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The influence of operational factors in the profile of monolesional leprosy cases in South India

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Summary A comparison of the profile of monolesional cases among new PB cases detected in a Government Leprosy Control Unit (GLCU) and the field area of a Central Leprosy Teaching and Research Institute (CLTRI), both located in South India, demonstrates that the proportion of monolesional cases among new cases detected between 1987 and 1991 was higher in children than adults, higher in females than males (only in the CLTRI)—over 95% were the tuberculoid type. A significantly increasing trend in this proportion could be seen in the GLCU but not in the CLTRI; an explanation of this is based on the difference in operational aspects in case detection methodology adopted by the 2 areas—e.g. intersurvey interval and mode of case detection. Such studies, focusing on single skin lesions, help us in understanding the role of various possible operational factors in influencing the behaviour of the disease.

Introduction

There is considerable controversy and uncertainty over the natural history of leprosy, but there is general agreement that treatment of single-lesion patients may assist an early diagnosis of leprosy.[1] If untreated this lesion may persist, progress or disappear. There is a renewed resurgence of interest in single-lesion cases. Though their ability to transmit infection in the community is unknown their significance in the context of leprosy control is undeniable. The proportion (and significance) of single-lesion cases among the new PB cases detected, the trend of this proportion over a period in areas where multidrug therapy (MDT) has been implemented, and any factors influencing this trend, are some of the features that need to be explored and examined to be able to understand better the behaviour of the disease. The control and treatment of leprosy could be altered if such an investigation suggests the necessity for it.

An attempt was made to study the profile the trend of monolesional cases and the factors influencing this trend in high endemic areas using data from the field area of the Central Leprosy Teaching and Research Institute (CLTRI) and also from a Government Leprosy Control Unit (GLCU) in the state of Tamilnadu in South India.

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Materials and methods

Data was taken from patient care cards of all the cases newly detected between 1987 and 1991, both in the field area of the CLTRI and the GLCU, have been computerized and analysed for this study. Data from these 2 units are regularly collected and updated as a part of a computerized management information system developed at the CLTRI. The population of the field area of the CLTRI is 112,000 (1991) and that of the GLCU area is 413,000 (1991). Pulse therapy was started in the field area of the CLTRI in November 1986 and in the GLCU in April 1987. The prevalence of leprosy at the start of MDT in the CLTRI area was 27·7 per 1000 and in the GLCU area 15·6 per 1000. About 1000 new cases in the GLCU area and 200 in the CLTRI area are being detected annually. The intersurvey interval in the CLTRI is $1-1\frac{1}{2}$ years and in the GLCU 3–4 years. In the CLTRI case detection is through a total population survey, special surveys (field research projects) or voluntary. In the GLCU it is through a total population survey, annual contact and school survey, sample survey, special surveys and voluntary mode.

Monolesion is defined as a single skin lesion, hypopigmented/erythematous, with or without infiltration and definite sensory loss, and without trunk nerve involvement. Biopsy was not done.

χ^2 test for linear trend (1988–91) and χ^2 (Yates' corrected) for a 2×2 contingency table was applied to test for significance using the EPI INFO package.

Results

About 61% of the total new PB cases detected between 1987 and 1991 in the CLTRI area and 56% in the GLCU area were single skin lesion (Table 1). The proportion of monolesion cases among new PB cases was higher among children than adults in both the CLTRI area ($\chi^2 = 23{\cdot}77$, $p = 0{\cdot}0001$) and the GLCU area ($\chi^2 = 220{\cdot}65$, $p = 0{\cdot}000$), higher among females than males in the CLTRI area ($\chi^2 = 11{\cdot}24$, $p = 0{\cdot}0008$) but not in the GLCU area ($\chi^2 = 1{\cdot}65$, $p = 0{\cdot}198$) (Table 2). Over 95% of monolesional cases in both the areas were the tuberculoid type (Table 2). About 4% (45/1022) and 6% (240/3840) of new cases detected in the CLTRI and GLCU areas, respectively, between 1987 and 1991 were multibacillary.

Table 1. Distribution of skin and nerve lesions among new PB cases detected in GLCU and CLTRI (1987–91)

	GLCU (nerve involvement (PB))			CLTRI (nerve involvement (PB))		
	0	1	>1	0	1	>1
No patch	3 (0·1)*	13 (0·4)	10 (0·3)	0	5 (0·5)	2 (0·2)
Patch (single)	2027 (56·3)	45 (1·2)	4 (0·1)	595 (61)	76 (8)	14 (1·4)
Patch (>1)	1180 (33)	168 (4·7)	150 (4·2)	179 (18·3)	71 (7·3)	35 (3·4)
Total		3601 (100)			977 (100)	

*Numbers in parentheses are percentages.

