

Childhood Leprosy Scenario at a Tertiary Level Hospital: A Four - Year Retrospective Study

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Received : 27.12.2018

Accepted : 30.06.2019

Childhood leprosy is an important marker of the status of any ongoing leprosy control programme because it is an indicator of active disease transmission in the community. Studies pertaining to proportion and characteristics of paediatric cases from Bihar are few in number. Hence, present study was carried out to know the scenario of childhood leprosy. A retrospective analysis of 4 year records of leprosy patients aged up to 14 years in a tertiary care hospital of Bihar, was carried out from June 2014 to May 2018. A total number of 72 (9.31% of total leprosy) cases of childhood leprosy reported to AIIMS, Patna, Bihar, India during this 4-year period. The majority of cases belonged to the age group of 11-14 year (84.72%) with a male preponderance. Borderline tuberculoid was the commonest clinical type (44%) followed by tuberculoid type (29%). Borderline lepromatous, Indeterminate form, Histoid leprosy and Pure Neural type was seen in 2, 4, 1, 2 cases respectively. Multibacillary (MB) cases constituted a total of 39 (54.16%), while remaining 33 (45.83%) were of paucibacillary (PB) type. A solitary skin lesions either a hypo-pigmented or an erythematous patch with decreased sensation with or without thickened nerve was the most frequent manifestation in 34 cases (47.22%) followed by 2-5 skin lesions in 29 (40.27%) and more than 5 skin lesions or diffuse infiltration in 9 (12.5%) patients. Although nerve thickening was seen in 32 (44%) cases, neuritis and lepra reactions were less common. Disability was noted in 15.27% cases (Grade1 disability in 2.7% and Grade 2 disability in 12.5%). History of contact was found in 51.38% cases. Continuous and sustained efforts for early case detection of leprosy cases in the community in general, and a close follow-up of susceptible children amongst household contacts of leprosy cases will be desirable to treat these cases of childhood leprosy early before they develop any disability. Intense efforts are thus required to achieve the target of zero disability in child leprosy cases set in the Global Leprosy Strategy 2016-2020.

Keyword : Childhood Leprosy, Prevalence, Retrospective Study, Elimination.

Introduction

Childhood Leprosy is an important epidemiological indicator as it reflects active disease transmission in the community and the

operational efficiency of a given Leprosy elimination programme. There is something unique about childhood leprosy, right from acquiring infection to the final diagnosis. Children

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are believed to be the most vulnerable group for leprosy. Close and prolonged contact with intra-familial sources of infection exposes children to high risk of acquiring infection and manifesting disease because of their weak immune response. Clinical differentiation from other similar looking skin lesions may not be possible at times, because there might be lack of well-defined clinical signs in children. Diagnosis of childhood leprosy is thus a special issue. Interpretation of sensory testing in this age group is difficult. However, detection and treatment of each case of childhood leprosy takes us one-step closer towards the goal of eradication. Though theoretically infants remain resistant to the disease because of its long incubation period, leprosy has been reported in children as young as 6-9 months (Sardana 2006).

At the end of 2017, the registered global prevalence of leprosy was 192713 cases (0.25/10000 population), an increase by 20765 cases over that in 2016. The 3 countries with the highest burdens, India, Brazil and Indonesia accounted for 80.2% of the new case load globally in 2017 (WHO Global Leprosy Update 2017, WHO 2018). According to NLEP data, a total of 1,35,485 new cases were detected during the year 2016-17, which gives Annual New Cases Detection Rate (ANCDR) of 10.17 per 100,000 population, as against 1,27,334 cases in 2015-16. Detailed information on new leprosy cases detected during 2016-17 indicates the proportion of MB (49.57%), Females (39.17%), Children (8.7%). A total of 11792 child cases were recorded, indicating the child care rate of 8.7%. Bihar is one of the Indian states with high endemicity for leprosy. As on 31st March 2017, Bihar reported with PR>1/10,000 population and total number of new cases detected was 21818. It is one of the 10 states/UTs in India where the proportion of childhood cases was 13.7% i.e.

more than 10% of the newly detected cases (NLEP Report 2016-17). Even though, cases reporting to a Tertiary Care Hospital like AIIMS may not be representative of situation in the community, this information can be useful in planning proper epidemiological studies and also plan the type of services required in specialized settings. Because of these reasons, this retrospective analysis of data of child leprosy cases who came to AIIMS, Patna has been carried out.

