

Impact of Migration on New Case Detection Rates in Leprosy in Gudiyatham Taluk, Tamil Nadu, India

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Migration of persons affected by leprosy was hinted at as early as 1929 (Bhaskara Rao 1930). All new cases of leprosy in Isfahan Province (Iran) were found to be migrants (Asilian et al 2005). Chudasama (2007) suspected increase in leprosy cases in Surat district to migration. These suggest migration contributes to new cases. This study was done to find out 1. Extent of migration among new cases, 2. Characteristics of migrants, 3. Occupational pattern 4. Reasons for migration. 5. Place of origin of migrants 6. Assimilation of migrants into the society. Trained staff collected information regarding migration using special questionnaire from all 222 new untreated cases from the field area of Community Health department during 2004 to 2008. Migrants were 10.4%. Distribution of place of residence, age, gender, marital status, education, mode of detection, Ridley-Jopling and MB/PB classifications of migrants were not significantly different from that of non-migrants. Grade 2 deformities were more among migrants. All migrants found occupation. Mostly men migrated for job and women for joining their husbands. The role of migration in increasing the number of new cases cannot be minimized. Enhanced efforts should be made to provide adequate medical, health and rehabilitation services for them also.

Keywords: Leprosy, Ridley-Jopling

Introduction

Migration among persons affected by leprosy was hinted at as early as 1929 (Bhaskara Rao 1930). All new cases reported in the Province of Isfahan of Iran, were examined by experts and found to be migrants from outside (Asilian et al 2005). Chudasama et al (2007) suspected the increase in the leprosy cases in Surat district due to migra-

tion. Shen et al (2010) found a small proportion of migrants among new leprosy patients detected in China. Chakraborty et al (2006) discussed about the way of life of the persons affected by leprosy who commute daily and migrate for their livelihood. Fischer et al (2008) concluded that the risk of leprosy was the highest within one kilometer of Town Centers and decreased with

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distance from Town Centers. Perhaps that is the place where the migrants mingle with locals. A few papers were published on international migration of persons with leprosy and its implications (Boggild et al 2004, Khan and Ghosh 2005, Taylor et al 2003, White 2010) but very little work was reported about internal migrants affected by leprosy. There is a need to investigate the role of internal migration of persons affected with leprosy. In order to address this question, a study was conducted with the objectives: 1. to find out the extent of migration among new cases. 2. to describe the characteristics of migrants 3 to compare the occupational pattern of migrants with the non-migrants 4. to elucidate the reasons for migration. 5. to find out the place of origin of migrants and 6. to describe the level of assimilation of migrants into the society

Material and Methods

All 222 (58.1% males and 41.9% females) new untreated cases of leprosy registered /detected from the field area (Gudiyatham Taluk) of the department of community health of Schieffelin Institute of Health Research and Leprosy Centre, Karigiri, during the years 2004 to 2008 were interviewed by trained staff to collect information regarding migration status and related details using a specially designed pre-tested question-

naire. The field area was having an estimated population of 4,50,000 for the mid-period of 2004 to 2008. Migrants were defined as those who came from other places and staying in the place of registration/detection for less than 15 years. Comparison of the characteristics of migrants was made with those of the non-migrants using cross-tables. Salient features of the migrants were studied using frequency distribution. Students' t – test was applied to test the difference between the means and Chi square test was used to test association between two qualitative variables. Estimation of percentage of migrants for future years was done using computer generates 'best applicable curve'.

Results

Extent of migration and trend

The new cases detection rate was 0.98 per 10,000 population during the period of study. There were 23 (10.4%) migrants among the 222 new cases registered during these five years. If the 23 migrants are excluded, the new cases detection rate will be 0.88 per 10,000 population. Surprisingly the percentage of migrants was increasing over the years 2004 - 2008 (Table 1). In 2004 the migrants were 6.8 % and in 2008 they were 19.6%. The increasing trend of percentage of migrants over the period 2004 to 2008 was significant ($\chi^2=6.00, p=0.014$).

