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Epidemiological profile of leprosy in children under 15 in Manaus (Northern Brazil), 1998–2005

ABSTRACT

OBJECTIVE: To describe the epidemiological status of leprosy in children living in a metropolitan area.

METHODS: There were studied 474 leprosy cases detected in children under 15 living in the metropolitan area of the city of Manaus, Northern Brazil, between 1998 and 2005. The endemic profile and quality of care services were assessed based on data from the Notifiable Diseases Information System using epidemiological and operational indicators of the National Leprosy Elimination Program.

RESULTS: Of all leprosy cases detected in the period studied, 10.4% were found in children under 15. The detection rates in this age group remained at hyperendemic levels between 1998 and 2003, and decreased from 2004 onwards but keeping on very high endemic levels. The most common clinical form was tuberculoid followed by dimorphous. Paucibacillary forms were seen in 70.7% of the cases. The level of disability at the time of diagnosis was assessed in 94.7% of patients and 2.9% of them had physical disabilities. Most children (99.4%) were treated with the multiple drug regimen recommended by the World Health Organization.

CONCLUSIONS: Despite its decrease, detection rate of leprosy in children in the city of Manaus remains at a very high endemic level.

DESCRIPTORS: Leprosy, epidemiology. Child. Adolescent. Endemic Diseases. Disease Notification.

INTRODUCTION

Leprosy remains a public health concern in Brazil, the sole country in Latin America that has not attained the goal of eliminating the disease, i.e., reducing the prevalence rate to less than one case in every 10,000 inhabitants. From 1998 to 2005, the prevalence rate^a in Brazil fell from 4.93/10,000 (1998) to 1.48 (2005)^a but detection rate, which is an indicator of disease transmissibility, has remained at very high endemic levels (2.16/10,000 in 1998 and 2.09/10,000 in 2005).

The Brazilian National Program for Leprosy Elimination has developed together with state focal points a working plan for the year 2005. The program was intended to strengthen strategies for endemic elimination. The priority intervention

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focused on state capitals and cities reporting at least 50 cases in treatment in December 2003 as well as all cities that diagnosed on average 10 multibacillary cases and two cases in children under 15 over the last five years. Manaus, the Amazon state capital, met all priority criteria for program actions with a very high detection rate^a in children under 15, which accounted for most cases reported statewide during the period studied.

Leprosy in children can be an indicator of disease prevalence in the general population and its detection helps determining the disease transmissibility.^{2,9} Due to its long incubation period, leprosy characteristically occurs in adults but children can also be susceptible. Hence, they are at higher risk of developing the disease when living in endemic areas and when exposed to family contacts.^{5,9,11}

In 2005, the detection rate of leprosy in Brazilian children under 15 was 0.60/10,000.^b During that same year, a hyperendemic rate^b of 1.62/10,000 was seen in the Northern region, of 0.66/10,000 in the state of Amazonas^c and of 0.53/10,000 in the city of Manaus. They all indicated very high endemic levels.

Ongoing high endemic levels of leprosy suggest children can be exposed to cases that go undetected in the health system. In settings of high disease transmissibility and early exposure to leprosy bacillus people are at higher risk of developing the disease and thus detection rate in this specific age group can be an indicator of more severe endemic disease.^{11,12,d} With the purpose of providing input for disease control actions, the present study assessed the epidemiological status of leprosy in children living in a metropolitan area.

METHODS

This study is part of a larger research study, "Detection of leprosy cases in the city of Manaus through a geoprocessing approach," developed by Leônidas and Maria Deane Research Center and *Fundação de Dermatologia e Venereologia Alfredo da Matta*.

A descriptive, retrospective study was conducted including 474 cases of leprosy in children under 15 living in the metropolitan area of the city of Manaus between 1998 and 2005, accounting for 33.6%^e of the city population at that time.

Data from the Information System of Disease Notification (SINAN) were provided by the Leprosy Control Program State Coordination of Amazonas.

To assess the profile of leprosy endemic and quality of care provided in health services the following variables, recommended by the Brazilian Ministry of Health^f for the construction of epidemiological and operational indicators, were included: (a) annual detection rate of new cases in children under 15 per 10,000 inhabitants; (b) proportion of new cases by gender; (c) proportion of new cases by clinical classification; (d) proportion of new cases by clinical form according to the Madrid classification; (e) proportion of cases with bacilloscopic examination; (f) proportion of new cases with physical disability (level I – reduction or loss of sensation in both eyes, hands and/or feet; level II – disabilities or deformities in both eyes, hands and/or feet) assessed at the time of diagnosis; (g) proportion of cases with physical disability among new cases detected and assessed during the period study; (h) proportion of cured cases with physical disability assessed; (i) proportion of cured cases with physical disabilities (paucibacillary and multibacillary); and (j) proportion of new cases receiving the multiple drug regimen.

EPI-Info program version 3.3.2 was used for handling, management and analyses of data.

