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A health club for a community school in south-eastern Nigeria: influence on adult perception of onchocerciasis and compliance with community-based ivermectin therapy

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Summary The impact of a school health club on adult perception of onchocerciasis and compliance with ivermectin was evaluated in an onchocerciasis-endemic community in southeastern Nigeria. Venous blood was collected from each of 26, 32 and 124 randomly selected subjects during ivermectin distribution programmes in 1995 1996 and 1997 respectively. Ivermectin concentrations were measured in the samples. Data was also collected from 334 and 319 randomly selected household heads or their representatives (aged 24 to 65 years) before and after health talks by schoolchildren, using interviewer-administered questionnaires. There was an increasing number of subjects who participated in control programmes (116 in 1995, 437 in 1996 and 2055 in 1997). Compliance with ivermectin treatment was low (53.9%) in 1995 but increased dramatically (90.1%) in 1997. A significant proportion ($\chi^2 = 108.7$, df $= 1$, $P < 0.0001$) of respondents knew about onchocerciasis after health education, predominantly from health workers (64.5%) before the tests and children (92.3%) after. Knowledge and beliefs about causative agents ($\chi^2 = 266.4$, df $= 5$, $P < 0.0001$), diagnostic method ($\chi^2 = 207.4$, df $= 3$, $P < 0.0001$), prevention ($\chi^2 = 67.0$, df $= 4$, $P < 0.0001$) of onchocerciasis and the effectiveness of ivermectin ($\chi^2 = 40.4$, df $= 1$, $P < 0.0001$) also differed significantly between the periods before and after tests. The school health club increased adult knowledge about onchocerciasis and its treatment. Schoolchildren could therefore supplement the information, education and communication (IEC) aspect of health care delivery in a community through such health clubs.

keywords school health club, adult perception, compliance, onchocerciasis chemotherapy

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Introduction

Onchocerciasis, a filarial disease caused by *Onchocerca volvulus*, is endemic in most parts of tropical Africa. With 20% to 40% of the world's 17.5 million cases of onchocerciasis, Nigeria is the country most affected by the disease (Anonymous 1994). Its control strategy is based on annual administration of ivermectin to all members of communities where the disease is highly prevalent and where therefore the risk of blindness is greatest. There appears to be a lack of communication between health services and the general population, resulting in low motivation to participate in curative and preventive activities.

Previous studies (Shu *et al*. 1999) have shown that compliance with ivermectin treatment may not be effective if communities perceive onchocerciasis as a low-priority health problem. In pharmaco-epidemiological studies involving largely illiterate subsistence farmers, estimating compliance is difficult (Okonkwo *et al*. 1993). However, to achieve high, sustainable levels of appropriate use of ivermectin among those at risk, the communities must be educated about the effects of the disease and the need for ivermectin.

Theoretical analysis suggests that school-based health systems might rank amongst the most cost-effective of public health strategies (World Bank 1993), since they make use of an established infrastructure which may supplement the existing public health care system. Therefore schools can contribute to health delivery provided that the package is

simple, demands little school time, and is perceived as appropriate to local needs. To test this hypothesis, we assessed the influence of health education of schoolchildren on adults' perception of onchocerciasis and compliance with community-based ivermectin distribution.

Subjects and methods

Study site

The study took place in Okpatu, an autonomous community in the Udi Local Government Area of Enugu State in south-eastern Nigeria. Brieger *et al*. (1996) defined an autonomous community as the largest indigenous political unit among the Igbo people and headed by a community leader known as the *Igwe*. The number of villages in an autonomous community varies from 6 to 30. The family compound is the basic living unit in the study community and may contain several households. We have previously described a household (Onwujekwe *et al*. 1998). Okpatu is about 27 km from Enugu City and comprises 786 households. The 1991 census figures show that the community has a population of 7021. It has been reported to be hyperendemic for onchocerciasis (Shu & Okonkwo 1998).

