Research Article

Pattern of disabilities of hands and feet among leprosy patients reported at tertiary care centre

Shivani Ranjan[1*], Devraj Dogra[2], Naina Dogra[3]

[1]Senior Resident, Department of Dermatology, Veneorology and Leprology, ASCOMS Hospital, Jammu, J & K, INDIA.
[2]Professor and HOD, [3]Associate Professor, Department of Dermatology, Veneorology and Leprology, GMC, Jammu, J & K, INDIA.
Email: drshivaniranjan@rocketmail.com

Abstract

Introduction: In leprosy patients, disabilities involving hands, feet, eyes, face are seen. Deformities of hands include ulcers, cracks, scars, blisters, claw hand, wrist drop, dactylitis, contractures of fingers, resorption of fingers, stiff joints. Defomities of feet include ulcers, cracks, scars, blisters, foot drop, claw toes, resorption of toes, contracture of tendo achilles, equinovarus deformity. **Aims and Objectives:** To study the pattern of disabilities of hands and feet among leprosy patients reported at tertiary care centre. **Material and Method:** The present study was conducted in the Post Graduate Department of Dermatology, Venereology and Leprology, Government Medical College, Jammu from November 2012 to October 2013. All patients clinically diagnosed as cases of leprosy both old and new registered in the hospital were included in the study. A detailed history was taken regarding the age, sex, occupation, education, duration of disease, reactional states, treatment status, past history and family history. Complete clinical examination of each patient was performed with respect to skin lesions, nerve involvement and distribution, site, symmetry, type and grading of disability of hands and feet. **Results:** It was observed that out of total 150 patients, 93 (62%) were diagnosed to be with disability. Disability among lepromatous leprosy and borderline lepromatous leprosy was seen in 89.29% and 75.61% respectively. Both hands and feet were involved in 70.97% of disabled patients. Bilateral involvement of hands and feet was seen in 83.87% of disabled patients. Grade II disability was seen in 62.37% of disabled patients whereas grade I disability was diagnosed in 37.63% of disabled patients. In hands, 62.07% of patients had wasting in form of flattening of thenar or hypothenar eminence or guttering as the commonest deformity followed by clawing in 51.72% and ulceration in 18.97%. In feet, 24.14% of patients had ulceration as the commonest deformity followed by wasting. Disability increased with increasing number of nerves involved. This finding is statistically significant (χ^2=61.28; p=0.0005). **Conclusion:** Thus we conclude that wasting and clawing was most common disability in hand whereas ulceration and wasting was common disability in feet. The most common pattern of disability was bilateral involvement of both hands and feet with grade II class of disability. Increasing age, male sex, lepromatous and borderline lepromatous leprosy was the common factors associated with disability.

Keywords: leprosy, disabilities of hands and feet,

[*]**Address for Correspondence:**
Dr. Shivani Ranjan, Sector No. 3, Opp. New Shiv Mandir, Bhagwati Nagar, Jammu, J & K, INDIA.
Email: drshivaniranjan@rocketmail.com

Received Date: 01/02/2015 Revised Date: 10/03/2015 Accepted Date: 12/04/2015

Access this article online	
Quick Response Code:	Website: www.statperson.com
	Volume 5 Issue 2

INTRODUCTION

The word "LEPROSY" is derived from the greek word "LEPROS" which means 'scaly'. The Indian word 'KUSHTHA' is derived from Sanskrit word "KUSHNATI" which means 'eating away'.[1] A case of Leprosy is defined as an individual who has not completed the course of treatment and has one or more of three cardinal signs- hypopigmented/ erythematous skin lesion(s) with definite loss/impairment of sensations; involvement of peripheral nerves, as demonstrated by definite thickening with sensory impairment; skin smear positive for acid fast bacilli. In leprosy patients, disabilities involving hands, feet, eyes, face are seen[2]. Deformities of hands include ulcers, cracks, scars, blisters, claw hand, wrist drop, dactylitis, contractures of fingers, resorption of fingers, stiff joints[4]. Defomities of feet include ulcers, cracks, scars, blisters, foot drop, claw toes, resorption of toes, contracture of tendo achilles, equinovarus deformity. In the present study we tried to study the Pattern of disabilities of hands and feet among leprosy patients.

