

Disabilities of hands, feet and eyes in newly diagnosed leprosy patients in eastern Nepal

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Summary The objective of the study was to determine the magnitude of hand/feet/eye disabilities in newly diagnosed leprosy patients by examining all newly diagnosed leprosy patients who presented at the Eastern Leprosy Control Project (supported by The Netherlands Leprosy Relief Association), made up of a regional clinic in Biratnagar and 5 mobile clinics in surrounding districts.

The study comprised of all new and previously untreated patients who presented at the clinics over a 10-week period who were diagnosed as leprosy sufferers.

Of the 260 leprosy patients examined 12 (4.6%) had sight-threatening lesions (lagophthalmos, iris involvement, corneal anaesthesia); 3 patients were blind due to cataract; 96/260 patients (37.0%, 95% confidence interval 35.0–43.0%) had 1 or more disabilities of their hands and/or feet. The most frequently found disabilities were sensory loss of the hands and feet, claw hand and plantar ulcers. According to the WHO disability grading 60% had no disabilities, 19% had grade 1 and 21% had grade 2 disability.

Disability assessment is very important not only to evaluate the effectiveness of the control programme but also for the patient, whose most important worry is the stigmatizing deformities leprosy patients suffer. The earlier detection of sensory loss might reduce these secondary deformities.

Introduction

Leprosy patients are the same as everybody else in that they need their hands, feet and eyes in order to cope with daily living. Unfortunately, many patients still present to a clinic already suffering from limb damage in a disease which now can be well treated and

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even cured. The 2 most important leprosy-related sight-threatening lesions are lagophthalmos and iridocyclitis.¹

Disabilities occur because of the direct involvement of peripheral nerves which cause sensory loss and/or motor paralysis. Secondary deformities can also develop, e.g. contracture, ulcers and absorption of digits. With early detection many of these problems can be prevented.

According to the International Classification of Impairment, Disabilities and Handicaps (ICIDH), disability is defined as: 'any restriction or lack of ability (resulting from an impairment) to perform an activity in the manner considered normal.'² Sensory loss, by this definition, is an impairment, but for practical reasons we have used the term disability. The Eastern Leprosy Control Project (ELCP) is a joint project of the Nepalese Government with the Netherlands Leprosy Relief Association. The project covers 6 districts in the eastern terai (lowlands) of Nepal. An increasing number of patients come from India. From previous data and a subjective impression we presumed there would be more disabilities in the Indian patients.

The main clinic of the ELCP is in Biratnagar. There are 5 mobile clinics in the surrounding districts where the central staff goes once every month. In addition to these clinics there are 72 health posts where multidrug therapy (MDT) is provided for that area. District leprosy workers are responsible for supervising the resident multipurpose staff in these health posts.

Patients and methods

For 10 weeks between September and November 1992 we saw all new diagnosed leprosy patients who presented at the clinics.

After recording a registration number, age, sex, type of leprosy, duration of disease, district and presenting symptom, the eyes were examined.

Hands and feet were checked for deformities: clawing, drop foot, absorption, ankylosis, contracture and the presence of ulcers. The degree of deformity was measured and noted down. Voluntary muscle testing and sensory testing was then done by the physiotherapy technician, who also tested the following muscles: abductor digiti minimi, abductor pollicis, wrist extensors and dorsiflexors of the foot. For sensory testing a nylon filament was used on the hands and feet to test protective sensibility. Sensory loss was defined as missing more than 1 point of 12 test points on the hand and of 13 test points on the foot.

Disability grading was done according to the WHO 2 point scale (Table 1).³

Results

POPULATION

We examined 260 newly diagnosed leprosy patients; 219 in the main clinic in Biratnagar and 41 in the mobile clinics. There were 88 females and 170 males (sex ratio 1:9). The mean age was 34.5 years (females 32.9 and males 35.3 years). The patients from India tended to be older than the Nepalese patients (mean age 36 (India) and 32 (Nepal) years, statistically significant, 2-tailed *t*-test, $p < 0.05$).

Table 1. WHO disability grading 2-point scale

Hands and feet:

Grade

- 0: no anaesthesia or visible deformity or damage.
- 1: anaesthesia, but no visible deformity or damage.
- 2: visible deformity or damage.

Eyes:

Grade

- 0: no eye problems due to leprosy, no evidence of visual loss.
- 1: eye problems due to the presence of leprosy, but vision not severely affected ($VA \geq 6/60$).
- 2: severe visual impairment ($VA < 6/60$).