Compliance assessment

The population was given ivermectin annually from 1995 to 1997, and participation in the programmes was recorded. During these three ivermectin administration programmes, 5 ml of venous blood samples (in EDTA) were collected from each of 26, 32 and 124 randomly selected subjects, respectively, 4 h after giving ivermectin. The blood samples were conveyed to the laboratory before plasma was separated and stored at −20 °C until needed for analysis. Plasma ivermectin concentrations were measured by a sensitive HPLC method with fluorescent detection (Krishna & Klotz 1993; Okonkwo *et al*. 1993). The lower limit of detection of the method in our laboratory is 1 ng/ml, and intra- and inter-assay variability averaged 3.6% and 5.8%, respectively.

Health education

In April 1995, students of Saviour School of Commerce in Okpatu, Enugu State of Nigeria received health education on onchocerciasis: its transmission, symptoms, treatment and prevention. A pre- and post-education evaluation showed encouraging results (Shu *et al*. 1999). The students then formed a health club sponsored by one of the authors (E.N.S) aimed at transferring the knowledge gained to the local population. Prerequisites for admission into the club were good performance in the post-health education evaluation, interest, area of residence and ability to express oneself.

Quantitative survey

In September 1995 and August 1997, 334 and 319 household heads or their representatives, respectively, were administered pretested interviewer-administered questionnaires. Although the number of household heads in the second sample (in 1997) who were also in the first sample (in 1995) was not known, we tried to include as many new respondents as possible in 1997. The questionnaires were administered by trained natives of the community who held at least a secondary school certificate and had difficulties in furthering their education because of lack of funds. The same questionnaires were administered before and after education was provided to schoolchildren and each interview lasted for 15 min. The households were selected through a multistage sampling technique: villages were selected by balloting from the community and households were then selected by simple random sampling using the primary health care (PHC) house numbering as the sampling frame. The research objectives and methods were then explained to the participants and oral informed consent was obtained before the research was started. The study was approved by the Ethics Committee of the University of Nigeria Teaching Hospital, Enugu, Nigeria. The survey data were analysed using GraphPad Prisms and Epi Info software.

Results

Table 1 summarizes the number of participants in control programmes and compliance with ivermectin therapy over three years. The proportion of subjects who participated and complied with ivermectin therapy increased from 1995 to 1997. The majority of respondents in pre- and post-education assessments (74% and 70%, respectively) were aged 24–65 years. Married males comprised 85.9% and 71.8% of subjects in the pre- and post-tests, respectively. Most respondents in both pretest (90.1%) and post-test (87.6%) had no formal education. All were Christians and predominantly farmers (94% in both cases).

Table 1 Participation in control programmes and compliance with therapy

Period	Participation	Compliance	
	N	*n	n (%)
1995	116	26	14 (53.9)
1996	437	32	20 (62.5)
1997	2055	124	112 (90.3)

*n, number of subjects randomly selected; n(%), number(%) of subjects with a detected level of ivermectin in the blood.