How to cite this article: Shivani Ranjan, Devraj Dogra, Naina Dogra. Pattern of disabilities of hands and feet among leprosy patients reported at tertiary care centre. *International Journal of Recent Trends in Science and Technology* April to June 2015; 5(2): 103-107 http://www.statperson.com

AIMS AND OBJECTIVES

To study the pattern of disabilities of hands and feet among leprosy patients reported at tertiary care centre.

MATERIAL AND METHOD

The present study was conducted in the Post Graduate Department of Dermatology, Venereology and Leprology, Government Medical College, Jammu from November 2012 to October 2013. All patients clinically diagnosed as cases of leprosy both old and new registered in the hospital were included in the study. The patients with other causes of peripheral neuropathies (e.g. diabetes mellitus, sarcoidosis, porphyrias, hypercholesterolemia, uremia, polyarteritis nodosa, hereditary neuropathies and human immune virus infection) were excluded from the study. Thus total 150 patients were enrolled in the study and total 93 patients with deformity of hands and feet were diagnosed. Detail history was taken regarding the age, sex, occupation and literacy status of the patient and was entered in a prestructured proforma. A detailed history was taken with regard to duration of disease, delay in starting the treatment, reaction states (type 1 or type 2 lepra reactions) and treatment status [untreated (new patient); treated (taken full course of MDT)] or on treatment (on regular or irregular treatment)] of the patient was also noted. General physical and systemic examination was performed and relevant investigations, wherever required were carried out. Cutaneous examination was performed with respect to skin lesions, nerve involvement and distribution, symmetry, type and grade of disability. Grading of disability of hands and feet was done as per Proposed Operational and Expanded Grading of WHO disability grading of 1998.[4] For overall disability grade the maximum grading of hands and feet was considered.

- **Grade 0:** no sensory or visible impairment present. But it includes scars of healed ulcers when sensation is normal.
- **Grade 1:** sensory impairment present but no visible impairment present. It also includes scars of healed ulcers when sensation is impaired, hands and feet following successful reconstructive surgery, muscle weakness without clawing but excludes scars of healed ulcers when sensation is normal and minor skin cracks.
- **Grade 2:** Visible impairment present. It includes ulcers, severe cracks, severe atrophy and muscle weakness, clawing or contractures are present.

At the end of the study, the data so generated was analyzed with the help of computer software Microsoft Excel for Windows.

RESULTS

Table 1: Age and sex distribution of patients

Variable		No. of disabled	Total
Age	0-9	0 (0)	2
	10-19	5 (31.25)	16
	20-29	14 (53.85)	26
	30-39	26 (55.32)	47
	40-49	19 (79.17)	24
	50-59	20 (80)	25
	≥ 60	9 (90)	10
Sex	Male	75 (66.96%)	112
	Female	18 (47.37%)	38
Total		**93 (62%)**	**150**

It was observed that out of total 150 patients, 93 (62%) were diagnosed to be with disability. The youngest patient with disability was 12 years and oldest was 70 years old. Median age for patients with disability was 40 years. Mean age was 40.22±13.15 years. Total number of males was 112 and females were 38. The male to female ratio for disability was 4.2:1.

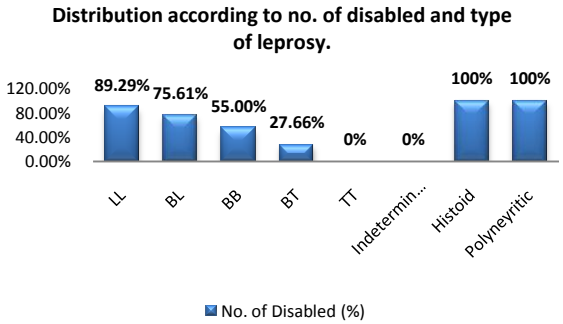
Table 2: Distribution of patients according to treatment type

Treatment type	No. of disabled	Total
New patient	40 (57.97%)	69
On treatment	48 (64.00%)	75
Treated (RFT)	5 (83.33%)	6
Total	**93**	**150**

Among the newly diagnosed patients, 57.97% were disabled whereas among the on treatment patients 64% were disabled.

