

LEPROSY AS A LOW PREVALENCE DISEASE

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ABSTRACT- *With the rapid progress in the control of leprosy due to the implementation of WHO-MDT and the positive modification carried out in the health services system that accompanied MDT introduction, the prevalence of leprosy is facing a steady reduction worldwide, making possible that in the next 10 years leprosy becomes a low prevalence disease in endemic countries.*

At this stage, components of a leprosy control program should be reviewed as concern their priority. Maintenance of diagnosis and treatment services, supervision and an attentive surveillance system are fundamental. Support to Reference Centers is mandatory to guarantee their role as reservoir of knowledge and for the development of research still in need.

POD and rehabilitation will play a predominant role provided leprosy is, at that time, to be regarded as a disability-and deformity- producing disease and there will be more time and funds available to be allocated to these activities since a significant load of cases in need for these activities will do exist, which should not and could not be ignored. From available data in the literature, the author presents an estimation on the size of the problem and suggest the adoption of new indicators.

Key-words: *low prevalence. Prevention of Disabilities. Leprosy Control Programs.*

1. INTRODUCTION

With the rapid implementation of WHO recommended MDT and its large acceptance we are facing an important decrease in the prevalence of leprosy in most of endemic countries, due both to the review of records and to the reduction and limitation in the period of treatment with MDT. Additionally, the goal of elimination of leprosy as a public health problem to the year 2000, adopted by governments of most endemic countries, has been playing an important role to increase the political commitment to the control of leprosy, by means of prioritizing activities and allocation of human and financial resources. If these conditions

are maintained, within a decade endemic countries will be facing a new and unique situation - leprosy will become a low prevalence disease.

Taking into consideration that leprosy is a millenary disease we may say that the most relevant facts to its control are being achieved in a quite recent and short period of time: the introduction of dapsone in the 40's, the implementation of WHO-MDT in the 80's and the elimination of leprosy by the year 2000. In this connection, it is important to think about leprosy as a low prevalence disease and to anticipate, from the managerial point of view, needs to come in this future situation.

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2. LEPROSY AS A LOW PREVALENCE DISEASE

According to the Brazilian Ministry of Health leprosy will become as low prevalent disease when it reaches a prevalence rate of less than 1 case/ 10.000 inhabitants (1). This definition equals to the goal of elimination of leprosy approved by the 44th World Health Assembly (WHO) in 1991.

The relation between the prevalence rate and the detection rate plays also an important role in the identification of a low prevalence situation. In this sense the Ministry of Health uses as a parameter to define an area as being in the

maintenance stage of elimination if the prevalence rate is 1/10.000 or below this figure and, additionally, the prevalence/detection ratio should be between 1 and 3. In the present situation of the National Plan for Elimination of Leprosy, no State in Brazil has attained this goal.

Another approach to this issue refers to the two stage proposal of YUASA (2) where the prevalence/detection ratio is found to be high in the first stage, (may reach up to 10:1), mainly due the large backlog of untreated or insufficiently treated cases. To the second stage, the trend for a prevalence/detection ratio is of 3:1 which is also adequate to define an area as having a low prevalence of leprosy.

Table 1 - Situation of Brazilian States as regards the stages of the National Plan for Eliminating Leprosy as a Public Health Problem in 1994.

STATE	STAGE	Prevalence/Detection Rate
Rondonia	intensive	4.7
Acre	consolidation 1 st phase	4.0
Amazonas	intensive	6.0
Roraima	consolidation 1 st phase	5.6
Para	consolidation 1 st phase	4.4
Amapa	intensive	3.6
Maranhão	consolidation 1 st phase	8.1
Piaui	consolidation 1 st phase	5.0
Ceara	consolidation 1 st phase	3.5
Rio G. Norte	consolidation 1 st phase	5.5
Paraíba	consolidation 1 st phase	3.1
Pernambuco	consolidation 1 st phase	3.7
Alagoas	consolidation 1 st phase	5.2
Sergipe	consolidation 1 st phase	2.7
Bahia	consolidation 1 st phase	3.5
Minas Gerais	consolidation 1 st phase	9.4
Espirito Santo	consolidation 1 st phase	9.3
Rio de Janeiro	intensive	7.7
São Paulo	intensive	8.4
Parana	intensive	19.8
Santa Catarina	consolidation 1 st phase	9.0
Rio G. do Sul	consolidation 1 st phase	14.4
Mato Grosso	intensive	4.1
Mato G. do Sul	intensive	7.8
Goiás	intensive	4.5
Tocantins	intensive	4.9
DF	consolidation 1 st phase	5.4

3. A NEED FOR NEW INDICATORS

There are at least two indicators that should be introduced to handle leprosy as a low prevalence disease: the proportion of cases released of treatment with disability grade 1 or 2 and the cumulated prevalence. These indicators are of utmost importance to the analysis of emergent needs, mainly those concerned to prevention of disabilities (POD) and rehabilitation.

