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A cross-sectional study on burden of disability among leprosy patients in a tertiary care center of West Bengal, India

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ABSTRACT

Background: Leprosy, an infectious disease caused by *Mycobacterium leprae*, mainly affects skin, peripheral nerves, mucosa of the upper respiratory tract, and eyes. New goal of the WHO is to decrease the rate of disabilities in new cases among 10 lakhs population 35% with compare to base line 2010. Burden of disabilities continues to rise in society and they are in need of prevention and/or rehabilitation services. Prevention of disability consists of early detection and treatment of reactions and nerve damage. **Aims and Objectives:** The objectives of the study were to find out the proportion of disability among leprosy cases and the factors associated with disability. **Materials and Methods:** This observational, cross-sectional, and descriptive study was conducted at Dermatology, Venerology, and Leprosy Department of a tertiary hospital from May 2015 to January 2016. Data were collected from all the study population by interviewing the study subjects and clinical examination of patients with pre-designed and pre-tested schedule and disability assessment form available from National leprosy eradication program (NLEP). Skin examination was done as per NLEP guideline and palpation of all the nerve and function of the nerve by voluntary muscle testing (VMT) done as stated national guideline. Data were analyzed using R Studio. **Results:** Among the study population, 87.9% of patients had disability and 61.7% of patients had Grade 2 disability. EHF score of most of the patients (59.8%) was ranged between 4 and 6. Among participants 33.6% had foot ulcer, 28% had ulnar claw hand, and 15.6% had lagophthalmos. Proportions of the upper limb digit loss, median claw hand, wrist drop, foot drop, and lower limb digit loss were 5.6%, 13.1%, 3.7%, 9.3%, and 12.1%, respectively. **Conclusion:** The present study reflected that a large number of cases with leprosy have presented with complication and disability. There was significant association of disability with multibacillary cases, number of nerve thickening, and number of functionally impaired nerve as assessed by VMT, lepra reaction, presence of nodular skin lesion and patch in skin and delayed initiation of treatment since the onset of symptoms.

Key words: Leprosy; Disability; Voluntary muscle testing; Stigma

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INTRODUCTION

Leprosy is an infectious disease caused by *Mycobacterium leprae*. Incubation period is 5 years but symptoms may occur within 1 year. It can also take as long as 20 years or even more to occur. Leprosy mainly affects the skin, the peripheral nerves, mucosa of the upper respiratory tract, and the eyes. The bacillus is likely transmitted through droplets, from the nose and mouth, during close and frequent contact with untreated cases. Leprosy is curable with multidrug therapy (MDT). It can cause progressive and permanent damage to the skin, nerves, limbs, and eyes if early treatment is not initiated. There were 127,558 new leprosy cases registered globally in 2020. Among

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them, 8629 were children below 14 years and the new case detection rate among child population was recorded at 4.4/million child population. Global prevalence corresponds to 16.7/million population at end of 2020. Among the new cases, 7198 new cases were detected with Grade-2 disabilities (G2D) and the G2D rate was recorded at 0.9/million population.[1]

Elimination of leprosy as a public health problem at the global level was achieved in the year 2000. The strategy "Final push to eliminate leprosy as a public health problem (2000–2005)" aimed at eliminating leprosy as a public health problem at the country level. The "Global strategy for further reducing the leprosy burden and sustaining leprosy control activities" (Plan period: 2006–2010) and the "Enhanced global strategy for further reducing the disease burden due to leprosy" (Plan period: 2011–2015) – retained emphasis on reducing the disease burden. The Global Leprosy Strategy 2016–2020 aims at early detection of leprosy disease and prompt treatment to prevent disability and reduce transmission of infection in the community. The proportion of G2D cases among newly diagnosed patients and the G2D rate in a population indicate the efficiency of early detection of leprosy.[2] The strategy is designed to achieve a long-term goal of a "leprosy-free world," which refers to a situation where in the community is free of morbidity, disabilities, and social consequences due to leprosy.

