areas. The data obtained from this study will enable a refinement on the GIS map of the disease distribution for the State onchocerciais control programme on the actual status of these LGAs. The data would also serve as baseline for monitoring impact of intervention on the disease.

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