The proportion of cases released of treatment with disability grade 1 or 2 should be calculated as follows:

Proportion of RFT case with disability 1 or 2	$\frac{\text{number of RFT cases showing disabilities 1 or 2}}{\text{total number of RFT cases}} \times 100$
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6. NEW STRATEGIES FOR LEPROSY AS A LOW PREVALENCE DISEASE

Irrespective of the parameter utilized to define a region as of low prevalence for leprosy, after more than 10 years of WHO-MDT implementation and the reorganization of health services, the actual situation is of increasing reduction in the prevalence of the disease. In this connection, health policies regarding leprosy should be reviewed without delay to anticipate to this new and unique situation, formulating new strategies to manage leprosy as a low prevalence disease. In this sense, some issues should be discussed, as follows:

4. MAINTENANCE PHASE

It is the phase where the adopted parameters shows that a country or region has reached a prevalence rate inferior to 1 case / 10,000 inhabitants. This is also a risky phase since the attained goal may suggest that no more political commitment nor operational support is anymore necessary. It is important to stress that maintenance phase implies the maintenance of diagnosis and treatment services in the basic health network since elimination means not eradication. There will be room for basic health services to cope with a reduced but still present number of new cases which will tend to decrease

The concept of cumulated prevalence is somewhat controversial due to the fact that prevalence deals with actual cases of a disease and cumulated prevalence, as regards to leprosy, should include new cases, cases under MDT and RFT cases and this last category is not regarded as real cases of leprosy (3). Although some authors (4,5) may suggest other concepts for cumulated prevalence, as for the discussion that follows we will define cumulated prevalence as the total number of leprosy patients and ex-leprosy patients, excluding deceased cases and transfers to other countries.

in the year to come. In this connection, leprosy control managers should provide adequate and additional training in leprosy to health personnel, to assure adequate procurement and delivery of MDT drugs according to the new dimension of needs and, most of all, to guarantee adequate supervision.

Another fundamental step in this phase is the maintenance of an adequate system of surveillance with the main purpose of monitoring the trends of epidemiological indicators and allowing quick interventions to correct eventual situations such as focal increment of new cases in a given area, among others.

6. SPECIAL ACTION PROGRAMS (SAP)

Special action programs aims to cope with specific identified needs, focal and limited in time and space. Broad examples includes difficult access areas, circumscribed populations with special cultural and social behavior, groups with special needs and special areas of medium-high prevalence, with a well delimited social-geographical boundary and acting as a "pocket" within a larger region declared as of low prevalence.

These are some situations which are hardly manageable by conventional means (standard basic health services) and applies for Special Action Programs (SAP) such as the use of

new and short-term therapeutic regimens (rifampicin, ofloxacin, mynomiclin) including the mobilization of special groups of health personnel to cope locally with the identified needs of these special areas.

This sort of action should have a vertical, focal scope, limited in space and time and prepared after an adequate identification of the problem and following a well designed plan of action. The national and State or provincial level should be in charge of the implementation of these special action programs.

The present successful initiative of WHO with Special Action Projects for the Elimination of Leprosy (SAPEL) should serve as a reservoir of experiences to face needs which might emerge along the low prevalence phase. This is the connection between the present SAPEL and the future SAP.

7. REFERENCE CENTERS

International and national reference centers have an important role to play in the low prevalence phase. Main two reasons are:

- with the steady progress towards elimination it is most likely that the disease will reach low prevalence levels before some important question are comprehensively answered such as the cultivation of *M. leprae*, the intrinsic mechanism of nerve damage and, most of all, the development of an effective vaccine.

- the existence of a reduced but still important number of new cases and cases under treatment presenting clinical complications and rehabilitation demands which make reference centers necessary to act as specialized units to promote training, supervision and to treat complex clinical demands.

