



## Assessment of Disability amongst Leprosy Patients: A Cross-Sectional Study

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## ABSTRACT

**Introduction:** Leprosy is one the public health problem in India leading to physical disabilities. In some studies the prevalence rates of disability in leprosy patients were between 16% to 56%.

**Objectives:** To study the socio-demographic profile of patients of leprosy and to study the factors associated with disabilities in leprosy patients.

**Material and methods:** This cross sectional study was carried out amongst 46 leprosy patients. Socio-demographic factors, clinical profile and WHO disability grading for disability assessment was assessed by house to house survey method.

**Results:** Of the 46 leprosy patients, 17 (37%) were from age group of 31 to 45 years, 30 (65.2%) were males, 21 (45.7%) belonged to Hindu, 36(78.3%) were married. 23 (50%) were from nuclear families, 17 (37%) patients educated up to primary school, 20 (43.5%) were unskilled workers, 24(52.2%) were from middle class. Clinical profile of the patients showed that 36 (78.3%) were suffering from multibacillary leprosy, 42 (91.3%) patients had no lepra reaction and 24 (52.2%) patients had at least one nerve involved. The 60.86% leprosy patients had disability (grade 1 and 2). The disability among leprosy patients was significantly associated with nerve involvement and not significantly related with sex, religion, type of family, education, socio-economic status, marital status, occupation, type of leprosy, lepra reaction.

**Conclusion:** More than half of the registered leprosy patients had disability in Nanded city.

**Key words:** Leprosy, Disability, WHO disability grading, Nanded

## INTRODUCTION

Leprosy, the oldest disease known to man, caused by *Mycobacterium leprae* is a chronic, infectious and contagious disease. It primarily affects the skin and peripheral nerves and causes significant motor and sensorial impairment. Leprosy is considered a public health problem due to its severe clinical manifestations, potential to cause physical disabilities and its socioeconomic impact.<sup>1-4</sup> The clinical signs and symptoms which may come up with a few months or many years after infection; varies from simple dermatological lesion to peripheral nervous, ocular, bone damages and even damage

of vital organs.<sup>5</sup> These clinical manifestations depends upon immune status of the patient.<sup>6</sup> Even though the lethality of leprosy is not high, the occurrence of disabilities deriving from it determines considerable physical consequences as well as psychological, social and economic aspects.<sup>5</sup> It also restrict day to day activities and social participation.<sup>7</sup>

These disabilities are linked with stigma also leading to impact on public health programme in developing country like India.<sup>8,9</sup> They may conceal the disease or deny the condition, resulting delay in seeking treatment, increasing the chances of further progression to deformities.<sup>7</sup> The second report

of the World Health Organization (WHO) expert committee on leprosy estimated that the risk of impairment occurring in leprosy patients was 25%.<sup>10</sup> In some studies the prevalence rates of disability in leprosy patients were between 16% to 56%.<sup>11-13</sup>

Physical disabilities may affect individuals before, during and after treatment. Patients continue to develop disabilities resulting from leprosy reactions which may occur up to eight years after finishing treatment.<sup>14</sup> Some of the common disabilities are claw hand, wrist drop, contracture and resorption of fingers and toes, ulcers, foot drop and these are preventable by early diagnosis and treatment.<sup>11, 15</sup>

The WHO developed the enhanced global strategy for further reducing the disease burden due to leprosy: 2011-2015, which aims to reduce the prevalence of grade 2 physical disabilities by 35%, thereby reducing the prevalence rate to 1.19 cases/100,000 inhabitants.<sup>3</sup> A low proportion grade 2 disability is an indicator of a successful control programme, but does not provide much information on actual health burden, both at the individual and population levels. For this we have to assess for grade 1 disability also for disability limitation and mitigation.<sup>7</sup> Very few studies on disabilities in leprosy were conducted in India. Considering all this the present study was conducted by using following objectives-to study the socio-demographic profile of patients of leprosy and to study the factors associated with disabilities in leprosy patients.

**MATERIAL AND METHODS**

This was a cross-sectional study carried out in Nanded city, Maharashtra from October to November 2015. There were 50 patients enrolled during October 2014 to September 2015 in District leprosy center, Nanded for treatment. All the 50 patients were enrolled in the study. But we could approach only 46 patients as 4 patients were migrated from Nanded City and could not be traced. The predesigned questionnaire was used for data collection which included socio-demographic features like age, sex, religion, marital status, type of family, educational status, occupation, socio-economic status by BG Prasad classification<sup>16</sup>, leprosy related questions viz. type of leprosy, lepra reaction, nerve involvement and WHO disability grading for disability assessment.<sup>17</sup> The leprosy technicians of Nanded city were designated as investigators for data collection by house to house survey. They were trained for collection of data at Urban Health Training Center, Shivaji Nagar, Nanded. The verbal informed consent was obtained from each participant before interviewing. The ap-

proval by Institutional Ethics Committee was obtained before beginning of the study. The data was analyzed for the frequency and chi-square test by statistical software, EpiInfo™ 7 Version (Atlanta, Georgia, USA)<sup>18</sup>.

