Research Article

A study of factors associated with disabilities of hands and feet among leprosy patients

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Abstract

Introduction: Leprosy (Hansen's disease, hanseniasis) is a chronic infectious disease caused by Mycobacterium leprae, affecting the peripheral nervous system, the skin, mucous membranes and occasionally other tissues. 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 various factors associated disabilities of hands and feet among leprosy patients reported in a tertiary care center. **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. Among the newly diagnosed patients, 57.97% were disabled whereas among the on treatment patients 64% were disabled. Mean age was 40.22±13.15 years. The male to female ratio for disability was 4.2:1. Maximum number of disabled patients was seen among manual labourers (farmers and labourers) and housewives. Disability was more common among illiterates (73.33%) as compared to literate patients (45%). It was observed that as the duration of disease increases and registration was delayed, the proportion of disabled was increased. Disability rate was increased with increasing number of nerves involved. 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. **Conclusion:** Thus from the above results we conclude that increasing age, male sex, manual labourers and illiterates were common demographic factors associated with disabilities of hands and feet among leprosy patients. It was also seen that delay in registration, increase in duration of disease and increasing number of nerves involved were common reason for disability. Disability is common in lepromatous leprosy and borderline lepromatous leprosy.

Keywords: Leprosy, occupation, literacy, delay in registration.

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INTRODUCTION

Leprosy (Hansen's disease, hanseniasis) is a chronic infectious disease caused by Mycobacterium leprae, affecting the peripheral nervous system, the skin, mucous membranes and occasionally other tissues[1]. Clinical manifestations of disease depends on the immune status of the patient which in turn is influenced by genetic factors.[2] Leprosy is one of the crippling diseases, if not treated early and properly it may end up with many disabilities and deformities**.** There are two types of deformities encountered in leprosy patients, primary deformities which are due to direct involvement of tissues and peripheral nerves with mycobacterium

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leprae causing sensory loss or motor paralysis while secondary deformities occur as a result of damage to the anaesthetic parts of the body by trauma or friction[3]. In leprosy patients, disabilities involving hands, feet, eyes, face are seen[4]. Deformities of hands include ulcers, cracks, scars, blisters, claw hand, wrist drop, dactylitis, contractures of fingers, resorption of fingers, stiff joints[5]. Defomities of feet include ulcers, cracks, scars, blisters, foot drop, claw toes, resorption of toes, contracture of tendo achilles, equinovarus deformity. Various factors which affect the onset and progression of disabilities include age, sex, duration of disease, type of disease, reactional states, occupation, attitude of patient towards disease, educational status of patient, treatment status and availability of medical care[6].

AIMS AND OBJECTIVES

To study the various factors associated disabilities of hands and feet among leprosy patients reported in a tertiary care center.

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.[7] 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: Distribution of patients according to treatment type

	No. of disabled	No. of non disabled	Total
New patient	40 (57.97%)	29 (42.03%)	69
On treatment	48 (64.00%)	27 (36.00%)	75
Treated (RFT)*	5 (83.33%)	1 (16.67%)	6
Total	**93 (62%)**	**57 (38%)**	**150**

It was observed that out of total 150 patients, 93 (62%) were diagnosed to be with disability. Among the newly diagnosed patients, 57.97% were disabled whereas among the on treatment patients 64% were disabled.

Table 2: Distribution according to age and sex

Variable		No. of disabled	Total
Age in Years	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 (80.00%)	25
	≥ 60	9 (90.00%)	10
Sex	Male	75 (66.96%)	112
	Female	18 (47.37%)	38

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 3: Distribution of disabled patients according to occupation and literacy

Variable		No. of disabled	Total
Occupation	Farmer	33 (82.5%)	40
	Labourer	33 (60%)	55

	Housewife	11 (61.11%)	18
	Govt. job	12 (57.14%)	21
	Student	2 (18.18%)	11
	Shopkeeper	1 (25%)	4
	Begger	1 (100%)	1
Literacy status	Literate	27 (45%)	60
	Illiterate	66 (73.33%)	90
Total		**93 (62)**	**150**

