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Community-based ivermectin distributors: onchocerciasis control at the village level in Plateau State, Nigeria

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The use of community residents as agents for distributing mass ivermectin therapy for onchocerciasis provides a component of community participation absent from mobile team delivery methods. Community-based distribution, however, presupposes preexisting human resources in the endemic villages capable of fulfilling the essential functions of an ivermectin distribution process: mobilizing and educating the population, dispensing the drug, maintaining records, and monitoring and treating adverse reactions. Even when such human resources exist, the community workers must continue to receive tangible support from both external (government and donor agencies) and internal (community) sources. Donor and government agencies must accept that their data collection demands will be limited by the literacy standards of the communities being served. Community leaders must agree to set and use their own local standards of payment (including food stuffs or exchange in kind) to compensate the distributors for their time and efforts. The use of locally available human and remunerative resources is a prerequisite for true community ownership of a program.

Key words: Onchocerciasis; Ivermectin; Village health worker; Mass drug therapy; Community based health activities

1. Introduction

Onchocerciasis ranks among the leading causes of visual impairment and blindness in developing countries. The infection is caused by *Onchocerca volvulus*, a filarial (worm) parasite transmitted by the bite of tiny blackflies of the *Simulium* species. These flies breed in fast-flowing water, thus the origin of the common name, river blindness. Onchocerciasis also is a cause of intense pruritus (itching), and disfiguring dermatitis. The World Health Organization estimates that 20 million people are currently infected worldwide. Approx. 100 million people, most of whom are African, live in endemic areas and are, therefore, at risk.

Control of the blackfly vector by periodic application of larvicides to breeding sites was the only available option for controlling river blindness until the introduc-

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tion of the drug ivermectin (Mectizan[®]). Periodic treatment with ivermectin prevents the severe manifestations of human onchocerciasis (Dadzie et al., 1987; Greene et al., 1985; Taylor and Greene, 1989; Greene, 1991). The drug acts by reducing the *O. volvulus* microfilaria present in the eye and skin. This decreases the risk of visual impairment, and may also alleviate for a time dermal lesions and pruritus. Although some persons who are infected with *O. volvulus* may experience reactions (body aches, swelling, headache) after ivermectin treatment, these are generally mild and of short duration (DeSole et al., 1989). Therefore, ivermectin provides an opportunity for preventing onchocerciasis-related morbidity on a vast scale, because it is safe for use in mass distribution programs (Taylor and Greene, 1989). However, ivermectin does not cure onchocerciasis, and to prevent morbidity indefinitely the drug must be taken at least annually (Green et al., 1991).

In an unprecedented humanitarian gesture, the manufacturer of ivermectin (Merck & Co.) has pledged to donate the drug to distribution programs that can meet certain basic requirements for controlled administration. These requirements are set by the Mectizan[®] Expert Committee, an independent group of experts that has established a process by which governments or nongovernmental development organizations (NGDOs) may apply for and receive ivermectin (Foege, 1990). The Mectizan[®] Expert Committee secretariat monitors these ivermectin distribution programs (IDPs) by requiring annual reports before resupplying the programs with new drug shipments. IDPs must also provide information about the numbers of persons and communities treated, any serious adverse reactions to treatment, and tallies of ivermectin tablets remaining after the year's activities. The latter is needed to discourage the use of the drug for purposes other than the treatment of onchocerciasis (a lucrative veterinary market exists) or the selling of the donated drug on the open market.

The successful public health application of ivermectin to control onchocerciasis requires cost-effective and sustainable systems for its distribution. One strategy to meet this objective employs local residents as community-based distributors (CBDs) of ivermectin. The purpose of this paper is to describe the essential components of an IDP, compare and contrast programs that use CBDs with those that utilize mobile teams for distribution, and describe the experience using CBDs for ivermectin distribution in Plateau state, Nigeria as a case study.

2. Ivermectin delivery programs: definitions of terms and strategic options

Mass treatment of eligibles and community coverage

Mass treatment is defined as providing ivermectin to all residents of communities where onchocerciasis is an important health problem. Because prevalence of infection reaches nearly 100% in highly endemic areas, this approach assumes that a threshold prevalence can be chosen, above which the entire village population can be treated without establishing the infection status of each inhabitant. A number of guidelines have been developed to aid in determining which communities in a region should be targeted for a mass treatment program (WHO, 1993; Ngoumou and Walsh, 1993). Members of the targeted community (except those meeting the manufacturer's exclusion criteria) are considered eligible for treatment. Excluded from treatment are children weighing less than 15 kg (or having a height of less than 90 cm), women

who are pregnant or who are nursing babies under 1 week of age, and individuals who are seriously ill. Coverage is variably defined as either the percent of all eligible residents treated, or the percent of the entire population treated; IDPs strive to sustain the highest possible coverage for each round of therapy offered every 6 to 12 months.