**RESULTS**

Out of 46 patients, 17 (37%) were from age group of 31 to 45 years followed by 12 i.e. 26.1% from 16 to 30 years age group. Thirty (65.2%) were males and maximum were Hindus i.e. 21 (45.7%). Most of the patients i.e. 36(78.3%) were married. Twenty three (50%) belonged to nuclear and 22(47.8%) belonged to joint families.

**Table 1:- Socio-demographic Profile of Leprosy patients**

Socio-demographic factors	Cases (n = 46) (%)
<b>Age distribution (age in years)</b>	
1 to 15	3 (6.5)
16 to 30	12 (26.1)
31 to 45	17 (37)
46 to 60	9 (19.6)
61 onwards	5 (10.9)
<b>Sex</b>	
Male	30 (65.2)
Female	16 (34.8)
<b>Religion</b>	
<b>Hindu</b>	<b>21 (45.7)</b>
Muslim	13 (28.3)
Buddhist	10 (21.7)
Sikh	2 (4.3)
<b>Marital status</b>	
Married	36 (78.3)
Unmarried	7 (15.2)
Divorced	1 (2.2)
Widow/widower	2 (4.3)
<b>Type of family</b>	
Nuclear	23 (50)
Joint	22 (47.8)
Three generation	1 (2.2)
<b>Educational status</b>	
Illiterate	16 (34.8)
Primary	17 (37)
Middle	4 (8.7)
High school	6 (13)
Intermediate	3 (6.5)
<b>Occupation</b>	
Skilled worker	5 (10.9)
Semiskilled worker	3 (6.5)
Unskilled worker	20 (43.5)
Semi-professional	1 (2.2)
Unemployed	17 (37)
<b>Socioeconomic status*</b>	
Class I	2 (4.3)
Class II	6 (13)
Class III	24 (52.2)
Class IV	8 (17.4)
Class V	6 (13)

\*BG Prasad’s classification

There were 17 (37%) patients who were educated up to primary followed by 34.8% i.e. 16 illiterate. Most of the patients were unskilled workers followed by unemployed i.e. 20 (43.5%) and 17 (37%) respectively. Only two patients were from socio-economic class I while maximum, 24 (52.2%) were from middle class (Class III) (Table 1).

Clinical profile of the patients showed that 78.3% (36) were suffering from multibacillary leprosy and 42 (91.3%) patients had no lepra reaction. There were 18 (39.1%) patients with '0' grade of disability followed by 15 (32.6%) and 13 (28.3%) from grade '2' and grade '1' respectively. Out of total 46 patients, 24 (52.2%) had at least one nerve involved while 22 (47.8%) had none (Table 2).

Out of 30 males, 9 (30%) had '0' grade of disability while out of 16 females, 56.25% had '0' grade of disability. In spite a larger difference in the percentages, chi square revealed no significant association between sex and grade of disability (P = 0.08).

**Table 2:- Clinical Profile of Leprosy patients**

Clinical Profile	Cases (n = 46) (%)
<b>Type of Leprosy</b>	
Multibacillary	36 (78.3)
Paucibacillary	10 (21.7)
<b>Lepra reaction</b>	
Present	4 (8.7)
Absent	42 (91.3)
<b>Disability Grading</b>	
0	18 (39.1)
1	13 (28.3)
2	15 (32.6)
<b>Number of Nerves involved</b>	
0	22 (47.8)
1	16 (34.8)
2	4 (8.7)
3	2 (4.3)
4	1 (2.2)
5	1 (2.2)

**Table 3:- Association of Socio-demographic variables and Grade of disability**

Variables	Disability		Total(%)	P value
	Zero (%)	1 or 2(%)		
<b>Sex</b>				
Male	09(30)	21(70)	30(65.21)	0.08
Female	09(56.25)	07(43.75)	16(34.78)	
<b>Religion</b>				
Hindu	07(33.33)	14(66.66)	21(45.65)	0.46
Others	11(44)	14(56)	25(54.34)	
<b>Type of family</b>				
Nuclear	07(30.43)	16(69.56)	23(50)	0.22
Joint	11(47.82)	12(52.17)	23(50)	
<b>Education</b>				
Illiterate	05(31.25)	11(68.75)	16(34.78)	0.42
Literate	13(43.33)	17(56.66)	30(65.21)	
<b>Marital status</b>				
Married	13(36.11)	23(63.88)	36(78.26)	0.42
Single	05(50)	05(50)	10(21.79)	
<b>Occupation</b>				
Unemployed	07(41.17)	10(58.82)	17(36.95)	0.82
Employed	11(37.93)	18(62.06)	29(63.04)	
<b>Socioeconomic status</b>				
Upper & Middle (I, II & III)	10(31.25)	22(68.75)	32(69.56)	0.1
Lower (IV & V)	08(57.14)	06(42.85)	14(30.43)	

