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Does the introduction of WHO-MDT influence trends in the incidence of leprosy?—the Malaŵian experience

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Summary There has been an average annual decline in detection rates of all types of leprosy in Malaŵi of around 11·6% between 1977 and 1991. There was no obvious acceleration or slowing down of this decline following the introduction of WHO/MDT in 1983–84. Disability ratios stayed at the same level of about 11% during the 15 years covered by this paper suggesting that patients did not self-report earlier after 1983–84 which might have masked an underlying accelerated decline in detection rates. Thus it is concluded that the influence of WHO/MDT on the pattern of leprosy over a period of time, in a country like Malaŵi, is so far not noticeably different from any influence dapsone monotherapy might have had.

Introduction

It is now well known that shortening anti-leprosy treatment—e.g. by implementing the WHO recommended multi-drug-therapy (WHO/MDT)[1] markedly decreases the number of patients on treatment (prevalence rates).[2,3,4] Expectations that multi-drug-treatment would break chains of transmission faster than dapsone monotherapy and thus lead to a noticeable decline (or an acceleration in the decline) of incidence rates have so far not been fulfilled.[5,6,7] On the other hand, there are detection rate data which have been interpreted to show such an effect.[8]

Leprosy control activities in Malaŵi have been intensified since 1966 with the assistance of the British Leprosy Relief Association (LEPRA). Given the continuity of main operational methods (e.g. passive case finding and mobile treatment) at least since 1973,[9] we feel that a description of detection rates in Malaŵi covering the period before and after the introduction of WHO/MDT in 1983/84 is a useful contribution to the ongoing discussion on the influence of multi-drug-treatment on the patterns of leprosy over time.[10] Because detection activities in Malaŵi were constant over time, trends in detection rates can be assumed to reflect trends in incidence rates.

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Methods

Methods of leprosy control work in Malawi up to 1983 have been described in detail in a previous publication.[9] WHO/MDT was introduced in the whole country between April 1983 and December 1984. The procedure adopted was to review patients on treatment at that time and to release those from treatment who (i) had paucibacillary leprosy (PB), had been treated for at least 4 years and whose lesions were inactive at the time of review *or* (ii) had multibacillary leprosy (MB), had been treated for at least 5 years and whose slit skin smears had been negative for at least 5 years. All other patients were given WHO/MDT: 6 monthly doses for PB leprosy and until smear negativity for MB leprosy (but for not less than 2 years during which period the patient had to take at least eighteen monthly doses). This review procedure led to a great reduction in the prevalence rate of leprosy. The cadre of staff called clinic attendants was therefore made redundant. As a consequence anti-leprosy treatment was from then on given on a monthly basis by leprosy control assistants (LCAs) rather than on a weekly basis by clinic attendants. All LCAs were equipped with motorcycles and great efforts were made to keep them mobile at all times. In general, as before, there was one LCA in each administrative district in Malawi but larger districts continued to have two LCAs. They continued to be supervised by assistant field officers, field officers and medical officers.

Until 1982 the taking of slit skin smears had been prompted by a clinical suspicion of MB leprosy but with the introduction of WHO/MDT slit skin smears were taken from *all* newly registered patients. Further new operational developments which added to the workload of LCAs were (i) the introduction of active surveillance after completion of treatment of PB leprosy patients and (ii) the intensification of care for all patients who were left with disabilities after completion of treatment.