The study was approved by Fundação Alfredo da Matta Research Ethics Committee.

RESULTS

Of 4,541 cases of leprosy detected during the study period, 474 (10.4%) were 0 to 14 years old. Table 1 displays the distribution of cases by age group and gender. It also shows tuberculoid was the most common clinical form of leprosy (50.2% of cases), followed by dimorphous, indeterminate, and lepromatous; and paucibacillary forms predominated (70.7%). Bacilloscopic examination was performed in 387 patients (81.6%) and a negative result was seen in 316 of them (66.7%).

The comparison of number of cases and detection rates (Table 2) show a reduction but remaining at hyperendemic levels between 1998 and 2003 and then falling to very high levels from 2004 onwards.

Physical disability at the time of diagnosis was assessed in 94.7% of patients (Table 3); 2.9% of new

^a Brazilian Ministry of Health. Situação epidemiológica da hanseníase no Brasil. Brasília; 2007. [cited 2007 Apr 13]. Available at: http://portal.saude.gov.br/portal/arquivos/pdf/situacao_hansen_2007.pdf

^b Brazilian Ministry of Health. Departamento de Informática do SUS. Acompanhamento de Hanseníase. Brasília; [s.d.] [cited 2007 Jun 31]. Available at: <http://tabnet.datasus.gov.br/cgi/tabcgi.exe?hans/hanswuf.def>

^c Information System of Disease Notification. SINAN – State database. Rio de Janeiro: Brazilian Ministry of Health; 1996

^d Lombardi C. História natural da hanseníase. In: Lombardi C. Hanseníase: epidemiologia e controle. São Paulo: Imprensa Oficial do Estado de São Paulo; 1990. p. 13-20.

^e Brazilian Ministry of Health. Health Information. Brasília; [s.d.] [cited 2007 Aug 12]. Available at: <http://tabnet.datasus.gov.br/cgi/tabcgi.exe?ibge/cnv/popAM.def>

^f Brazilian Ministry of Health. Guia para o controle da hanseníase. Brasília; 2002

Table 1. Leprosy cases in children under 15 by age group, gender, clinical classification, clinical form and bacilloscopic examination. Manaus, Northern Brazil, 1998–2004.

Variable	Age group (years)			Total	%
	1 to 4	5 to 9	10 to 14		
Gender					
Male	15	74	149	238	50.2
Female	12	66	158	236	49.8
Total	27	140	307	474	100.0
Clinical classification					
Paucibacillary	21	106	208	335	70.7
Multibacillary	6	34	99	139	29.3
Clinical form					
Indeterminate	6	22	51	79	16.7
Tuberculoid	14	81	143	238	50.2
Dimorphous	5	32	87	124	26.2
Lepromatous	2	5	24	31	6.5
Unknown	0	0	2	2	0.4
Bacilloscopic examination					
Positive	2	16	53	71	15.0
Negative	14	92	210	316	66.7
Not performed	11	32	44	87	18.3

Source: National System of Disease Notification (SINAN) – State database.

cases detected had physical disabilities. At the end of the medical follow-up, physical disability was assessed in 365 patients (82.7%) and eight children (2.2%) had disability level I and 15 (4.1%) level II.

The number of lesions was not unknown in 63.1% of cases; 14.1% did not have any lesions; 19.6% had one to five lesions and 3.2% had more than five.

Most cases (64.3%) were detected through spontaneous reporting, followed by referral (14.1%), contacts testing (12.7%) and global testing (3.2%).

Only 24.2% of patients had at least one contact examined and 71.3% had no contacts examined; and this information was missing in 4.6% of cases.

The proportion of new cases receiving the World Health Organization (WHO)-recommended multiple drug regimen was 99.4%. For the remaining, no information was available on treatment.

During the period studied, 441 patients ended their medical follow-up; 87.8% of them due to cure. Table 4 shows the main reasons for ending follow-up. Of those ending follow-up due to cure, 93.2% were assessed for physical disability: 3.0% of cured paucibacillary patients had physical disability compared to 7.3% of multibacillary patients.

DISCUSSION

Corroborating other studies,³ the majority of children affected (64.8%) were between ten to 14 years of age, which could be explained by the long incubation period of leprosy.¹¹ However, the number of children affected aged one to nine reflects their early exposure to bacilliferous cases.

The literature^{10,a} describes higher prevalence of leprosy among male adults and the risk of exposure is a determinant for this gender difference. Among children, there is no gender difference,¹¹ although the present study found a slightly higher proportion of cases among males (50.2%).

The tuberculoid form was the most common clinical presentation, followed by dimorphous, indeterminate

Table 2. Leprosy cases in children under 15 and detection rates in the State of Amazonas and in the city of Manaus, Northern Brazil, 1998–2004.