Active vs. passive ivermectin distribution

Most IDPs are outreach programs that aim to provide maximum drug coverage to a community targeted for mass therapy in the minimum time. This campaign approach usually lasts about 1 week, during which time a maximum effort is made by distribution personnel to mobilize the population for treatment. Active distribution usually occurs by one of two techniques: the IDP agent may go from house to house, offering treatment at each household; or a message can be sent for all villagers to gather at a central location (such as a health center, central compound, or public square) to receive treatment.

In contrast, passive approaches to ivermectin distribution usually function through clinics and hospitals in endemic areas. An energetic publicity or health education activity informs villagers about where the drug is available and why the drug is important to motivate persons to travel possibly long distances to reach the facility for treatment. Passive distribution is not particularly effective for mass therapy, but it does provide ivermectin to the population as an ongoing, continuous service, rather than as a time-limited opportunity. This method is often reserved for areas of lower onchocerciasis endemicity where the risk of visual impairment is low, or as a backup for an active distribution program.

Active distribution – mobile vs. community-based distribution

The mobile approach to active distribution uses specialized treatment teams or agents, usually equipped with a four-wheel drive vehicle or motorcycles, to visit targeted villages. The team speedily motivates and treats the village population, usually on a time schedule in compliance with the team's, rather than the villagers', convenience. The team remains in the village or general vicinity for about 48 h to treat persons with any adverse reactions. In contrast, community-based distribution is conducted primarily or entirely by village residents. The distributor may be a person recruited exclusively for the purpose of distributing ivermectin, or may be a village health worker already stationed at the local health center. In either case, the responsibilities of the CBD are similar to those of the mobile team: to mobilize, educate, dispense, maintain records, and monitor for adverse reactions. In a report from an IDP in Kwara State, Nigeria, comparing the use of village health workers with mobile teams, the village workers provided better coverage (93% vs. 72%), kept better records, and were less expensive to support (\$0.50 per person/treated by village workers vs. \$0.82 by mobile teams; Pond, 1991).

Community participation vs. community compliance

In programs that rely on mobile teams, the community must simply be receptive to taking the drug. This passive acceptance of outside intervention is best termed compliance, rather than community participation (Bermejo and Bekui, 1993). In contrast, at least some degree of community participation occurs in those programs

that incorporate community members into the planning and implementation of drug delivery (Akpala et al., 1993a).

3. Case study: The use of community-based workers to distribute ivermectin in Plateau State, Nigeria

The seminal effort to establish state level IDPs in Nigeria was initiated in 1989 by Kwara State health authorities in collaboration with Africare and the International Foundation. This experience, summarized by Pond (1990, 1991) emphasized the enlistment of CBDs. Other IDPs in Nigeria followed, including the Plateau State/River Blindness Foundation (RBF) Onchocerciasis Control Program, which, by the end of 1994, had a CBD network in approx. 930 villages that treated a total population of about 750 000.

Plateau State is located in central Nigeria; its capital city is Jos (10°N, 9°W). As suggested by its name, the region is higher than surrounding states, having a mean elevation of 1200 m. Seventy percent of Plateau State's 3.3 million inhabitants live in rural areas; most are of the Hausa ethnic group. The Ministry of Health provides medical services through cottage hospitals and rural clinics in central locations in each of the 23 administrative districts (called local government areas – LGAs). Ten of these LGAs contain villages classified as needing mass ivermectin therapy for onchocerciasis.

Initiation of the Plateau State Onchocerciasis Control Project

The Plateau State Onchocerciasis Control Project started in June of 1991 as a combined effort of the Ministry of Health and the RBF. The objectives were to implement cost-effective ivermectin distribution programs integrated with the existing primary health care delivery system. Preexisting state and local Ministry of Health onchocerciasis control teams were used to initiate IDP activities. A specific protocol was prepared to communicate the intentions of the project and followed through the hierarchy of authority. First, LGA officials were apprised of the goals and plans of the program. Next, the local political and/or traditional leaders were informed. Once support had been secured on these two levels, the onchocerciasis control teams began the process of orientation, education, and mobilization in the targeted communities. In addition, a passive ivermectin distribution mechanism was established at each of the 23 LGA health department clinics located in those communities designated as LGA headquarters.

