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Research Article

COMPARATIVE AND CROSS-SECTIONAL STUDY OF SUCCESSES OF THE LEPROSY ELIMINATION STRATEGY BEFORE (2000 TO 2005) AND AFTER (2006 TO 2010) ERADICATION PERIOD IN REFERRAL HOSPITAL OF TAMIL NADU

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ABSTRACT

To assess the successes of the leprosy elimination strategy before (2000 to 2005) and after (2006 to 2010) eradication period in referral hospital of Tamilnadu District. Retrospective cross-sectional study of all registered new cases of leprosy carried out from records over a ten year period from referral Sacred heart leprosy hospital, Kummbakkonam, Tamil Nadu. During the survey, total number of 5,794 new leprosy cases registered during 2000 to 2010 between before and after eradication period at referral leprosy hospital. Comparative analysis of 5 years of before and after eradication period survey shows that the total number of multibacillary and paucibacillary cases registered before eradication was 4177and after eradication it was reduced to1617, in that multibacillary cases reduced from 2724 to 1150 after eradication and paucibacillary cases reduced from 1453 to 467 cases. According to this analysed report concluding that the total number of leprosy cases reported in referral hospital per day before eradication was 2.28 and after eradication it was reduced to 0.88 cases per day. Leprosy was still an important public health problem and was getting out of control in some districts in Tamil Nadu, south India. However, leprosy elimination is well within sight, and after eradication period also risk of the leprosy cases in endemic districts. So leprosy awareness days and community-based surveillance could help to improve early detection, treatment, case holding and prevention of disabilities. Increase the awareness program for endemic districts is a very well method in decrease the leprosy.

Keywords: Leprosy, Multibacillary, Paucibacillary, Multi Drug Therapy

INTRODUCTION

Leprosy is caused by *Mycobacterium leprae* and manifests as damage to the skin and peripheral nerves. The disease is dreaded because of the damage that occurs in weak and anaesthetic hands and feet, as well as in blindness and facial disfigurement [1]. In 1991, the 44th World Health Assembly set a target for the elimination of leprosy from the world as a public health problem by 2000 [2]. Elimination was defined as a prevalence of less than 1 case per 10000 populations. The elimination strategy is based on detecting and treating all leprosy cases with Multi Drug Therapy (MDT) and thereby reducing the disease burden to a very low level. The key is to ensure that all new cases continue to have access to MDT services [3]. MDT is based on the combination of dapsone, rifampicin, and clofazimine which was introduced in 1982 after dapsone-resistant strains appeared and spread. MDT proved highly efficacious in killing the bacteria without inducing resistance, although the optimal length of treatment and associated relapse rates are still controversial [4]. The regional leprosy prevalence in the South East Asian (SEA) region declined from 4.6/10000 population in 1996 to 1.05/10000 population in 2005 [5]. The SEA Region was on the verge of achieving the leprosy elimination goal at the regional level and in countries, by the end of 2005. Among the 11 countries of the Region, India, Nepal and Timor-Leste were yet to achieve elimination, with prevalence of 1.2, 1.8 and 3.9/10000 population respectively in 2005 [5]. Child proportion among new cases dropped from 12% in 2004 to 5% in 2007 and increased to 9% in 2008 and grade 2 disability among new cases has remained very high between 21%-27% within the previous five years period [6]. Most previously highly endemic countries have now reached elimination. After the creation of the Global Alliance to Eliminate Leprosy in November 1999 and the drafting of the WHO's "Final Push" strategy (2000-2005) to eliminate leprosy, many partners supported the elimination struggle including the WHO, the World Bank, the International Leprosy Federation (ILEP), the Nippon Foundation and the Sasakawa Memorial Health Foundation (SMHF), Novartis, the Danish International Development Agency (DANIDA) and many more [7]. A significant proportion of patients in Kerala and a few other states did not get MDT in the nearest health facility, and there was no patient counseling in most states. Similar comments were made on the need for effective monitoring and evaluation of the integration process [8]. Another research study carried out in tribal state of Gujarat in India reports a decline in prevalence, but which has not yet reached the elimination level [9]. Singh advocates active surveillance not to miss hidden cases in the community [9]. Another state with a large tribal population is Chhattisgarh, which is still endemic for leprosy; a study carried out during 2003–2009 showed a total of 1530 untreated leprosy cases reported to the Leprosy Mission Referral Hospital in Champa (Chhattisgarh, India), of which 151 (9%) were classified as belonging to the scheduled tribes [10]. Even after a country has achieved elimination of leprosy, the profile of new leprosy might change; for example, in India, new cases of historic are still recorded with the same incidence rate [11]. This successfully reduced the national prevalence of leprosy from 57.6 per 10,000 in March 1981 to 2.44 per 10,000 in March 2004 [12]. Leprosy was eliminated nationally by December 2005 [12]. In the present study we have described the results of an active leprosy survey of before and after eradication intervention during 2000 to 2010, a ten years period in the southeast Indian state of Tamil Nadu.