Table 1 : New cases by Migration Status

Year of Registration	Non-Migrants		Migrants		Total
	No.	%	No.	%	
2004	41	93.2	3	6.8	44
2005	47	95.9	2	4.1	49
2006	40	90.9	4	9.1	44
2007	30	88.2	4	11.8	34
2008	41	80.4	10	19.6	51
Total	199	89.6	23	10.4	222

Chi square test for trend: $\chi^2 = 6.00$ $p=0.014$

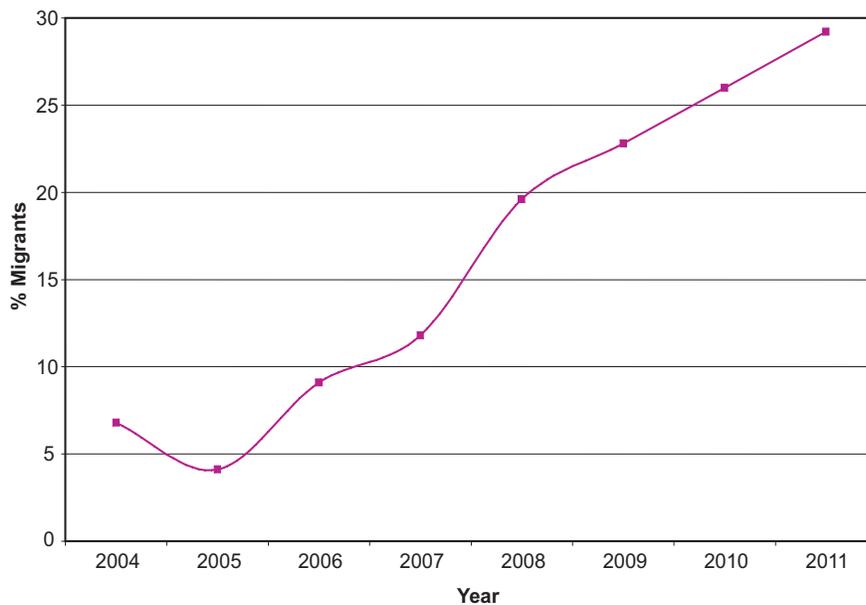


Fig. 1 : Estimation of percentage of migrants for 2009, 2010 and 2011

Table 2 : Age and sex distribution

Sex	Non-Migrants		Migrants		Total
	No.	%	No.	%	
Male Adult	101	50.8	10	43.5	111
Male Child	18	9.0			18
Female Adult	64	32.2	11	47.8	75
Female Child	16	8.0	2	8.7	18
Total	199	100	23	100	222

Chi square test for adult vs. child: $\chi^2 = 1.635$ $p=0.200$

Characteristics of migrants

The mean age at registration/detection of migrants was 32.3 (SD = 15.6) and of non-migrants was 35.8 (SD = 18.3). This difference between migrants and non-migrants was not significant. Among non-migrants 57.8% were males and among migrants 43.5% were males. The gender distribution of migrants was not significantly different from that of the non-migrants. Among the non-migrants, male adults were 50.8% and

female adults were 32.2%. Among migrants, male adults were 43.5% and female adults were 47.8%. No male child was a migrant but 2 female children were migrants. The two distributions were not significantly different. (Table 2). Among the migrants 65.2% were living in rural areas and among the non-migrants it was 72.9%. The difference in the percentage living in rural areas between migrants and non-migrants was not significant. Among migrants 73.9% were married,

Table 3 : Statistical data for marital status of patients.

Marital Status	Non-migrants	Migrants	Total
Married	110 (55.3%)	17 (73.9%)	127
Un Married	65 (32.7%)	4 (17.4%)	69
Separated	2 *		2
Widow	18*	2(8.7%)	20
Widower	4*		4
Total	199	23	222

* all combined 12.0%

Chi Square between ever married and never married: $\chi^2 = 1.588$, $p = 0.207$

Table 4 : Education of patients.

