PNG Med J 2000 Sep-Dec;43(3-4):183-187

Community empowerment in the control of lymphatic filariasis in Misima, Milne Bay Province using diethylcarbamazine in combination with albendazole

BILLY P. SELVE[1], SIONI BWADUA[1], MICHAEL MISA[1], KANIMO JAMES[1], JETHRO P. USURUP[2], PAUL TURNER[3], WAYNE MELROSE[3], WAME YAD[4], RUTA SAMUEL[4] AND CATHY EDDIE[4]

Misima Mines Limited, Misima Island and Porgera Joint Venture, Mt Hagen, Papua New Guinea, Filariasis Centre for Disease Control, James Cook University, Townsville, Australia and Department of Health, Samarai Murua District, Papua New Guinea

SUMMARY

We report the successful implementation of a community-based lymphatic filariasis control program using annual single-dose treatment with diethylcarbamazine (DEC) in combination with albendazole. The target population included over 28,000 people in the Samarai Murua District, Milne Bay Province, Papua New Guinea. A community-based delivery model was as effective as the standard health services delivery model. The number of people tested in 1998 before mass drug administration (MDA) and in 1999, one year after treatment, were 1644 and 942 respectively; the number who received mass treatment was 29,883 in 1998 and 28,965 in 1999. The prevalence of antigenaemia decreased significantly from 19% to 12%. The cost of running the program also decreased by 50%. The total number of trained health staff required to conduct the MDA program declined from 62 in 1998 to 12 in 1999, a reduction of 81%, with a cost saving in salary and allowances. A salient organizational initiative that surfaced was the use of local expertise in the private sector as a catalyst for obtaining funds from external sources to manage and facilitate the program which was conducted with locally available resources.

Introduction

The prevalence of microfilaraemia in Papua New Guinea (PNG) is one of the highest in the world (1) though very little consideration has been given to this at the national government level. Although local health authorities acknowledge the morbidity and the disfigurement caused by filariasis they still place it as a low priority disease. Previously, research studies of the control of lymphatic filariasis both through vector control and mass drug administration (MDA) have been carried out in selected areas in the country, such as Ok Tedi in Western Province (2) and Dreikikir in East Sepik Province (3). Impregnated bednets and focal insecticide spraying aimed at vector control have been used in many areas for the control of malaria. These measures may also have had an impact on the prevalence of filariasis (4). Recent findings on Bagabag Island suggest that the use of untreated bednets can reduce the prevalence of filarial infection and disease (5). Studies by Charlwood and coworkers on vector populations in Papua New Guinea demonstrated that bednets could have an impact on the transmission of the disease (6).

In 1996 and 1997 a preliminary study was conducted by a team from James Cook University to assess the effect of community-wide treatment using diethylcarbamazine (6 mg/kg) and ivermectin (200 µg/kg) in three

1 Misima Mines Ltd, PO Box 38, Misima Island, MBP 222, Papua New Guinea

2 Porgera Joint Venture, PO Box 484, Mt Hagen, WHP 281, Papua New Guinea

3 Filariasis Centre for Disease Control, James Cook University, Townsville, Queensland 4811, Australia

4 Department of Health, Samarai Murua District, PO Box 56, Bwagaoia, MBP 225, Papua New Guinea

sentinel villages on the island of Misima, in Milne Bay Province, Papua New Guinea. The study showed a remarkable drop in filarial antigenaemia from 67% before to 3% after treatment (P.F. Turner and W. Melrose, unpublished data). Based on this result and others carried out in PNG and abroad, Misima Mines Limited (MML), as part of its community relations project, took on the task and covered the whole district in 1998 and treated a population of over 28,000 (7). The projected population of the Samarai Murua District was 40,000 at that time.

Since for any community-based program to be a success the community must play a major role, community participation was given a high priority in this study. The stigma of elephantiasis is known in the region as confirmed by words in the local languages used to describe the illness. A prevalence survey conducted in the district in 1997 showed a filarial antigenaemia frequency that ranged between 5% and 64% (P.J. Usurup, B.P. Selve and J. Metu, unpublished report). If the disease pattern is similar to that seen in the Dreikikir area of the East Sepik Province, where 66% of the population was positive with 6% having lymphoedema of the legs and 12% with hydrocele (8), one would anticipate that hydrocele and leg oedema together would be in the range of 1% to 18%. Indeed, from field patrols it is evident that both hydrocele and leg oedema are common in the Samarai Murua District.