Materials and Methods

This 4-year retrospective study was conducted in the Department of Dermatology, Venereology and Leprology in AIIMS, Patna. This institution is a tertiary-care teaching hospital catering to a large population of 38 districts of Bihar including the native population as well as a large number of migrants from adjoining states of Uttar Pradesh, Jharkhand and West Bengal. Medical records of all leprosy cases up to the age of 14 years registered by self - reporting between June 2014 to May 2018 were analysed. All data regarding age, sex, history of household contact, number of skin lesions, nerve involvement, clinical classification, presence of lepra reaction(s) and disabilities were taken from Leprosy register. As per the protocol of the leprosy clinic, all patients' data are documented in a numbered proforma and kept serially year-wise. Cases were classified according to the Ridley-Jopling classification (1966) and IAL classification (1982). The WHO classification was used for grading of the disabilities (Brandsma and van Brakel 2003). Cases were classified into MB and PB groups as per WHO classification (WHO 1994) and as also followed by NLEP (NLEP 2009). In AIIMS Patna complete clinical examination is followed by slit skin smear and histopathological examination. This criteria is common for adult as well as child leprosy cases. Data was analysed for descriptive statistical analysis using percentage and proportion.

Results

A total of 773 cases of leprosy were registered during the 4-year period, of which 72 cases were children up to 14 years of age. This paediatric age group thus constituted 9.31% of the total diagnosed leprosy cases during June 2014 to May 2018. Percentage of child leprosy cases ranged from 8% in 2017-18 to 10.6% in 2015-16. The year wise (June - May period arbitrarily taken as study was initiated in June) proportion of childhood leprosy cases is presented in Table 1. However, on an average proportion of childhood leprosy cases are around 10%. The majority of cases, i.e.

61 (84.72%) belonged to the age group of 11-14 years, followed by 11 (15.27%) to the age group of 6-10 years. In our study there were no child leprosy cases in the 0-5 years age group. Among these child leprosy cases 40 (55.55%) were males and 32 (44.44%) were females. Age and sex distribution of these child cases is shown in Table 2.

A history of contact with a possible index leprosy case was present in 14/72 cases (19.44%), of which 11 (15.27%) were household contacts and only 3 (4.16%) were extra-familial contacts (Table 3). The most common familial contact

Table 1 : Year-wise proportion of child cases from June 2014 to May 2018

	Total no. of new cases of Leprosy	No. of child cases ≤ 14 years of age	Child Proportion (%)
June 2014 to May 2015	132	13	9.84
June 2015 to May 2016	160	17	10.62
June 2016 to May 2017	206	20	9.7
June 2017 to May 2018	275	22	8
Total	773	72	9.31

Table 2 : Age and gender wise distribution of cases

Age (Yrs.)	Total No. of cases	Male	Female
0-5	0	0	0
6-10	11	7	4
11-14	61	33	28
Total	72	40	32

Table 3 : History of contact of child cases with index leprosy patients

	No. of child cases with history of contact	Percentage (%)
Present	14	19.44
Absent	58	80.55

Table 4 : Number of skin lesions in child cases studied

Age (Yrs)	No. of skin lesions		
	Single skin lesion	2-5	>5
0-5	0	0	0
6-10	6	5	0
11-14	28	24	9

Table 5 : Clinical spectrum of disease types in childhood leprosy Cases

Age (Yrs)	TT	BT	BB	BL	LL	I	Histoid	PN
0-5	0	0	0	0	0	0	0	0
6-10	8	3	0	0	0	0	0	0
11-14	21	29	0	2	0	4	1	2

TT: Tuberculoid, BT: Borderline Tuberculoid, BB: Borderline Borderline, BL: Borderline lepromatous, LL: Lepromatous, I: Indeterminate, PN: Pure Neuritic

Table 6 : Classification of cases in MB and PB groups

	No. of patients	Percentage (%)
Multibacillary	39	54.16
Paucibacillary	33	45.85

was with a parent, followed by siblings and grandparents.

The distribution of patches was predominantly over the exposed parts of the body with the following order of involvement: upper extremities, face, lower extremities and trunk. A solitary skin lesions either a hypo-pigmented or an erythematous patch with decreased sensation with or without thickened nerve was the most frequent manifestation in 34 cases (47.22%) followed by 2-5 skin lesions in 29 (40.27%) and more than 5 skin lesions or diffuse infiltration in 9 (12.5%) patients (Table 4). Thickened peripheral nerve trunks were present in 32 (44.44%) children of whom 21 (29.16%) had a single thickened nerve and 11 (15.27%)

had more than one thickened nerve. The most frequent nerve affected was ulnar, followed by the common peroneal and radial cutaneous nerves. 40 children did not show clinical evidence of peripheral nerve involvement.