Table 3: Distribution according to disability and type of leprosy

Type of Leprosy	No. of Disabled (%)	Total patients
LL	25 (89.29%)	28
BL	31 (75.61%)	41
BB	11 (55.00%)	20
BT	13 (27.66%)	47
TT	0 (0)	0
Indeterminate	0 (0)	1
Histoid	8 (100%)	8
Polyneyritic	5 (100%)	5
Total	**93(62%)**	**150**



It was observed that all the patients with histoid and polyneuritic leprosy were disabled. Disability among

lepromatous leprosy and borderline lepromatous leprosy was seen in 89.29% and 75.61% respectively. It was followed by patients with borderline borderline leprosy and borderline tuberculoid leprosy in whom 55% and 27.66% patients were disabled respectively. There was no patient with tuberculoid type of leprosy.

Table 4: Distribution according to site, laterality and grades of disability

Variable		No. of disabled (%)
Site	Hands and feet	66 (70.97)
	Hands alone	13 (13.98)
	Fe*et al*one	14 (15.05)
Laterality of disability	Bilateral Involvement	78 (83.87%)
	Unilateral Involvement	15 (16.13%)
Disability grades	Grade 1	35(37.63)
	Grade 2	58(62.37)

It was observed that both hands and feet were involved in 70.97% of disabled patients. Disability of feet alone was observed in 15.05% and that of hands alone was observed in 13.98% of disabled patients. Bilateral involvement of hands and feet was seen in 83.87% of disabled patients. While unilateral involvement of hands and feet was seen in 16.13% of disabled patients. While studying the grades of disability according to WHO classification, Grade II disability was seen in 62.37% of disabled patients whereas grade I disability was diagnosed in 37.63% of disabled patients.

Table 5: Distribution according to deformities in hand and feet

Deformity		No. of disabled (%)
Deformity in hands	Wasting of muscles	36(62.07)
	Clawing	30(51.72)
	Ulcers	11(18.97)
	Resorption	5(8.6)
	Dactylitis	3(5.17)
	Contractures	1(1.72)
	Wrist drop	0(0)
Deformity in feet	Wasting of muscles	11(18.97)
	Clawing	3(5.17)
	Ulcers	14(24.14)
	Resorption	2(3.45)
	Dactylitis	3(5.17)
	Contractures	0(0)
	Foot drop	5(8.62)

In hands, 62.07% of patients with deformity (grade 2 disability) had wasting in form of flattening of thenar or hypothenar eminence or guttering as the commonest deformity followed by clawing in 51.72% and ulceration in 18.97%. There was no patient with wrist drop. In feet, 24.14% of patients with deformity had ulceration as the commonest deformity followed by wasting in form of flattening of plantar arch in 18.97% and foot drop in 8.62%. There was no patient with contracture foot.

Table 6: Distribution according to number of nerves involved and disability

Nerves involved	No. of disabled (%)	Total patients
0-2	14(24.14)	58
3-6	35(76.09)	46
>6	44(95.65)	46
Total	**93 (62)**	**150**

Maximum Disability was seen in 95.65% (n=44) of patients with >6 nerve involvement followed by 76.09% (n=35) of patients with 3-6 nerves involved and only 24.14% (n=14) of patients with nerve involvement 0-2 were disabled. So, disability increased with increasing number of nerves involved. This finding is statistically significant (χ^2=61.28; p=0.0005)