The prevalence of leprosy varies greatly from country to country, but most cases occur in the developing world particularly in Southeast Asia. A total of 127,588 new cases of leprosy were reported to the WHO in 2020 from 139 countries; the vast majority occurring in South and South-east Asia, South America, and Africa. The countries that reported the newest cases were: India, Brazil, Indonesia, Democratic Republic of Congo, Ethiopia, and Nigeria. Among the communicable disease in the world, leprosy remains a leading cause of peripheral neuropathy and disability despite efficient measures taken to reduce disease burden.[3] India contributes significantly to the global caseload. About 202,189 new cases were registered in 2020 worldwide of whom 114,451 (57%) were in India.[4] Among these 2791 new cases showed Grade 2 disability.[4] India achieved elimination level in 2005 [prevalence <1/10,000][5] at national level, however, at sub national level some area still have high prevalence of leprosy. Nerve involvement may lead to progressive impairment and disability in leprosy. As disability prevention is the main challenge, new goal of WHO is to decrease the rate of disabilities in new cases among 10 lakhs population 35% with compare to base line 2010.[5] New indicator of WHO is to decrease visible deformity less than 1 per 10,000,00 population by the year of 2020.[5] There are so many sociodemographic and environmental and behavioral factor associated with disability. Moreover, the most important aspect of prevention of disability (POD) is to early diagnoses and early initiation of MDT.[6]

Disability is not merely physical dysfunction, and includes activity limitations, stigma, discrimination, and social participation restrictions. Disability and Health (ICF), disability is defined as "an umbrella term for impairments, activity limitations, and participation restrictions. It denotes the negative aspects of the interaction between an individual (with a health condition) and the individual's contextual factors (environmental and personal factors)".[7]

The burden of disabilities continues to rise in society and they are in need of prevention and/or rehabilitation services. Besides, early detection and treatment of leprosy itself, POD consists of early detection and treatment of reactions and nerve damage.[8] Hence, it is necessary to find out the factor associated with disabilities among leprosy cases. There are very limited numbers of study regarding the issue from West Bengal, India. With this background, the study was undertaken to assess the extent of disability and its determinants among persons with leprosy-related disabilities. Objectives of the study were to find out the proportion of disability among leprosy cases and the factors associated with disability.

Aims and objectives

To find out the proportion of disability among leprosy cases and the factors associated with disability.

MATERIALS AND METHODS

This observational, cross-sectional, and descriptive study was conducted at Dermatology, Venerology and Leprosy department of Burdwan Medical College Hospital. Study populations were all patients that were newly registered at Dermatology, Venerology, and Leprosy department of Burdwan Medical College from May 2015 to January 2016. Seriously ill and unwilling participants were excluded from the study.

Data were collected from all the study population during data collection period (9 months). Complete enumeration procedure was followed for collection of data. Total number of newly registered all dermatological cases were 26,957 and number of newly registered leprosy patients were 124. Seventeen patients were excluded from the study applying the exclusion criteria; hence, study populations was 107.

The study was conducted after getting permission from the Institutional Ethics Committee of Burdwan Medical

College and Hospital and permission from the West Bengal University of Health Sciences. Informed consents were obtained from the study subjects for examinations and interview. Confidentiality during data collection was ensured.

The leprosy clinic of Burdwan Medical College and Hospital operates once in a week (Tuesday). Data were collected by the investigator from the clinic interviewing the patients followed by clinical examination with a pre-designed pre-tested schedule and disability assessment[9] and reviewing relevant records. Data were collected by interviewing the study subjects and clinical examination of patients with pre-designed and pre-tested schedule and disability assessment form[9] available from National leprosy eradication program (NLEP). Schedule was made by reviewing NLEP guideline[5,9] and various published article. Pre-testing of the schedule was done on 15 patients of leprosy clinic before starting of the study. Skin examination was done as per NLEP guideline,[5,10] and palpation of all the nerve,[11] and function of the nerve by voluntary muscle testing (VMT) done as stated national guideline. Lateral popliteal, posterior tibial, ulnar, median, radial, and facial were assessed. Sensory testing also had been done with a light ball pen with plastic body without cap.