In conclusion, reference centers should act as reservoir of the leprological knowledge, to improve, multiply this knowledge and to seek for new solution for emerging problems. For these reasons, such center should be politically and financially strengthened in order they can play their revised role during the low prevalence phase

8. PREVENTION OF DISABILITIES (POD)

YUASA(2) in 1991 has proposed that leprosy should be considered under two stages facing the challenge of its control by MDT: stage one means leprosy solely as an infectious disease and stage two as a disability-and deformity-producing infectious disease. A careful analysis of the policies adopted by most endemic countries in the past years clearly reveals that the first approach (solely a infectious disease) has been largely adopted. In this regard, no time and funds should be allocated to POD and rehabilitation. In Brazil, this approach was also adopted although not strictly. Some priority has been given to POD and rehabilitation activities without compromising priority activities such diagnosis of new cases and MDT treatment.

However, POD has its main place in the phase of low prevalence and this is in consonance with the stage two proposed by YUASA (2) where leprosy can and should be regarded as a disability - and deformity - producing infectious disease. Although early diagnosis and adequate treatment with MDT has prevented considerable number of cases with disabilities (6), the potential of leprosy for disability production is a reality and we may expect an expressive number of cases with disabilities among those regularly treated with MDT. For these reasons we can assure that POD activities will have an important place in the low prevalence era and, moreover, these action will be the most time and resources consuming. In this regard, we have been seeing an increasing interest and concern of leprosy control managers to anticipate to POD needs by introducing this issue in the agenda of meetings, by supporting specific publication in this field (7,8) chapters on this regard in general leprosy books, manuals and technical guides (3).

Additionally, we understand that the leprosy control program is the one responsible to manage the needs for POD which should be implemented and offered by the basic health network.

9. REHABILITATION

Taking into consideration the same reasons presented in the above POD section, the rehabilitation actions are also of utmost importance in the low-prevalence phase. At this time leprosy health services will be facing an important demand of cases in need for surgical correction, orthosis, prosthesis, vocational training and settlement and social rehabilitation as a whole.

Here is the moment to discuss **who** is responsible for undertaking these actions. We strongly believe that the basic health network that has been diagnosing and treating leprosy patients should be in charge of **identifying** these needs and adequately **referring these** individuals, being them cases (under treatment) or RFT cases. However, it should be neatly clear that the health unit should not and can not be responsible for implementing actions of rehabilitation. For these, we suggest the use of the governmental and private network of specialized institutions to handle this specific demand. In this sense, it is mandatory the participation of the national and State/Province level to set relations among institutions to discuss this issue. Among these institutions to be contacted and cooped we mention University Hospital, General Hospital in the governmental health system and private or governmental special Rehabilitation Facilities devoted to other diseases than leprosy (polio, trauma, etc.). The relations of leprosy control managers with these institutions should include availability to offer specialized training to the health staff of these institutions utilizing the references centers above mentioned; to increase the awareness of health personnel as a whole as regard rehabilitation of leprosy patients by stimulating and assuring leprosy rehabilitation issues in the agenda of congress of related specialties such as plastic surgery, orthopedic surgery, neurosurgery, physical medicine, social workers, psychology, physical therapy, occupational therapy, among others (9).

In review, the rehabilitation action should be undertake by the community based health institution which normally deals with other conditions in need for rehabilitation procedures. It is the role of the leprosy control manager to establish these relations and it is the role of the

health unit which treats the patients to identify the needs and to know where to refer. With this strategy, we can guarantee adequate qualitative and quantitative attention to the rehabilitation needs of leprosy or ex-leprosy patients, we stimulate social integration, fight stigma and reduce costs for the leprosy control program.

10. THE SIZE OF THE PROBLEM

To all these proposals for the low prevalence phase, the estimation of the size of the problem is essential to its analysis and to the establishment of adequate policies.

Unfortunately, the amount and quality of data available is quite reduced to arrive to a conclusive response. However, an estimation is possible and necessary.

ALMEIDA (10) presents an exercise of estimation which is relevant to an specific high endemic region of India. He says that the final number of patients and ex-patients (cumulated prevalence as defined above) presenting with some sort of needs after 18 years of starting a MDT program in this same region is estimated to be 145 % greater than the initial number of cases. In this final percentage are include a few new cases, some cases still under MDT treatment, RFT cases and those cases presenting disabilities.

In Brazil (11), considering global data for 1992, the disability grade was evaluated in 79.66% out of 34.451 newly detected cases. Among these 27,443 new cases (79.66%) the distribution of cases among the disability grade was: 75.25 grade zero, 16.16% grade 1 and 8.59% grade 2 and 3 (that means, grade 2 by the new WHO system of grading) (table 2.).

Table 2 - Distribution of disability grade among new cases evaluated in Brazil, 1992.

GRADE	NUMBER OF CASES	
0	20,650	75.25
1	4,435	16.16
2/3*	2,358	8.59
Total	27,443	100.00

(*)That means grade 2 according to the new grading system suggested by WHO. In Brazil this system is yet not in use.