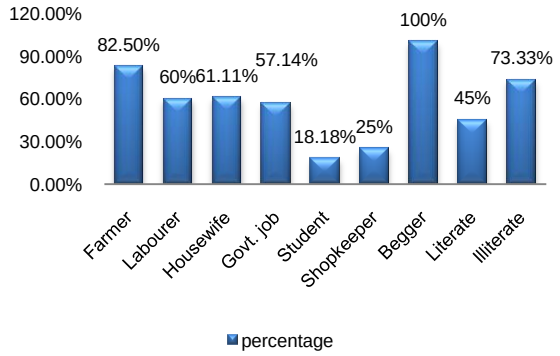

Figure 1: Distribution of disabled patients according to occupation and literacy

It was observed that the maximum number of disabled patients was seen among manual labourers (farmers and labourers) and housewives. There was one begger patient who was also disabled. It was seen that disability was more common among illiterates (73.33%) as compared to literate patients (45%). The difference observed was also statistically s significant. (χ^2=12.27; p=0.0004).

Table 4: Distribution according to delay in registration, duration of disease and nerves involvement

Variable		No. of disabled (%)	No. of patients
Delay in registration	<6 mths	29 (48.33)	60
	6 mths-1yr	30 (63.83)	47
	>1 yr	34 (79.07)	43
duration of disease	<1 yr	23 (40.35%)	57
	1-5 yr	57 (74.03%)	77
	>5 yr	13 (81.25%)	16
Nerves involved	0-2	14(24.14)	58
	3-6	35(76.09)	46
	>6	44(95.65)	46

The majority of disabled patients i.e. 79.07% were seen among patients with registration delay of more than one year followed by 63.83% and 48.33% of patients with registration delay of 6 months to 1 year and less than 6 months respectively. So, number of disabled patients increased with increase in delay in registration. And the difference observed in registration delay was also statistically significant (χ^2=10.14; p=0.006) It was observed that as the duration of disease increases the proportion of disabled was increased. The association of disability with increase in duration of disease was found to be statistically significant (χ^2=18.58; p=0.0001). 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)

Table 5: 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**

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.

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* (2011) who reported disability in 62.64% of patients. In contradictory to our findings Selvaraj *et al*[8] and Saha and Das[9] observed less disability rate (39% and 22% respectively). Whereas Noor SM *et al*[10] and Van Brakel *et al*[11] observed higher rate of disability (83.33% and 75% respectively). Among the newly diagnosed patients, 57.97% were disabled whereas among the on treatment patients 64% were disabled. The findings were consistent with Thappa DM *et al*[12] who observed higher disability in new patients and those who had irregular treatment to those taking treatment regularly. Early case detection and treatment reduces the incidence of physical impairment at diagnosis and in addition, it is hoped that through intense control efforts, the overall incidence of leprosy will be reduced by reducing the reservoir of infection. The mean age of patients in the present study was 36.30 ± 13.84 years and patients with disability was 40.22 ± 13.15 years. Thappa DM *et al*[12] also observed

