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Epidemiological pattern of leprosy in Ethiopia: a review of the control programmes

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Summary Leprosy control started in a limited area of Ethiopia in 1956. Extended coverage of the country was achieved in the early seventies. Review of the data from the control projects since 1976 revealed that leprosy is a disease of the Ethiopian highlands where prevalence rates as high as 7 per thousand have been recorded in some provinces, while the cumulative national average for the last 13 years was 2·6 per thousand. The paucibacillary form was predominant. However, unlike other African countries, a relatively high proportion of multibacillary leprosy was found in Ethiopia. The male-to-female ratio was 2:1 with the highest prevalence in the 15–44 years age bracket. Detection rates for new cases have shown a gradual decline since 1982, a year before multiple drug therapy (MDT) was introduced into the country. For the last 5 years the number of new cases has stabilized at 4700/year. These trends probably reflect a general reduction in the prevalence of leprosy in the country, while the conspicuous decline in 1982 is most likely related to discharge of cases during screening before MDT. The new villagization policy of Ethiopia with its effective reorganization of the populations is believed to make control programmes and supervision of MDT easier and presumably more effective. Similarly, more reliable prevalence and incidence studies could be undertaken with success.

Introduction

Over 10 million people in the world are estimated to have leprosy. Only 50% are registered cases and of these, 12% are found in Africa. Ethiopia belongs to the endemic regions of the continent, with prevalence rates of 1·0–1·9.[1] Situated in the north-eastern part of the continent, Ethiopia covers an area of 1·25 million sq.km, and has a population of 46 million.[2] The topography of the country is dominated by the high central plateau (2000–

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3000 metres), which is split diagonally by the Rift Valley. In 1977 Cap & Banjaw[3] estimated that less than 50% of the leprosy patients in the endemic highland regions were registered for treatment. Thus, in Ethiopia, leprosy poses a major national public health problem with serious medicosocial consequences.

The data available on the prevalence of the disease are far from complete. Many rural parts of the country are not easily accessible, and lack basic medical services. In addition, because of social stigma and ostracism, those affected by the disease may fail to seek medical attention. However, in Ethiopia, compared with other infectious diseases leprosy has received significant attention from government and international agencies. Thus, there has been reliable registration of cases by leprosy control programmes that have been operational in the country since 1969.

This study was designed to review the epidemiology of the disease in Ethiopia, based on accumulated data from the control programmes. It is also intended to give some predictive forecast on the general trends in the prevalence of the disease as related to the leprosy control activities in the country.

Materials and methods

HISTORICAL BACKGROUND AND ORGANIZATION OF LEPROSY CONTROL PROGRAMMES

Organized leprosy treatment was started in 1934 at the Princess Zenebe Work Hospital, which was built on the outskirts of Addis Ababa by the Sudan Interior Mission (SIM), under the auspices of the Ethiopian Ministry of Health. This modest nucleus of leprosy care expanded over the years into a leprosy hospital with facilities for diagnosis and treatment, as well as a base for leprosy control activities. In the 1960s other smaller leprosaria were established in the northern, central and southern parts of the country, with emphasis on treatment and agricultural rehabilitation of the leprosy patients and their families.

A leprosy control programme was effectively started in 1956 with the policy of 'bringing leprosy treatment as near to the patient's home as possible'.[4] Accordingly, in estimated low and moderate prevalence areas (1–4 and 5–9 per thousand respectively), the treatment and follow-up of patients was carried out by the existing basic health services, supervised by the provincial medical officer with guidance and coordination from the National Leprosy Control Programme. In areas with high prevalence rates (10 per thousand), the basic medical service staff was supplemented by a specially trained leprosy health worker. In addition to his duties in the basic medical services, whenever possible the leprosy health worker is made responsible for three to five leprosy treatment centres situated in a market-place, not far from his post. The overall supervision and coordination of the control activities are under the provincial leprosy officer, who is attached to the Provincial Health Department.

In 1965, with international supporting agencies, the leprosy hospital in Addis Ababa was turned into the All Africa Leprosy and Rehabilitation Training Centre (ALERT), with the aim, 'to train men and women in all aspects of leprosy, with special emphasis on control, treatment and rehabilitation for work in Africa'.[5] As part of a national antileprosy campaign, and with the need for a model for training purposes, ALERT took up the leprosy control programme in Ethiopia's central administrative region of Shoa and Addis Ababa town.

