Original Research Article

An evaluation of risk factors of leprosy and how it affects treatment outcome in a low endemic state of India

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ABSTRACT

Background: Leprosy is a chronic infectious disease caused by Mycobacterium leprae. India achieved elimination at the national level in 2005. But it still had world's leprosy burden in 2015 and currently has a prevalence rate of 0.81 per 10,000. The aim of our study was thus to identify the risk factors associated with the development of leprosy and assess their effect on the treatment outcome of the disease, especially in a low endemic state like Punjab.
Methods: A retrospective study conducted across Punjab by assessing the medical records of 55 leprosy admissions that were diagnosed, treated, and monitored at a tertiary hospital and those living in leprosy homes, from a time period of 2015 to 2018. Data was analysed using SPSS 25 software and presented in the form of figures and percentages.
Results: Maximum number of leprosy patients under study belonged to upper lower socioeconomic class (46.2%) according to The Modified Kuppuswamy Scale. 48.7% of the patients were migrants to the state of Punjab. Overall, 24 patients (61.5%) were successfully treated. 20.5% were relapse cases while 7.7% default and 2.6% failure cases were seen.
Conclusions: This study shows the current status of disease in an otherwise low endemic state. Leprosy is associated with a lower socioeconomic status due to lesser access to health services and lower levels of education. The high rate of disease, lower case reporting and treatment outcomes, as compared to the national averages is a cause for alarm thus more health seeking practices need to be encouraged.

Keywords: Demographic, Early detection, Leprosy, Risk factors, Treatment outcome

INTRODUCTION

Leprosy is a chronic infectious disease caused by Mycobacterium leprae that involves the skin, mucosal membranes and peripheral nerves, often causing disability.[1] Depending on the host's immunological response and the magnitude of the M. leprae infection, patients manifest a broad clinical spectrum ranging from tuberculoid to lepromatous disease. Despite the availability of effective treatment and MDT therapy for leprosy, early diagnosis of the disease remains the most effective way to stop the transmission chain and avoid late diagnosis and its subsequent disabilities. The incubation time of leprosy is usually long with reported maxima of 20 years but is in most cases between 2 and 5 years.[2] The long incubation time makes it difficult to determine when and under what circumstances the disease was contracted, and therefore transmission of leprosy is not well-understood.

The WHO benchmark for elimination of leprosy is a prevalence rate (PR) of less than 1 per 10,000 persons.

India achieved elimination at the national level in 2005. But it still had world's leprosy burden in 2015. It currently has a prevalence rate of 0.81 per 10,000. India followed by Brazil remain the two countries with the largest number of cases.[3] The WHO calls to globally interrupt leprosy transmission and reduce grade-2 disabilities in newly detected cases to below 1 per million population by 2020.[4] Until now, the prevalence decreased mainly due to the introduction and subsequent shortening of multidrug treatment (MDT). However, until the risk factors for the disease such as gender, age, sex, migration status, household contacts, presence of BCG scar and socio-economic status are identified and assessed, treatment outcomes cannot be improved, and new cases will continue to emerge. Challenges to timely diagnosis result in delay in treatment, which leads to severe disability.[5] This study was designed to identify potential risk factors of the index cases and their contacts on development of leprosy and how it affected their treatment outcomes and prevention of disability. Punjab being a low endemic state, lesser number of cases were expected.

The aim of our study was to identify the risk factors associated with the development of leprosy and assess their effect on the treatment outcome of disease.

METHODS

Study design, setting and population

It was a retrospective study conducted across leprosy homes and medical colleges of Punjab, from a time period of 2015 to 2018. All the medical records of 55 leprosy admissions that were diagnosed, treated, and monitored at a tertiary care hospital in Patiala from 2015 to 2018 were assessed and they were interviewed regarding the potential risk factors of their disease. Same was done for the inmates of leprosy homes of Ludhiana, Patiala and Jalandhar. Informed consent was taken before interviewing. For the index cases, the demographic characters that were described included sex, age, educational level and income (socio-economic status), family size, migration and BCG vaccination status.

Exclusion and inclusion criteria

A total of 55 patient records were taken as the sample size. Out of these, those who failed to give consent for the study were excluded. Since leprosy is a highly stigmatized disease, patients and their relative contacts had trouble talking about it. Those who gave consent and fell under the time frame of 3 years of study were included in the study and data analyzed for them.

Data analysis

The epidemiological and demographic characteristics included patient age, gender, ethnicity and origin, time of onset, time of misdiagnosis, disability and socio-economic status in terms of Kuppuswamy scale. This data was entered into a series of spreadsheets in EXCEL software. Data was described and analyzed using SPSS 25 and presented in the form of figures and percentages.