The program's initial emphasis was on education. This was done through detailed patrols by the team throughout the region. The main objectives were to educate the people in the region about lymphatic filariasis, get them to appreciate the natural course of the disease and the 'silent' destruction it causes to the lymphatics, and convince them how endemic it was in their area.

Materials and Methods

In 1998 MML in collaboration with the national Department of Health and the University of Papua New Guinea (UPNG) conducted a filariasis survey in the whole of the Samarai Murua District in Milne Bay Province, PNG (Figure 1). The teams comprised health personnel who went out to the villages, administered treatment and conducted immunochromatographic tests (ICT) for the detection of filarial antigenaemia on

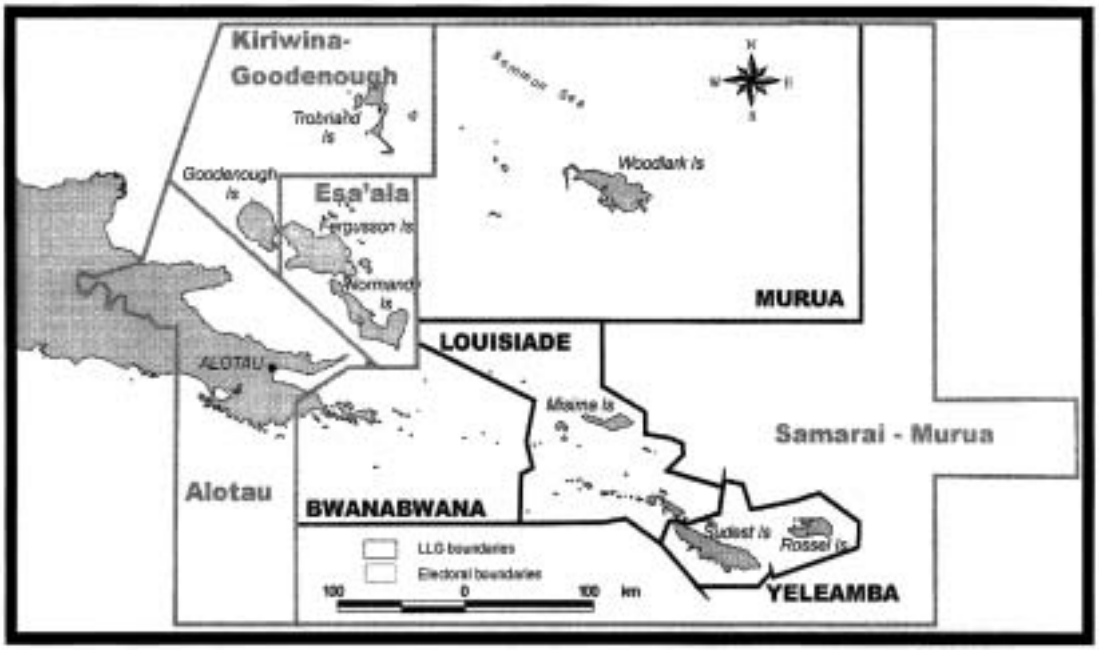

Figure 1. Map of Samarai Murua District of the Milne Bay Province.

10% of the population selected at random. No age-specific categories were selected and tested at that time. Due to the remoteness of most of the areas designated for mass drug administration and the limited number of staff, the ICT card was the ideal choice because it is sensitive and specific for *Wuchereria bancrofti*. Moreover, no night blood collection is required and it is a simple and rapid test (9).

Diethylcarbamazine (DEC) tablets were obtained from MAV Laboratory in Brisbane, Australia. Tablets were colour coded in 300 mg pink and 150 mg blue tablets. The dose was 6 mg/kg body weight and was rounded up to dosages that would require whole tablets or halves. In situations where the 300 mg and the 150 mg tablets were not available 50 mg Hetrazan tablets were used. Albendazole in 200 mg chewable tablet form was locally available in the health establishments throughout the region. The dose was 400 mg (two chewable tablets) for those of school age and above. Those under school age and above 1 year were given 200 mg (one tablet). Children younger than 12 months, pregnant women and breastfeeding mothers were excluded from treatment.