The program delivered its first community-based treatment in January 1992. Initially, two mobile teams went from village to village administering ivermectin in the state's two most highly infected LGAs. The mobile team approach was used initially to give the state and local onchocerciasis control team staff exposure and experience in the distribution process. However, it was clear that the annual task of delivering ivermectin to the targeted villages would be impossible without the use of village level personnel, with the ultimate roles of the onchocerciasis control teams being supervision, training, problem resolution, and quality control.

Transition to community-based distribution

Transition from a mobile team to CBD distribution began in May 1992. As a

first step, community chiefs and village leaders were asked to identify someone from the community who could serve as an ivermectin distributor (some larger communities were asked to nominate more than one CBD). The CBD was expected to be available to the program for about 5 to 10 work days just before and during the treatment period. Preference was given to existing VHWs, but it was discovered early on that there were very few village health workers present in the targeted communities, and many of them were illiterate. Therefore, the Plateau State program leadership began recruiting personnel for the sole purpose of ivermectin distribution. CBD candidates had to speak the local dialects, read, write, and perform basic arithmetic functions. Sometimes, only the local school teacher had the skills needed to perform the required tasks.

Remuneration

Monetary incentives for the CBDs quickly became an important issue. Initially, each LGA had the responsibility for providing the incentives to their CBDs. Payment was calculated on the 5–10 days that the CBDs were expected to be engaged in IDP work at a day's wage at 20 naira; therefore, total compensation ranged from 100 to 200 naira (approx. US \$8–16 in 1992). Several problems occurred with this arrangement in the first year: Some LGAs underpaid their CBDs, or did not pay them at all. Among LGAs willing and able to pay their CBDs, the logistics of payments were often prohibitive, with the wages sometimes being siphoned off during delivery to the CBDs. Lastly, payment in currency made the CBD's position so highly desirable that community leaders often chose friends or relatives for the job. Thus, financial, political, and familial considerations caused by the payment of wages in naira often resulted in selection of a CBD who was not the best qualified person.

As an alternative approach, it was decided that the communities targeted for treatment would have to assume the responsibility of providing the CBD incentives. The negotiation of payment was left to the community leadership, and agreements for remuneration could include whatever was deemed locally appropriate: currency, foodstuffs, or labor exchange. This approach put the CBD's support in keeping with village standards, reduced the desirability of the CBD position, placed the IDP into the realm of community responsibility, and made clear to the CBD that (s)he was accountable to community leadership during the treatment campaign. The Plateau State program was responsible for providing the CBD with training, record keeping materials, ivermectin, and drugs for treating minor secondary reactions.

In approx. 10% of targeted communities, the leadership was not willing to comply with the obligation of paying a CBD, usually insisting that money come from the LGA or the Plateau State program. In those communities, ivermectin distribution activities were suspended, and individual villagers advised that they could seek ivermectin treatment through the passive distribution system established at the main LGA clinic. The community could rejoin the mass distribution project when the means to support the CBD were made available.

Fortunately, over time, taking ivermectin was increasingly perceived as beneficial, particularly as the more recognizable advantages of treatment were observed (loss of lice, scabies, and intestinal round worms). In many areas, ivermectin became known as a 'cure-all' drug, and even an aphrodisiac. Given the rising popularity of ivermectin, community leaders found themselves pressured to identify resources to support the CBDs and so allow village participation in the Plateau State program.

The negative side of this popularity was that it created a demand for more frequent than annual dosing, and thus a concern that the donated drug would find its way to the market place.

Training

By the end of 1994, over 1000 CBDs had been trained by the Plateau State program. Annual training and retraining sessions in Hausa and in English, supported with RBF funds, were given at each LGA government seat by members of the onchocerciasis control teams (the former mobile unit teams). Groups of approx. 30 to 50 CBDs from the LGA attended, each receiving a per diem payment of 20 (\$1.60) naira per day. The CBDs spent 2 days in class followed by 1 day in the field to gain practical experience. The training period was also a time to listen and learn from experienced CBDs, and to cultivate a CBD identity. The goal was for the CBDs to view themselves as both village employees and national agents playing a role in a historic movement to control an ancient disease. At the beginning and end of each training session, individual testing was done to determine if important messages were being communicated to the CBDs: such testing allowed the onchocerciasis control teams to identify the weaknesses of the course. The sessions ended with a ceremony in which the CBDs were awarded with certificates of achievement. Whenever possible, onchocerciasis control team staff would return with new CBDs to their villages to ceremoniously present them to the chief and community. Drawing attention to the achievement of the CBD allowed for the growth of prestige and esprit de corps that contributed to successful completion of the often tedious active distribution process.