Data were coded and entered into Microsoft-Excel spread sheet. Statistical analysis was done by statistical software R Studio version 0.99.878. Descriptive statistics were used. Categorical data were presented in percentages in text, tables, and diagrams. Continuous data were presented as their mean. Chi-square test was used for test of significance and association with disability. $P<0.05$ was taken as significant.

RESULTS

Most of leprosy patients (33.6%) belonged to 35–44 years. Minimum age of study subjects was 16 year and maximum was 78 years. Mean age is 42.94 (SD 15.2). It was noticed that majority of them 67.3% were male, Hindu (66.4%) by religion and resided in rural (70.1%) area. About 48.6% of leprosy patients were just literate. About 57% of leprosy patients were manual worker (People working as farmers, day-laborers, rickshaw-pullers, carpenters, etc.). About 41.1% of leprosy patients belonged to lower class and 81.3% were married (Table 1).

About 77.6% of leprosy patients were referred from primary or block primary health center. Among the study population 97.2% of leprosy patients were multi bacillary (MB) category, 67.3% were Bacille Calmette-Guérin (BCG) vaccinated. About 52.34% of leprosy patients did not have

Table 1: Distribution of leprosy patients by demographic and clinical status

Characteristics	Cases (%)
Age (years)	
15–24	7 (6.5)
25–34	23 (21.5)
35–44	36 (33.6)
45–54	20 (18.7)
55–64	11 (10.3)
>64	10 (9.3)
Sex	
Male	72 (67.3)
Female	35 (32.7)
Socioeconomic status (modified B.G. Prasad Scale September 2015)	
Upper class	1 (0.9)
Upper middle class	17 (15.9)
Middle class	8 (7.5)
Lower middle class	37 (34.6)
Lower class	44 (41.1)
Classification of case (WHO)	
Multibacillary	104 (97.2)
Paucibacillary	3 (2.8)
Types of case NLEP	
New case	74 (69.2)
Relapse case	21 (19.6)
Defaulter	1 (0.9)
Release from treatment	11 (10.3)
Number of patches	
Nil	56 (52.34)
1–5	15 (14.02)
≥6	36 (33.64)
Nodule	
Yes	18 (16.8)
No	89 (83.2)
Foot ulcer	
Yes	36 (33.6)
No	71 (66.4)
Nerve thickening	
Yes	104 (97.2)
No	3 (2.8)
Nerve tenderness	
Yes	37 (34.6)
No	70 (65.4)
Lepra reaction	
Yes	45 (42.1)
No	62 (57.9)
Skin sensation on palm and sole	
Present	94 (87.9)
Absent	13 (12.1)
Number of nerve impaired	
0	36 (33.6)
1–5	23 (21.5)
≥6	48 (44.9)
Delay in in initiation of treatment months from diagnosis	
≤6	34 (31.9)
7–12	18 (16.9)
13–24	19 (17.6)
25–36	4 (3.7)
>36	32 (29.9)
WHO grade of disability	
Grade 0	13 (12.1)
Grade 1	28 (26.2)
Grade 2	66 (61.7)

NLEP: National leprosy eradication program

any patch, only 16.8% of leprosy patients had nodules, 33.6% of leprosy patients had foot ulcer, 97.2% of patients had thickened nerve, 34.6% of patients had tender nerve, 42.1% of patients had reaction, 87.9% of patients had loss of skin sensation. VMT reveals that 44.9% of patients had more than five nerve functionally impaired. About 29.9% of patients had started to consume MDT after 36 months of onset of symptoms. Stigma (57%) and lack of time to attend health-care facility (66.3%) and lack of awareness of availability of treatment (53.2%) important cause of delaying initiation of MDT (Table 1).

Proportion of disability was higher among MB cases, relapse cases, those had thickened nerve and Lepra reaction and delayed initiation of treatment and association was significant (Table 2).