In parallel with the introduction of WHO/MDT a computerized National Register

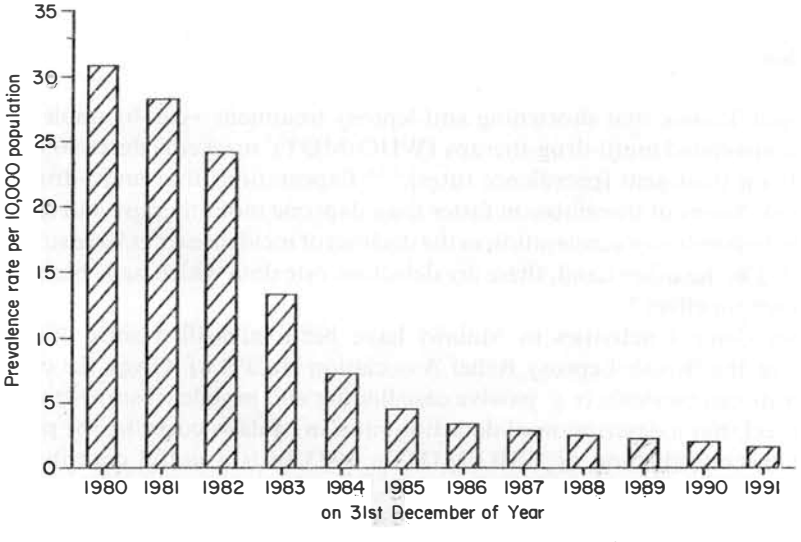

Figure 1. Prevalence rates of leprosy patients on treatment in Malawi per 10 thousand population, 1980–91.

Table 1. Prevalence rates of leprosy patients on treatment in Malawi 1980 to 1991

	Year											
	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Patients on treatment 31st December	18862	17925	15867	9042	5116	3240	2529	2207	2024	1895	1773	1438
Population (× 1,000)	6,117	6,340	6,571	6,811	7,060	7,319	7,589	7,869	8,160	8,463	8,777	9,105
Prevalence rates per 10 thousand	30·8	28·3	24·1	13·3	7·2	4·4	3·3	2·8	2·5	2·2	2·0	1·6

was set up and LCAs notified the National Register of all new patients, their year of birth, sex, classification, slit skin smear results, disabilities and their residence at registration. Statistics for the period prior to 1983 are based on manually compiled data.

National Censuses were carried out in Malawi in 1977 and 1987 and all rates are based on figures derived and projected from the census reports.[11,12]

All new patients registered for anti-leprosy treatment and thought to be Malawian citizens are included in the data presented. Care was taken to exclude foreigners (e.g. Mozambican refugees) from the calculations.

For the purpose of this paper a patient is considered to have a disability if according to the 1960 WHO disability grading system[13] there was at least one score of 2 or higher at registration.

A multibacillary patient was, until 1982, defined as anyone registered as a new BB, BL or LL case with a positive slit skin smear result (BI > 0) or else as a new LL case with no slit skin smear result but clinical findings typical for lepromatous leprosy. From 1983

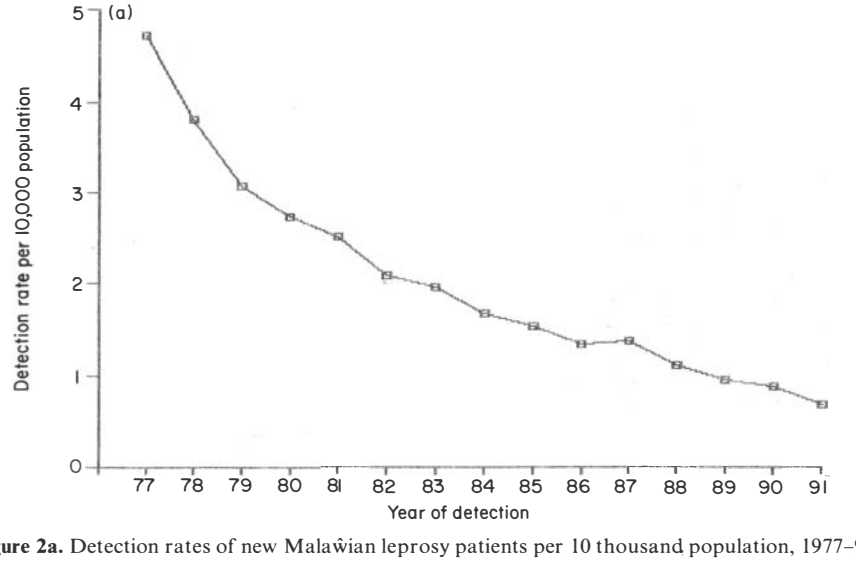

Figure 2a. Detection rates of new Malawian leprosy patients per 10 thousand population, 1977–91.