DISCUSSION

In the present study, out of 150 leprosy patients 62% (n=93) patients had disabilities. Similar findings were also reported by Jain PK *et al*[5] who reported disability in 62.64% of patients. In contradictory to our findings Selvaraj *et al*[6] and Saha and Das[7] observed less disability rate (39% and 22% respectively). Whereas Noor SM *et al*[10] and Van Brakel *et al*[9] observed higher rate of disability (83.33% and 75% respectively). The age of patients in the present study ranged from 5 years to 70 years with a mean age of 36.30 ± 13.84 years and patients with disability ranged from 12 years to 70 years with a mean age of 40.22 ± 13.15 years. It was seen that rate of disability was increasing as the age was increasing. These findings are consistent with the findings of Girdhar M *et al*[10], Htoon MT *et al*[11], Schreuder PA *et al*[12], Sow SO *et al*[13], Solomon S *et al*[14], Srivasan H *et al*[15], Sarkar J *et al*[16] who also observed increase in disability with increasing age. Leprosy and disabilities due to leprosy can affect both sexes. Total number of males was 112 and females were 38. The male to female ratio for disability was 4.2:1. Thus male predominance was observed in the present study. Kumar R *et al*[17], Norman *et al*[18], Arora M *et al*[19], Bhat RM *et al*[20] also observed incidence of leprosy was more in males. Among the newly diagnosed patients, 57.97% were disabled whereas among the on treatment patients 64% were disabled. These findings were in consistent with Thappa DM *et al*[21]. In the present study, all the patients with histoid and polyneuritic leprosy were disabled. Disability among lepromatous leprosy and borderline lepromatous leprosy was seen in 89.29% and 75.61% respectively. These observations were consistent with Tiwari VD *et al*[22] who reported that polyneuritic, LL, BL patients were more prone to develop deformities. Kaur P *et al*[23] reported maximum number of disabled among LL, BL patients. Hasan S[24], Saha SP *et al*[25] and Singhi MK *et al*[26] observed maximum disability in LL patients. It was evident from the table that both hands and

feet were involved in 70.97% of disabled patients. Disability of fe*et al*one was observed in 15.05% and that of hands alone was observed in 13.98% of disabled patients. Thappa DM *et al*[21] also observed that hands and feet together were more commonly involved than either hand or fe*et al*one. Bilateral involvement of hands and feet was seen in 83.87% of disabled patients. While unilateral involvement of hands and feet was seen in 16.13%. Thus bilateral involvement was more commonly observed than unilateral involvement. These findings are similar to findings of Thappa DM *et al*[21]. Jain PK *et al*[5] and Ramos JM *et al*[27] also observed grade II disability more common than grade I disability in their study. While studying the grades of disability according to WHO classification, Grade II disability was seen in 62.37% of disabled patients whereas grade I disability was diagnosed in 37.63% of disabled patients. In Grade I there was no visible damage (only loss of sensation) whereas in Grade II involves visible damage. Thus in the further analysis only grade II cases were taken into consideration. As per the present study, 62.07% of patients with deformity (grade 2 disability) had wasting in form of flattening of thenar or hypothenar eminence or guttering as the commonest deformity followed by clawing in 51.72% and ulceration in 18.97% in hands. In feet, 24.14% of patients with deformity had ulceration as the commonest deformity followed by wasting in form of flattening of plantar arch in 18.97% and foot drop in 8.62%. Claw hand was the commonest deformity in studies of Nagabhushanam[28], Girdhar *et al*[21], Iyere BB[29], Scipper A *et al*[30], Kumar A *et al*[31]. While Brunel W *et al*[32] observed ulceration as the commonest deformity. Noor SM *et al*[8] also reported that in feet ulceration was the commonest deformity. Schipper A *et al*,[30] Observed claw hands and plantar ulcers as the commonest deformities in hands and feet respectively. In the present study, significant number of patients had wasting of hands and/or feet. Wasting is likely to be unnoticed by patients and so, they approach late to the health facilities when more apparent deformities like clawing or ulceration are present. Disability was seen in 95.65% (n=44) of patients with more than 6 nerve involvement followed by 76.09% (n=35) of patients with 3-6 nerves involved and only 24.14% (n=14) of patients with nerve involvement 0-2 were disabled. So, disability increased with increasing number of nerves involved. The finding were also statistically significant (χ^2=61.28; p=0.0005). The findings of present study were consistent with Kumar A *et al*[31] and Moschioni C *et al*[33] who also observed that deformities increase with increasing number of nerves involved. Nerve involvement occurs in the form of nerve thickening and/or nerve deficit. Damage to sensory nerves results in impairment of sensations to temperature, pain and touch while damage to the motor nerves causes paralysis of muscles leading to paralytic deformities[31]. Motor paralysis and loss of perception of pain predisposes the patient to damage of the affected parts and development of deformities[21]. In the present study, multibacillary disease, longer duration of disease, registration delay are likely causes for multiple nerve involvement and hence, greater number of disabled patients.

