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Impact of Ivermectin treatment on the occurrence of nodules in onchocerciasis infection in two communities in Etung Local Government of Cross River State, Nigeria

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ABSTRACT: The impact of Ivermectin treatment on the occurrence of nodules in onchocerciasis infection in two communities in Etung Local Government Area of Cross River State was investigated. Out of 200 individuals examined, the overall nodule prevalence was 26 (13.0%). The overall prevalence for both male and female individuals were 18 (18.0%) and 8 (8.0%) respectively. Statistical analysis showed that there was no significant difference between the prevalence rate in both sexes ($P > 0.05$). However, the percentage prevalence of nodules in the two communities – Abia and Agbokim – were 10 (10.0%) and 16 (16.0%) respectively. There is a significant reduction in the nodule prevalence in the two communities investigated indicating that Ivermectin plays a role in the inhibition of nodule formation.

Key Words: River blindness; Onchocerciasis; Ivermectin; Epidemiology; Prevalence rate; Nigeria.

Introduction

Onchocerciasis remains a serious public health problem in Africa where it affects some 18 million people (Remme et al., 1995; WHO, 1997; Duke, 1990). The disease is a clinical syndrome partly or entirely characterized by severe skin lesions, nodules, ocular and lymphatic pathologies and sometimes systemic manifestations. There is also the presence of microfilariae in the subcutaneous tissues and the ocular pathology eventually results in blindness. Two major strategies that were adopted for onchocerciasis control included mass chemotherapy with ivermectin and vector control (Dadzie, 1996; WHO, 1995).

Onchocerciasis Control Programme (OCP) in West Africa and several other control programmes which had been launched had recorded major successes in controlling the disease through vector control and large scale ivermectin treatment in areas where blindness were common.

Ivermectin (Mectizan) is an antiparasitic drug developed and manufactured by Merck and Co., Inc. to treat onchocerciasis and lymphatic filariasis. Ivermectin has an excellent safety profile and is proved to be highly effective and well tolerated (WHO, 1998). Taken once annually, Ivermectin relieves the signs and symptoms of onchocerciasis and reduces the transmission of lymphatic filariasis.

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In Agbokim and Abia communities of Etung Local Government Area of Cross River State, treatment of onchocerciasis started in 1995 and the African Programme for Onchocerciasis Control (APOC) support for community directed treatment with Ivermectin (CDTI) project started in 1997. The two communities fall within the hyperendemic foci in the state because of the riverine nature of the environment.

The objective of this study is to find out if the treatment of onchocerciasis with Ivermectin can reduce or eliminate the prevalence in these two communities (Agbokim and Abia).

Materials and Methods

Study Area

The study areas were Agbokim and Abia communities located in the hyperendemic foci of the tropical rainforest of Etung Local Government Area of Cross River State, Nigeria. The two communities shared the same boundary with the Cameroon Republic.

Agbokim community lies between latitude 5°32' and 4°27' North and longitude 7°50' and 9°28' East. In Agbokim community, there are several hills, plateau and valleys with the characteristic presence of rivers and waterfalls commonly called "Agbokim waterfall". The estimated population of Agbokim community is about 20,000 people comprising farmers, fishermen and hunters.

Abia community lies between latitude 8°00' and 7°22' North and longitude 5°22' and 6°30' East. The Abia community is surrounded by water, thus it is an island and has several hills. There are approximately 22,000 people mainly farmers.

Ethical consideration

The survey was carried out after the necessary permission had been sought and obtained from the Local Government Council. Moreover, the cooperation and assistance of the Village Head, the village-based health workers and the community directed distributor of Ivermectin were also obtained.

Method of examination of individuals

Two hundred persons who confirmed having taken Mectizan on yearly basis presented themselves for physical examination for nodules. The nodule search was done with the assistance of the Community Directed Distributor (CDD) of Ivermectin. A rechargeable lamp was used for the close examination of individuals providing adequate light source. The examination was carried out in all parts of the body. The number of nodules found per patient was recorded. Structured questionnaires were administered to the individuals examined to confirm their ages, sex, Mectizan consumption regime, etc.

Results

The number of individuals who had previously been treated with Ivermectin in Abia and Agbokim communities, Etung Local Government Area were examined for the presence of nodules. Out of the 200 individuals examined, the overall prevalence recorded was 26 (13%). The overall prevalence for both males and females were 18 (18%) and 8 (8%) respectively (Table 3). Statistical analysis showed that there was no significant difference between prevalence rate in both sexes ($P > 0.05$). It was observed that individuals at the age range between 50 – 59 years recorded higher prevalence for nodules for males and females 3 (30.0%) and 10 (45.5%) respectively in both communities (Table 3). However, there was no significant difference in prevalence based on the various age ranges.