Year	# cases Amazonas	Detection rate	# cases Manaus	Detection rate
1998	200	2.00	90	2.14
1999	183	1.78	81	1.88
2000	142	1.30	58	1.24
2001	140	1.24	52	1.07
2002	163	1.42	65	1.31
2003	133	1.13	61	1.19
2004	114	0.95	38	0.73
2005	83	0.66	29	0.53
Total	1.075		474	

Source: National System of Disease Notification (SINAN) – State database.

Table 3. Assessment of disability by age group at the time of diagnosis and end of follow-up in children under 15. Manaus, Northern Brazil, 1998–2004.

Assessment of disability	Age groups (years)			Total	%
	1 to 4	5 to 9	10 to 14		
At the time of diagnosis					
Level I	1	3	10	14	3.1
Level II	0	2	11	13	2.9
At the end of follow-up					
Level I	1	1	6	8	2.2
Level II	0	2	13	15	4.1

Source: National System of Disease Notification (SINAN) – State database.

^a Albuquerque MFPM. A Hanseníase no Recife: um estudo epidemiológico para o período 1960-1985 [master's dissertation]. Recife: Faculdade de Medicina da Universidade Federal de Pernambuco; 1987.

Table 4. Reasons for the end of follow-up of leprosy cases in children under 15 by age group. Manaus, Northern Brazil, 1998 – 2004.

Reason for the end of follow-up	Age group (years)			Total	%
	1 to 4	5 to 9	10 to 14		
Cure	22	115	250	387	87.8
Administrative leave	1	4	11	16	3.6
Transfer	3	5	19	27	6.1
Unknown	0	4	7	11	2.5
Total	26	128	287	441	100.0

Source: National System of Disease Notification (SINAN) – State database.

and lepromatous, which corroborates other studies,^{7,8} although in children paucibacillary forms (indeterminate and tuberculoid) are expected to be the most frequent ones due to the incubation period.

The indeterminate form is the early presentation of leprosy and it may progress to either spontaneous cure or polarized forms.¹² In the present study, it was found a lower rate of indeterminate forms compared to polarized ones, which may suggest that the disease is not being diagnosed at its early stages.

The predominance of non-contagious forms is most often reported among children,^{5,11} but multibacillary forms have also been detected in endemic areas.¹¹ During the period studied, five cases with dimorphous forms and two cases with lepromatous forms were reported in children aged one to four as well as 32 dimorphous and five lepromatous cases in children aged five to nine. The literature shows that the diagnosis of leprosy is usually made after the age of three.^{5,11} In the present study the two lepromatous cases in children aged one to four were seen in two-year-old and three-year-old children and the youngest case was found in an one-year-old child with an indeterminate form.

The predominance of paucibacillary forms may indicate that the actions for early diagnosis have been effective.

Spontaneous reporting is the main method of detection, followed by case referral, which may indicate that active search and contacts examination have not been implemented as recommended. This assumption is supported by the high number of cases with no contacts assessed (71.3%). But one should also bear in mind that

missing information, such as underreporting of actions taken, can also have occurred.

According to Costa & Patrus,⁴ the finding of disabilities at the time of diagnosis may indicate that diagnosis is being made late in the disease course as they tend to have a late development, and suggests ineffective leprosy control. Amador et al (2001)¹ argue that leprosy in children under five can be potentially incapacitating due to its very early onset and higher risk of deformities but severe disabilities are uncommon in children.

The proportion of children assessed for disability at the time of diagnosis is an indicator of the quality of services provided. In the city of Manaus, the quality was adequate according to the Leprosy Control Program criteria.^a As the proportion of disabilities found (2.9%) was low, both these findings may indicate that early diagnosis is being made. Though this proportion is not as high as in other studies,^{4,6} disabilities are recognizably major factors of stigma associated with leprosy and they may impair children's social life and psychological development.

According to the Brazilian Ministry of Health variables,^a the proportion of cured cases that were assessed for disability was adequate, with a low proportion of paucibacillary case with physical disability. Yet the proportion of multibacillary cured cases with disability (7.3%) was fair. This indicator suggests a need for disability prevention and rehabilitation after follow-up, despite the good quality of services and early diagnosis found in Manaus.

Another indicator that measures quality of care is the proportion of new cases receiving the WHO-recommended multiple drug regimen. Based on the current Leprosy Control Program criterion, it is defined as adequate when the number of patients receiving this protocol is equal to or greater than 98%. Thus, the finding of 99.4% of patients on this protocol shows full compliance with the recommended treatment.

In conclusion, despite a reduction seen over the period studied, detection rates remain at very high endemic levels among children in Manaus. Based on the indicators studied, quality of care and case detection at health services can be considered adequate.

Prevention and control actions should be taken to detect and treat cases as early as possible because children are very responsive to intervention at the early stages of disease.⁹

^a Brazilian Ministry of Health. Situação epidemiológica da hanseníase no Brasil. Brasília; 2007. [cited 2007 Apr 13]. Available at: http://portal.saude.gov.br/portal/arquivos/pdf/situacao_hansen_2007.pdf

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