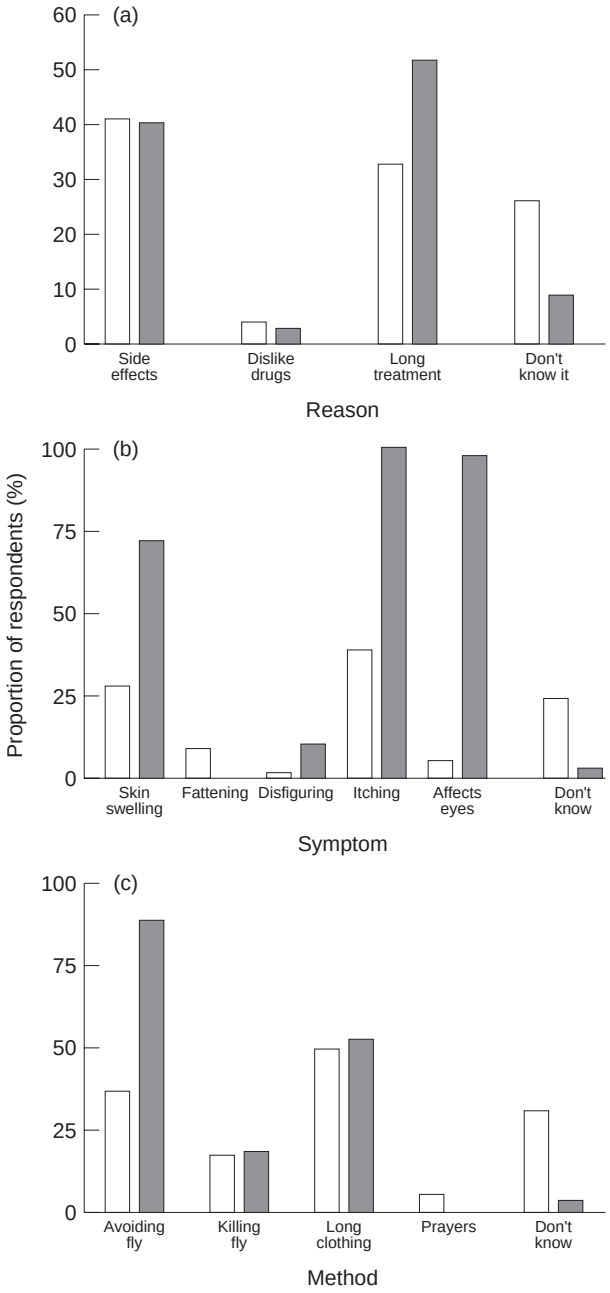

Figure 1 a, Reasons for not complying with ivermectin; b, knowledge about the symptoms of onchocerciasis; c, knowledge about methods of prevention of onchocerciasis. □ pre-education; ■ post-education.

The reasons for low compliance with ivermectin treatment differed significantly (Figure 1a; $\chi^2 = 64.6$, d.f. = 3, $P < 0.0001$). Pre-assessment 89 (41.0%) of the respondents complained about side-effects of ivermectin while post-assessment, 124 (40.0%) and 159 (51.3%) complained of side-effects and duration of treatment, respectively. There were significant differences in the proportion of respondents (65.0% pre- and 97.2% post-education) who knew about onchocerciasis ($\chi^2 = 108.7$, d.f. = 1, $P < 0.0001$) and in the sources of this knowledge ($\chi^2 = 181.6$, d.f. = 3, $P < 0.0001$) before and after education evaluations. Most of the respondents in the pre-education assessment knew about onchocerciasis from health workers (64.5%), while in the post-test, their knowledge came predominantly from health workers (42.9%) and children (92.3%).

Significant differences also exist in the knowledge/belief about the causative agents (Table 2; $\chi^2 = 266.4$, d.f. = 5, $P < 0.0001$). In post-assessment, 93.9% of respondents knew that onchocerciasis causes itching, 67.1% that it causes swelling of the skin and 91.9% that it affects the eyes (Figure 1b); as opposed to pretest knowledge about itching (36.4%) and swellings (26.2%). There were significant differences in the knowledge about diagnostic method (Table 3; $\chi^2 = 207.4$, d.f. = 3, $P < 0.0001$), effectiveness of ivermectin ($\chi^2 = 40.4$, d.f. = 1, $P < 0.0001$) and prevention (Figure 1c; $\chi^2 = 67.0$, d.f. = 4, $P < 0.0001$) of onchocerciasis before and after tests. Although 80 (36.9%) and 107 (49.3%) of respondents in the pre-evaluation knew about avoiding

Table 2 Knowledge/belief about the causative agents of onchocerciasis

	Pre-education		Post-education	
Agent	*n*	%	*n*	%
Blackflies	63	29.0	155	50.0
Mosquitoes	33	15.2	8	2.6
Bad food	26	12.0	0	0.0
Don't know	95	43.8	3	0.9
Total	217	100.0	310	100.0

$\chi^2 = 273.6$, d.f. = 3, $P < 0.0001$.

Table 3 Knowledge about the diagnostic method of onchocerciasis

	Pre-education		Post-education	
Method	*n*	%	*n*	%
From clinical signs	60	27.7	155	50.0
Skin snip	28	12.9	143	46.1
Cannot be tested	27	12.4	0	0.0
Don't know	102	47.0	12	3.9
Total	217	100.0	310	100.0

$\chi^2 = 207.4$, d.f. = 3, $P < 0.0001$.

black flies and putting on long clothing to prevent onchocerciasis, in the post-evaluation, 276 (89.0%) and 163 (52.6%) of them mentioned avoiding black flies and putting on long clothing, in that order.