CONCLUSION

Thus we conclude that wasting and clawing was most common disability in hand whereas ulceration and wasting was common disability in feet. The most common pattern of disability was bilateral involvement of both hands and feet with grade II class of disability. Increasing age, male sex, lepromatous and borderline lepromatous leprosy was the common factors associated with disability.

REFERENCES

1. Shah A and Shah N. Deformities of face, hand, feet and their management. In:Hemanta Kumar Kar and Bhushan Kumar, eds. IAL textbook of Leprosy, Ist edition, New Delhi, Jaypee Brothers Medical Publishers 2010,p.449-450.
2. Singhi MK, Ghiya BC, Gupta D, *et al*. Disability rates in leprosy. Indian J of Dermatol Venereol Leprol 2004; 70(5):314-316.
3. Palit A, Ragunatha S, Inamadar AC. History taking and clinical examination. In: Hemanta Kumar Kar and Bhushan Kumar, ed. IAL textbook of Leprosy, Ist edition, New Delhi, Jaypee Brothers Medical Publishers 2010, p.137-138.
4. Brandsma and Brakel V. WHO disability grading: operational defination. Lepr Rev(2003)74,366-373
5. Jain PK, Tripathi D, Singh CM, *et al.* A study of high disability rate among leprosy affected persons in Gwalior district. Indian Journal of Community Health 2011, Jul-Dec; 23(2).
6. Selvaraj G, Prabhakar N, Muliyil J, *et al*. Incidence of disabilities among multibacillary cases after initiation of multidrug therapy and factors associated with the risk of developing disabilities. Indian J Lepr 1998; 70 suppl: 11s-16s.
7. Saha SP and Das KK. Disability pattern amongst leprosy cases in an urban area(Calcutta). Indian J Lepr 1993 Jul-Sep 65(3) 305-314.
8. Noor SM, Paracha MM, Ali Z, *et al*. Frequency of disabilities in newly diagnosed patients of leprosy presenting to Lady Reading Hospital, Peshawar. Ann Pak Inst Med Sci 2010; 6(4):210-213.
9. Van Brakel, Sihombing B, Djarir H *et al*. Disability in people affected by leprosy: the role of impairment, activity, social participation, stigma, discrimination. Glob Health Action 2012, vol.5.

