

A Cross Sectional Study of Deformities in Patients of Leprosy at a Tertiary Care Center of Western India

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Disabilities and deformities are major concerns as these trigger social, economic and psychosocial problems of leprosy patients. This study has been carried out to study the frequency and severity of the leprosy related deformities and disabilities in diagnosed cases of leprosy and to ascertain the correlation between selected socio-demographic factors, lepra reactions and the pattern of deformities. This cross sectional study was conducted at Outpatient Department of Dermatology, Venerology and Leprosy at Smt N.H.L. Municipal Medical College, Ahmedabad, a Tertiary Care Center of Western India for a period of years between February 2010 to February 2015. The confirmed cases with deformities and disabilities included in the study were analyzed according to WHO grading of deformity and disability. In our study out of 239 patients of leprosy 127 (53.14%) patients developed deformities of any type which included 79 (62.20%) males and 48(37.79%) females. The maximum deformities 41(32.28%) were found in the age group 20-29 years. Hands were most commonly affected in 70 (55.11%) patients. According to WHO grading system of leprosy deformities, in our study 49(20.50%) patients were in grade 1 deformity, 78(32.64%) patients were in grade 2 deformity. Deformities were more common with multibacillary leprosy than paucibacillary leprosy ($p<0.05$). Significant association was found ($p<0.05$) between leprosy reactions and deformities of any type. While this high proportion of deformities in a Tertiary Care Centre do not represent community, this situation indicates the need to raise awareness about Prevention of Deformities, ensure early diagnosis (<12 months) and treatment to avert visible deformities and hence social stigma in leprosy patients.

Key words : leprosy, deformities, western India.

Introduction

Leprosy is chronic infectious disease caused by *Mycobacterium leprae* affecting peripheral nerves and skin. Leprosy is the one of the oldest disease entity affecting human being and continues to haunt with the deformities and

disabilities creating the huge social stigma. This disease has struck fear into human beings for thousands of years, and was well recognized in the oldest civilization of China, Egypt and India, Indonesia and Bangladesh (Brycesson and Pfalzhruff 1990). The number of individuals who

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over the millennia have suffered its chronic course of incurable disfigurement and physical disabilities can never be calculated (WHO 1997). In 2013, approximately 58.85% of new leprosy cases in the world were estimated to be in India (Global leprosy update 2014). In some studies from India (Reddy et al 1984, Girdhar et al 1989, Sheshadri et al 2015) and Pakistan (Soomoro et al 2002) the prevalence rates of deformity in leprosy patients have been reported to range from 16 to 56%. Existence of an effective Leprosy Control Programme influences the deformity rates, some reports quote that 4 to 10% of patients suffer from some form of disability (WHO 1995, Kumar et al 2013).

Leprosy produces deformities and disabilities through nerve damage (Hamilton 1998). Patients who are not treated at early stages of the disease develop anaesthesia and/or the deformities of the eyes, hands and feet. Common deformities such as claw hand, foot drop, lagophthalmos and trophic ulcers are preventable to some extent by early diagnosis and proper management. Two types of deformities are encountered in leprosy patients, primary deformities are due to direct involvement of tissues and peripheral nerves with *M. leprae* causing sensory loss or motor paralysis while secondary deformities occur as a result of damage to the anaesthetic parts of the body (WHO 1997). Deformities and disabilities are generally more common in multibacillary leprosy than paucibacillary leprosy. Lepra reactions are one of the common causes leading to deformity.

India has a successful National Leprosy Eradication Programme and the services have been merged with general health services. Such transition may create the problem of late reporting and thereby higher deformity rates in self reporting cases (Sheshadri et al 2015). The main aim of this study is to determine the frequency and grade of the leprosy related

deformities and disabilities in diagnosed cases of leprosy in self reporting cases in a Tertiary Care Centre at Ahmedabad. In addition, relationship between selected socio-demographic factors, lepra reactions and the pattern of deformities has been analyzed.

Patients and Methods

This retrospective cross sectional study was conducted at Outpatient Department of Dermatology, Venerology and Leprosy of Smt. SCL Hospital at NHL Medical College, Ahmedabad between the periods of February 2010 to February 2015, for 5 years. During this period, a total 239 patients of leprosy were diagnosed and classified as per multibacillary and paucibacillary types. Paucibacillary leprosy: Presence of 1-5 skin lesions with asymmetrical distribution and skin anaesthesia. Multibacillary leprosy: Presence of more than 6 lesions with more symmetrical distribution with skin anaesthesia or skin smear positive leprosy (NLEP 2009). Out of 239 leprosy patients, deformities were found in 127(53.14%) patients. The confirmed cases with deformities and disabilities included in the study were analyzed according to WHO grading of deformity and disability (WHO 1988).

