

# Relationship of Skin Ulcers and Physical Deformity with Employment Status and Compliance with Health Promotion in Leprosy

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## Abstract

**Objective:** To determine if recurrence of ulcers and physical deformity in leprosy is associated with employment status and compliance with health promotion advice.

**Methods:** Between April-August 1992, a cohort of 55 consecutive leprosy patients admitted with skin ulcers were studied for ulcer recurrence, physical deformity (taking into account neuromuscular and skeletal damage), employment status, compliance with health promotion advice and knowledge of the disease.

**Results:** High grade physical deformity was present in 34/55 (62%) patients while recurrent ulceration occurred in 40/55 (75%) patients. With regard to employment status, the odds of high grade physical deformity were significantly higher for street traders and unemployed compared to semiskilled and skilled workers (odds ratio 4.2, 95% confidence interval 1.01 -19.8,  $p = 0.03$ ). There was a trend of higher odds of recurrence of ulcers for street traders and unemployed compared to semiskilled and skilled workers (odds ratio 2.3, 95% confidence interval 0.5-9.4,  $p = 0.2$ ). With regard to health promotion, there was poor compliance with advice about protective footwear and care of insensitive extremities. Level of knowledge about the disease and its prevention was also inadequate.

**Conclusion:** Physical deformity was associated with lack of reasonable employment among leprosy patients. There was poor compliance with preventative advice. Health promotion strategies should be directed toward targeted health education and prevention of physical deformities (UPMA 50:338, 2000).

## Introduction

Since the introduction of multi-drug therapy in leprosy control, the prevalence of leprosy patients has declined steadily. However there is still a high percentage of patients with sensory and motor neuropathies who are at risk of progressive physical deformity and recurrent ulceration<sup>1,2</sup>. Primary deformity is due to the activity of the disease, however, secondary deformity is due to damage which the patient inadvertently self-inflicts as a consequence of anesthesia or paralysis<sup>1</sup>. The WHO<sup>3</sup> emphasized that prevention of physical deformity and ulcers is important and that patients with a sensory loss of their feet should follow a schedule of precautions including daily examination of feet regarding injuries and blisters, protective footwear, reduction of walking especially once there are signs of an injury or an infection. Therefore, health education to prevent recurrent ulceration of anesthetic skin and physical deformity of the limbs should be a priority.

We often forget that a lot of patients do not accept their disease and refuse to wear orthopedic shoes<sup>4</sup> or to take regular care of their insensitive hand and feet. Moreover, employment can prevent the patients from protecting their skin from injuries and ulceration. Sadly, once affected by secondary deformity or recurrent ulceration, the patient is at risk of unemployment. This study was conducted to determine if recurrence of ulcers and physical deformity in leprosy was associated with employment status and compliance with health promotion advice.

## Patients and Methods

During the period April to August 1992, a cohort of 55 consecutive patients with skin ulcers requiring hospitalization were evaluated at the Marie-Adelaide Leprosy Centre, Karachi, Pakistan. All patients

had received regular health education by trained teachers in the past and each patient had been given advice about adequate footwear<sup>5,6</sup> and had been offered special orthopedic shoes. The suggested methods of prevention included daily inspection of anesthetic hand and feet regarding skin injuries, regular baths and care with Vaseline afterwards to restore loss of seborrhic function. On admission, a detailed assessment including disease duration, ulcer location and recurrence and grading of general physical deformity was conducted. The occupation of the patient, appropriateness of footwear and their knowledge of the disease and methods for prevention of ulcers were, recorded. Physical deformity was classified as high grade if deformity included moderate bony absorption, nerve palsies with subsequent contractures and functional loss of hand and feet<sup>2</sup>. Nerve palsies without contractures, minor bony absorption without functional loss of hand and feet were classified as low grade physical deformity<sup>2</sup>. Employment history was classified as unemployed, street traders, semiskilled factory workers, skilled workers and housewives. The effect of high grade deformity on employment status was studied by comparing street traders and unemployed to semiskilled and skilled workers. This comparison was chosen because street traders had taken this occupation as a result of unemployment. Housewives were excluded from this analysis. The association of recurrence of ulceration with employment was evaluated according to the above groups using recurrence over a period of more than five years for analysis. Information on compliance with advice about use of protective footwear was analyzed according to grade of physical deformity. Rate of daily inspection and care of insensitive extremities among patients with recurrent ulcers was estimated. Patients with recurrent plantar ulcers for more than five years had a detailed interview about causes and prevention of ulcers. Epi-info Software<sup>7</sup> was used for statistical analysis. Proportions were assessed for differences using Chi-square test (with Yate's correction when expected cell value  $< 5$ ). A two tail p-value of  $< 0.05$  was regarded as significant.