Among the study population, 87.9% of patients had disability and 61.7% of patients had Grade 2 disability. EHF score of most of the patients (59.8%) was ranged between 4 and 6. About 33.6% of patients had foot ulcer, 28% of patients had ulnar claw hand, and 15.9% of patients had lagophthalmos. Proportions of the upper limb digit loss, median claw hand, wrist drop, foot drop, and lower limb digit loss were 5.6%, 13.1%, 3.7%, 9.3%, and 12.1%, respectively (Figure 1).

DISCUSSION

In the present study, majority of leprosy patients (33.6%) belonged to 35–44 year and ranging from 16 to 78 years. Mean age was 42.9 years (SD 15.2). In a field based study done at Agra revealed that most of study subjects (40.4%) belonged to 35–54 year age group and mean age was 43.4 years.[6] Various literature also showed that the prevalence of leprosy was more in male and it predominantly from rural area[6,12] An institutional study conducted at Bankura also showed that disease was more in male and proportion of disability was significantly more

Table 2: Association of disability with different variables

Characteristic	Number of Grade 0 disability, n (%)	Number of Grade 1 disability, n (%)	Number of Grade 2 disability, n (%)	Chi-square test (χ^2)	Comments
Residence					
Rural	3 (4)	19 (25.3)	53 (70.7)	χ^2=17.057, df=2, *P*=0.000	Significant
Urban	10 (31.3)	9 (28.1)	13 (40.6)		
Directly attending tertiary care centre	5 (20.8)	12 (50)	7 (29.2)	χ^2=13.939, df=2, *P*=0.001	Significant
Referred to tertiary care centre	8 (9.6)	16 (19.3)	59 (71.1)		
BCG vaccination					
Yes	10 (13.9)	23 (31.9)	39 (54.2)	χ^2=5.370, df=2, *P*=0.068	Insignificant
No	3 (8.6)	5 (14.3)	27 (77.1)		
MB cases	10 (9.6)	28 (26.9)	66 (63.5)	χ^2=22.318, df=1, *P*=0.001	Significant
PB cases	3 (100)	0	0	(Fisher's exact test)	
New case	12 (16.2)	20 (27)	42 (56.8)	χ^2=8.466, df=2, *P*=0.015	Significant
Relapse case	0	2 (9.5)	19 (90.5)		
Patch present	4 (7.1)	7 (12.5)	45 (80.4)	χ^2=17.455, df=2, *P*=0.000	Significant
Patch absent	9 (17.6)	21 (41.2)	21 (41.2)		
Nodule present	5 (27.8)	6 (33.3)	7 (38.9)	χ^2=6.598, df=2, *P*=0.037	Significant
Nodule absent	8 (9)	22 (24.7)	59 (66.3)		
Number of thickened nerve					
1–2	12 (22.6)	20 (37.7)	21 (39.6)	χ^2=28.238, df=2, *P*=0.000	Significant
≥3	0	6 (11.8)	45 (88.2)		
Number of nerve impaired motor function by VMT					
0	13 (36.1)	45 (41.7)	8 (22.2)	χ^2=47.031, df=4, *P*=0.000	Significant
1–5	0	7 (30.4)	16 (69.6)		
≥6	0	6 (12.5)	42 (87.5)		
Lepra reaction					
Yes	6 (15.8)	15 (39.5)	17 (44.7)	χ^2=7.372, df=2, *P*=0.025	Significant
No	7 (10.1)	13 (18.8)	49 (71)		
Delay in initiation of treatment in month					
≤6	5 (14.7)	11 (32.4)	18 (52.9)	χ^2=27.105, df=8, *P*=0.001	significant
7–12	2 (11.1)	2 (1.1)	14 (77.78)		
13–24	3 (15.8)	8 (42.1)	8 (42.1)		
25–36	3 (75)	0	1 (25)		
>36	0	7 (21.9)	25 (78.1)		