**Table 4: Association of some clinical findings and Grade of disability**

Variables	Disability		Total (%)	P value
	Zero (%)	1 or 2 (%)		
<b>Type of Leprosy</b>				
Multibacillary	13(36.11)	23(63.88)	36 (78.26)	0.43
Paucibacillary	05(50)	05(50)	10 (21.73)	
<b>Lepra reaction</b>				
Present	02(50)	02(50)	04 (8.69)	0.64 *
Absent	16(38.09)	26(61.90)	42 (91.30)	
<b>Number of nerves involved</b>				
No Nerve involved	16(72.72)	06(27.27)	22 (47.82)	0.001
At least one nerve involved	02(8.33)	22(91.66)	24 (52.17)	

\*Fisher's Exact test

Similarly there was no association between other socio-demographic variables like religion, type of family, education, marital status, occupation and grade of disability ( $P > 0.05$ ). Out of 32 from upper and middle socioeconomic status 22 (68.75%) had grade '1' or '2' disability while 6 (42.85%) out of 14 from lower socioeconomic status had the same grade of disability. Chi square did not reveal any association ( $X^2 = 2.74, P = 0.1$ ) (Table 3).

Out of 36 (78.26%) patients of multibacillary and 10 (21.73%) paucibacillary leprosy patients 23 (63.88%) and 5 (50%) had grade '1' or '2' disability respectively. But there was no statistically significant association between type of leprosy and grading of disability ( $P = 0.43$ ). Presence or absence lepra reaction also did not show any significant association ( $P = 0.64$  by Fisher's Exact test). Six (27.27%) out of 22 (47.82%) patients without involvement of any nerve and 22 (91.67%) of 24 patients where at least one nerve was involved had grade '1' or '2' disability. Chi square showed significant association between involvement of nerve and disability ( $X^2 = 19.98, P < 0.001$ ) (Table 4).

## DISCUSSION

We included the comparable studies for discussion which had used WHO disability grading system and cross-sectional study design. In our study, 60.86% leprosy patients had disability (grade 1 and 2). Khapreeta<sup>7</sup> observed that 44% leprosy patients had disability. Nardietal<sup>14</sup> in Brazil reported 32% patients had disability. Sarkaretal<sup>19</sup>, showed 20.1% leprosy patients had disability. Ranjanetal<sup>20</sup> observed 62% patients with deformity of hand and feet. Rad etal<sup>21</sup> in Iran reported 78.33% patients had disabilities of extremities and 60.55% patients had ocular impairment and also mentioned about 84.4% patients had developed some kind of disability. Noor<sup>22</sup> et al in Pakistan detected 86.11% patients with disability. The difference in percentages of disability might be due to difference in treatment modalities, health seeking behavior, education, socio-economic status of patients and many pitfalls in the health system to deal with issue of disability among leprosy patients.

In the present study, 70% males were affected by disability as compared to 43.75% females. Similar to present study, Rad et al<sup>21</sup> reported no significant relationship between sex and disability among leprosy patients. Similar to our findings, many studies<sup>14,20,22</sup> observed that frequency of disabilities was more in the males than females. Contrary to our findings, Khapreeta<sup>7</sup> reported hand and feet disabilities in 49.9% of females compared to 40.6% males. In our study, illiterates were more affected with disability than literates. Nardietal<sup>14</sup> also re-

ported no significant relation between education and disability among leprosy patients. But Ranjanetal<sup>20</sup> showed significant relationship between educational status and disability. Health education about leprosy, information about availability of free treatment facility, monitoring of long duration course of Multi-drug treatment for leprosy is the main benchmark in reducing disability among leprosy patients.

In our study, married were more affected with disability than unmarried showing no significant relationship. Nardi et al<sup>14</sup> reported that there was no difference in percentages of disability in leprosy patients those who were with partner (31.5%) and without partner (33%).

In present study, there was not much difference in percentages of disability among unemployed and employed leprosy patients and there was no significant association between occupation and disability among leprosy patients. This might be due to very few cases detected in community during the study period as leprosy was eliminated from India at National level in 2005<sup>23</sup> which might not be a representative sample. Sarkaretal<sup>19</sup> and Ranjan et al<sup>20</sup> showed that the maximum number of disabled patients were with manual occupation.

Present study showed that the multibacillary leprosy patients were more affected with disability than paucibacillary leprosy with no significant relationship. Similar findings were observed by many studies<sup>14,19,21,22</sup>. It might be due to frequent nerve involvement in multibacillary patients than paucibacillary.<sup>19</sup> There was significant relationship between number of nerves involved and disability among leprosy patients. Disabilities in leprosy are mainly due to damage to peripheral nerves. Nerve damage can occur as part of lepra reaction with signs of acute inflammation. It can also occur during the course of the disease without any obvious signs and symptoms of inflammation.<sup>24</sup>

## CONCLUSION

The 60.86% leprosy patients were affected with disability. The disability among leprosy patients was significantly associated with nerve involvement and not significantly related with sex, religion, type of family, education, socio-economic status, marital status, occupation, type of leprosy, lepra reaction.

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