WHO grading of disability and deformity index hands and feet and eyes

Hands and Feet

- Grade 0- No anaesthesia, no visible deformity or damage
- Grade 1- Anaesthesia present, but no visible deformity or damage
- Grade 2- visible deformity or damage present (claw hand, Ulcer, Foot drop, Wrist drop, Resorption of fingers and Stiff joints)

Eyes

- Grade 0- No eye problems due to leprosy, no evidence of visual loss

Grade 1- Eye problems due to leprosy present, but vision not severely affected as a result (vision 6/60 or better, can count fingers at 6 meters)

Grade 2- Severe vision impairment (vision worse than 6/60, inability to count fingers at 6 meters, also includes lagophthalmos, iridocyclitis, corneal opacities)

Statistical analysis was performed with the help of Microsoft Excel. Chi-square test was used to analyze the data.

Results

Of the 239 patients of leprosy included in this study, 127(53.14%) patients developed deformities of either hands, feet or eyes. Out of 127 patients 79(62.20%) were male and 48(37.79%) were female (Table 1). The maximum deformities 41(32.28%) were found in the age group 20-29 years followed by 26(20.47%) in age group 30-39

years (Table 2). Regarding the body parts hands were most commonly affected in 70(55.11%) patients, feet in 57(44.88%), eyes in 24(18.89%) (Table 3). Deformities were more common with multibacillary leprosy than paucibacillary leprosy ($p < 0.05$). Out of 127 patients having deformities 78(61.42%) were of multibacillary leprosy, and 49(38.58%) patients were having paucibacillary leprosy (Table 4). Significant association was found ($p < 0.05$) between leprosy reactions and deformities of any type. Out of 100 patients of leprosy reactions 65 patients had developed deformities. There were 68 patients of type 1 lepra reaction, 38 patients developed deformities. There were 32 patients of type 2 lepra reaction, amongst them 27 patients developed deformities (Table 5). According to WHO grading system of leprosy deformities, in our study 49(20.50%) patients were in grade 1 deformity, 78 (32.64%) patients were in grade 2 deformity (Table 6).

Table 1 : Sex wise distribution of deformities

Sex	No. of patients	Deformity
Male	146	79(62.20%)
Female	93	48(37.79%)
Total	239	127

Table 2 : Age group wise distribution of deformity

Age	No. of patients	Deformity
<20	41	10(7.88%)
20-29	77	41(32.28%)
30-39	47	26(20.47%)
40-49	31	20(15.75%)
50-59	24	17(13.38%)
60-69	11	8(6.30%)
>70	8	5(3.40%)
Total	239	127(53.14%)

Table 3 : Site wise distribution of deformity

Site	Deformity		Percentages
Hand	Anaesthesia	46	70(55.11%)
	Claw hand	20	
	Ulcers	12	
	Other	3	
Foot	Anaesthesia	50	57(44.88%)
	Foot drop	4	
	Ulcers	27	
	Other	4	
Eyes	Madarosis	14	24(18.89%)
	Redness	9	
	Blurring of vision	8	
	Other	1	

Table 4 : Distribution of deformities in PB and MB types

Type of leprosy	With deformity	Without deformity	Total
Multibacillary (MB)	78	66	144
Paucibacillary (PB)	49	46	95
Total	127	112	239

Chi value: 3.95, p value :< 0.05

Table 5 : Reactions versus deformities

Reaction	No. of patients	Deformity
Type 1	68	38
Type 2	32	27
Total	100	65

Chi value: 9.71, p value :< 0.05

Table 6 : Grades of deformities in PB and MB leprosy types

Grade	Multibacillary	Paucibacillary	Total
0	66	46	112(46.86%)
1	26	23	49(20.50%)
2	52	26	78(32.64%)

Discussion

Deformities are the most striking manifestation of leprosy. Deformities seen in leprosy-affected persons range from a mild degree such as small

areas of anaesthesia on the hands, to a very severe degree such as shortening of fingers and thumbs in both hands, bilateral wrist drop, ulceration and fixed deformities of both feet

rendering them useless for walking and loss of vision in both eyes (Smith and Brakel 1996). Involvement of more than one body part such as hands, feet or eyes may be considered as more severe than involvement of only one body part.