BCG: Bacille Calmette-Guérin, MB: Multi bacillary, PB: Paucibacillary, VMT: Voluntary muscle testing

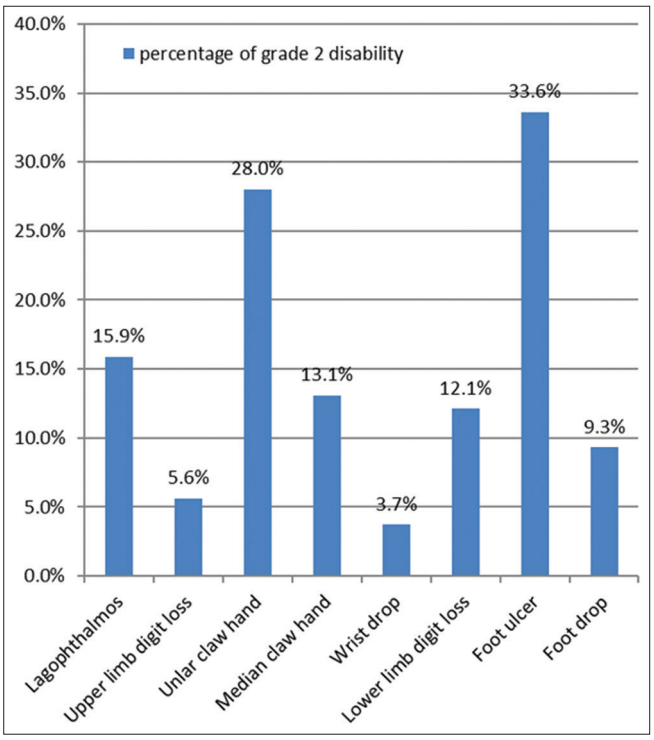

Figure 1: Clinical presentation of Grade 2 disability cases (n=66)

in male.[13] A cross-sectional study conducted at Iran also showed that most (65.3%) of study subjects were male.[14] The ILEP Nerve Function Impairment and Reactions also showed most of study subjects were male (71.8%).[15] Most of study subjects were just literate (48.6%) and only 25.2% were educated up to primary level. In clinic based study at Christian Medical College, Vellore revealed that 93.2% of study population were literate of which 32.9% were graduates.[16]

Among the study subjects, 57% were manual worker (i.e., farmers, day-laborers, rickshaw-pullers, carpenters, etc.). In a study done at Bankura Sammilani Medical College and Hospital showed that only 28.7% study subjects were manual worker.[13] Most of the study subjects (41.1%) belonged to the lower class according to modified B.G. Prasad's scale, September 2015. A study published in American Journal of Dermatology also showed that leprosy were more prevalent in low socioeconomic group.[17]

Most of study subjects were diagnosed as MB (97.2%) and 69.2% were new case. A cross-sectional study conducted at Iran also showed that most (67%) of study subjects were affected by MB.[14] Nerve damage is the main cause of disability. In leprosy sensory, motor and autonomic components of nerves are involved. Impairment of sensory component of nerve leads to loss of skin sensation. Involvement of motor component of nerve leads to loss of power of muscle. In leprosy, autonomic components of nerve also may be involved leading to loss of sweating of skin. Loss of sensation predisposes extremities more prone to trauma and development of ulcer. Autonomic nerve involvement makes the skin dry and as a result there is delayed healing of ulcer. Involvement of facial nerve leads to lagophthalmos resulting exposure keratitis and corneal ulcer. Motor nerve damage causes foot drop, ulnar, and median claw hand as a result of impairment of common peroneal, ulnar, and median nerve. Reaction also causes nerve damage.[5]

The present study also revealed that overall 87.9% of patients had disability and 12.1% of patients were free from disability. When data were analyzed by distributions of different grades of disability, it revealed that 61.7% of patients and 26.2% of patients had Grade 2 disability and Grade 1 disability, respectively, among all leprosy cases. A similar study done at Out Patient Department of Bankura Sammilani Medical College between August 2006 and Jun 2007 also showed that 11.5% had Grade-1 and 8.6% had Grade 2 disability.[13] A study was done in the year 2011 at Agra showed that prevalence of Grade 2 disability was 10.1%.[6] A cross-sectional study done at Iran (2006–2007) also showed overall Grade 2 disability 65.3%.[14]