For age distribution see Figure 1.

Of the total population investigated 46.5% came from Nepal. In the main clinic in Biratnagar the percentage of Indian patients was 63.5%.

In total, 41% of the patients had tuberculoid leprosy (TT) or borderline-tuberculoid leprosy (BT) and these were treated with the 6-month WHO multidrug regimen. The other 59% had BT+, mid-borderline leprosy (BB), borderline-lepromatous leprosy (BL), lepromatous leprosy (LL) and pure neural leprosy (PNL) and were treated with a 24-month WHO regimen (Figure 2).

BT+ is defined in Nepal as having BT with at least 3 body areas involved.⁴

There is a significant difference in the distribution of leprosy type between females

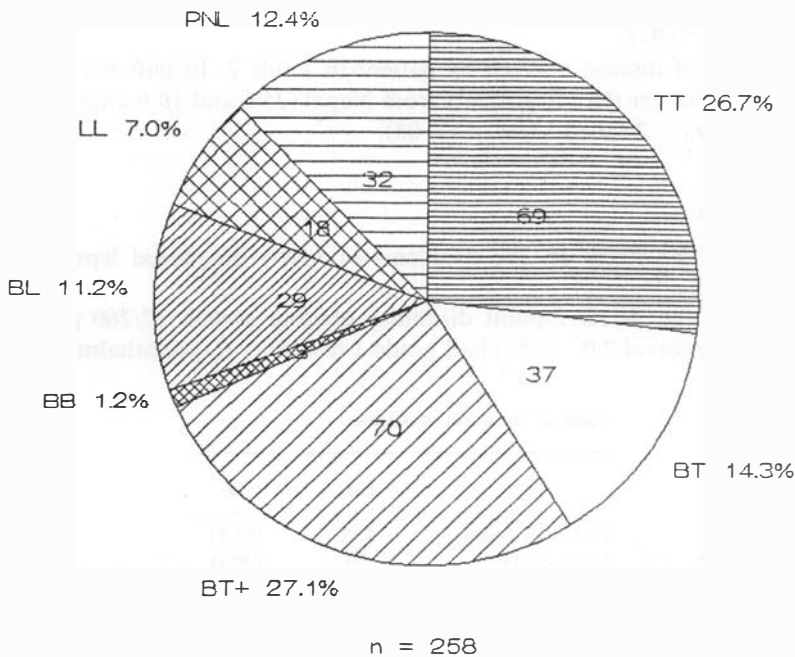


Figure 1. Age distribution.

N = 257

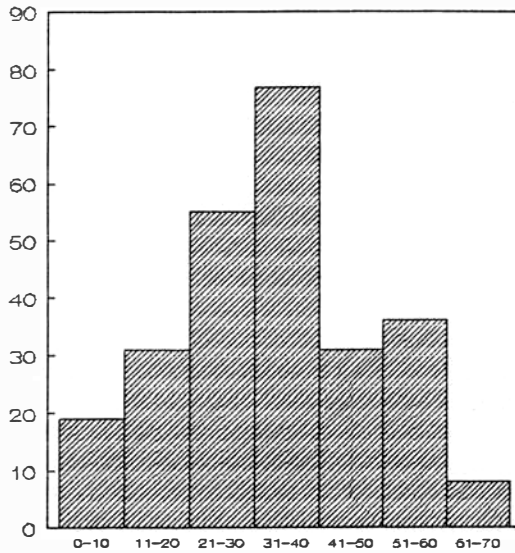


Figure 2. Type of leprosy. TT, tuberculoid; BT, borderline tuberculoid; BT+, borderline tuberculoid with 3 or more body parts involved, Nepalese definition;⁴ BB, borderline; BL, borderline lepromatous; LL, lepromatous; PNL, pure neural leprosy.

and males, with 52% of females in the TT,BT group against 34% of males (statistically significant, χ^2 , $p < 0.01$).

The duration of disease is given by patient in Table 2. In patients from India the mean duration is longer than in patients from Nepal (25.6 and 19.6 months, statistically significant difference, 2-tailed t -test, $p < 0.05$).