Table 2. Proportion of monolesional cases among new PB cases detected between 1987 and 1991 in CLTRI and GLCU by age, sex and type

Characteristics	CLTRI	GLCU
Total	595/977 (61)*	2027/3599 (56)
Age		
Child	294/433 (68)	933/1280 (73)
Adult	301/574 (55)	1094/2319 (47)
Sex		
Male	280/502 (56)	1006/1820 (55)
Female	315/474 (66)	1021/1777 (57)
Sub-type		
I	13 (2·2)	
TT	567 (95·3)	2005 (99)
BT	15 (2·5)	22 (1·0)

* Numbers in parentheses are percentages.

Table 3. Relapse rates in mono and multilesion PB cases in CLTRI and GLCU

	Relapse rate	
Characteristics	CLTRI	GLCU
Monolesion	5/446 (1·1)*	5/1256 (0·4)
Multiple	8/282 (2·8)	13/1080 (1·2)

* Numbers in parentheses are percentages.

There was no difference in treatment regularity (two-third clinic attendance in a given period) between monolesion and multiple lesion PB cases (85% and 83% in the GLCU area and 85% and 80% in the CLTRI area, respectively). Relapses were seen in monolesion cases but they were significantly less than the multiple lesion cases ($\chi^2 = 3{\cdot}86$, $p = 0{\cdot}049$) (Table 3).

The proportion of monolesion cases was higher among children than adults in both the CLTRI and GLCU areas throughout the period under consideration. The proportion of single lesion cases in all new cases detected between 1988 and 1991 shows an interesting trend in the GLCU but not in the CLTRI area (Figure 1). This trend in the GLCU area is obvious only in the adult ($\chi^2 = 9{\cdot}07$, $p = 0{\cdot}0026$) but not in the child cases ($\chi^2 = 0{\cdot}087$, $p = 0{\cdot}76$), in males ($\chi^2 = 5{\cdot}045$, $p = 0{\cdot}024$) but not in females ($\chi^2 = 1{\cdot}65$, $p = 0{\cdot}213$) (Table 4(a) and (b)).

No clear linear trend could be discerned in the proportion of MB cases in the new cases detected (Table 5).

In the GLCU area there was a significant rise in the number of monolesional cases detected among adults through the different survey modes of others,(e.g. sample survey, referral, special selective surveys) ($\chi^2 = 4{\cdot}191$, $p = 0{\cdot}040$) (Table 6(b)), whereas the linear

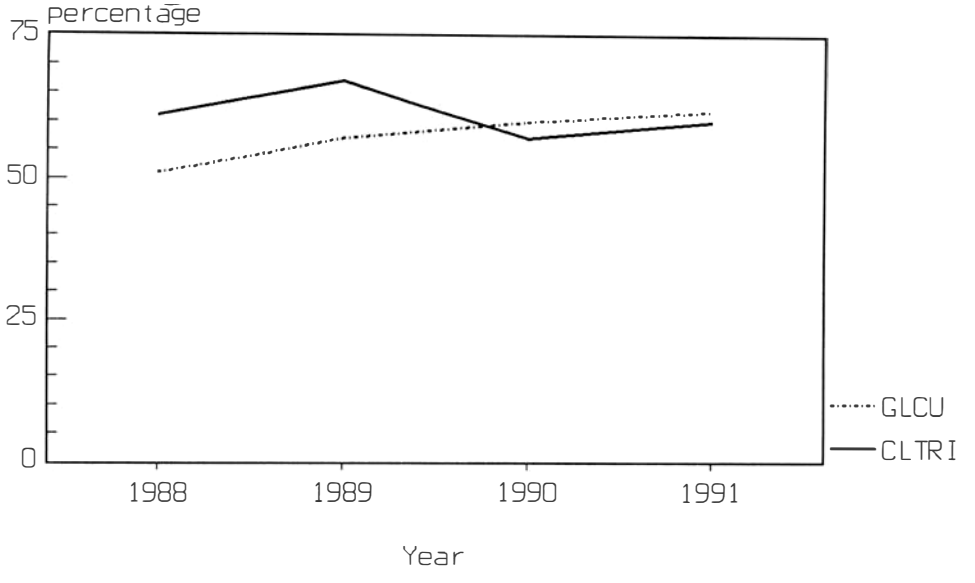

Figure 1. The proportion of monolesional cases among new PB cases between 1988 and 1991.

