Original Research Article

Clinico-epidemiological study of Hansen's disease patients attending a tertiary care centre in South India

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ABSTRACT

Background: Leprosy (also known as Hansen's disease) is a chronic disease caused by a slow multiplying bacillus, *Mycobacterium leprae* (*M. leprae*). Incubation period of the disease is about 5 years, but the symptoms can take as long as 20 years to appear. The disease mainly affects the skin, the peripheral nerves, mucosa of the upper respiratory tract, and also the eyes. Leprosy is curable with multidrug therapy (MDT). Although not highly infectious, leprosy is transmitted via droplets, from nose and mouth, during close and frequent contacts with untreated cases. The main objectives were to describe the clinico-epidemiological profile of Hansen's disease patients.

Methods: Hospital based cross-sectional study using convenience sampling method was carried out. A total of 114 patients were enrolled in the study.

Results: Around 25.27% of males presented with ulcer at the time of examination whereas in females, the common mode of presentation was the hypo-pigmented patch (48.47%). Out of the total 114 patients 55% had already developed residual disability at the time of examination. The mean age at onset of illness for males was 34 years and 31.60 years for females. About 25% of the patients gave positive history of contact with Hansen's disease patient and the most common source of contact was another family member with the disease. On clinical examination most common nerve involved was ulnar nerve followed by lateral popliteal nerve.

Conclusions: Study recommends periodic nerve examination of patients with hypopigmented patches to identify any abnormality in nerve and patients also need to be educated on self-care.

Keywords: BCG, Hansen's disease, *Mycobacterium leprae*

INTRODUCTION

Hansen's disease is transmitted mainly from an active case to susceptible individuals through respiratory droplets, the causative agent *Mycobacterium leprae* grows extremely slowly and has not been able to grow successfully on culture media.¹ When *M. leprae* was discovered by Hansen GA in 1873, it was the first bacterium to be identified as causing disease in man.

However, treatment for leprosy only appeared in the late 1940s with the introduction of dapsone, and its derivatives.² Hansen's disease mainly affects skin and peripheral nerves. It also affects the muscles, eyes, bones, testes and internal organs, which leads to permanent and progressive disability.^{3,4}

The results of genome-wide analyses (linkage and association) and candidate gene studies suggest an

independent genetic control over both the susceptibility and development of clinical type of disease.⁵

With the precise transmission mechanism of disease still unknown and a lack of an effective vaccine, Hansen's disease will probably continue to pose an ongoing public health problem in coming decades. Hence a study was conducted with the objective to describe clinico-epidemiological profile of persons affected with Hansen's disease.

METHODS

Study design: A hospital based cross-sectional study.

Study subjects: Study included Hansen's disease patients attending outpatient and inpatient department of Hubballi Hospital for Handicapped (HHH), which acts as a designated centre for Leprosy care. Study subjects consist of patients in the age group of 18 – 60 years, which may include patients with complications like lepra reaction, relapse, default or the one with residual disability. Patients less than 18yrs were excluded because there were very few cases below this age limit.

Study period: The study was conducted for a period of one year from November 2012 to October 2013.

Sample size: A convenient sampling technique was used and 114 cases were studied. As it is a cross sectional study patients were examined at only one point of time and repeat visits were excluded.

Study centre: Hubli Hospital for Handicapped (HHH) which acts as a designated centre for care of leprosy patients diagnosed at SDM hospital and also from other parts of South India.

Study instrument and data collection: After obtaining ethical clearance from the institutes ethical committee and informed consent from patients, necessary clinical history was elicited and thorough clinical examination was done.

Study analysis: Descriptive statistics like mean, percentages and proportions were used. Chi-square test was applied to see association between two attributes.

RESULTS

In our study, most common mode of presentation was the presence of hypopigmented patch alone (in 37.72% of patients followed by ulcer in 26.32% patients).

There were 58.77% multibacillary cases and 41.23% paucibacillary cases with males being commonly involved with multibacillary type of disease (Figure 1).

There were 55.26% patients who had residual disability, 22.81% with active disease. There were 7.89% patients,

who have been identified as defaulters. 26 (22.80%) new cases were detected during our study period, of which 12 (46.15%) had already developed disability by the time of diagnosis (Figure 2).

Figure 1: Hansen's disease patients as per clinical type of the disease.

Figure 2: Hansen's disease patients, as per WHO case definitions (n=114).

Mean age at onset of illness was 31.60 years for female patients and 34 years for male patients. 31.58% patients had illness for more than 10 years and only 11.40% had illness lasting less than a year, which indicates that more number of cases were detected late during the course of illness. In our study only 28 patients had intact nerve sensation, whereas 86 (75.44%) had impaired nerve sensation.

On eliciting the history regarding the possible source of contact, only 24.56% patients gave positive history and the source being another member in the family with active disease (in 57.14% of the contacts).

On peripheral nerve examination, ulnar nerve was found to be enlarged more commonly (in 64.49%) followed by lateral popliteal (in 53.27%) and median nerve (in 30.84%) of the patients (Table 1).

