GRADE 2 DEFORMITY AND NEW LEPROSY CASES, AN ISSUE OF CONCERN- A RETROSPECTIVE, DESCRIPTIVE STUDY IN A TERTIARY CARE HOSPITAL

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ABSTRACT

BACKGROUND

Leprosy is a chronic infectious disease with neural, skin and upper airway mucosal involvement caused by *Mycobacterium leprae*. The magnitude of deformity in new leprosy patients measures indirectly the disease transmission in the community and rapidity of case detection. Occurrences of grade 2 deformity in new leprosy cases have been included as one of the indicators for a good control of the disease.

The aim of this study is to find out the incidence of grade 2 deformities among new leprosy cases in a tertiary care hospital.

MATERIALS AND METHODS

A retrospective, descriptive, record-based study of 223 new leprosy cases registered in our department from April 2012 to March 2017 (5 years) with 14 cases of grade 2 deformities was conducted. Data were compiled and analysed.

RESULTS

Out of 223 cases, 14 patients had grade 2 deformities. Out of 14 patients, male patients outnumbered female patients. Multibacillary cases with grade 2 deformities outnumbered paucibacillary cases with grade 2 deformities. Upper limb (Claw hand) deformities outnumbered Lower limb (Foot drop) and lagophthalmos cases. There is an increasing trend in the incidence of grade 2 deformities in 5 years.

CONCLUSION

Early diagnosis and treatment will prevent deformities. All healthcare professionals must be trained to identify leprosy. Field work of case detection must be strengthened. People awareness, Information, Education and Communication Activities about leprosy must be strengthened.

KEYWORDS

New Leprosy Cases, Grade 2 Deformities, Multibacillary, Paucibacillary.

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BACKGROUND

Leprosy is a chronic infectious disease with neural, skin and upper airway mucosal involvement caused by *Mycobacterium leprae*. Among communicable diseases leprosy remains a leading cause of peripheral neuropathy in the world, despite extensive efforts to reduce the disease burden in India. The National Leprosy Control Programme was launched in 1954 in India and converted to National Leprosy Elimination Programme (NLEP) in 1983 with the objective to eliminate Leprosy.¹ With the introduction of MDT (Multi-Drug Treatment) since 1983 as recommended by the WHO study group, India has achieved the goal of elimination of leprosy in December 2005.² In 2009, WHO launched the Enhanced Global Strategy for further reducing the disease burden due to leprosy for 2011 - 2015, under which the

target was to reduce numbers of new cases of leprosy with grade 2 deformities per 10000 population by at least 35% between the end of 2010 and the end of 2015 instead of leprosy prevalence. Grade 2 deformities has been proposed as an indicator instead of leprosy prevalence, because it is less susceptible to operational factors such as detection delay and is a more robust marker for mapping cases of leprosy in a country. WHO expects that by using grade 2 deformities as an indicator and by focusing interventions on reducing grade 2 deformities, delayed detection and treatment of leprosy patients will also be reduced and so will the number of new leprosy cases in the population.³ Deformity is the visible alteration in the form, shape or appearance of the body due to impairment produced by the disease. The magnitude of deformity in new leprosy patients measures indirectly the disease transmission in the community and rapidity of case detection.⁴ The longer the duration of active disease remains untreated, the greater is the risk of deformities.⁵ A sudden increase in the number of registered new leprosy cases with grade 2 deformity in our outpatient department made us to undertake this retrospective study for 5 years.

MATERIALS AND METHODS

This study was done in the Department of Dermatology, Government Theni Medical College and Hospital, Theni. A retrospective, descriptive, record-based study was done on

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leprosy patients. The period of study was from April 2012 to March 2017 (5 years); 223 newly registered leprosy cases were analysed. The sex distribution, type of leprosy, type of grade 2 deformity and distribution of grade 2 deformities were studied, results compiled and analysed. Disability assessment is a very relevant measure of leprosy control. However, routinely in our Healthcare System only grade 2 deformity record (WHO) is maintained, whereas grade 1 deformity assessment though is more important in terms of prevention of disability is a neglected issue.⁶ WHO grading system of deformities was followed in our study.

Box 1. WHO grading system.

Hands and Feet

- Grade 0- No anaesthesia, no visible deformity or damage.
- Grade 1- Anaesthesia present, but no visible deformity or damage.
- Grade 2- Visible deformity or damage present.