In our study 127(53.14%) patients had developed some kind of deformity. Low level of education, low social status, cultural lag, social stigma leading to a delay in referring to health care centers, lack of early diagnosis, improper treatment were important factors which contributed to the high rate of disability in our study. There have been different reports about prevalence of deformities from different part of world. It is likely that such differences have arisen as a result of improper technique of physical examination or mismatching the kinds of deformities with deformity grading criteria (Ponnighaus et al 1990, Sharma et al 1996). The prevalence of disabilities in some of these studies has been high - 30% (Reddy et al 1984), 82.4% (Smith et al 1980), 67% (Kalla et al 2000), 61% for grade 1 and 2 combined (Sheshadri et al 2015). Some of these studies pertain to pre-MDT/early MDT era (Reddy and Bansal 1984), others reflect delayed diagnosis in a section of cases. After NLEP had achieved good coverage, overall deformity rates had declined (Kumar et al 2013), rates have started increasing after programme was merged with general health services; our figures are similar to those reported by Sheshadri et al (2015) and possibly reflect delayed diagnosis and inadequate management of reactions/neuritis.

In our study deformity was highest in age group 20-29 years of age which was 32.28%. In another study, Kusagur (2013) also reported maximum deformities (33.33%) in the age group of 20-29 years. Although the Grade 2 deformities were common after the age of 40. Deformities are lesser common in children, reason for this is that leprosy in them may be often of self limiting type.

Further, disease is likely to be of short duration in children and so would not have spread widely in the body to produce deformities (Srinivasan and Dharmendra 1978). The increase in the deformity rate with age may probably be due to combined effects of age and duration factors (Kartikayan and Chaturvedi 1992).

The present study showed that male patients had more deformities i.e., 62.20% and 37.79% of female patients suffered with deformities. Lesser exposure to hard work has been implicated as one of the possible factors that may account for lower deformity rate among female patients. The prevalence of disease is not only lower in women, but women also tend to suffer more often from the benign form like the non-lepromatous type. The women also tend to suffer less nerve damage compared to men. The reason for the favoured position of women is not known (Srinivasan and Dharmendra 1978). Similar finding was also reported by Kusagur (2013), deformities were more common in males compared to females.

Disability rate was more in Multibacillary leprosy patients than in Paucibacillary leprosy. ($p < 0.05$). In our study from the patients having deformities, 69(52.75%) were of multibacillary leprosy and 58(45.67%) were of paucibacillary leprosy. Similar findings of having more deformity rate in multibacillary/lepromatous leprosy patients were reported by others (Girdhar et al 1989, Seshadri et al 2015). The nerve damage occurs fairly early in paucibacillary form of the disease. In multibacillary leprosy, multiple nerve trunks are involved but damage occurs quite late. Due to widespread nerve involvement, deformities are observed in larger proportion in multibacillary leprosy.

Association of lepra reaction with deformity was found to be significant in our study ($p < 0.05$). Reactions in the leprosy constitute the complications of the disease which can lead to serious

consequences, nerve damage that leads to deformity. Effective and early management of leprosy and complications can bring down the occurrence of disabilities to a great extent (WHO 1995, Kumar et al 2013).

Regarding the sites hands were most commonly affected in our study in 70(55.11%), followed by feet in 57(44.88%), followed by eyes in 24(18.89%). For hands and feet in our study most common problem was ulcer (30.70%). Chavan (2011) also reported ulcers to be a common problem. Yet another survey, revealed deformity index of 39.5% and the commonest deformity observed was claw hand (Lyere 1990).

The proportion of patients with grade 2 deformities among new cases is an indicator for the quality of case detection and care of leprosy (Joshi 2010). Disabilities are preventable by early diagnosis and proper treatment. Multi drug therapy (MDT) has reduced the number of people disabled by leprosy (Rao et al 1994). Therefore proper planning for case detection and periodic examinations in newly diagnosed patients who are at the risk of developing disabilities should be regarded necessary. A more careful investigation to assess the disability status of leprosy patients requires the patients to be followed for a long period from the time of diagnosis to several years after completing the treatment course. Thus awareness about Prevention of Deformities, early diagnosis (<12 months) and treatment are recommended to avert visible deformities and hence reduce social stigma in leprosy patients.

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