In our study, more than half of the patients (55.26%) did not have BCG scar. And also it was observed that in those patients who had BCG scar, 46.27% were

multibacillary cases. Thus it can be concluded that BCG vaccine is not protective against the type of disease as the difference was not statistically significant (Table 2).

Table 3 shows Hansen's disease patients as per their disability grades (WHO disability grading system), in our study 71% patients had developed WHO Grade 2 disability at the time of examination.

Table 1: Peripheral nerve involvement in leprosy (n=107)*.

Peripheral nerve	Normal		Enlarged		Painless/Cord like		Tender	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Greater auricular	87	81.31	17	15.89	00	00.00	03	02.80
Radial	71	66.36	31	28.97	01	00.93	04	03.74
Median	67	62.62	33	30.84	02	01.87	05	04.67
Ulnar	15	14.02	69	64.49	05	04.67	18	16.82
Lateral popliteal	28	26.17	57	53.27	09	08.41	13	12.15
Post tibial	66	61.68	27	25.23	05	04.67	09	08.41

*multiple nerve involvement.

Table 2: Association between BCG vaccine and type of the disease (n = 114).

BCG scar	Paucibacillary		Multibacillary		Total	
	Number	Percent	Number	Percent	Number	Percent
Present	20	42.55	31	46.27	51	44.74
Absent	27	57.45	36	53.73	63	55.26
Total	47	41.23	67	58.77	114	100.00

$\chi^2=0.1542$, df=1 and p=0.6945.

Table 3: Distribution of Hansen's disease patients as per WHO disability grades (n= 114).

WHO disability grade	Male		Female		Total	
	Number	Percent	Number	Percent	Number	Percent
Grade 0	16	17.58	04	17.39	20	17.54
Grade 1	11	12.09	02	08.70	13	11.41
Grade 2	64	70.33	17	73.91	81	71.05
Total	91	79.82	23	20.18	114	100.00

DISCUSSION

In an analogues study done at Bombay Leprosy Project clinics Mumbai, Maharashtra, 68.3% of patients had on-going skin involvement with patches, nodules, ulcers or infiltration. 23.8% had painful skin lesions, of which 37.5% had neuropathic pain.⁶

WHO classification of Hansen's disease

In a study done at leprosy clinic of national medical college, Kolkata, India 60.2% of patients had multibacillary leprosy and 21.5% of which had developed deformity.⁷ In a study conducted in West Azerbaijan in the West North of Iran, 67% of the male patients were affected by multibacillary leprosy.

Multibacillary cases were more common in men compared to women but there was no difference in paucibacillary cases.⁸

Persons with Hansen's disease as per their age at onset of illness

In a study done in Northern area of Teresina, Brazil, the earliest age at onset of disease was 15 years.⁹ Early age at onset of disease is associated with increased rates of grade 2 disabilities.⁷

Nerve involvement in Hansen's disease

In a similar study done at Bombay Leprosy Project clinics Mumbai, Maharashtra 30.4% of patients had single nerve involvement where as the remaining 69.6% had multiple nerve involvement.⁶

A study done in the department of Clinical Neurology, University of Oxford, UK showed that the likelihood of detecting one or more enlarged nerves can vary from in as few as 20% of patients to as many as 96%.¹⁰

Similar findings were noted in a study done at Bombay Leprosy Project clinics Mumbai, Maharashtra, where

37.5% had neuropathic pain, 45.5% had nerve enlargement and 18.8% had nerve tenderness. The most common nerve involved was ulnar (65.22%) followed by lateral popliteal (43.5%), posterior tibial (39.1%) and greater auricular nerve in 37% of patients.⁶

History of contact with Hansen's disease patient

In a study done in Northern area of Teresina, Brazil 38.3% of patients gave history of contact with leprosy patient.⁹

Association between BCG vaccine and type of the disease

It is proved that BCG vaccine gives protection against Hansen's disease. The overall protective effect of BCG in Hansen's is 26%. An additional dose of BCG is more protective in the prevention of the disease compared to single dose and is specially recommended for contacts of leprosy patients.¹¹

Hansen's disease patients as per WHO disability grades

In a similar study done at Bommasamudram taluk of Chittoor district, Andhra Pradesh, India 66.66% of males and 30% of the females had visible deformities at the time of study.¹²

In a study done in Punjab, 58.65% of Hansen's disease patients had grade 2 deformities.¹³

CONCLUSION

Study recommends periodic nerve examination of patients with hypopigmented patches to identify any abnormality in nerve and patients also need to be educated on self-care.

Recommendations

Study recommends periodic nerve examination to identify enlargement, tenderness, firm cord like feel of the nerves. Physiotherapy exercises should be taught to the patients in order to prevent contractures, clawing of fingers and toes. If wrist drop or foot drop are found on clinical and neurological examinations then patients should be subjected for reconstructive surgeries.

The protective effect of BCG vaccine in leprosy is variable, so children with history of contact with active leprosy patient should receive an additional dose of BCG.

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