

Do Contacts have a Role in the Transmission of Leprosy?

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Abstract

Introduction: Leprosy is an infectious disease with a long incubation period. Age, contacts, relatives are risk factors for leprosy. Though leprosy is declared eliminated in Nepal yet the number of new cases seen at the leprosy clinic is high.

Aim: To see if leprosy does occur in contacts, the type of contacts and the characteristics of contacts.

Materials and Methods: All recorded data of leprosy patients attending the leprosy clinic at a tertiary care centre was analyzed with emphasis on the age, the bacteriological index, (BI) history of contact and the diagnosis of leprosy.

Results: The total number of patients was 766. The patients having contact with a patient of leprosy was 53. 4.2% of patients were relatives. The mean BI in all contacts was 4+. The time interval for contracting leprosy in the contacts from the index case was a mean of 2.2 years. A diagnosis of lepromatous leprosy was made in 62.1% of contacts with leprosy.

Conclusion: Household contacts as well as social contacts need to be investigated particularly the related contacts in the follow up along with patients.

Key words: Contact, Transmission, Leprosy

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Original Article**Introduction**

Leprosy is a chronic infectious disease with the incubation period varying from months to years. It has been well-established that contacts of leprosy patients are at higher risk of developing leprosy than the general population. The risk is dependent on the closeness of contact as leprosy is an infectious disease and spreads from person to person by nasal droplet. It has long been recognized that contact with a leprosy patient is a risk factor for leprosy. The risk of contracting leprosy is 9 times and 4 times when the contact is in the household and neighborhood respectively when compared to the general population.¹ The risk further increases when the index person has lepromatous leprosy. Doull et. al, showed that individuals living in household contact with a paucibacillary case were at approximately twice the risk infection compared with individuals without known household contacts whereas the risk of acquiring leprosy increased eightfold if the patient was a lepromatous case.² The occurrence of leprosy amongst family members is well established. Genetic relationship is an independent risk factor irrespective of the physical distance from the patient.³ However it is still not clear whether it is the contacts sharing the same environment or a genetic predisposition or a combination of both that favors the transmission of the disease.

Materials and Methods

This is a retrospective analysis of patients records diagnosed with leprosy at a leprosy clinic in a tertiary care centre in Eastern Nepal. All demographic data, family history of contact, relationship with contact or living with a person with leprosy was recorded in a preset proforma. A thorough history of the evolution of the disease, a cutaneous examination, and skin slit smear for bacteriological index (BI) was done in all patients. Classification of leprosy was done according to the Ridley and Jopling classification.

Results

The total number of patients seen in the clinic

was 766. A history of contact was seen in 53 patients and a family member (mother, son, father, brother) having leprosy was seen in 33 patients. The family members were sharing the same house. The age of the contacts ranged from 7years-45years with a mean of 21.4years. The time interval for contracting leprosy in the contacts from the index case ranged from 1year - 4.8years with a mean of 2.2years. The BI amongst all contacts was positive in 33patients and ranged from 2+ - 6+ with a mean of 4+ . Among the family members 20 had a BI of 3+ (mean) the rest had a negative BI. Among the contacts 20 were diagnosed as borderline tuberculoid leprosy, (BT) 20 were borderline lepromatous leprosy (BL) and thirteen were lepromatous lepromatous leprosy (LL). The family members diagnosed as LL was 10, BL 10 and BT thirteen.

Discussion

The risk factors for developing leprosy are contacts, age, type of leprosy and genetic relationship. Contacts whether household, neighbours or social are at a risk of developing leprosy. Van Beers et al in their study found that 78% of new leprosy cases were found to have contact with a previously diagnosed case of leprosy.⁴ Of these 28% were household contacts, 35% were neighbours and 15% were social contacts. Various studies also shows that attack ratio in households with more than one leprosy patient were twice than that of families with one case only.^{5,6} In Sri Lanka, a 20-year follow up showed that a second case is diagnosed in 20% of household with a leprosy case.⁷ The risk of household contact is 8-10 times in lepromatous leprosy and 2-4 times for tuberculoid leprosy. The recognition that household contacts are at risk of contracting leprosy has led to control programmes screening all household contacts. In our analysis 6.9% of leprosy patients had a history of contact with a patient and 4.2% of patients had a family member with leprosy. The contacts diagnosed with leprosy of these patients had all been treated for the disease. The time interval for contracting leprosy in the contacts from the index case was a mean of 2.2years. The disease can

manifest years after contact with a index case as the incubation period of leprosy varies from months to years and it maybe years later that the patient develops signs and symptoms of leprosy hence patients should be followed up for a long period of time. Household contacts should also be examined in the follow-up of these patients. The contacts related genetically were 33 (4.2%) in our study. Genetic factors for the development of leprosy have always been considered. Several genes could be involved in the development of leprosy. Though family members share a same genetic background, differences in risk compared to the general population could be an attributing factor. Biguelman in his study concluded that “consanguineous relatives of lepromatous cases are prone to the same form of leprosy than non-consanguineous relatives” (spouses).⁸ A study from India showed that the concordance is more than twice as high in monozygotic twins as in dizygotic.⁹ Studies have shown that a genetic relationship is a relevant risk factor independent of physical distance. The univariate analysis showed that related contacts of index patients had a higher risk than distant contacts.³ The annual incidence of leprosy in various countries is declining and though it has been declared eliminated in Nepal in December 2009 the number of new cases attending the leprosy clinic weekly at the tertiary care centre is 2-3 patients indicating that transmission continues at the same level. Control programmes have intervention mainly aimed only at household contact. Additional intervention need to be considered focusing on high risk groups for contracting leprosy, particularly among those who are genetically related. Living with a leprosy patient is an important factor for transmission of the disease.

The stone in the pond model as used successfully in tuberculosis control could be a useful model in leprosy.¹ The results of the tuberculosis research strengthen the hypothesis that an effective intervention aimed at prevention of leprosy among contacts of known leprosy patients should include other contacts other than household and that actively looking for infected individuals could

be effective. Bacterial load of a patient, measured by a slit skin smear is an important risk factor for developing leprosy but patients who have a negative bacterial index are also a source of infection and have to be treated promptly. To interrupt transmission we need to eliminate or remove the reservoir, eliminate the agent in the reservoir and protect those who are susceptible. This study shows that though elimination has been declared in Nepal the disease among the contacts is still high. Targeted intervention should be aimed at close contacts both inside and outside the household particularly when genetically related.

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