EYE-DISABILITIES

The outcome of the study on eye problems in newly diagnosed leprosy patients is presented elsewhere.⁵

According to the WHO 2-point disability grading system 12/260 patients (4.6%, 95% confidence interval 2.0–7.2%) had grade 1 disability (lapophthalmos, iris involve-

Table 2. Duration of disease

	No.	%
Less than 1 year	133	(51.1)
1 to 5 years	91	(35.1)
More than 5 years	14	(5.8)
Unknown	22	(8.5)
Total	260	(100.00)

Table 3. Disabilities (306 disabilities in 96 patients)

	Unilateral	Bilateral	Total (% of 260)
Hand			
Clawing	22	7	29 (11.0)*
Contracture	5	4	9 (3.5)
Ulcer	6		6 (2.3)
Absorption	11	3	14 (5.4)
Sensory loss	45	21	66 (25.0)
Foot			
Drop foot	5	1	6 (2.3)
Ulcer	16	6	22 (8.5)
Absorption	8	5	13 (5.0)
Sensory loss	22	36	58 (22.3)
Eye			
Lagophthalmos	9	—	9 (3.5)
Iris involvement	3	—	3 (1.2)

* Numbers in parentheses are percentages.

ment with VA $\geq 6/60$). Grade 2 disability was found in 13/260 patients (5.0%, 95% confidence interval 2.3–7.7%) with VA $< 6/60$ in 1 or 2 eyes. All were caused by cataract. More patients had impaired vision caused by cataract but they are not included in grade 1 disability by the WHO standard.

DISABILITIES OF HANDS/FEET

No disability or muscle weakness was found in 60% of patients. Only muscle weakness, without sensory loss or other disabilities, was found in 3% of patients; 96 patients (36.9%, 95% confidence interval 30.9–42.9%) had 1 or more of the disabilities listed below in Table 3.

Table 4 shows the number of disabilities per patient. When there was only 1 disability this was most often sensory loss.

In total, 66 patients (26%, 95% confidence interval 20.6–31.4%) had 1 or more motor nerves involved (voluntary muscle testing score less than 5). The distribution in the 135 nerves concerned in these 66 patients is as follows: facial 7%, ulnar 51%, median 29%, radial 4% and peroneal 9%. The total number of nerves involved per patient is given in Table 5.

According to WHO disability grading 60% of patients had no disability, 19% had grade 1 and 21% had grade 2 disability. The mean age of these 3 groups is respectively 32, 39 and 36 years. The WHO disability grading does not seem to be higher in Indian patients (Table 6, no significant difference, χ^2 , $p > 0.1$).

Proportionally, 73% of females had no disability (WHO grade 0), against 53% of males. There were more disabilities (64%) in the multibacillary group of patients, against 27% with disabilities in the paucibacillary group (Table 7, statistically significant, χ^2 , $p < 0.01$).

The disabilities listed in Table 3 will now be discussed more extensively.

CLAWING AND CONTRACTURES

There were 29 patients (11%) with 1 or 2 claw hands, giving 36 claw hands in all. In 18

Table 4. Number of disabilities

No. of disabilities	No. of patients	%
0	163	62.7
1	36	13.8
2	20	7.7
3	9	3.5
4	8	3.1
5	6	2.3
6	8	3.1
7	3	1.2
8	3	1.2
9	2	0.8
10	1	0.4
14	1	0.4
Total	260	100.0

Sum of above disabilities: absorption hand, absorption foot, clawing hand, contracture hand, ankylosis hand, ulcer hand, ulcer foot, sensory loss in hand, sensory loss in foot; each

patients (20 hands) there was only ulnar clawing, which did not exceed 60 degrees. In 11 patients (16 hands) there was ulnar/median clawing exceeding 70 degrees, of which 10 hands had contractures (7 patients), and 1 patient with only mild clawing also had a contracture.

ULCERS

The 6 hands with an ulcer all had partial or complete sensory loss—4 out of 6 were on the dorsum of the fingers. Of 26 feet with ulcers, 20 had complete sensory loss and 6 had partial sensory loss. Ulcers were most frequently on the metatarsal heads (Table 8).

Table 5. Number of muscles involved

No. of muscles involved	No of patients	%
0	198	76.2
1	30	11.5
2	18	6.9
3	4	1.5
4	4	1.5
5	4	1.5
6	2	0.8
Total	260	100.0

Sum of facialis, abductor digiti minimi, abductor pollicis, wrist extensors, dorsiflexors foot; each left or right. Max = 10.