RESULTS

Among the 55 patient's record under study, 39 were included after appropriate exclusion criteria. Majority belonged to the age group between 31-40 years. Mean age of patients was found to be 38.13 years and range came out to be 54 years. The age wise distribution can be seen in (Figure 1).
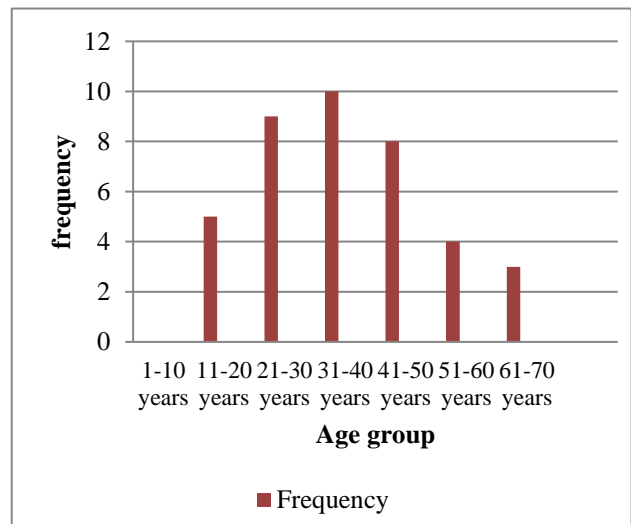

Figure 1: Age wise distribution of the study sample.

Out of the study sample, 69.28 % were male (n= 27) and 30.8% were female (n= 12). Thus, male to female ratio was 69: 31. The gender wise distribution of the study sample is shown in (Figure 2).
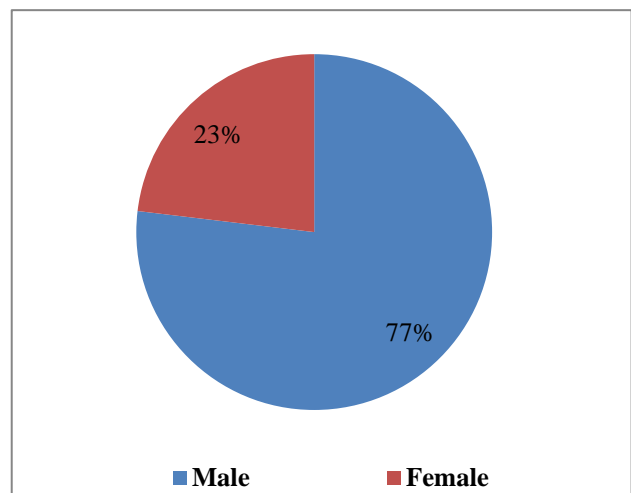

Figure 2: Gender wise distribution.

There were 48.7% of the patients (n=19) were migrants to the state of Punjab. Only 5.1% patients (n=2) gave a

positive history of any household contact. The definition of household contacts included family members of leprosy patients, living under same roof, and partaking in meals from a common kitchen.[6] Only 5.13% patients (n=2) reported disability at the time of diagnosis. Maximum number of leprosy patients under study belonged to upper lower socioeconomic class (46.2%) according to the modified Kuppuswamy scale of January 2017 as shown in (Figure 3).
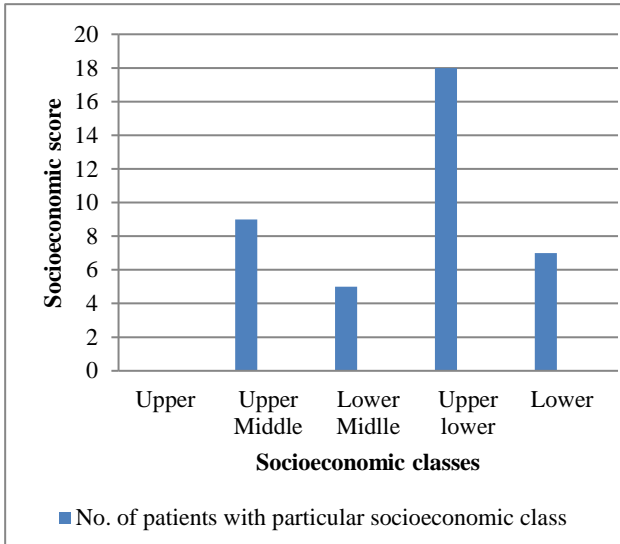

Figure 3: Patients socioeconomic status according to modified Kuppuswamy scale.