Discussion

Persuading people to take ivermectin and informing them about the effects of the disease if not treated requires special public health communication efforts. Although education and motivation of village parents is an important function of the community health worker (CHW) with the help of the village health committee (Wyatt 1984), it is rarely performed. However, 'vertical' distribution programmes are normally preceded by community sensitization. Despite this, there is still need for public health education of the population. Since school systems rank amongst the most cost-effective public health strategies (World Bank 1993), we investigated the influence of a school health club in supplementing health care delivery.

Our results showed that an increasing proportion of subjects participated in onchocerciasis control programmes and complied with ivermectin. Informal discussions with participants revealed that some subjects would not take ivermectin during distribution programmes because they wanted to observe others who had taken the drug for side-effects. Although these people may have taken the drug later at home, it resulted in low compliance in 1995 and 1996. However, with increased awareness, the proportion of individuals who took ivermectin increased dramatically in 1997.

After health education, a significant proportion ($\chi^2 = 108.7$, d.f. $= 1$, $P < 0.0001$) of respondents knew about onchocerciasis. Those who did not might have been absent from their homes during the schoolchildren's information campaigns. In a similar study in northern Cameroon, Gardon *et al*. (1996) found that participation of compound heads increased with household size and diminishing distances to the distribution point: getting information on health programmes was easier in large households whose members were involved in various social activities and in compounds located near the village centre. By contrast, in south-western Nigeria where information media and social network were used as patient education methods, Oladipo *et al*. (1996) saw decreasing attendance at the second round of ivermectin distribution.

Although most respondents (96.5%) know that onchocerciasis is caused by black flies, a small proportion (2.6%) believe that mosquitoes are among its causative agents. It is not clear why, since there is a local name for the blackfly vector. This is comparable with reports of a previous study (Shu *et al*. 1999) in which 12.9% of schoolchildren still believed that onchocerciasis is caused by mosquitoes after health education.

Most respondents reported swellings on the skin (67.1%), itching (93.9%) and effects on the eyes (96.9%) as symptoms of the disease in the post-evaluation (Figure 1b). In a preliminary survey in the study community, informal discussions revealed that the villagers recognized the disease by the itching which will produce swellings on the skin when scratched. The health club built on this fact. However, in Malawi, none of those interviewed associated *Simulium damnosum* with any symptoms other than those related to the actual bite (Johnston *et al*. 1994).

In our previous study (Chijioke & Okonkwo 1992), some patients in Achi, Nigeria interpreted adverse effects as a sign that the drug was effective. In the present community, this attitude was encouraged by simple explanation of the mode of action of ivermectin by members of the health club. Although a comparatively high proportion of respondents still complained of side-effects, we suspect that they may have been acting out stories by previous users of the drug. Much more information needs to be communicated on the life cycle of the infecting agent in order to explain the long duration of treatment.

Even though 89.% of respondents know that the disease can be prevented by avoiding the vector, they are faced with the dilemma of sleeping on their farms (where the vectors breed), knowing that their families depend essentially on subsistence farming. People often feel that preventive health measures in the village will inevitably fail unless a higher economic level has been reached. However, raising the level of knowledge about diseases in endemic communities gives people the confidence that they can themselves do something to improve their health.

Although large differences were seen before and after the educational intervention, the lack of a control group makes it hard to confidently ascribe the changes seen entirely to the health club. It is possible that these differences were a result of other factors: Firstly, perhaps they occurred naturally over the course of time from improved communications. Also, households may have made an effort to increase their awareness following the first round of surveys. Secondly, although the number of household heads in the second sample (in 1997) who were in the first sample (in 1995) was not established, households in 1997 may have been more knowledgeable and compliant after having had a visit from researchers in 1995 and 1996. Thirdly, although the interviewers received training prior to administering questionnaires, the way in which options were framed could have influenced responses (Ham 1993).

In conclusion, the local people (in Okpatu, Nigeria) are now well informed about onchocerciasis and the need to comply with ivermectin treatment principally through health

education. They still need to be encouraged on a particular preventive method. School health clubs can effectively supplement control measures, especially in the area of community mobilization and enlightenment campaigns. We believe that successful implementation of school health clubs in endemic communities may help sustain control programmes such as the community-directed treatment with ivermectin (CDTI).

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