Table 2. Detection rates of new Malawian leprosy patients, 1977 to 1991

	Year														
	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Patients detected during year	2598	2179	1818	1672	1601	1372	1348	1197	1135	1029	1093	907	810	781	638
Population (× 1,000)	5,499	5,697	5,903	6,117	6,340	6,571	6,811	7,060	7,319	7,589	7,869	8,160	8,463	8,777	9,105
Detection rate per 10 thousand	4·7	3·8	3·1	2·7	2·5	2·1	2·0	1·7	1·6	1·4	1·4	1·1	1·0	0·9	0·7
Annual reduction/increase of the detection rate (in percent)		−19·0	−19·5	−11·2	−7·6	−17·3	−5·2	−14·3	−8·5	−12·6	2·4	−20·0	−13·9	−7·0	−21·2

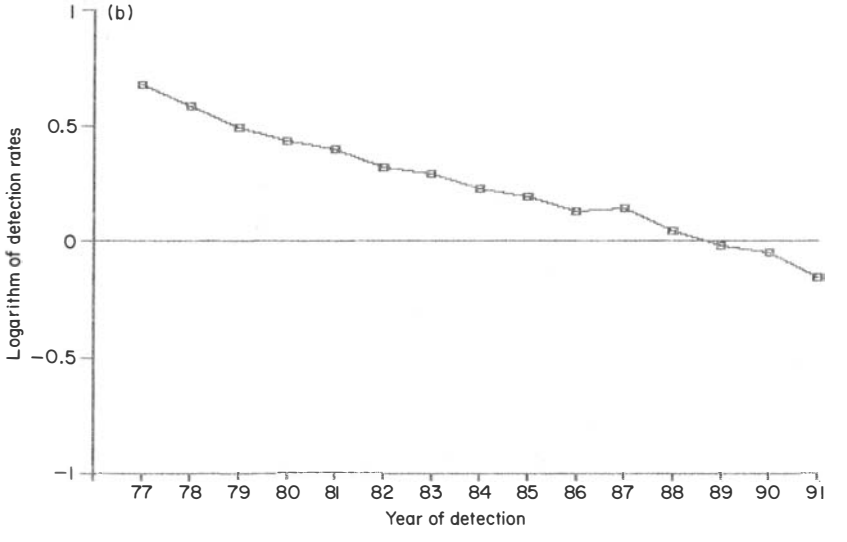

Figure 2b. Logarithmic detection rates of new Malawian leprosy patients per 10 thousand population, 1977–91.

onwards a MB patient is defined as any patient with a slit skin smear result of a BI of 2 or higher. In our experience these two definitions of MB leprosy are virtually the same.

Results

Figure 1 and Table 1 show prevalence rates of leprosy in Malawi from 1980 until 1991. Prevalence rates declined most steeply during the years 1983 and 1984 when WHO/MDT was introduced. At the end of 1991 the prevalence rate had been reduced to 1438 patients on treatment per 9,104,600 people (1·58 per 10,000).

Detection rates per 10,000 population from 1977 until 1991 are shown in Figure 2a and Table 2. The rate fell from 4·7 per 10,000 in 1977 to 0·7 per 10,000 in 1991. This represents an average annual reduction (geometric mean of the decline) of 11·6%. Table 2 also shows (in percentage) the variation in the detection rates per year. The annual 'reduction' varies from an increase of 2·4% from 1986 to 1987 to a reduction of 21·2% from 1990 to 1991. Figure 2b shows detection rates after logarithmic transformation and, as expected from Figure 2a, demonstrates a log-linear relationship between years of detection and detection rates. There is no change in the trend (decline) of detection rates at any time after introduction of WHO/MDT.