All patients received monotherapy with dapsone until 1970, when the first cases of resistance were reported.[6] Subsequently, multiple drugs were used in the management of selected resistant cases. Multiple drug therapy (MDT), as recommended by WHO,[7] was officially adopted by the Ethiopian leprosy control programmes in 1983. In this study, the 13 years' records, since 1976, of the National and ALERT leprosy control programmes are reviewed. The Ethiopian Central Statistics Office provided the national census figures.

Results

The age and sex distribution of the leprosy patients, as shown in Table 1, is based on the records of the ALERT Leprosy Control Programme (1984–88). Ten per cent were under 15 years of age. The age group 15–44 was predominantly affected (70%). The male-to-female ratio was 2:1. This distribution is similar to that reported by Adamu & Naafs.[8]

Analysis of the diagnostic classification of leprosy over the last 5 years, using a modification of the Ridley–Jopling classification,[9] revealed borderline–tuberculoid leprosy to be the commonest (38·3%), followed by borderline–lepromatous leprosy (27·6%) (Table 1). In the classification of leprosy used by the leprosy control programmes in Ethiopia, the indeterminate (I) and borderline (BB) groups were not used. The age distribution of newly registered cases has remained relatively constant while the proportion of lepromatous patients has shown an increase over successive years since 1986 (Table 2).

Figures 1 and 2 show the detection rate of leprosy from the Shoa Administrative Region and the whole country respectively over the last 13 years. One sees a definite decline of detection rates starting in 1982. The decline forms a plateau over the last 5 years (Figure 2), at an average of 4700 new cases per year,[10] The number of new cases will

Table 1. Distribution of new leprosy cases by age, sex and classification in the Shoa Administrative Region (1984–88)

Age group (years)	TT		BT		BL		LL		Total					
	M	F	M	F	M	F	M	F	M	%	F	%	M+F	%
0–14	79	46	128	100	71	56	27	22	305	5·9	224	4·4	529	10·3
15–24	139	76	300	188	201	120	110	70	750	14·6	454	8·9	1204	23·5
25–34	129	87	264	169	256	132	144	85	793	15·5	473	9·2	1266	24·7
35–44	119	47	288	154	208	74	154	70	769	15·0	345	6·7	1114	21·7
45–54	73	32	155	62	128	51	73	39	429	8·4	184	3·6	613	11·9
55+	47	27	106	49	90	29	42	15	285	5·5	120	2·3	405	7·9
Total	586	315	1241	722	954	462	550	301	3331	64·9	1800	35·1	5131	100·0
%	11·4	6·1	24·2	14·1	18·6	9·0	10·7	5·9						
Total	901		1963		1416		851							
%	17·6		38·2		27·6		16·6							

Table 2. Yearly distribution of new leprosy cases by age and classification in Shoa Administrative Region (1984–88)

Age group (years)	1984						1985					
					Total						Total	
	TT	BT	BL	LL	No.	%	TT	BT	BL	LL	No.	%
0–14	35	35	25	17	112	9·3	23	30	22	9	84	9·5
15–24	91	68	57	47	263	21·9	39	98	40	30	207	23·5
25–34	82	57	83	49	271	22·6	43	82	75	51	251	28·4
35–44	80	75	63	65	283	23·6	29	65	48	43	185	21·0
45–54	50	32	38	31	151	12·6	22	27	28	17	94	10·7
55+	37	31	29	23	120	10·0	19	18	14	10	61	6·9
Total	375	298	295	232	1200	100·0	175	320	227	160	882	100·0
%	31·3	24·8	24·6	19·3	100	—	19·9	36·3	25·7	18·1	100·0	—

Age group (years)	1986						1987					
					Total						Total	
	TT	BT	BL	LL	No.	%	TT	BT	BL	LL	No.	%
0–14	26	61	21	11	119	11·8	19	48	23	6	96	9·5
15–24	35	101	57	28	221	22·0	27	110	80	36	253	25·0
25–34	37	85	62	38	222	22·1	32	117	78	45	272	26·9
35–44	36	93	50	36	215	21·4	12	98	58	36	204	20·2
45–54	14	58	39	17	128	12·7	8	57	37	22	124	12·2
55+	5	50	36	10	101	10·0	3	33	18	9	63	6·2
Total	153	448	265	140	1006	100·0	101	463	294	154	1012	100·0
%	15·2	44·5	26·3	13·9	99·9	—	10·0	45·8	29·0	15·2	100·0	