MATERIALS AND METHODS

Diagnosis of leprosy

A person was diagnosed as the leprosy affected persons had one or more hypo-pigmented (whitish or brownish) skin patches with loss of sensation in the patch and/or enlargement of peripheral nerves and/or was currently on leprosy treatment with multidrug therapy.

Leprosy patches could be pale or reddish, could be flat or raised, do not itch, usually painless, lack sensation to touch, pain or heat and could appear anywhere on the body. Other signs of leprosy include reddish or skin- coloured nodules or smooth, shiny diffuse thickening of the skin without a loss of sensation [13]. Patients with leprosy were then classified using the 1998 WHO classification in which patients are classified as paucibacillary (PB) if they have up to five skin lesions and as multibacillary (MB) if they have five or more skin lesions [14]. The identified new cases of leprosy were diagnosis was registered with the hospital. Leprosy cases currently on treatment were assessed for compliance to MDT treatment in the leprosy cases.

Study design

A descriptive cross-sectional hospital based study was designed and conducted in four different parts. Part one comparison of before eradication MB and PB type. Part two comparison of after eradication MB and PB type. Part three comparison of before/after eradication MB and MB type male cases. Part four comparison of before/after eradication PB and PB type female cases.

Selection of study sites and sample size

Detailed data were collected from the sacred heart leprosy hospital Kumbakonam, Thanjaur district, Tamil Nadu, South India. Registered new leprosy cases data were collected in before/after eradication period. Before eradication total numbers of new cases registered were 4177, after eradication total number of new cases registered was 1617 and total numbers of new leprosy cases registered during 2000 to 2010 period were 5794.

Ethical considerations

This study was approved by the Institutional Human Ethical Committee at Bharathiar University – Coimbatore-641 046, Tamil Nadu, India.

RESULTS

During the survey, total number of 5,794 new leprosy cases registered during 2000 to 2010 between before and after eradication period at Sacred heart leprosy hospital, kummbakkonam, Tamil Nadu, South India. Profile of Leprosy new cases reported and classified before eradication period at referral hospital, Tamil Nadu, 2000 – 2005 presented in Table 1. Total number of multibacillary and paucibacillary cases reported five years (2000-2005) period of before eradication was 4177, out of that 2724(65.2%) cases were multibacillary and 1453(34.8%) were paucibacillary cases. Total number of male adult multibacillary cases reported was 1922(70.60%) and paucibacillary cases was 861(59.1), female adult multibacillary cases was 731(26.8%) and paucibacillary cases was 466(32%). Total number of male child multibacillary cases reported was 41(1.5%) and paucibacillary cases was 67(4.4), female child multibacillary cases was 30(1.1%) and paucibacillary cases was 59(4.5%).

Table 1: Profile of Leprosy new cases reported and classified before eradication period at referral hospital, Tamil Nadu, 2000 – 2005.

No	YEARS	Multi bacillary (MB) cases					Paucibacillary (PB) cases					
		MA cases age > 15 (%)	FA cases age > 15 (%)	MC cases age < 15 (%)	FC cases age < 15 (%)	TOTAL NO. OF MB CASES	MA cases age > 15 (%)	FA cases age > 15 (%)	MC cases age < 15 (%)	FC cases age < 15 (%)	TOTAL NO. OF PB CASES	TOTAL OF MB+PB CASES
1	2000	591(77.3)	154(20.1)	16(2.1)	4(0.52)	765(75.2)	138(54.8)	80(31.7)	15(6)	19(7.5)	252(24.8)	1017
2	2001	469(70.6)	177(26.7)	12(1.8)	6(0.90)	664(67.3)	198(61.3)	92(28.5)	16(5)	17(5.3)	323(32.7)	987
3	2002	335(63.3)	192(36.2)	3(0.6)	1(0.2)	531(66)	107(39.1)	137(50)	17(6.2)	13(4.7)	274(34)	805
4	2003	63(50)	41(32.3)	7(5.5)	16(12.6)	127(23.3)	303(72.5)	105(25.1)	5(1.2)	5(1.2)	418(76.7)	545
5	2004	197(72.4)	73(26.8)	2(0.71)	0(0)	272(72.9)	61(60.4)	26(25.7)	11(10.9)	3(3)	101(27.1)	373
6	2005	267(73.2)	94(25.7)	1(0.3)	3(0.82)	365(81.1)	54(63.5)	26(30.6)	3(3.5)	2(2.4)	85(18.9)	450
	Total	1922(70.60)	731(26.8)	41(1.5)	30(1.1)	2724(65.2)	861(59.1)	466(32)	67(4.4)	59(4.5)	1453(34.8)	4177