Figure 3 and Table 3 show multibacillary ratios from 1977 to 1991. From 1977 to 1982 these ratios are based on the patients in those parts of the country which were used in an analysis of the epidemiology of leprosy in Malawi in a previous paper.[14] From 1983 onwards ratios are based on all newly registered patients in Malawi. A doubling of the multibacillary ratio from about 10% to 20% can be observed between 1977 and 1985. From then onwards the multibacillary ratio appears to have remained constant.

Disability ratios among newly registered patients are presented in Table 4. This ratio of patients with any disability score greater than one varies between 9% and 13% per year without any apparent underlying trend.

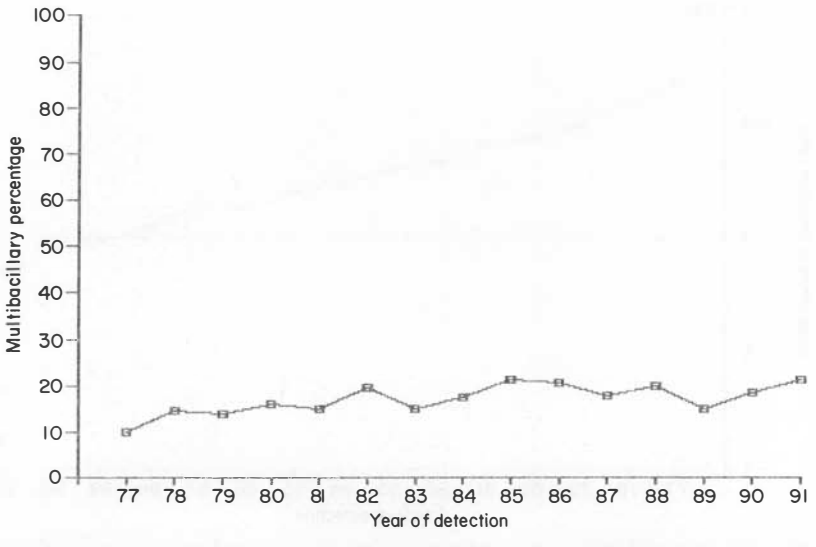

Figure 3. Proportion (%) of new Malawian leprosy patients with multibacillary leprosy, 1977–91.

Discussion

We have shown in this paper that the average annual decline in detection rates of all types of leprosy in Malawi has been around 12·5% since 1977 (Figures 2a, 2b and Table 2) and that there was no obvious acceleration or slowing down of this decline in the wake of introducing WHO/MDT in 1983–84. These data argue against WHO/MDT exerting any influence on the patterns of leprosy over time, in a country like Malawi, other than the influence dapsone monotherapy might have had.

This argument is only valid in so far as operational methods and characteristics of patients remained the same after the introduction of WHO/MDT. Concerning operational methods we mentioned that the number of staff (and thus opportunities for new leprosy patients to self-report) were reduced following the dramatic decline of prevalence rates by 1985. However, this operational change, if it mattered, could only have resulted in an accelerated decline of detection rates—which is not seen. The operational change could not have masked an underlying genuine acceleration in decline and the reduction in staff therefore appears to be irrelevant for the point in question.

Concerning characteristics of patients we have shown that disability ratios remained constant between 1977 and 1991 and that there was no noticeable change at any time after 1983–84 (Table 4). This supports the suggestion that the introduction of WHO/MDT did not result in earlier self-reporting which again could have masked an underlying genuine acceleration in the decline of detection rates. (Nor did the introduction of WHO/MDT result in higher disability ratios because of later self-reporting which could have been the effect of the reduction of staff.)

As a further characteristic of patients we describe the multibacillary ratios among newly registered patients (Figure 3, Table 3). It appears that the rise in multibacillary ratios came to an end after the introduction of WHO/MDT and has remained constant

Table 3. Proportion of new Malawian leprosy patients with multibacillary leprosy

	Year														
	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Patients detected during year	2598	2179	1818	1672	1601	1372	1348	1197	1135	1029	1093	907	810	781	638
Patients on whom the MB ratio is based	1602	941	831	831	794	641	1348	1197	1135	1029	1093	907	810	781	638
Percentage of patients with MB leprosy	9·8	14·5	14·0	16·1	15·0	19·7	14·8	17·4	21·1	20·7	17·7	19·7	14·8	18·3	21·2