increasing trend seen in a general survey among adults is not significant ($\chi^2 = 1{\cdot}291$, $p = 0{\cdot}25$). Intensification of case detection through an annual sample survey by an independent agency, camps, etc. might have contributed to some extent to this trend. In the CLTRI area there is a gradual but not significant fall ($\chi^2 = 1{\cdot}355$, $p = 0{\cdot}24$) in the proportion of monolesional cases detected by voluntary mode over the specified period (Table 6(a)). Parallel active surveys as a part of research projects which began in 1988 diagnosed cases which would otherwise have been detected by the voluntary mode.

Discussion

The upsurge in interest shown in single skin lesion leprosy cases, especially in India, in the face of reports of a rising proportion of monolesional PB cases from various leprosy project districts, is understandable. Such a trend, if evident, could either signify an epidemiological drift in the disease profile, or reflect merely an operational process, or both.

The 2 areas selected for the study are similar in being highly endemic for leprosy but dissimilar in the case detection strategy that they adopt. In both a preponderant proportion of new PB cases was shown to be monolesional. The proportion of monolesional cases among PB was higher in children than in adults in both the areas, possibly due to a greater susceptibility of children to infection[2] and a higher occurrence of benign lesions (including mono) among them, coupled with the intense case detection activity that is focused on this age group. Interestingly enough the monolesional proportion is higher in females than in males in the CLTRI area, due perhaps to better examination coverage through the involvement of a female health worker.

An increasing trend in the proportion of monolesional among new cases was

Table 4. Proportion of monolesional cases among new PB cases by age and sex detected in (a) CLTRI and (b) GLCU (1987–91)

(a) CLTRI	Year of detection					
Age	1987	1988	1989	1990	1991	
Child	70/105 (67)	67/102 (66)	60/77 (78)	42/66 (64)	55/83 (66)	$\chi^2 = 0{\cdot}028$ $p = 0{\cdot}86$
Adult	66/126 (52)	82/143 (57)	63/105 (60)	35/70 (50)	55/100 (55)	$\chi^2 = 0{\cdot}14$ $p = 0{\cdot}70$
Total	136/231 (59)	149/245 (61)	123/182 (67)	77/136 (57)	110/183 (60)	$\chi^2 = 0{\cdot}10$ $p = 0{\cdot}75$
Male	67/122 (55)	79/127 (62)	57/95 (60)	37/74 (50)	40/84 (48)	$\chi^2 = 1{\cdot}61$ $p = 0{\cdot}20$
Female	69/109 (63)	70/117 (39)	66/87 (76)	40/62 (64)	70/99 (70)	$\chi^2 = 0{\cdot}32$ $p = 0{\cdot}57$
(b) GLCU	Year of detection					
Age	1987	1988	1989	1990	1991	
Child	58/84 (69)	195/280 (70)	217/287 (76)	211/285 (74)	252/344 (73)	$\chi^2 = 0{\cdot}087$ $p = 0{\cdot}76$
Adult	56/210 (27)	228/542 (42)	216/471 (46)	242/471 (51)	352/623 (56)	$\chi^2 = 9{\cdot}07$ $p = 0{\cdot}0026$
Total	114/294* (39)	423/822 (51)	433/758 (57)	453/756* (60)	604/967* (62)	$\chi^2 = 6{\cdot}11$ $p = 0{\cdot}013$
Male	47/145 (32)	210/424 (49)	210/375 (56)	233/394 (59)	306/482 (63)	$\chi^2 = 5{\cdot}045$ $p = 0{\cdot}024$
Female	67/149 (45)	213/398 (53)	223/383 (58)	220/362 (60)	298/485 (61)	$\chi^2 = 1{\cdot}65$ $p = 0{\cdot}213$

* Age and sex particulars for one case each in 1987, 1990 and 1991 are not available.

Table 5. New cases detected (1987–91) by type of leprosy in (a) CLTRI and (b) GLCU

(a) CLTRI	Year of detection				
Type	1987	1988	1989	1990	1991
PB	231	245	182	136	183
MB	11 (4·5)*	9 (3·5)	10 (5·2)	16 (10·5)	9 (4·7)
(b) GLCU	Year of detection				
	1987	1988	1989	1990	1991
PB	295	822	758	757	968
MB	44 (13)	40 (4·6)	52 (6·4)	45 (5·6)	59 (5·7)

* Numbers in parentheses are percentages.