10. Girdhar M, Arora SK, Lal M, *et al*. Pattern of disabilities in Gorakhpur (UP). Indian J Lepr 1989 Oct; 61(4)503-513.
11. Htoon MT and Win Z. Disabilities among rural leprosy patients in Myanmar. Int J Lepr Other Mycobact Dis 1994, 62(1); 567-9.
12. Schreuder PA. The occurrence of reactions and impairments in leprosy: experience in the leprosy control program of three provinces in northeastern Thailand, 1987-1995. Neural and other impairments. Int J Lepr Other Mycobact Dis 1998; 66:170-81.
13. Sow SO, Tiendrebeogo A, Lienhardt C, *et al*. Leprosy as a cause of physical disability in rural and urban areas of Mali. Sante. 1998 Jul-Aug: 8(4):297-302.
14. Solomon S, Kurian N, Ramads P. Incidence of nerve damage in leprosy patients treated with MDT. Int J Lepr 1998; 66(4):451-6.
15. Srinivasan H. The problem and challenge of disability and rehabilitation in leprosy. Asia Pacific Disability Rehabilitation Journal 1998; 9(1).
16. Sarkar J, Dasgupta A, Dutt D. Disability among new leprosy patients, an issue of concern: Indian J Dermatol Venereol Leprol 2012(78):3; 328- 334.
17. Kumar R, Singhasivanon P, Sherchand JB *et al*. Gender difference in socio-epidemiological factors for leprosy in the most hyper-endemic district of Nepal. Nepal Med Coll J; 2004 Dec,6(2):98-105.
18. Norman G, Bhushanam JDRS and Samuel P. Trends in Leprosy over fifty years in Gudiyatham Taluk, Vellore, Tamilnadu. Indian J Lepr. 2006; 78: 167-185.
19. Arora M, Katoch K, Natrajan M, *et al*. Changing profile of disability in leprosy patients diagnosed in a tertiary care centre during years 1995- 2000. Indian J Lepr (2008) 80;257-265
20. Bhat RM and Chaitra P. Profile of New Leprosy Cases Attending a South Indian Referral Hospital in 2011-2012. ISRN Tropical Medicine 2013, 4 pages.
21. Thappa DM, Kaur S, Sharma VK. Disability index of hands and feet in patients attending an urban leprosy clinic. Indian J Lepr 1990 Jul- Sep; 62 (3):328-337.
22. Tiwari VD, Mehta RP. Deformities in leprosy patients of Indian Armed Forces treated/reviewed at Military Hospital Agra (a retrospective study). Lepr India 1981, Jul; 53(3):369-78.
23. Kaur P and Singh G. Deformities in leprosy patients attending urban leprosy clinic at Varanasi. Indian J Lepr, 1985 Jan-Mar; 57(1):178-182.
24. Hasan S. A survey of leprosy deformities among the patients of Hyderabad city.Lepr India 1977, Jul (49):3; 393-399.
25. Saha SP and Das KK. Disability pattern amongst leprosy cases in an urban area (Calcutta). Indian J Lepr 1993 Jul-Sep 65(3) 305-314.
26. Singhi MK, Ghiya BC, Gupta D, *et al*. Disability rates in leprosy. Indian J of Dermatol Venereol Leprol 2004; 70(5):314-316.
27. Ramos JM, Reyes F, Lemma D, *et al*. Disability profile in leprosy patients' diagnoses in a rural reference leprosy centre in Ethopia during 1999-2009. Trop Doct (2011) Jan; 41(1)51-53.
28. Nagabhushanam P. Gross deformities in leprosy- a group survey. Indian J dermatol venereol leprol 1967; 33(2):70-72.
29. Iyere BB. Leprosy deformities: experience in Molai Leprosy Hospital, Maiduguri, Nigeria. Lepr Rev 1990 Jun; 61(2):171-9.
30. Schipper A, Lubbers WJ, Hogeweg M, *et al*. Disabilities of hands, feet and eyes in newly diagnosed leprosy patients in eastern Nepal. Lepr Rev.1994 Sep; 65(3):239-247.
31. Kumar A, Girdhar A, Girdhar BK. Nerve thickening in leprosy patients and risk of paralytic deformities: A field based study in Agra,India. Lepr Rev (2004)75,135-142.
32. Brunel W, Schecter WP, Schecter G. Hand deformity and sensory loss due to Hansen's disease in American Samoa. J Han Surg Am. 1988 Mar; 13(2):279-83.
33. Moschioni C, Antunes C, Grossi M, *et al*. Risk factors for physical disability at diagnosis of 19,283 new cases of leprosy. Rev Soc Bras Med Trop vol.43 no.1 Uberaba Jan/Feb, 2010.

Source of Support: None Declared
Conflict of Interest: None Declared