Table 6. WHO disability grade by localization ($n=247$)

WHO grade	India	Nepal	Total
0	80 (58.8)*	68 (61.3)	148 (59.9)
1	27 (19.9)	20 (18.1)	47 (19.0)
2	29 (21.3)	23 (20.8)	52 (21.1)
Total	136 (55.1)	111 (44.9)	247 (100.0)

Difference not significant, χ^2 , $p > 0.1$.

* Numbers in parentheses are percentages.

ABSORPTION

Of 17 hands (14 patients) with a shortening of the fingers 3 were caused by an accident unrelated to leprosy, 10 hands had only slight absorption (tips of fingers or one phalanx) and 4 had more severe absorption with more than 1 phalanx missing. Of 18 feet (13 patients) with absorption, 1 was caused by an accident. There were 10 feet with a slight absorption of toes and 8 with severe absorption.

SENSORY LOSS

There were 90 patients (36%) with sensory loss of hands and/or feet. Of the 66 patients (25%) with a sensory loss of hands (78 hands) there was in 25 hands a partial loss, in 38 hands a loss in the ulnar region and in 24 hands a complete sensory loss; 58 patients (22%) had sensory loss of feet (94 feet), 44 feet with partial and 50 feet with complete sensory loss.

DROP FOOT

Drop foot is defined as a voluntary muscle testing (VMT) score of 3 (or less) for the dorsiflexors if the foot can just be moved against gravity (or less). There were 6 patients with drop foot, 1 of them with bilateral drop foot. In 3 feet there was a complete paralysis.

Table 7. WHO grading in pauci- and multibacillary patients (missing 16)

WHO grade	PB	MB	Total
0	120 (73.2)*	28 (35.9)	148
1	21 (12.8)	21 (26.9)	42
2	23 (14.0)	29 (37.2)	52
Total	164 (100)	78 (100)	242

Difference statistically significant, χ^2 , $p < 0.01$.

* Numbers in parentheses are percentages.

Table 8. Ulcers on feet

	No.
Metatarsal heads	18
Dig. 1	3
Dig. 2-5	3
Heel	6
Midfoot	2
Dorsum/Lat malleolus	4

Discussion

We examined 260 new patients. The fact that we could not examine the new patients in the health posts might mean that our population has more complications than the mean leprosy population of eastern Nepal. We do not think this difference is significant in new patients when selection has not yet taken place.

The mean age of our patients was less than that in other studies,^{6,7} which was to be expected because other studies have usually been done in resettlement villages or leprosaria.

DISABILITIES

Of our population 36.9% (95% confidence interval 30.9–42.9%) had 1 or more disabilities. A similar study in Nigeria recorded 38.8% in a hospital-based population.⁶ Reports from Malawia and Tanzania give figures of 21.9% and 30.0%, also in new patients.⁸ This lower figure is probably due to the higher prevalence of tuberculoid leprosy in Africa in comparison with Asia, while disabilities are found more frequently in lepromatous patients.⁷ More male than female patients suffer from disabilities, as reported by others, perhaps because the percentage of men suffering from lepromatous disease is significantly higher.^{6,7}

Sensory loss was the most common disability, accounting for 59.1% of the total number of disabilities. When only 1 disability was present this was most often sensory loss. This means that some of the secondary disabilities can be prevented with health education and regular check-ups.

Apart from sensory loss the most frequent disabilities were claw hand (11.8%) and plantar and palmar ulcers (11.2%). In Molai these were also the 3 most frequently found disabilities (sensory loss 35%, claw hand 13%, ulcers 17%).⁶ The high figure of sensory loss in our study might be due to our definition of sensory loss.

Although we expected more disabilities in the patients coming from India, this could not be confirmed. Neither was there a greater percentage of patients with disabilities, nor more disabilities per patient. The self-history of disease according to the patient is not very reliable because of their subjective interpretation.

Conclusions

The importance of careful disability measuring at intake in a leprosy control programme

cannot be overestimated, because it is an indication of effectiveness. Also, from the patient's viewpoint, the deformity caused by leprosy is the part of the disease which affects his or her life most, because of the stigmatizing and disabling effect. Some of the early detected disabilities may still be suitable for treatment by steroids.

Because a high percentage of the disabilities is sensory loss in hands and feet, which can be the cause of secondary deformities, early detection and frequent monitoring of disabilities may prevent secondary deformities. Early detection and early treatment does not always mean secondary deformities can be prevented, but they can be minimized.⁸

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