In 1999 the concept of community empowerment was used in the delivery of treatment. Since the majority of the island's population were Christians, we decided to use a passage in the Bible from the gospel of Mark. A rhyming cascade in educating, delegating, regulating and motivating was adopted from that passage for the program. Village representatives were selected from specific areas in the four council areas of the district. They then convened in a specified area where they were trained. The course ran for a maximum of three days and covered basic principles including better understanding of lymphatic filariasis, the treatment program, dose calculation based on age, proper data collection and basic management based on biblical principles and the ICT protocol. Participants practised on each other then in the neighbouring villages where the course was conducted. After the course had been completed the village-based workers were delegated the responsibility of carrying out the treatment and filarial antigen detection using ICT on 5% of the population in their respective areas. Data collected were compiled and sent to the regional coordinators in the respective areas and eventually sent on to the central team for analysis. The staff strength required in the initial phase of the patrol was 62 in 1998. This comprised personnel from the Health Department, MML, church agency health centres and the University of Papua New Guinea. Out of the 62 staff 10 were hired externally, mainly community health workers (CHWs) to provide cover during the period of the patrol. The patrol staff comprised nursing officers, medical doctors, health extension officers (HEOs), CHWs, health inspectors, laboratory assistants, first aid instructors, teachers, dinghy operators and one radio technician. In 1999 when the program was delegated back to the community only 12 staff comprising 3 doctors, 1 HEO, 4 CHWs, 2 nursing officers and 2 health ancillary staff were required, mainly in the training phase.

Results

The cost of the program

Our MDA lymphatic filariasis program commenced in partnership with other organizations as an awareness program simultaneously facilitating MDA in the district. The main sponsors of the program were Canada Fund and Misima Mines. The cost of the control effort when it started in 1998 was K56,000. This included rations, transport, fuel and labour. In 1999 village representatives were selected and delegated the responsibility of conducting the MDA under the supervision of regional coordinators. This reduced the cost by 50% to K28,000 and the program was able to reach a population size similar to that achieved in 1998.

The reduction in the manpower required for the whole patrol dropped by 81% from 62 in 1998 to 12 in 1999. This was obviously cost saving in terms of salaries and allowances. There were also other indirect benefits such as staff being available at their place of work to perform their respective duties. The average staff costs in terms of salary in each patrol was markedly reduced from US$14,472 to $2736. This calculation was based on the different rate for each category of health worker, the number of staff available, the average number of hours worked each day and the average duration of the patrol.

Treatment coverage and impact on prevalence of antigenaemia

In areas where we were not able to access, the locally trained village-based health staff carried out the program successfully. In areas closest to where we were based such as Calvados and Misima Islands, the number of individuals that were treated by the communities in 1999 was similar to that in 1998. Treatment coverage was lower in Samarai and the Woodlark districts because they were the furthest from Misima Island where the coordinators of the program were based. Furthermore, many of the reports were either misplaced or lost from these districts. The area covered in this program consisting of several islands was 92,500 km^2.

All in all, at the end of the MDA, the total population treated was 29,883 in 1998 and 28,965 in 1999 (Table 1). There was a reduction in the number of people treated in 1999, mostly from areas far from the coordinating centre. This emphasizes the need to look into problem areas in consultation with the affected communities and rectify specific problems if the program is to be sustainable. The number of people tested in 1998 before MDA and in 1999, one year after treatment, were 1644 and 942 respectively. The prevalence of antigenaemia decreased significantly from 19% to 12%.

Discussion

Our experience provides a new model of health service delivery for lymphatic filariasis control and reinforces the need for health planners and practitioners to develop practical ways to deliver vital health services based on community ownership and commitment. The idea of teaching villagers about what is required from them, based on what they have around them, and utilizing the resources they are more familiar with is not a new concept. We found that by using biblical texts as the framework our management training had more impact on the rural community. As much as possible foreign materials were avoided and when used they were adapted to suit local settings. The language used to expound on the subject was English, 'their type of English', which was then translated into the local language. Money was never used to motivate the community. Subsequent training after the first year was problem-based and was incorporated into the lymphatic filariasis MDA program, thus using the 'piggy back' concept.

The principle used in educating, delegating, regulating and motivating people towards community empowerment had emerged as a practical reality. People were able to take on tasks and make them work with a certain degree of optimism and pride. Awareness was the mainstay of the success of the program. The awareness brought together the private sector, other important organizations and potential sponsors within the region and externally. Local expertise in the private sector acted as a catalyst for obtaining funds from external sources to manage and facilitate the local program.

The person allocated the responsibility of delivering the drugs and collecting data did so on a voluntary basis. It is a well-known fact that money when used as a motivator creates ill-feeling amongst village volunteers (10). In order to avoid this, we insisted on conducting the program in partnership with the community, their main contribution being the village volunteers. It is worth noting that at the time of writing this paper we are already in our fourth year of this community-based program with no remuneration for the village volunteers.