MA (Male Adult), FA (Female Adult), MC (Male child), FC (Female child)

Profile of Leprosy new cases reported and classified after eradication period at referral hospital, Tamil Nadu, 2006 – 2010 presented in Table 2. Total number of multibacillary and paucibacillary cases reported five years (2006-2010) period of after eradication was 1617, out of that 1150(71.1) cases were multibacillary and 467(28.9) were paucibacillary cases. Total number of male adult multibacillary cases reported were 809(70.4%) and paucibacillary cases was 260(55.6%), female adult multibacillary cases was 323(28.1%) and paucibacillary cases was 180(39%). Total number of male child multibacillary cases reported was 13(1.1%) and paucibacillary cases was 10(2.1), female child multibacillary cases was 5(0.43%) and paucibacillary cases was 17(3.3). Comparative analysis of 5 years of before and after eradication period survey shows that the total number of multibacillary and paucibacillary cases registered before eradication was 4177and after eradication it was reduced to1617, in that multibacillary cases reduced from 2724 to 1150 after eradication and paucibacillary cases reduced from 1453 to 467 cases. According to this analysed report concluding that the total number of leprosy cases reported in referral hospital per day before eradication was 2.28 and after eradication it was reduced to 0.88 cases per day and presented in Table 3.

Table 2: Profile of Leprosy new cases detected and classified after eradication period at referral hospital, Tamil Nadu, 2006 – 2010.

No	YEARS	Multi bacillary (MB) cases					Paucibacillary (PB) cases					
		MA cases age > 15 (%)	FA cases age > 15 (%)	MC cases age < 15 (%)	FC cases age < 15 (%)	TOTAL NO. OF MB CASES	MA cases age > 15 (%)	FA cases age > 15 (%)	MC cases age < 15 (%)	FC cases age < 15 (%)	TOTAL NO. OF PB CASES	TOTAL OF MB+PB CASES
1	2006	189(63.3)	99(33.1)	7(2.3)	4(1.3)	299(68.7)	99(72.8)	27(19.8)	5(3.7)	5(3.7)	136(31.3)	435
2	2007	174(65.4)	91(34.2)	1(0.4)	0(0)	266(71.7)	18(17.1)	82(78.1)	2(1.9)	3(2.9)	105(28.3)	371
3	2008	153(76.5)	44(22)	2(1)	1(0.4)	200(73.5)	38(52.8)	25(34.7)	4(5.6)	5(6.9)	72(26.5)	272
4	2009	143(76.9)	40(21.5)	3(1.6)	0(0)	186(60.4)	85(69.7)	34(27.9)	0(0)	3(2.4)	122(39.6)	308
5	2010	150(75.4)	49(24.6)	0(0)	0(0)	199(86.1)	20(62.5)	11(34.4)	0(0)	1(3.1)	32(13.9)	231
	Total	809(70.4)	323(28.1)	13(1.1)	5(0.43)	1150(71.1)	260(55.6)	180(39)	10(2.1)	17(3.3)	467(28.9)	1617

MA (Male Adult), FA (Female Adult), MC (Male child), FC (Female child)