The present study reveals that proportions of foot ulcer, ulnar claw hand, and lagophthalmos were 33.6%, 28% and 15.6%, respectively. Proportions of the upper limb digit loss, median claw hand, wrist drop, foot drop, and lower limb digit loss were 5.6%, 13.1%, 3.7%, 9.3%, and 12.1%, respectively. Another study was done at dermatology clinic of Christian Medical College showed that 19.2% of patients had deformity and 10.1% had trophic ulcer.[16] A study done in Northern Nigeria on ocular disability among leprosy cases showed that prevalence of lagophthalmos was 12.6%.[18] Another study showed that 7% of patients had foot ulcer and 1.2% of patients had lagophthalmos.[13] Hence, overall proportion of trophic ulcer and lagophthalmos was more in this study.

The present study also revealed that disability was more in Muslim religion (77.8%) with a significant association (X^2=5.157, df=1, P=0.031). In this study, disability had statistically significant association with residence of study subjects (X^2=17.057, df=2, P=0.000) and disability was more in rural population (70%).This study showed that disability had an association with referral of study subjects to tertiary care center. There was more disability with refer case. This was because complicated cases were referred to tertiary care center.

There was no significant association with BCG vaccination and disability (X^2=5.370, df=2, P=0.068). However, a cross-sectional study done Iran showed that BCG had significant role in preventing leprosy.[14] Various study

had revealed that BCG could prevent the infection.[17,19,20] However, the present study could not find any association with BCG.

This study revealed that disability had an association with multibacillary cases. However, a study done at another tertiary center of West Bengal showed that only 46.7% cases were MB type.[13] Results showed that disability had an association with type of case and disability is more in MB cases (X^2=22.318, df=1, P=0.001). Similar findings also were also seen in various other study.[6,13,20] As there is more nerve involved in MB cases, so there is more chance of impairment of nerve function. Moreover, this impaired function of nerve leads to disability.[21]

The present study also showed an association of disability with relapse case more than new case (X^2=8.466, df=2, P=0.015). This study also showed that disability had an association with presence of patch and nodule in skin. The literature also showed that nodular leprosy had an association with stigma and disability. As stigma caused delay in diagnosis and initiations, there was more chance of disability.

In the present study, association between disability and nerve thickening was observed.It revealed that disability had a statistically significant association with number of thickened nerve (X^2=28.238, df=2, P=0.000). Disability was more if three or more nerve thickened. Similar findings were found in a study conducted at Agra. That study showed that important risk factors for disability were three or more thickened nerve with odds 3.73.[6] Nerve enlargement (>4) was significantly associated with increased risk of events.[15]

In the present study, association between disability with number of functionally impaired nerve was observed (X^2=47.031, df=4, P=0.000). Impairment of motor functions of nerves were assessed by VMT.[5] Around 48 patients had six or more than six impaired nerve and among them 42 patients had Grade 2 disability (87.5%). Another study showed that approximately 20% of study subjects had disability associated with motor NFI.[13]

While associations between disability and lepra reaction was noted, it revealed that it had statistically significant association between disability and lepra reaction (X^2=4.557, df=1, P=0.033). Overall, 42.1% of patient had lepra reaction in this study. Incidence of T1R was 18.8% at hospital level and incidence of T2R was 4.8% at hospital level. A study was carried out at the Leprosy Laboratory in Rio de Janeiro, Brazil between 1997 and 2007 showed that patients with neuritis showed a 65% increased risk of worsening of disability (HR 1.65 [95% CI: 1.08–2.52]). Impairment at diagnosis was the main risk factor for neurological worsening after treatment/MDT. Early diagnosis and prompt treatment of reactional episodes remained the main means of preventing physical disabilities.[22] If patients with affected nerves are not treated promptly with glucocorticoids, irreversible nerve damage may result in as little as 24 h.[23,24] As lepra reaction caused nerve damage and proportion of lepra reaction and neuritis were higher that was the reason of higher proportion of disability.