Eyes

- Grade 0- No eye problem due to leprosy; no evidence of visual loss.
- Grade 1- Eye problems due to leprosy present, but vision not severely affected as a result (vision: 6/60 or better; can count fingers at 6 meters).
- Grade 2- Severe visual impairment (vision worse than 6/60; inability to count fingers at 6 metres); also includes lagophthalmos, iridocyclitis and corneal opacities.

Source- Box adapted from Brandsma et al.⁷

Among the case sheets of the new leprosy cases, a search was made to find out distribution of the grade 2 deformities in Hands, Feet and Eye. In hands, ulnar claw hand, median claw hand, total claw hand, wrist drop, self-absorption of phalanges, amputated fingers and contractures were taken as grade 2 deformities. In feet, foot drop, claw toes, amputated toes and contractures were taken as grade 2 deformities. In eye lagophthalmos, corneal opacities, iridocyclitis and loss of eyebrows were taken as grade 2 deformities.

RESULTS

A total number of 223 cases were diagnosed as new cases of leprosy. The sex distribution was shown in Table 1. Out of

223 cases 137 (61.4%) were males and 86 (38.6%) were females. There was a male preponderance with a male-to-female ratio of 1.6: 1. Multibacillary cases 118 (53%) outnumbered Paucibacillary cases 105 (47%) (Table 2). Again, a male preponderance was noted among multi and paucibacillary cases. Males outnumbered with (64.3%) with females (35.7%) (Table 3). Number of new leprosy cases showed an increasing trend during 4 years with a slight downward trend in the last year (Figure 1) (Table 4); 14 cases of grade 2 deformities were reported. Multibacillary cases showed an increasing trend (Table 4) in developing grade 2 deformities with a peak of 8 cases in the last year (Figure 2). Among the grade 2 deformity cases 5 (35.8%) cases were ulnar claw hand, 3 (21.4%) cases were total claw hand and 3 (21.4%) cases were foot drop and 3 (21.4%) cases were lagophthalmos (Table 5) (Figure 3). Claw hand deformity is the commonest deformity in our study. The study conducted by Shiv Dharsan Singh et al confirms the same.⁸ No other deformities like claw toes, contractures, amputation of fingers or toes, corneal opacities or loss of eyebrows were noted. In our study, upper limb deformities (57.2%) outnumbered lower limb deformities (21.4%) and deformities of eye (21.4%) (Table 5).

Year	Male (%)	Female (%)
2012 – 13	18 (8.07)	6 (2.6)
2013 – 14	23 (10.3)	20 (8.96)
2014 – 15	35 (15.6)	17 (7.62)
2015 – 16	31 (13.9)	25 (11.22)
2016 – 17	30 (13.5)	18 (8.07)
Total	137 (61.4)	86 (38.6)

Table 1. Sex Distribution

Year	Multibacillary Cases (%)	Paucibacillary Cases (%)
2012 – 13	18 (8.07)	6 (2.69)
2013 – 14	29 (13.0)	14 (6.27)
2014 – 15	24 (10.7)	28 (12.25)
2015 – 16	25 (11.2)	31 (13.9)
2016 – 17	22 (9.86)	26 (11.6)
Total	118 (53)	105 (47)

Table 2. Distribution of Type of Leprosy Cases (n= 223)

Year	Male				Female			
	Multibacillary	Paucibacillary	Total	%	Multibacillary	Paucibacillary	Total	%
2012 - 2013	0	0	0	0	0	0	0	0
2013 - 2014	1	0	1	7.14	1	0	1	7.14
2014 - 2015	2	1	3	21.44	0	0	0	
2015 - 2016	0	0	0	0	1	0	1	7.14
2016 - 2017	3	2	5	35.71	3	0	3	21.44
Total	6	3	9	64.3	5	0	5	35.7

Table 3. Distribution of Grade 2 Deformities among Multibacillary and Paucibacillary Cases (n= 14)

Year	Number of New Cases of Leprosy	Grade 2 Deformity Cases in	
		Multibacillary Cases	Paucibacillary Cases
2012 – 13	24	0	0
2013 – 14	43	2	0
2014 – 15	52	2	1
2015 – 16	56	1	0
2016 – 17	48	5	3
Total	223	10	4

Table 4. Incidence of New Cases of Leprosy and Distribution of Grade 2 Deformities among Multibacillary and Paucibacillary Cases

No. of Cases	Upper Extremity				Lower Extremity		Eye	
	Ulnar Claw	%	Total Claw	%	Foot Drop	%	Lagophthalmos	%
Total	5	35.8	3	21.4	3	21.4	3	21.4