In general, the percentage prevalence of nodules in individuals in the two communities – Abia and Agbokim – treated previously with Ivermectin recorded 10 (10.0%) and 16 (16.0%) respectively (Tables 1 and 2).

From the questionnaire analysed, all the individuals examined consumed 3 – 8 doses of Ivermectin from the period of commencement of the distribution exercise till the year 2005 when the investigation was carried out.

Table 1: Age range and percentage prevalence of individuals with nodules after treatment with Ivermectin from Abia Community, Etung LGA.

Age range	No. of individuals examined for the presence of nodules		No. and (%) prevalence of individuals with nodules		No. and (%) prevalence of individuals of both sexes with nodules.
	Male	Female	Male	Female	
20 – 29	9	18	0 (0.00)	0 (0.00)	0 (0.00)
30 – 39	12	13	1 (8.33)	0 (0.00)	1 (4.00)
40 – 49	17	9	0 (0.00)	1 (11.11)	1 (3.84)
50 – 59	7	5	3 (42.85)	1 (20.00)	4 (33.33)
60 and above	7	3	4 (57.14)	0 (0.00)	4 (40.00)
Total	52	48	8 (15.38)	2 (4.17)	10 (10.00)

Table 2: Age range and percentage prevalence of individuals with nodules after treatment with Ivermectin from Agbokim Community, Etung LGA.

Age range	No. of individuals examined for the presence of nodules		No. and (%) prevalence of individuals with nodules		No. and (%) prevalence of individuals of both sexes with nodules.
	Male	Female	Male	Female	
20 – 29	9	15	0 (0.00)	0 (0.00)	0 (0.00)
30 – 39	14	12	0 (0.00)	0 (0.00)	0 (0.00)
40 – 49	16	18	5 (31.25)	3 (16.66)	8 (23.52)
50 – 59	5	5	4 (80.00)	2 (40.00)	6 (60.00)
60 and above	4	2	1 (25.00)	1 (50.00)	2 (33.33)
Total	48	52	10 (21.27)	6 (11.32)	16 (16.00)

Discussion

According to NOCP-CRS report in 1994, out of 50 persons examined in Agbokim Community, 50% were infected with nodules. Similarly, in Abia Community, out of 30 individuals examined 325 were reported with nodules. In the present study, out of 100 individuals examined in Agbokim, only 16% were infected with nodules while in Abia community 10% nodules prevalence was reported out of the 100 individuals examined. This indicated a marked reduction in nodule prevalence from the previously reported results by NOCP-CRS (1994).

Table 3: Age range and percentage prevalence of individuals with nodules after treatment with Ivermectin in the two communities (Agbokim and Abia) in Etung LGA.

Age range	No. of individuals examined for the presence of nodules		No. and (%) prevalence of individuals with nodules		No. and (%) prevalence of individuals of both sexes with nodules.
	Male	Female	Male	Female	
20 – 29	18	33	0 (0.00)	0 (0.00)	0 (0.00)
30 – 39	26	25	1 (3.85)	0 (0.00)	1 (1.96)
40 – 49	33	27	5 (15.15)	4 (14.81)	9 (15.00)
50 – 59	12	10	7 (58.33)	3 (30.00)	10 (45.45)
60 and above	11	5	5 (45.45)	1 (20.00)	6 (37.50)
Total	100	100	18 (18.00)	8 (8.00)	26 (13.00)

Ivermectin, technically, is not a macrofilaricide but in the course of routine evaluation and monitoring of on-going Community Directed Distribution of Ivermectin (CDDI) in endemic communities in the rainforest of Southeastern Nigeria, Ukaga et al. (2000) reported the disappearance or dissolution of onchocercal nodules after repeated treatment with Ivermectin.

All the 200 individuals examined confirmed their yearly intake of the recommended doses of Ivermectin since the commencement of the distribution exercise in the communities in 1997. The reduction in the nodule prevalence in this investigation confirmed the study of Chavasse et al. (1992) who observed an increasing number of discoloured and calcified worms with possible trend towards mortality of worms after 4 – 5 doses of Ivermectin.

The reduction in the nodule prevalence in both communities suggest that Ivermectin has successfully interrupted transmission and has greatly reduced prevalence of onchocerciasis. Thus, a significant observation in this study is that prolonged treatment with Ivermectin will help to reduce the microfilaria load in the skin, thereby preventing the formation of nodules and inhibiting the transmission of onchocerciasis.

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