Age group (years)	1988					
					Total	
	TT	BT	BL	LL	No.	%
0–14	22	54	36	6	118	11·4
15–24	23	111	87	39	260	25·2
25–34	22	92	90	46	250	24·3
35–44	9	111	63	44	227	22·0
45–54	11	43	37	25	116	11·3
55+	10	23	22	5	60	5·8
Total	97	434	335	165	1031	100·0
%	9·4	42·1	32·5	16·0	100·0	

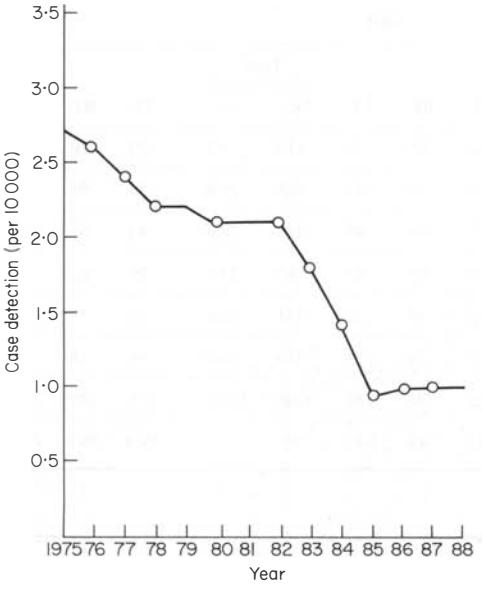

Figure 1. Leprosy case detection rate in Shoa Administrative Region, 1975–88. (*Source*: Annual Reports, ALERT Leprosy Control.)

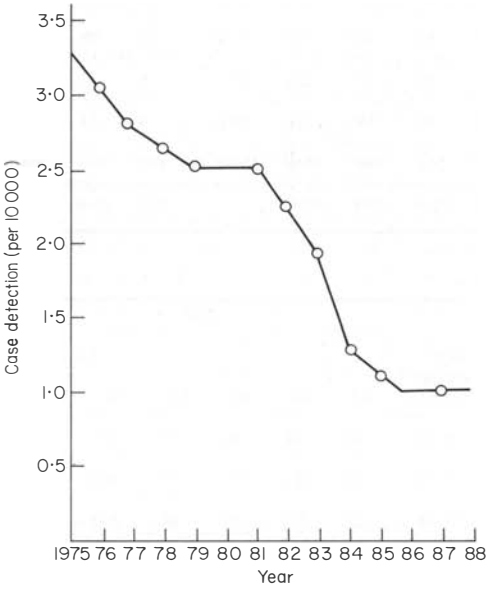

Figure 2. Leprosy case detection rate in Ethiopia, 1975–88. (*Source*: Annual Reports, National Leprosy Control Project.)

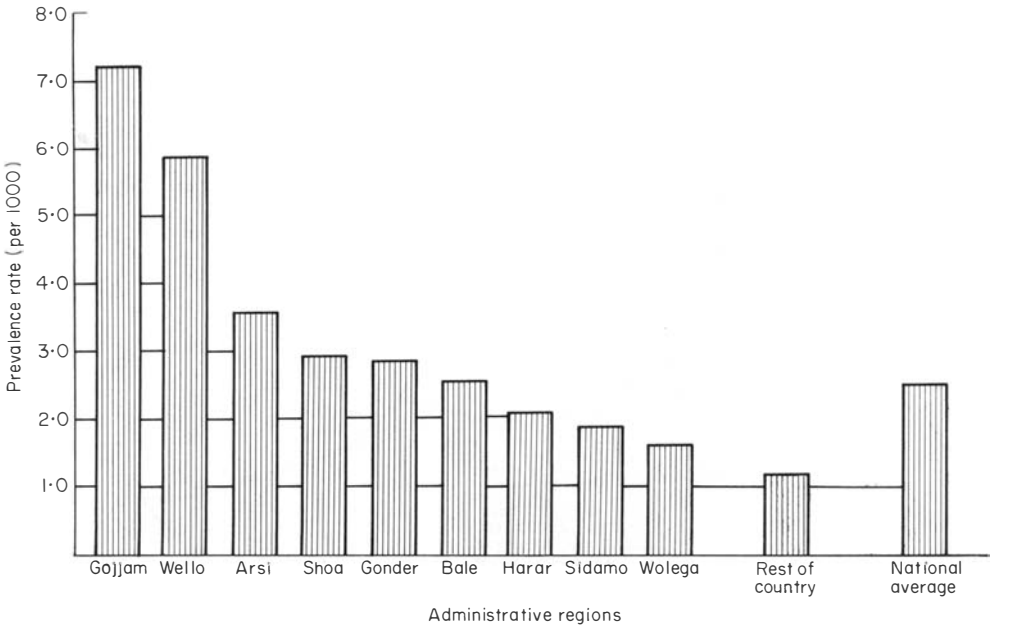

Figure 3. Prevalence rate of leprosy in the different administrative regions of Ethiopia. (*Source*: Annual Reports (1975–81), National Leprosy Control Project.)