that the mean age of patients with disability was 39 years (range 14-71 years). The present study thus showed that all age groups suffer from leprosy. Also all age groups can develop disabilities except very young patients. The maximum number of patients were disabled in age group ≥60 years i.e., 90% followed by age group 50-59 years with 80% patients being disabled, least in age group 10-19 year with 31.25% disabled patients and none in 0-9 years age group. Thus, in the present study an increasing trend of disability was observed with increasing age with statistically significant difference. These findings were consistent with the findings of Girdhar M *et al*[13], Htoon MT *et al*[14], Schreuder PA *et al*[15], Sow SO *et al*[16], Solomon S *et al*[17], Srivasan H *et al*[18], Sarkar J *et al*[19] who also observed increase in disability with increasing age. Disability increases with age due to chronic nature of disease, occupation of patients and associated illiteracy, ignorance, malnutrition and poor self care among the aged. Leprosy and disabilities due to leprosy can affect both sexes but male predominance was observed in the present study with statistically significant difference. Kumar R *et al*[20], Norman *et al*[21], Arora M *et al*[22], Bhat RM *et al*[23] also observed that incidence of leprosy was more in males. This could be related to less opportunity in women to contract disease as they are predominantly homebound. Also there is difference in health seeking behaviour between males and females as females are slow to self report[24]. It was observe that occupation significantly affects disability. In the present study, the maximum number of disabled patients was seen among farmers, labourers and housewives. These observations were consistent with Thappa DM *et al*[12], Patel P *et al*[25], Saha SP *et al*[26], Sow SO *et al*[16] and Sarkar J *et al*[19]. Disabilities are more commonly found among manual workers, since they are more frequently exposed to injuries. Also they are not willing to approach health facilities on working days and tend to ignore their disabilities. It may be true for housewives as minor scratches and injuries are often neglected and are not taken care of wives leading to disabilities[25]. It was observed that disability was more common among illiterates (73.33%) than literate (45%). This difference was also statistically significant (χ^2=12.27; p=0.0004). Similar findings were also reported by Thappa DM *et al*[12], Jain PK *et al*[27], Sarkar J *et al*[19]. The difference was more likely to be due to the fact that literate people are more aware about the signs and symptoms of disease and the treatment required for it.[27] It was observed that the majority of disabled patients i.e. 79.07% were seen among patients with registration delay of more than one year followed by 63.83% and 48.33% of patients with registration delay of 6 months to 1 year and less than 6 months respectively. So, number of disabled patients increased with increase in delay in registration. And the difference observed in registration delay was also statistically significant (χ^2=10.14; p=0.006). Similar findings were also reported by Richardus JH *et al*[24], Schreuder PA *et al*[15], Nicholls PG *et al*[28], Sarkar J *et al*[19]. Registration delay is the time patient notices the first symptom to the time of diagnosis of disease and start of treatment. It is the result of complex interactions between physical, social, economic and psychological factors[19]. It indicates poor information, education and communication activities and /or poor accessibility of MDT services[25]. Disability increases with increase in duration of disease. It was observed that as the duration of disease increases the proportion of disabled was increased. The association of disability with increase in duration of disease was found to be statistically significant (χ^2=18.58; p=0.0001). These findings were consistent with Sehgal VN *et al*[29], Girdhar M *et al*[13], Thappa DM *et al*[12], Saha SP *et al*[26], Kalla G *et al*[30] and Singhi MK *et al*[4]. Leprosy is a chronic disease slowly affecting the nerves. Hence, with increase in duration of disease more and more nerves are likely to get involved leading to disabilities. Disability was seen in 95.65% (n=44) of patients with more than 6 nerve involved 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. This finding was statistically significant (χ^2=61.28; p=0.0005).and was consistent with Kumar A *et al*[31], Moschioni C *et al*[32] who also observed that deformities increase with increasing number of nerves involved. 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*[33] who reported that polyneuritic, LL, BL patients were more prone to develop deformities. Kaur S *et al*[34] reported maximum number of disabled among LL, BL patients. Reddy BN *et al*[35] observed majority of disabled in LL and neuritic leprosy. Hasan S,[36] Saha SP *et al*[26] and Singhi MK *et al*[4] observed maximum disability in LL patients. In our study, all the neuritic leprosy and histoid leprosy patients suffered from disability. It could be due to the fact that in histoid leprosy, there is high bacillary load and the lesions are asymptomatic. Reactions are also rare and so patient presents late to the health facilities and thus, develops disabilities. There is more delay in diagnosis of neuritic leprosy due to lack of skin lesions. The patients usually ignore or misinterpret the symptoms and present rather late, after significant nerve damage has already occurred. In our study, 96%

disabled patients had multibacillary leprosy. This is consistent with Thappa DM *et al*[12], Zhang G *et al*[37], Sow SO *et al*[16], Patel P *et al*[25], Sarkar J *et al*[19] who reported more disability in multibacillary patients. Multibacillary patients are more likely to have greater number of nerves involved. Also they are at risk of reactions and consequent nerve damage which may succumb to disability[22].

CONCLUSION

Thus from the above results we conclude that increasing age, male sex, manual labourers and illiterates were common demographic factors associated with disabilities of hands and feet among leprosy patients. It was also seen that delay in registration, increase in duration of disease and increasing number of nerves involved were common reason for disability. Disability is common in lepromatous leprosy and borderline lepromatous leprosy.

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