## **Results**

**Table I. Characteristics of leprosy patients with skin ulcers.**

Characteristics	Number of Patients*	
	n/mean	%/S.D.
Patient's Age (years)	49.3	17.4
Duration of illness (years)	14.2	10.5
Patient's sex		
Male	40	73
Female	15	27
Recurrence of ulcers	40	73
More than 5 years	21	38
Less than 5 years	19	35
Time of recurrence (years)	5.6	6.0
Recurrence of ulcers grade of physical deformity		
High grade	34	62
Low grade	21	38
Profession		
Semiskilled factory workers	14	25
Skilled workers	6	11
Street traders	7	13
Unemployed	15	27
Housewives	13	24

\* Data collected from 55 patients hospitalised for leprosy ulcers. Data presented as number and percent or mean and standard deviation.

Table I shows the general characteristics of the patients studied. There were 40 male and 15 female patients. The mean age was 49.3 years and mean duration of disease 14.2 years. Forty patients had recurrent ulcers and the mean time of recurrence was 5.6 years (range 6 months to 24 years). Of these, 21 patients showed recurrence of ulceration over more than five years. Out of 55 patients, 34 had a high grade physical deformity. Employment history revealed that 15 patients were unemployed, 7 were street traders, 14 were semiskilled factory workers, 6 were skilled workers and 13 were housewives.

**Table 2. Recurrence of skin ulcers and physical deformity in leprosy patients according to employment status.**

Employment status (N)	High grade physical deformity <sup>+</sup>		Recurrence*	
	n	%	n	%
Semiskilled factory workers (14)	6	43	4	29
Skilled workers (6)	3	50	3	50
Street traders (7)	4	57	5	71
Unemployed (15)	13	87	7	47
Housewives (13)	9	85	2	15

As shown in Table 2, high grade deformity was found in 13/15 unemployed patients, 4/7 street traders, 6/14 factory workers and 3/6 skilled workers. The odds of high grade physical deformity were significantly higher for street traders and unemployed compared to semiskilled and skilled workers (odds ratio 4.2, 95% confidence interval 1.01-19.8,  $p = 0.03$ ). Recurrent ulcers over more than five years occurred in 7/15 unemployed patients, 5/7 street traders, 4/14 factory workers and 3/6 skilled workers. There was a trend of higher odds of recurrence of ulcers for street traders and unemployed compared to semiskilled and skilled workers (odds ratio 2.3, 95% confidence interval 0.5-9.4,  $p = 0.2$ ). Among housewives high grade deformity occurred in 9/13 and recurrent ulceration of the skin was only seen in 2/13.

Compliance with advice that use of protective footwear showed that only 3/21 (14%) patients with low grade deformity used such protection compared to 20/34 (59%) in the high grade deformity group ( $P < 0.001$ ). Only 22/40 (55%) patients with recurrent ulcers used daily inspection and care of their insensitive extremities. The remainder inspected their insensitive hands and feet occasionally or never. There were 2 I patients with recurrent plantar ulcers for more than live years and we questioned them in depth about cause and prevention. Of these, 18 completed the interview and their responses are summarised in Table 3.