TABLE 1

NUMBER OF PEOPLE TREATED WITH DEC IN COMBINATION WITH ALBENDAZOLE, IN 1998 AND 1999, IN FOUR LOCAL GOVERNMENT AREAS IN THE SAMARAI MURUA DISTRICT, MILNE BAY PROVINCE

Year	Number of people treated				
	Woodlark	Yeleamba	Misima	Samarai	Total
1998	5276	7964	10460	6183	29883
1999	3924	10312	10393	4336	28965

This paper reports on a control program for lymphatic filariasis in a remote and resource-poor region of Papua New Guinea. In particular, it illustrates the effectiveness of mass drug administration in reducing the prevalence of lymphatic filariasis as well as describing how the implementation of the program was successfully shifted from health system control to the community, with significant cost reduction. This is a model that may be exploited for lymphatic filariasis control in other Pacific island nations and other developing countries where lymphatic filariasis is endemic.

ACKNOWLEDGEMENTS

This program and the write-up was possible because of the assistance of all involved: villagers, church groups, local level government, provincial government, the national Department of Health, the World Health Organization and James Cook University. We thank the Canada Fund for meeting all the patrol expenses, Toba Motors for donating a dinghy and Misima Mines for being the constant driving force behind the program. We specially acknowledge Arthur Hood, the General Manager, and Laurie Martin, Superintendent of Community and Employee Development, of Misima Mines for their understanding and continuous support. We also appreciate the input from Dr Steve Bjorge, Dr Festus Pawa and many others who provided us with technical assistance. A special acknowledgement is due to the late Sai Keio who did the initial blood collection for the prevalence study. He and his two children unfortunately died by drowning when his boat capsized on 4 September 1998. We thank all those who have contributed to this program. This program belongs to you.

REFERENCES

1 **Michael E, Bundy DA, Grenfell BT**. Re-assessing the global prevalence and distribution of lymphatic filariasis. *Parasitology* 1996;112:409-428.

2 **Schuurkamp GJ, Kereu RK, Bulungol PK, Kawereng A, Spicer PE**. Diethylcarbamazine in the control of bancroftian filariasis in the Ok Tedi area of Papua New Guinea: Phase 2 – annual single-dose treatment. *PNG Med J* 1994;37:65-81.

3 **Bockarie MJ, Alexander NDE, Hyun P, Dimber Z, Bockarie F, Ibam E, Alpers MP, Kazura JW**. Randomised community-based trial of annual single-dose diethylcarbamazine with or without ivermectin against *Wuchereria bancrofti* infection in human beings and mosquitoes. *Lancet* 1998;351:162-168.

4 **Bockarie M**. Can lymphatic filariasis be eradicated in Papua New Guinea? *PNG Med J* 1994;37:61-64.

5 **Tavul L, Bockarie M, Kastens W, Bockarie F, Mai A, Alpers M, Kazura J**. Untreated bednets are protective against *Anopheles*-transmitted *Wuchereria bancrofti* infection and disease. Abstract in Program and Abstracts of the Thirty-sixth Annual Symposium of the Medical Society of Papua New Guinea, Port Moresby, 3-8 Sep 2000:17.

6 **Charlwood JD, Dagoro H**. Impregnated bed nets for the control of filariasis transmitted by *Anopheles punctulatus* in rural Papua New Guinea. *PNG Med J* 1987;30:199-202.

7 **Selve B**. A private sector partnership with the Government. *Filarial Update* 1999;1:4.

8 **Kazura JW, Bockarie M, Alexander N, Perry R, Bockarie F, Dagoro H, Dimber Z, Hyun P, Alpers MP**. Transmission intensity and its relationship to infection and disease due to *Wuchereria bancrofti* in Papua New Guinea. *J Infect Dis* 1997;176:242-246.

9 **Phantana S, Sensathein S, Songtrus J, Klagrathoke S, Phongnin K**. ICT filariasis test: a new screening test for bancroftian filariasis. *Southeast Asian J Trop Med Public Health* 1999;30:47-51.

10 **Richards F Jr, Gonzales-Peralta C, Jallah E, Miri E**. Community-based ivermectin distributors: onchocerciasis control at the village level in Plateau State, Nigeria. *Acta Trop* 1996;61:137-144.