Overcrowding was found substantially high in 41% of patients (n=28) (defined in terms of average floor area per person in metre square). 51.3% patients (n= 20) reported presence of BCG scar. Overall 61.5% patients (n=24) were successfully treated [(cured 33.3 %(n=13) + treatment completed 28.2% (n=11)]. 20.5% (n=8) were relapse cases while 7.7% (n=3) default and 2.6% (n=1) failure cases were seen. Treatment outcome wasn't available for 3 patients (Figure 4).
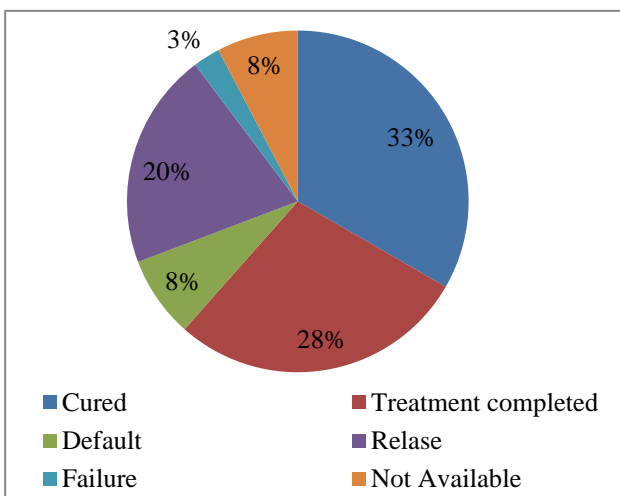

Figure 4: Treatment outcomes of leprosy patients.

DISCUSSION

In spite of the established fact that leprosy is least infectious and completely curable, the social stigma surrounding it persists and remains a major obstacle to early reporting and treatment. Our study shows the current status of disease in an otherwise low endemic state. Early detection and diagnosis for leprosy depends on voluntary reporting which implies awareness of disease and its treatment facilities.

This data with a successful treatment outcome of 61.5% shows that an early active search of cases may be needed. 5.1% patients gave a positive history of any household contact. Where proximity to the index case was concerned, among the various characteristics of the index cases, bacillary load could be the only risk factor associated with developing leprosy. This data is still lower than previous studies.

Majority of the patients belonged to the middle age group (31-40 years), similar to the finding reported by Jindal et al.[6,7]

Male dominance seen in the study sample could be due to an increased exposure and thus increased risk of acquiring the disease by males as opposed to females. These findings are less in agreement with those of other studies that did not observe any gender differences in the likelihood of acquiring leprosy.[7] Although, data showed fewer females susceptible to acquiring leprosy, there may be hidden cases among women in the community. Factors such as their low status in the community, low levels of education and mobility, religious and cultural tradition lead to lower number of cases reported since most women don't have open access to the health services. In the present study, deformities were present in only 5.13% patients. The number of patients presenting with deformity is less, mainly because of early detection of cases. Swarnakumari G et al, 58 (29.9%) patients showed deformities in the form of claw hand, foot drop, trophic ulcers and resorption of digits which suggests delay in diagnosis, treatment and lack of disease awareness in the patients.[8]

In this study, 48.7% of the patients were migrants to the state of Punjab, mostly from high endemic states of Jharkhand and Bihar suggesting they brought the disease here. Internal migration is common in the country and may influence leprosy transmission and hamper control efforts. Also, for migrants, stress renders one more vulnerable to infectious diseases such as leprosy and influences symptom onset for those previously exposed.[9,10] BCG scar was shown to have a protective effect similar to previous studies but its exact role in preventing leprosy could not be determined.

Leprosy is associated with a lower socioeconomic status. Majority of patients in our study belonged to the upper lower class. Population-based studies have also described

an increased risk of leprosy associated with fewer years in school, poor housing and low income.[11] Socioeconomic status includes level of education, income and occupation. Low income is related to lower access to health services. Lower education levels mean that the general information about the disease remains dull, as proved by another study within the same endemic area which showed that 50% of household contacts are still uncertain about the clinical aspects and treatment of leprosy. Also, higher population density due to overcrowding leads to an increased risk of transmission.

That lack of information reaches both patients and physicians as well. Underdiagnosed leprosy is common even into endemic areas as it gets misdiagnosed with other diseases such as psoriasis, pyoderma, angioderma and even vitiligo. It is not uncommon to see patients been clinically diagnosed by leprosy after many years of treatment for mistaken tendinopathy, arthritis, and many other orthopedic or rheumatic diseases.

Limitation of this study was a retrospective data analysis based mostly on departmental records, hence bias in reporting cannot be totally ruled out. More extensive community-based surveys covering the district population could help understand and resolve the issue better. Sample size is small and does not fully reflect the population statistics of leprosy.

CONCLUSION

In conclusion, the experience from our study suggests that though great strides have been made in elimination of leprosy, we still cannot celebrate. The high rate of disease or lower-case reporting and treatment outcomes, as compared to the national averages is a cause for alarm. Health seeking practices related to leprosy treatment, especially among women need to be encouraged and stigma surrounding it be addressed to enable early detection and improved outcomes. Implementation strategies of NLEP need to be strengthened.

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