DISCUSSION

Leprosy is a chronic infectious disease caused by Mycobacterium leprae, which was first described in 1873 by the Norwegian scientist Amauer Hansen. It is an intracellular acid-fast bacillus with an affinity for Schwann cells and skin macrophages. Patients with the multibacillary forms of the disease are considered the principal source of infection; nevertheless, the role of paucibacillary forms in the chain of transmission has already been demonstrated [15,16] Although leprosy control programmes try their best to reach the WHO goal of eliminating leprosy as a public health problem, defined as reduction of the leprosy prevalence to a level below 1/10 000 population at a national level per 2005 (WHO 2000b), pockets with extremely high leprosy prevalence still exist. In our survey analysis, total number of 5,794 new leprosy cases registered during 2000 to 2010 between before and after eradication period. Comparative analysis of 5 years of before and after eradication period survey shows that the total number of multibacillary and paucibacillary cases registered before eradication was 4177and after eradication it was reduced to1617, in that multibacillary cases reduced from 2724 to 1150 after eradication and paucibacillary cases reduced from 1453 to 467 cases. According to this analysed report concluding that the total number of leprosy cases reported in referral hospital per day before eradication was 2.28 and after eradication it was reduced to 0.88 cases per day and presented in Table 3.

Table 3: Comparative analysis and reduction in number of leprosy cases after eradication period

	BEFORE ERADICATION(YEAR 2000-2005)			AFTER ERADICATION(YEAR 2006-2010)		
LEPROSY CASES	CASES/5 YEARS	CASES/ANNUM	CASES/DAY	CASES/5 YEARS	CASES/ANNUM	CASES/DAY
MBMA cases	1922	384.4	1.05	809	161.8	0.44
MBFA cases	731	146.2	0.4	323	64.6	0.17
MBMC cases	41	8.2	0.02	13	2.6	0.007
MBFC cases	30	6	0.016	5	1	0.002
Total No. of MB Cases	2724	544.8	1.49	1150	230	0.63
PBMA cases	861	172.2	0.47	260	52	0.14
PBFA cases	466	93.2	0.25	180	36	0.098
MBMC cases	67	13.4	0.036	10	2	0.005
MBFC cases	59	11.8	0.03	17	3.4	0.009
Total No. of PB Cases	1453	290.6	0.79	467	93.4	0.25
Total No. of MB & PB Cases Before And After Eradication	4177	835.4	2.28	1617	323.4	0.88

MBMA (Multibacillary Male Adult), MBFA (Multibacillary Female Adult), MBMC (Multibacillary Male Child), MBFC (Multibacillary Female Child), PBMA (Paucibacillary Male Adult), PBFA (Paucibacillary Female Adult), PBMC (Paucibacillary Male Child), PBFC (Paucibacillary Female Child)

Comparatively more males were infected by leprosy than females in the 10-14 year age range [17]. In this current study more adult males were infected by multibacillary leprosy than females, a fact that is well established in the previous studies of Malawi [18]. On the whole the number of the youth affected in their study was very small when compared to adults our study also agree with that. The data collected over the study period reveal characteristics of what the World Health Organization defines as a hyperendemic area, since the detection rate of new cases was high and the prevalence of the disease in all the years of the study was consequently high, principally in 2003 and 2008 [19]. In the study also same aspect based study 2000 to 2010 period comparison before and after eradication period. After eradication period consequently low cases was found in the hospital. The risk of leprosy cases effective surveillance of the Tamil Nadu, districts. These modifications led to an increase in earlier diagnoses and thus contributed to the decreased proportion of MB leprosy cases revealed in the results of this case report study. Domestic contacts represent the main contagious route of the disease, and active detection of leprosy cases represents the most efficient way to eradicate the disease. Surveillance actions must be made with intra-domestic contacts since people in the same family are more exposed to the disease. This strategy is important to eradicate or reduce leprosy cases [20]. The present investigation highlights the need for continued surveillance for leprosy Eradication period 2000 – 2005, registered in the leprosy new cases 4177 and after eradication period 2006 – 2010 new cases 1617 so the communicable disease was currently also risked endemic districts. This study has also shown that leprosy though at a very small scale is a problem in particular hospital and endemic districts of Tamil Nadu. It is hoped that active surveillance screening will ensue along the districts so that cases of leprosy can be detected before people suffer the long term consequences of the disease. So earlier treatment and awareness for leprosy is a better way for decrease the diseases.

CONCLUSION

Leprosy was still an important public health problem and was getting out of control in some districts in Tamil Nadu, south India. However, leprosy elimination is well within sight, and after eradication period also risk of the leprosy cases in endemic districts. So leprosy awareness days and community-based surveillance could help to improve early detection, treatment, case holding and prevention of disabilities. Increase the awareness program for endemic districts is a very well method in decrease the leprosy.

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