**Table 3. Patients' knowledge about leprosy ulcers.**

Questions	Responses	Number of patients*	
		n	%
<b>What is the cause of an ulceration?</b>			
	Anaesthesia	12	67
	Disease itself	3	17
	Dysfunction of blood	1	6
	No idea	2	11
<b>How can ulcers be prevented?</b>			
	Prevention of heat	4	22
	Not walking barefoot	9	50
	Bedrest	6	33
	Daily inspection	11	61
	Daily care	5	28
	Scar massage	1	6
	Walking slowly	4	22
	No idea	1	6
<b>What are the first signs of an ulcer?</b>			
	Blister or redness	8	44
	Fever	1	6
	No idea	9	50
<b>How can a modification of gait avoid ulcers?</b>			
	Walking with small steps	7	39
	Walking slowly	7	39
	Walking on the healthy part of the foot	6	33
	No idea	4	22

\* Responses collected from 18 patients with recurrent plantar ulceration over 5 years.

Of 18 respondents, 12 were aware of a sensory loss which lead to ulceration and 8 knew the first signs of ulceration like blisters or redness. Regarding prevention of ulcers, 11/18 indicated daily inspection, however, they ignored daily care such as removal of pressure points, scar massage etc.

#### **Discussion**

Our results showed that high grade physical deformity and recurrent ulceration was common among hospitalized leprosy patients. With regard to employment status, the high grade of physical deformity was associated with unemployment. There was also a trend of higher unemployment among those with recurrent ulcers. With regard to health promotion, there was poor compliance with advice about protective footwear and care of insensitive extremities. Level of knowledge about the disease and its prevention was also inadequate.

Similar to our findings, other authors have described a high deformity rate among leprosy patients who are illiterate or unskilled<sup>8-10</sup>. On the one hand, hard manual work leads to serious deformity<sup>10</sup>. On the other, it has also been shown that deformity leads to a significant loss of production of leprosy patients<sup>11</sup>. In addition to the issue of deformity, it has been described in a questionnaire of leprosy patients and the public that 2/3 of the interviewed indicated that leprosy patients should be excluded from the majority of occupations<sup>12</sup>.

With regard to use of footwear, in our study, it was evident that patients only realised the necessity of protective shoes, when a deformity was already present. Many patients who feel stigmatised by their disease and especially by their deformity want to be accepted by society like other people. They want to walk as fast as possible and they refuse shoes, which show that they are handicapped<sup>4</sup>. It has been shown that many patients refuse microcell rubber-shoes because of the stigma they carry<sup>13</sup>. However it is important that patients use protective shoes in order to prevent the first ulcer<sup>14</sup>. One field project looked at outcome of prevention of plantar ulcers by supply of appropriate shoes and health education. Satisfying results were only found in patients who did not show ulcers at the beginning of the examination compared to those who already had pre-existing ulcers<sup>15</sup>.

Majority of our examined patients were aware of the insensitivity of their extremities, however, few realised its consequence for their every day life. Only a few patients could remember detailed facts of their disease such as first signs of an ulcer, although each patient had intensive health education at the onset of their disease and also subsequently during follow-up clinics. It has been shown that ulcers remain healed even without special footwear if patients learn to modify their gait with respect to change of pressure points<sup>16</sup>. Majority of our patients had some idea how to modify the gait, however, none of the patients remembered the importance of change of pressure points in prevention of foot ulceration. Regarding other methods of prevention a lot of patients indicated daily inspection of their hand and feet, however only a few remembered to also apply daily care like daily soaking in water, scar massage and removal of scar tissue.

In conclusion we realised that a lot of leprosy patients try to repress their disease and do not acknowledge the importance of prevention of ulcers and adequate footwear until they develop deformities. Price<sup>17</sup> demonstrated that practical advice like demonstration of preventative methods compared to theoretical advice was more remembered by patients. There are limited resources for providing resource intensive treatments to allow full development of people affected with leprosy<sup>18</sup>, therefore it is important to provide more intensive counselling for the patient who fears stigmatisation of society.

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