Table 5. Distribution of Deformities (n= 14)

Figure 1. Number of New Leprosy Cases (2012 - 2017) (n= 223)

Figure 2. Number of Grade 2 Deformity Cases (2012 - 2017) (n= 14)

Figure 3. Distribution of Deformities (n= 14)

DISCUSSION

Deformities in leprosy are the most striking manifestations. It may range from mild degree, such as sensory loss over the hands (grade 1 deformity) to a very severe degree such as complete claw hand and desorption of fingers (grade 2 deformity). A male preponderance was found in the number of new cases of leprosy in our study with male-to-female ratio of 1.6: 1. Male preponderance has been reported in other studies on leprosy as well.⁵⁻¹³ Higher male incidents have often been attributed to increased opportunities for them to contract infections due to more outdoor activities in search of livelihood.¹² In our study, multibacillary cases 53% outnumbered 47% of Paucibacillary cases. Multibacillary preponderance has also been reported in other studies.^{5,7,10,11} If pathogenesis of leprosy is considered, it is quite likely that multibacillary patients with more nerve involvement along with sensory and motor nerve function impairment will have more disability. Increased proportions of multibacillary cases indicate the presence of advanced cases of leprosy and indirectly the magnitude of the infection in the community. Out of 14 grade-2 deformity cases reported, 8 cases were

reported in 2016 - 2017. It may be due to the intense field work and Information, Education and Communication activities of healthcare personals, referral of cases by private practitioners to the tertiary care hospital and increasing awareness of patients. In the study conducted by Singh et al,¹⁴ there is an increasing trend in the new cases detection in the recent years. In the study conducted by Shiv Dharshan Singh et al,⁸ it is a decreasing trend noted every year in the number of new cases of Leprosy. This finding depends on the endemicity of the area concerned. In our study, number of new leprosy cases was increasing in all the years except last year as against the static trend noted in the report of NLEP-National Leprosy Eradication Programme Annual Reports.¹⁵ In our study upper limb deformities outnumbered lower limb deformities, whereas the study conducted by Shiv Dharshan Singh et al showed an increase in lower limb deformities when compared to upper limb deformities.⁸ A higher proportion of grade 2 deformities points to delay in diagnosis and starting the anti-leprosy treatment. Latest global figures point to increasing trend in grade 2 deformities.^{16,17} People with deformity may lose their employment because of functional disabilities associated with leprosy and/or because of negative attitude of employers and the community. This has a major impact on people's economic ability to support themselves and their families. Socioeconomic rehabilitation (SER) such as income generation projects and vocational training may enable leprosy affected people to find productive employment, contribute to the economy of their family and live with dignity. The important objectives of the Enhanced Global Strategy are: (1) To strengthen routine and referral services within the integrated health systems in all endemic countries; (2) To implement innovative approaches for case-finding to reduce delayed diagnoses and grade 2 deformities among newly diagnosed leprosy cases; (3) To improve the quality of clinical services for the diagnosis and management of acute and chronic complications and for prevention of disabilities or impairments, and to enhance rehabilitation services through a well-organised referral system; (4) To support all initiatives to promote community-based rehabilitation and especially to reduce stigma and discrimination against leprosy patients and their families; and (5) To explore the use of chemoprophylaxis to prevent new leprosy cases among household contacts.¹⁸ This being a retrospective study, based on the data analysis of departmental records cannot reflect on the actual situation of the disease on the ground. Moreover, ours being a tertiary care hospital, it can be safely assumed that mostly complicated cases would have reported to us for treatment.

CONCLUSION

Our study revealed an increase in trend of multibacillary cases and grade 2 deformities over the 5 years retrospective study. Early diagnosis and treatment will prevent this trend. Healthcare personals must be trained to identify leprosy. Field work of case detection must be strengthened. Information Education and Communication (IEC) activities at all levels, i.e. individual, community, patients and health personals for early diagnosis of leprosy, starting MDT and adopting proper preventive measures must be strengthened and it is the need of the present situation in our country.

Though the disease of leprosy comes to the stage of eradication, the persistent deformities in these patients

remains a major health problem. Cured patients with permanent sensory deficit need constant care of the hands and feet. Neuropathic changes also need continuous and lifetime care. Early and timely diagnosis of leprosy, starting MDT and proper preventive measures will facilitate us to reach WHO's Enhanced Global Strategy target to reduce the number of new leprosy cases with grade 2 deformities.

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