probably remain at the same level for some years to come, until the real effect of multiple drug therapy is expected to halt the transmission of the disease.

Figure 3 represents the prevalence pattern in the different administrative regions, as compared to the national average of 2·6 per thousand over 6 years (1976–81) two years prior to the start of MDT. The prevalence of leprosy is highest in Gojjam and Wello (north-west and north-east of the country, respectively) while moderate rates are observed in Arsi, Shoa, Gonder and Bale (respectively of south, central, north and south-east Ethiopia). As shown in Figure 4, these hyperendemic and endemic areas occupy the highland regions of Ethiopia. The prevalence rates in the lowlands of the Rift Valley are very low, except in some densely populated areas (the districts of Yifat and Timuga, and Haikoch and Butajira) within the Shoa Administrative Region, where hyperendemicity (prevalence rates 1·5–7·8 per thousand) has been documented by the ALERT Leprosy Control programme in the years 1981 to 1986.[11]

Discussion

Epidemiological studies of leprosy have been very difficult to make for many reasons, particularly because leprosy patients are self-selected groups, not representative of the population as a whole.[12] Previous prevalence and incidence studies have used both physical examination and verbal recall in data collection and analysis. These methods have been criticized for bias and variability. Population-based studies to determine

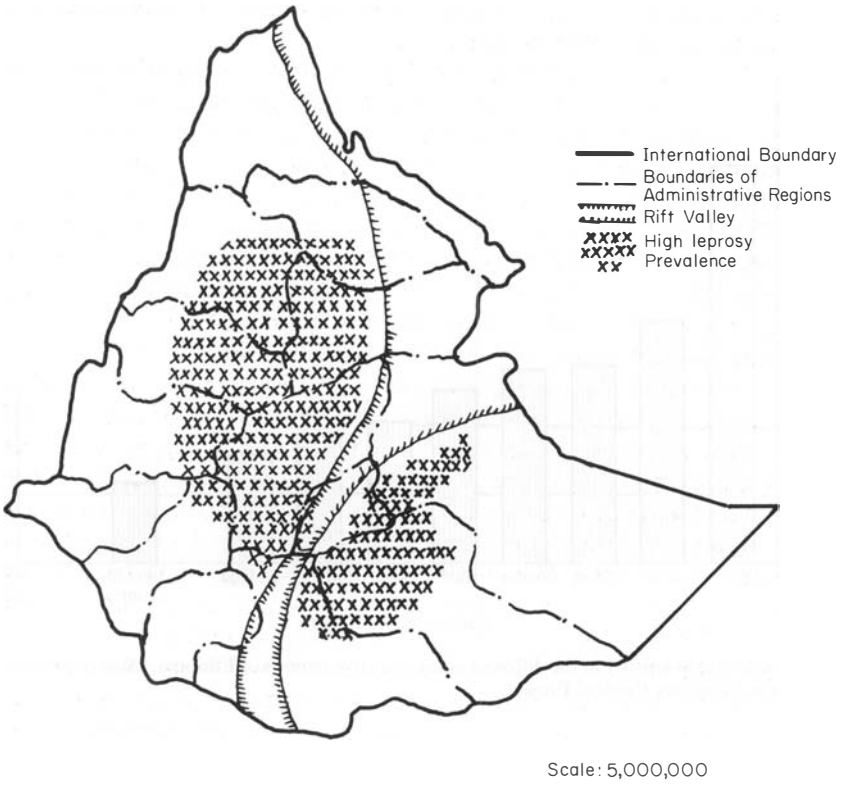

Figure 4. Ethiopia—showing areas of high leprosy prevalence corresponding to the highland regions of the country.

prevalence are very few and certainly not yet available for Ethiopia. We are therefore forced to rely on the information gathered by Control Projects.