Education	Non-Migrants					Migrants					Total
	Male		Female		Total	Male		Female		Total	
	No.	%	No.	%	No.	No.	%	No.	%	No.	
Illiterate	35	29.4	37	46.3	72(36.2%)	5	50	4	30.8	9(39.1%)	81
School level	82	69.0	41	51.3	123(61.8%)	5	50	9	69.2	14(60.9%)	137
Under Graduate	1	0.8	1	1.3	2*						2
Graduate	1	0.8	1	1.3	2*						2
Total	119	100	80	100	199	10	100	13	100	23	222

*all combined 2.0%

Chi square test between Illiterates vs others: $\chi^2 = 0.024$ $p = 0.961$

Table 5 : Deformity grade in patients

Disability at Registration	Non-Migrants	Migrants	Total
	No.	%	No. %
0	129	64.8	16 69.6
1	46	23.1	46
2	24	12.1	7 30.4
Total	199	100	23 100

Chi square between grade 2 vs others $\chi^2 = 4.365$ $p = 0.036$

17.4% unmarried and 8.7% widowed. The marital status distribution of the migrants was not different from that of non-migrants (Table 3). Among migrants 39.1% were illiterates and 60.9% had some schooling (Table 4). The education distribution of migrants was not significantly different from that of non-migrants.

Grade 2 deformities were found among 30.4% of the migrants and 12.1% of non-migrants. (Table 5) The distribution of deformity grade of migrants was significantly different from that of non-migrants ($\chi^2 = 4.32$, $p = 0.036$). So percentage of new cases with grade 2 deformities was found to be more among migrants than non-migrants.

Table 6 : Mode of detection under survey process.

Mode of Detection	Non-Migrants		Migrants		Total
	No.	%	No.	%	
Contact Survey	5	2.5	2	8.7	7
Focus Survey	7	3.5	2	8.7	9
General Clinic	5	2.5			5
School Survey	18	9.0	1	4.3	19
Voluntary reporting	164	82.4	18	78.3	182
Total	199	100	23	100	222

Chi square test between voluntary reporting vs others $\chi^2=0.415$ $p=0.838$

Table 7 : Ridley-jopling classifications.

Ridley Jopling Classification	Non-Migrants		Migrants		Total
	No.	%	No.	%	
ID	4	2.0			4
TT	15	7.5	3	13.0	18
BT	112	56.3	14	60.9	126
BL	41	20.6	4	17.4	45
LL	15	7.5	2	8.7	17
PN	12	6.0			12
Total	199	100	23	100	222

Chi square between LL vs Others $\chi^2=0.468$ $p=0.828$

Majority of the cases reported voluntarily (Table 6). None of the migrants was detected through general clinic. There was no statistical significant difference in the percentage reported voluntarily between the migrants and non-migrants. The proportion of MB cases was 55.5% among migrants and 56.8% among the non-migrants. Ridley-Jopling classification given in Table 7 reveals that the proportion of LL was 8.7% among migrants and 7.5% among non-migrants. They were not significantly different. Those who reported within two years of duration of disease were 60.8% among migrants and 84.4% among non-migrants (Table 8). The difference between the two was significant ($\chi^2=6.23$, $p=0.012$). Migrants reported late compared to non-migrants.

The distribution of age at migration (Table 9) reveals that 20% of the males and 23.1% of the females migrated at the age 15 or lower. Of the females, 53.8%, migrated at the age of 16 to 24 and 50% of males migrated at the age of 26 to 44. Only two, both males, migrated after age 60.

In fact 50% of the males and 53.8% of the females stayed for 5 years or less in the places they migrated (Table 10).

Comparison of occupation

None of the migrants were without any occupation. Both the migrant female children were attending schools just like the children of non-migrants. Six of the 11 women migrants (54.5%) were housewives. Among the non-migrants,

Table 8 : Duration of disease

Duration of the Disease (Years)	Non-Migrants		Migrants		Total
	No.	%	No.	%	
ID	4	2.0			4
1	146	73.4	11	47.8	157
2	22	11.1	3	13.0	25
3	5	2.5	3	13.0	8
4	3	1.5			3
5	5	2.5	3	13.0	8
Above 5	18	9.0	3	13.0	21
Total	199	100	23	100	222

Chi square test between 2 years or less vs more than two years $\chi^2 = 6.230$ $p=0.012$

Table 9 : Age at immigration

Age at immigration Disease (Years)	Male		Female		Total
	No.	%	No.	%	
Up to 15	2	20.0	3	23.1	5
16 - 24	1	10.0	7	53.8	8
25 - 44	5	50.0	3	23.1	8
45 - 59					
60 & above	2	20.0			2
Total	10	100	13	100	23

Table 10 : Duration of stay in the place migrated.