Borderline tuberculoid was the commonest clinical type in 32 (44.44%) followed by tuberculoid in 21 (29.16%) and indeterminate form in 4 (5.55%) cases. There were 2 cases each in borderline lepromatous and pure neural type. A 14 years old boy was diagnosed as histoid leprosy. No case of childhood lepromatous leprosy was seen (Table 5). Multibacillary (MB) cases constituted a total of 39 (54.16%) and paucibacillary (PB) cases constituted 33 (45.85%) (Table 6). 12 (16.66%) cases presented with sign

of reaction. Among these, 9 had signs of type 1 reaction, while 3 cases were found to have type 2 reaction. Two case reported sign of neuritis. Disabilities were present in 11 (15.27%) cases (Grade 1 in 2.7% and Grade 2 in 12.5% patients).

Discussion

In the present study, childhood cases constituted 9.31% of the total leprosy cases registered from June 2014 to May 2018. Similar findings were (9.16%) reported by Jain et al (2014) in their study from Maharashtra. Various studies have observed differences in the proportion of childhood leprosy. Dogra et al (2014) in their study from Chandigarh found that proportion of childhood leprosy was 4.81% and explained this due to the overall lower prevalence of disease or a lower proportion of migrants from endemic states in Chandigarh as compared to other states. Ghunawat et al (2018) and Singhal et al (2011) from Delhi found 7.5% and 9.6% proportion of childhood leprosy respectively. While the figures from studies done in South India were little bit higher, 12.1% by Sasidharanpillai et al (2014) and 11.2% by Babu et al (2018). These higher value have been explained due to referred cases and effective record maintenance, however, these are mere opinions. There can be given big variations even in the same place when different patients are sampled as 5.60% child proportion observed by us when leprosy patients from January 2016 to December 2017 were analysed (Gupta et al, paper in this issue). Thus the difference in incidence/prevalence could be the outcome of overall status of disease control over a period of time in different settings, a difference in case detection methods, lack of standard age criterion for the child category in different studies and also due to sampling of different patient populations. In current study, majority of the cases were belonging to the higher age group (11-14 years). Similar finding had also reported by Ghunawat

et al (2018), Singhal et al (2011), Dogra et al (2014), Jain et al (2014), Babu et al (2018). This can be attributed to the long incubation period of the leprosy, as well as chances of frequent misdiagnosis. In childhood leprosy, hypopigmented patch may be misdiagnosed as pityriasis alba or secondary to worm infestation, especially in younger children where the definitive history of anaesthesia and elicitation of hypoesthesia remains challenging. In our study there was male preponderance, but with very little difference. Horo et al (2010) and Babu et al (2018) also obtained similar results in their study. Palit et al (2014) reported almost equal gender ratio (Male : Female=29:32). This change indicates that, now more women are receiving timely health interventions when compared to the past whereas in other studies by Palit & Inamdar (2014) and Ghunawat et al (2018) high M:F ratio was noted. It might be explained as boys owing to their greater activity had increased opportunities for contact and girls for their negligence. In our study, we found that majority of cases had duration of symptom around six month where as in previous studies it exceeded up to one year.

Overall, 19.44% children had a history of contact with a leprosy case. In most of cases, contacts were intra-familial, parents and siblings were the potential source of infection. This means lot many index cases / those with subclinical disease are present in the community and implies endemic situation. However their status either paucibacillary or multibacillary was generally not available from the records. In different studies, there were different proportion of contact history as 14.5% by Singhal et al (2011), 19.7% by Kaur et al (1991) and 25.4% by Dogra et al (2014) whereas in the study of Jain et al (2014) only 8.33% cases had history of contact. The risk of developing leprosy is four times greater if there

is contact in the neighbourhood and it increased to nine times if present among the household members. The probability of transmitting leprosy to a child is highest when there is a multibacillary case in the family and is greater when the mother is the index case. The risk from paucibacillary contact in the family is the same as with multibacillary case in the neighbourhood. It is therefore important to take a complete family history and examine all the members as well as periodic screening of leprosy contacts specially the children in the family (van Beers et al 1999).