Leprosy in Africa is characterized by a low proportion of lepromatous cases.[13] However, as shown in this study, there is a significantly high prevalence of the multibacillary form of leprosy in Ethiopia, sufficient to make the distribution different from the rest of Africa.

As observed by Schaller,[14] and later Cap & Banjaw,[3] this study clearly demonstrates that leprosy is endemic over the highland regions of the country, but also affects a few of the districts of the Shoa Administrative Region (central Ethiopia) which lie either bordering or within the Rift Valley.

One study[15] found a high prevalence of leprosy in the lowland Mendi district within the Blue Nile Valley of western Ethiopia. It suggested that the previous endemic leprosy situation in the highlands had been overshadowed by tuberculosis prevalence; nevertheless, there was an ongoing leprosy epidemic in the lowlands.

Except for these isolated endemic areas, for Ethiopia at large, leprosy is a disease of the highland regions. However, it is interesting that this geographical distribution is contrary to the findings of one study[16] in Malawi, which found a five-fold increase in the

prevalence rates of the Rift Valley compared with the Central African plateau. We have been unable to explain this obvious difference.

The gradual decline of the prevalence of leprosy as observed in this study, may be a welcome result of the effort of the well-organized control projects, mainly with dapsone monotherapy. However, among others, Meade[17] has argued that secondary prevention of leprosy, as practiced in the Ethiopian or Malawian Control Programmes, is unlikely to contribute much towards the ultimate eradication of leprosy. Nevertheless, we see a definite decline of leprosy prevalence in Ethiopia, as registered both by the National and ALERT Leprosy Control Programmes. Similar trends expressed in a significant reduction of prevalence rates have been observed in Thailand,[18] and Burma,[19] Ponnighaus & Boerrigter, who have also registered declines in detection rates in Malawi, believe that the trend may actually reflect a genuine decline in the incidence rates.[16] Although analysis of the 5 years data from the Shoa Administrative Region did not show an obvious shift towards older age groups, the increase in lepromatous rates over the last 3 years (1986–88) may reflect a decline in the incidence of leprosy in Ethiopia as suggested by Irgens.[20]

The conspicuous start of the decline in registered and new cases as well as in the prevalence of the disease in 1982 has attracted attention because it coincided with the launching of multiple drug therapy in the country. This was not definitely a direct effect of MDT, however, because MDT was effectively started only in 1983. However, as part of the preparations for the start of the MDT programme, there was a general reorganization and up-grading of the leprosy clinics in terms of diagnosis and treatment. The leprosy workers were re-educated and motivated. This, coupled with new awareness created in patients, resulted in release from treatment of many patients, particularly the paucibacillary patients who were found to have been adequately treated, provided the following criteria were met:

(a) the disease was clinically inactive and bacteriologically negative; and
(b) there was a cumulative attendance of 75% of 5 year's treatment of paucibacillary patients, and of 10 year's treatment of multibacillary patients.

One study[21] using a hypothetical mode, shows that there will be significant falls in prevalence rates in the first 5 years of the introduction of MDT into leprosy endemic districts, mainly as a result of discharge of cases during screening and due to shortening of duration of treatment. In his extensive editorial review of the common features in the decline of leprosy epidemics, Davey[22] pointed to the voluntary isolation of infective and potentially infective leprosy cases on dapsone treatment, and the creation of an atmosphere of mutual trust and cooperation between patients and those engaged in control programmes, with strong public health education, as the most essential elements of a successful policy of leprosy control. In this context, in present-day Ethiopia, much is to be gained from the recent introduction and active implementation of villagization programmes, in which previously scattered populations have been brought together in order to establish centralized services. This will certainly be most useful in the early detection of leprosy cases. With their well-organized and regimented administrative structures, these villages should make the diagnosis, treatment and follow-up of leprosy cases more efficient. Health education should also be easily propagated and much more effective.

It is therefore suggested that those in leprosy control work might exploit the good organization of the Peasant' Associations. An additional advantage of these organized

villages is the possibility of conducting prevalence and incidence studies with limited resources. Such studies should be both accurate and reliable, because they will be based on a stable and controlled population whose social and economical characteristics are well defined.

In spite of Ethiopia's other priorities for dealing with communicable diseases of higher prevalences, leprosy has gained recognition and an advantageous position, with relatively good financial resources for it's control activities. Working closely with the basic medical services and the Peasant Associations, an operationally efficient control programme, with active case detection and MDT, can achieve a further and more significant reduction in the prevalence of leprosy in the country.

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