Duration of stay in the village after migration (Years)	Male		Female		Total
	No.	%	No.	%	
1-5	7	70.0	7	53.8	14
6-11	3	30.0	6	46.2	9
Total	10	100	13	100	23

45.25% were housewives (including those women who reported no occupation). None among the migrants was on white-collar job. However among the non-migrants, 7 (men 4, women 3) were holding white-collar jobs. Six men aged 55 to 80 reported no occupation. Six women aged 45 to 73 reported no occupation but in this analysis they were included as 'housewives' because all the women, in this area, do work at

their homes which they do not consider as work/ occupation.

Among non-migrants, those with grade 2 deformities were 24 persons, they were working (one each) as Tree climber, Shop keeper, Shoemaker, Post master, Cleaner-lorry, Driver, Labourer, Ironing clothes, Bike mechanic, Farmer (2 persons), and *Cooli* (6 persons). Housewife was 3 and persons with no occupation were 4.

Against this pattern, the migrants with grade 2 deformities were having occupation as Carpenter, Stone cutter (each one), and *Cooli* (5 persons). Among the migrants one woman with grade 0 deformity, reported begging as 'occupation'.

Reasons for migration

Among the migrants there were 10 males and 13 females. Only one woman came here for the treatment of the disease and stayed back. 5 women (38.5%) migrated for their marriage. 80% of the men migrated for job. One man and one woman migrated to settle down with their grown-up children who were having stable occupation and income. Female migrants were more because of marriage migration. This is common in the society here; women marry and move into their husband's home. Usually children accompany their mothers while migrating.

Place of origin

Of the 23 migrants, 9 (39.1%) were from the neighbouring State of Andhra Pradesh, 5 (21.7%) were from nearby areas (within 40 km) and another 9 (39.1%) were from far away places (more than 70 kms). None of them migrated within the study area of Gudiyatham Taluk.

Assimilation of migrants into the society

Migrants were 10.4% of the total new cases over the whole duration of study. Moreover the percentage of migrants was increasing over the years 2004-2008 (Table 1). In 2004 the migrants were 6.8% and in 2008 they were 19.6%. This means in 2008 nearly one in five new case was a migrant!

Among migrants there were 10 males and 13 females. Usually males come as migrants and then the rest of the family was brought in but this case it is different, the female migrants were more.

Furthermore, the distribution of place of residence, age, gender, marital status, education,

mode of detection, Ridley-Jopling and MB/PB classifications of migrants were not significantly different from that of the non-migrants. So migrants did not form an entity that was different from what was there in their places of stay (or place of destination). Perhaps they were not experiencing any hostile social environment. Another important observation was all male migrants found gainful occupation. That was the purpose for which they migrated. They also include those with deformity grade 2. Both the migrant girls were attending regular schools. They were not either sent away or denied admission. Neither self-perceived stigma nor enacted stigma kept the migrants away from the mainstream of the society. This is contrary to the literature reviewed on the topic of stigma recently (Wim et al 2010). There is high level of assimilation of migrants into the society into which they have migrated. In spite of existence of stigma as described by Sinha et al (2010) and Rao (2010), the migrants were able to integrate well into the community.

Discussion

In the defined Study area, the occurrence of new cases indicates continuous transmission of disease, even after the declaration that leprosy was eliminated as a public health problem. Having worked intensively for nearly 50 years in this area occurrence of new cases of leprosy should be very rare. (The intensity of work and the trends of new cases were described by Norman et al 2006 and Richard et al 2010). This study showed that in this area the new untreated case detection rate during 2004-2008 was 0.98 per 10,000 population. There was 10.4% migrants among the new cases during the period 2004 to 2008 This is very small compared to the reported finding of 100% migrants among new cases in Isfahan Province of Iran (Asilian 2005). However, the percentage of migrants was increasing over

the years 2004-2008 (Table 1). The increasing trend of percentage of migrants over the period 2004 to 2008 was significant ($\chi^2=6.00$, $p=0.014$). If the percentage of migrants were projected for the future years it reaches more than 25% for the year 2011 (figure 1). So provision for treating considerable number of additional migrants should also be made.