Table 4. Proportion of new Malawian leprosy patients with a disability > 1

	Year														
	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Patients detected during year	2598	2179	1818	1672	1601	1372	1348	1197	1135	1029	1093	907	810	781	638
Patients on whom the disability ratio is based	1602	941	831	831	794	641	1348	1197	1135	1029	1093	907	810	781	638
Percentage of patients with a disability > 1	10·1	11·6	12·8	13·4	9·9	11·8	9·0	12·9	12·5	11·1	9·8	11·7	7·9	11·3	11·9

since 1985. However, this variable is more difficult to interpret than the disability ratios because there were both a slight change in the definition in 1983 and a change of practice which we have mentioned. In addition, it could be argued that control services including slit skin smear services improved during the Seventies and early Eighties and that the rise in the multibacillary ratio resulted from this general improvement of quality. Thus there are three alternative explanations for the pattern of multibacillary ratios shown: (i) the rise in the multibacillary ratio until 1985 was merely due to operational circumstances *or* (ii) the rise was an indicator of the end phase of an epidemic[15] which declined no further in the late Eighties *or* (iii) the introduction of WHO/MDT led to earlier case finding which caused a break in the rise of the multibacillary ratio. The third possible explanation is not supported by the patterns of detection rates and disability ratios. It therefore seems likely that operational circumstances and a declining epidemic shaped the pattern of multibacillary ratios shown rather than the introduction of WHO/MDT.

On the whole we therefore conclude on the basis of the experience in Malaŵi that a variety of factors (e.g. BCG vaccination,[16,17] socioeconomic changes, leprosy control efforts) led to a steady reduction in detection rates of leprosy (and a parallel trend in incidence rates) in the late Seventies and throughout the Eighties and that this decline has not been accelerated by WHO/MDT so far.

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L'introduction de l'OMS-MDT a-t-elle eu une influence sur l'incidence de la lèpre?—l'expérience malawienne

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Résumé On a noté une baisse moyenne annuelle d'environ 11,6% des taux de détection de tous les types de lèpre à Malawi entre 1977 et 1991. Il n'a pas été observé d'accélération ou de ralentissement évident de cette baisse suite à l'introduction de l'OMS-MDT en 1983–84. Les taux d'infirmité sont restés les mêmes, à savoir d'environ 11%, durant les 15 années couvertes par cet article, ce qui tend à suggérer que les patients ne sont pas revenus se présenter en consultation plus tôt après 1983–84 et pourrait masquer une diminution accélérée sous-jacente des taux de détection. On a ainsi conclu que l'influence de l'OMS-MDT dans le schéma de la lèpre dans un pays tel que le Malawi durant cette période de temps n'est jusqu'ici pas sensiblement différent de l'influence que le dapsone pourrait avoir en monothérapie.

¿Influencia la introducción de WHO-MDT las tendencias en torno a la frecuencia de la lepra?—La experiencia adquirida en Malawi

GJALT BOERRIGTER Y JORG M. PONNIGHAUS

Resumen Se ha registrado una declinación media anual en los porcentajes de detección de todos los tipos de lepra en Malawi de aproximadamente un 11,6% entre 1977 y 1991. No hubo una aceleración o reducción manifiesta en esta declinación a partir de la introducción de WHO/MDT en 1983–84. Las relaciones de invalidez permanecieron al mismo nivel de aproximadamente un 11% durante los 15 años que abarca este estudio, sugiriendo que los pacientes no informaron su condición por sí propios con mayor anterioridad, después de 1983–84, lo cual podría haber disimulado una declinación acelerada subyacente en los porcentajes de detección. Así pues, se concluye que la influencia de WHO/MDT ejercida sobre el patrón de la lepra durante cierto período de tiempo, en un país como Malawi, no es hasta la fecha marcadamente diferente de cualquier influencia que pudiera haber ejercido una monoterapéutica a base de dapsona.