Table 6. Proportion of monolesional PB cases detected by various modes and age: 1987–91 in (a) CLTRI and (b) GLCU

(a) CLTRI		Year of detection				
Mode of suvey		1987	1988	1989	1990	1991
General survey	Child	57/83 (69)‡	58/87 (67)	51/64 (80)	25/39 (64)	35/53* (66)
	Adult	57/101 (56)	72/120 (58)	58/90 (62)	25/48 (52)	38/61* (62)
Other	Child	— (0)	— (0)	— (0)	3/4 (75)	12/15 (80)
	Adult	— (0)	— (0)	0/1 (0)	3/4 (75)	9/12 (75)
Voluntary	Child	13/22 (59)	9/15 (60)	9/13 (69)	14/23 (61)	9/16 *(56)
	Adult	9/25 (36)	12/23 (52)	7/14 (50)	7/18 (39)	7/25 *(28)
(b) GLCU		Year of detection				
Mode of survey		1987	1988	1989	1990	1991
General survey	Child	17/23 (74)	37/50 (74)	50/64 (78)	19/26 (73)	62/90 *(69)
	Adult	12/30 (40)	74/145 (51)	102/189 (54)	82/143 (57)	148/241* (61)
Contact survey	Child	3/3 (100)	9/15 (60)	5/8 (62)	5/6 (83)	14/17* (82)
	Adult	5/13 (38)	15/28 (54)	4/13 (31)	11/19 (58)	13/24* (54)
School survey	Child	10/13 (77)	82/109 (75)	97/120 (81)	113/153 (74)	93/115* (81)
	Adult	1/1 (100)	7/8 (88)	11/15 (73)	19/29 (66)	13/18* (72)
Others	Child	4/11 (36)	18/25 (72)	28/35 (80)	33/45 (73)	26/38* (68)
	Adult	8/39 (20)	31/85 (36)	36/81 (44)	63/118 (53)	85/144* (59)
Voluntary	Child	22/32 (69)	45/75 (60)	35/57 (61)	25/38 (66)	31/48* (21)
	Adult	27/122 (22)	95/265 (36)	59/162 (36)	49/125 (39)	54/138* (39)

* Not significant, $p > 0.05$.
† Significant, $p < 0.05$.
‡ Numbers in parentheses are percentages.

recognizable in one area, not in the other. Any epidemiological explanation for this drift could only be exceptional for 3 reasons: (a) the time span is too conservative to produce such a change; (b) it did not emerge in an area of similar endemicity and ethnicity; and (c) the MB proportion among new cases remained virtually stable during this period in both the areas.

Monolesional cases are believed to indicate early leprosy or early diagnosis. Delay in detecting cases does occur in the leprosy control programme, in which a total population survey lasts 3–4 years. Since a good segment of the child population (5–14 years) is covered through annual school surveys it is easy to understand why there is less delay in case detection in this group. This lag, therefore, is limited to adult cases and it gets gradually curtailed as case detection efficiency shows an upswing,[3] either through better coverage by a routine general survey, or special surveys, or through increased voluntary reporting brought about by health education. This may result in a gradual increase in the monolesional case proportion among new cases over a period of time. This is clearly reflected in the GLCU area. The manifestation of the trend only in adult males, though

not clear, could perhaps indicate a culturally-motivated difference in utilization of services offered by the programme and an unchanging ascertainment bias among the workers. The trend is not visible in the CLTRI area because even though a lag in case detection may occur it is minimal both in magnitude and proportion and does not show any year-to-year variation when considering a 20-year-old ongoing programme of an annual intense survey with an extensive examination coverage. Obviously, any differences are due to the mode of operation. A thorough understanding of the various operational elements in the programme is needed before a comprehensive explanation of the pattern of the disease in a particular direction could be made.

The study of the monolesional cases and their trend may be useful in understanding the disease. But the influence of case detection methods on the patterns of monolesional cases is great so that only studies using rigorously standardized methods of case detection can help us in understanding the disease process.

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References

[1] WHO/LEP/CTD/LEP/90.2. Report of the consultation on the early diagnosis of leprosy: 1990.
[2] Jopling WH, McDougall AC. *Handbook of leprosy*, 3rd edn (1984). CBS Publishers & Distributors, New Delhi.
[3] Lechat, MF. Epidemiological indicators in leprosy control programmes. WHO/LEP/SG/WP/83.4: 1983.