The study reinforces the fact that children more often have a single lesion of leprosy (47.22%). Similar findings have been published by others, 45% (Ghunawat et al 2018), 45.83% (Jain et al 2014), 52.9% (Singhal et al 2011) and 61.11% (Chaitra and Bhat 2013). However, in some studies as by Dogra et al (2014), Jain et al (2014) and Burman et al (2003) reported a higher percentage of children with multiple lesions. These skin lesions were predominantly seen over exposed part of the body. In present study, there was involvement of upper extremity in 44.4% cases. Singhal et al (2011) and Dogra et al (2014) also found the same results. In a study by Jain et al in (2014) found face (36.3%) most commonly involved. However, lesions also found over covered sites, as in our study up to 23% of patients had lesions over covered sites also. Therefore, there should be thorough cutaneous examination in all children. A suspicion of a possibility of leprosy should arise in any child presenting with skin patches even if sensation is intact, and such cases should be observed for early detection. In the present study, nerve involvement was observed in 42 (58.33%) cases in whom 23 (31.94%) had a single thickened nerve and 19 (26.38%) cases had more than one thickened nerve. In study by Dogra et al (2014) found nerve involvement in 81% cases

(Single nerve involvement in 43.7% cases and multiple nerve involvement in 56.35% cases) and Singhal et al (2011) found thickened nerve in 70% of cases (Single nerve involvement in 20.9% and multiple nerve involvement in 48.3%). Both of these studies had high percentage of nerve involvement. A high percentage of nerve thickenings predisposes to increased risk of reactions, disabilities and consequent psychological burden in children. In a study by Ghunawat et al (2018) found 59.2% cases with multiple nerve involvement where as Chaitra & Bhat (2013) found thickened nerve in 47.22% cases. It would be important to emphasize these variations when training doctors/specialists as well as other health professionals for diagnosis of childhood leprosy.

The commonest category in the spectrum was Borderline Tuberculoid disease in 44.44% of child leprosy cases in the present study, followed by Tuberculoid in 29.16% and indeterminate form in 5.55% cases. Each pure neuritic and borderline lepromatous were seen in two patients. The preponderance of BT cases is in concordance with the previous epidemiological studies, such as 65.9% (Sasidharanpillai et al (2014), 86.36% (Jain et al 2014), 68% (Rao 2009), 70.3% (Singhal et al 2011), 67.8% (Dogra et al 2014). Histoid leprosy was diagnosed in only 1 patients and has been infrequently reported in childhood leprosy. We observed a slightly higher percentage of children with multibacillary disease, but similar results were also obtained by Dogra et al (2014), Singhal et al (2011) and Ghunawat et al (2018). Jain et al (2014) have however, a large proportion of MB (91.6%) cases. MB cases are more infectious and can contribute to transmission of the disease, thus large proportion of MB cases becomes a matter of concern. However, in some other studies higher proportion of paucibacillary cases has been reported (Grover et al 2005, Chaitra and

Bhat 2013). Also in some studies, Sasidharanpillai et al (2014) observed paucibacillary disease in 73.2% cases and Sachdeva et al (2010) reported paucibacillary type in 74% cases. Such variations in proportion of PB/MB types could be local epidemiological realities, also due to differences in health seeking behaviour but also could be due to criteria used.

Nearly 17% cases presented with signs and symptoms of lepra reactions in the current study; similar findings had been noted in previous studies as 33.9% (Dogra et al 2014), 15% (Ghunawat et al 2018), 18.6% (Singhal et al 2011) and 5.56% (Chaitra and Bhat 2013). Thus proportion of cases having lepra reactions varies in different studies but in almost studies proportion of T1R is greater than T2R as in present study. Disability was noted in 11 cases (15.27%), similar results as 24.7% (Ghunawat et al 2018), 12.8% (Singhal et al 2011) and 13.8% (Chaitra and Bhat 2013). These disability rates are higher than overall national average of being less than 5% (NLEP 2016-17). Though there is some apparent decline, such high disability rates in children are not acceptable nationally as well as globally as zero disability in children is the global target set in the Global Leprosy Strategy with overall one in one million populational grade 2 disability levels (Global Leprosy Strategy 2016-2020). While the figures of disabilities are to be validated at community level, there is clearly delayed diagnosis and or inadequate management of neuritis/reactions.

Conclusions

This study shows that there is a considerable burden of leprosy in children in this part of India. As this study is based on retrospective analysis of data from a tertiary care centre, this has limitations and lessons learnt need to be validated at community level. This implies continued transmission. Situation appears to be optimistic due to absence of cases in 0-5 years,

however, this may be deceptive as such cases may not have reported to our centre. High disability rates indicate delayed diagnosis and inadequate management of reactions/neuritis. In case of childhood leprosy there should be complete cutaneous and neurological examination with strong diagnostic skill along with contact tracing and periodic screening. School surveys can be useful in early case detection. Apart from the case detection, it is also important to educate parents, regarding treatment completion, as many stop treatment following subjective improvement and stress the need to report timely for management of reactions/neuritis. Mother's health should be cared better because mother and child have intimate relationship.

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How to cite this article : Gupta R, Sinha R and Pradhan S (2019). Childhood Leprosy Scenario at a Tertiary Level Hospital: A Four - Year Retrospective Study. *Indian J Lepr.* **91**: 217-224.