The mean age at registration/detection of migrants was 32.3 (SD=15.6) and of non-migrants was 35.8 (SD=18.3). This is in contrast to the findings of Liu et al (2009) where the age at detection of migrants was higher than others.

The difference between the migrants and non-migrants on the characteristics, viz, gender, marital status, education, rural-urban composition, mode of detection, MB/PB, RJ classification, and occupational pattern were not significant and this showed that migrants did not disturb the structure or composition of the local leprosy population, especially new cases, and they have integrated with the locals well. Only one migrant reported 'begging' as her occupation. Begging as a profession among the leprosy affected was investigated and reported already. (Rao et al 2000, Kaur and van Brackel 2002).

Voluntary reporting was at the same higher level in both the groups. This may be because other modes of detection were stopped or curtailed after integration of leprosy programmes into general health system. So there need not be any visible curb on migration. Migrants and non-migrants significantly differed in their deformity grade and duration of disease. Grade 2 deformity was significantly higher among migrants than non-migrants. Migrants were detected/registered with longer duration of disease than non-migrants.

Except one case there seems to be no 'Push Factors' such as threat, either direct or indirect, to

livelihood, which pushed the migrants from their places of origin. The 'Pull factors', attractive at the place of destination, such as marriage prospects, presence of supportive close relatives, availability of treatment, job openings and schooling facilities were the reasons for migration. This is opposed to the 'push factors' such as stigma; refusal of employment, turning away from the family existed about 50 years ago that necessitated a need for a sanatorium at Karigiri (Premkumar 2010). Similar 'push factors' were responsible for development of a 'leprosy colony' at Champa (Chakraborty et al 2006) and also at Ambala City (Kaur and van Brackel, 2002) Even after they complete their treatment they continue to stay in the colony (Kaur and van Brackel, 2002). Dambalkar et al (1995) mentioned that the facilities and concessions given by the Delhi government to the leprosy affected persons made the migrants to stay there even after they completed their treatment. It is interesting to note, in this area, that now the migrants need not go to a sanatorium or a colony and they live within their society that gives them a reasonable job.

Only two female children and no male child were among the migrants. Either they did not have male children, which are a remote possibility, or they have left their male children in their place of origin with their relatives and migrated to the place of destination.

Unless they stabilize their livelihood at the place of destination, they will not engage in activities to enhance their quality of personal life, in other words, they will not spend their time and money on their personal welfare. Perhaps this may be the reason for coming late for treatment.

Among non-migrants a person with grade 2 deformity was working as Post-master. How did the post-master with grade 2 deformity was able to overcome stigma is yet to be ascertained.

Conclusion

The proportion of migrants among the number of new cases had been increasing. So the impact of migrants in increasing new cases cannot be minimized. Therefore enhanced efforts should be made to provide adequate medical, health and rehabilitation services for them also. No doubt, migrants should be educated to come for treatment early, before they develop grade 2 deformity. There seems to be no adverse impact of migrants in the society in which they had migrated.

Soulter (2010) and White (2010) have reviewed the problems faced by the migrants affected by leprosy and also the negative image prevailing among public because of insufficient or inadequate knowledge on leprosy. So education of officials, journalists and general public is necessary. The image of leprosy has to be changed at the local, national and global levels. A new environment, in which patients, including migrants, will not hesitate to come forward for diagnosis and treatment at any health facility, must be created (WHO 2011).

Limitation and further studies

The small number of new cases and also the migrants is a limitation of the study although the study period was five years. A larger study is needed to arrive at definitive conclusion. Studies are needed to find out how far migration is responsible for the spread of the disease. Moreover studies are necessary to explore the pattern of migration and the type of support received by them at the place of destination. It would be interesting to have comparative studies on total migrants with and without leprosy.

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