Disability had significant association (Table 2) with delay of initiation of treatment from onset of signs and symptoms (X^2=27.105, df =8, P=0.001). Another study showed that patients who had registered early, that is, within 6 months, suffered less from any grade of disability (3.8%).[13] However, in this study, 16.9% of patients had Grade 2 disability who were registered with in 6 month and 23.4% patients had Grade 2 disability among patients who were registered after 36 months of onset of disease. A study conducted at Agra also showed that delay in treatment was an important risk factor for disability with odds 2.27.[6]

In this study, disability had an association with stigma (X^2=9.302, df =2, P=0.010). Stigma is an important cause of delayed diagnosis, facilitating transmission of the infection within families and communities and thus stigma has a key role to increase the number of disability.[25] In a systematic review, it was seen that 52% of leprosy patients in India belonged to low SES group and had mixed stigma. At Brazil and Indonesia, 27.1% and 35.5% of patients were experienced stigma, respectively.[26] In this study, 57% of patients were experienced stigma. Stigma was an important factor associated with delay in presentation.[27] Visible deformities and ulcers were associated with higher stigma.[28]

However, there was no significant association with age of patients, sex, marital status, education, occupation, and SES. An institutional study showed that manual laborers such as rickshaw-puller, agricultural laborer, carpenter, and barber had significantly (P<0.001) more disabilities than those who were engaged in other occupations such as businessmen, clerks, and students. Other associated factors for increased proportion of disability among new leprosy patients found in this study were increase in age (P=0.143), male sex (P=0.05), illiteracy (P=0.117), and divorced/separated patients (P=0.40).[13]

A recent systematic review and meta-analysis showed that "Male patients with leprosy were more likely to have physical disability than female patients with leprosy (pooled OR, 1.66; 95% CI, 1.43–1.93; I2, 81.3%; P<0.001). Persons with multibacillary leprosy were 4-fold more likely to have

physical disability than those with paucibacillary leprosy (pooled OR, 4.32; 95% CI, 3.37–5.53; I2, 88.9%, P< 0.001). Patients having leprosy reactions were more likely to have disability (pooled OR, 2.43; 95% CI, 1.35-4.36; I2, 92.1%; P<0.001). Patients with lepromatous leprosy experienced 5- to 12-fold higher odds of disability".[29] Similar observation was noted in this study.

A case-control study in five states of India also showed similar findings. Odds of disability were 9-folds higher in MB cases and more disability were seen among patients, those treatment initiation was delayed.[30]

Limitations of the study

This study was a cross-sectional study. Study had been conducted in a tertiary care centre. For further research community-based follow-up study should be conducted with large sample size.

CONCLUSION

The present study reflected that a large number of cases with leprosy have presented with complication and disability. It indicated that progress in dealing with disabilities of leprosy has not been as successful as the progress in the antibacterial treatment of the disease. The burden of disabilities continues to rise along with large backlog of people with leprosy-related disability who are in need of disability prevention.

There was a significant association of disability with MB cases, number of nerve thickening, and number of functionally impaired nerve as assessed by VMT, lepra reaction, presence of nodular skin lesion and patch in skin, delayed initiation of MDT since onset of symptoms, residence, religion and referral of study subjects, relapse cases, and stigma.

There was no significant association with age of patients, sex, marital status, education, occupation, SES, and BCG vaccination status. The finding indicates that it is important to recognize and identify the health and social need of persons with disabilities for livelihood at family level. The present study finding undertaken at institutional indicate the tip of the overall problem; further study at community level will provide clear picture on the burden and factors of disability.

Continued stigma at community level is an issue of particular concern. Knowledge and awareness-raising involving community are of utmost importance to reduce discrimination and stigma.

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