After this investment in training, it was disheartening when CBDs at times emigrated from the village. This was a loss for both the program and the community, and the onchocerciasis control teams had to reinitiate the process of recruitment and training. In those communities with the greatest need of ivermectin treatment, mobile team distribution was used until a new CBD could be identified and trained.

4. Discussion

Before the introduction of ivermectin, onchocerciasis control was undertaken primarily by vertically-designed vector control programs, which have classically required little to no community involvement (Brown, 1983; Service, 1993). The availability of ivermectin has changed the focus of onchocerciasis control from vector to human populations; from high to low technology; and from programs that sought no community involvement to those that are predicated on community participation.

An ivermectin distribution program must accomplish these activities: (1) recruit and train personnel, (2) educate and mobilize leadership and the general population, (3) acquire, securely store, and account for ivermectin, (4) distribute the drug to eligible populations of targeted communities, (5) monitor for and treat adverse reactions, and (6) document program activities and report to local, national and international health authorities. Timely reporting to the Mectizan^R Expert Committee is required to ensure uninterrupted donations of ivermectin to the program.

The success or failure of the control initiative using mass ivermectin therapy will

rest on finding ways to sustain cost-effective distribution mechanisms. The use of community members to distribute ivermectin contains these elements of economy and sustainability, in addition to those of community ownership and self-reliance. Thus, the CBD strategy can have benefits that reach beyond onchocerciasis control to other development initiatives. However, challenges inherent to the CBD concept exist that must be addressed by both the local community leadership and the external advocates of the IDP in the donor community and government health structure. The Plateau State experience suggests that local community leadership must be challenged to provide remuneration of the CBDs. Although some community leaders initially refused to contribute to the distribution process, popular demand for ivermectin aided in overcoming this problem (or at least to keep it from becoming one that threatened the success of the overall Plateau IDP initiative). Another result of insisting that the community set the price of the CBD service was that a local (not external) value was placed on the CBD's labor. By avoiding direct cash payments to CBDs by non-governmental or governmental agencies, a 'gold rush' mentality in the villages was avoided, and the community branch of the IDP appeared to establish a life independent of the NGDO budget (Agudelo et al., 1983; Akpala et al., 1993b).

Donors and the local, state, and national government health structures must be challenged to provide culturally appropriate training and health education material to their IDPs (Rifkin et al., 1988). Since CBDs must serve as educators and motivators as well as distributors, not only their training, but their messages should be adapted to local knowledge, attitudes, and practices. The materials used in the Plateau State program will soon be available for use elsewhere in Nigeria, and other non-governmental organizations have published similar, experience-based, training guides (Pond, 1991; Laursen and Kassalow, 1995). Lastly, external health organizations should support their CBDs in less tangible ways, through encouragement, stimulation, and willingness to listen and to address new problems that are identified by the CBDs as the IDP matures.

In the most remote villages where onchocerciasis was often encountered in its most severe forms, the available pool of literate residents capable of performing the ivermectin distribution and record keeping was often extremely limited. At times, no one could be found who could keep a written record of names, fill out treatment and reaction forms, and calculate treatment summaries. The program had to recruit the best educated villagers, whose loss to the program was predictable because they composed a stratum likely to leave the community in search of better opportunities elsewhere. If the stability of CBD networks is jeopardized by data collection demands, new data management systems that can be used by illiterate residents should be devised and tested (Pond, 1990). Such systems will likely require some compromise in what are currently deemed fundamental data for ensuring safe delivery of ivermectin, and program monitoring and evaluation (Pond, 1990; Foege, 1990). Yet, paradoxically, a reduction in data demands may promote greater depth and stability of the CBD pool, and thus improved functioning of IDPs.

Perhaps the greatest lesson learned from the Plateau State program was that, when pressed, community leaders agreed to set and provide payment to their village-based ivermectin distributors. The leaders were stimulated to allocate resources to the project by the community interest in having continued access to ivermectin. As a result of these dynamics, a village-based system was established that was likely to provide the sustained and cost-effective delivery of ivermectin necessary to control

onchocerciasis. The process generated feelings of empowerment, ownership and responsibility, and the communities' experiences were in the spirit of the Alma Alta accords (WHO, 1978).

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