The assignment of actions to be provided to cases according to the disability grade should be as follows (table 3.):

In brief, **Health education actions** are those related to the establishment of an adequate communication between the health worker and the patient, the transfer of knowledge about leprosy including possible ailments, assuring that the patient will be willingly to seek for help when needed and teaching of protective measures for

insensitive areas. **POD activities** includes all sort of prevention measures in case of anesthesia of hands, feet, eyes by means of simple techniques such as self care, protective measures and other specific measures for cases with grading 2 and 3 (see * above) such as exercises, massages, dressings, etc.. **Rehabilitation actions**, in this sense, means more complex activities such as surgery and other activities aiming ultimately the social integration of patients. Of course, all

Table 3 - Assignment of basic actions according to the disability grade.

GRADE	Health education actions	POD actions	Rehabilitation actions
0			
1			
2 e 3*			

(*) That means grade 2 according to the new grading system suggested by WHO. In Brazil this system is yet not in use.

these actions are applied according to the amount of damage identified since inside the oversimplification of the WHO grading system there is a large spectrum of different findings.

The analysis of available data on the prevalence of deformities reveals a variety in its distribution as one can see in table 4.

Taking into consideration the Health education actions, 100% of cases that shows up at the health unit will require this activity, since it is activity defined as one of the component elements of a control program of leprosy (12,13).

POD actions by means of simple techniques, both for prevention of the onset of disability orto prevent the worsening of any present disability, may apply to cases with disability grade 1,2 and 3 (or 1 and 2 accordign to the new WHO grading system). Although it is difficult to analyze the available data in the literature, due to the heterogeneity in data collection, we may infer that at least 30% out of all patients and ex-patients will need such intervention.

Rehabilitation actions are intended to a more specific group including those with major deformities and disabilities correctable or amenable by surgical procedures, more complex physical therapy attention and other rehabilitation

procedures. The available data in literature concerning the prevalence for these actions is very scarce and widely variable. The Ministry of Health from Myanmar (14) estimated needs for reconstructive surgery in 2 to 5 percent of all cases. Some authors estimate the same needs to 20% (15) or 30-40 percent of all patients (16). For purpose of a global estimation, we can assume that 20 percent of all cases is a reasonably figure.

In brief, the estimate for demand of services in the area of health education, POD and rehabilitation can be demonstrated in table 5.

It is important to point out that data on disability is obtained from the prevalence data and that with the reduction in the period of treatment with MDT, RFT patients are not part of the prevalence anymore. For this reason and also

Table 5 - Estimation for demand of services in the area of health education, POD and rehabilitation among leprosy patients and ex-patients.

action	%
health education	100
POD	30
rehabilitation	20

Table 4 - Partial list of some available information on prevalence rate or absolute prevalence of disabilities among leprosy patients.

YEAR	AUTHOR	FIGURE	OBSERVATION
1960	WHO Tech. Rep. Ser.	25%	"circa 25% of all leprosy patients in the world show some kind of disability".
1960	Montestruc	40 %	out of 589 patients in Central America
1960	Bechelli & Martinez	23.4%	WHO Leprosy Ad. Team data for Nigeria
1961	Bechelli & Martinez	35.6%	WHO Leprosy Ad. Team data for Camerron
1962	Bechelli & Martinez	41.46%	WHO Leprosy Ad. Team data for Thailand
1963	Bechelli & Martinez	48.7%	WHO Leprosy Ad. Team data for Burma
1963	Bechelli & Martinez	32.32%	WHO Leprosy Ad. Team data for Philippines
1964	Bechelli & Martinez	35.85%	WHO Leprosy Ad. Team data for Argentina
1966	Noordeen et al.	35,5%	
1967	Nagabhushanam	39.5%	among 410 patients in Tirupati, India
1969	Noordeen & Srinivasan	19.4%	out of 412 patients in Chingleput. Probably only grade 2-3* were included
1970	Rao et al	42,9%	a study from Karigiri
1977	Hasan	44,3%	study in an endemic area in Hiderabad, India
1981	Kushaw et al.	30,23%	study in a health unit in India
1981	Smith et al.	31 %	
1984	Reddy & Bansal	16,23%	study in a rural population
1985	Sehgal and Sharman	30%	study in an urban area
1988	Mishra et al.	21,1%	exclude grade 1
1989	Girdhar et al.	44,6%	study in India in a group of 514 patients
1992	Brasil, M. Health	24,75%	grade 1,2 and 3(*) among new cases evaluated in 1992
1994	São Paulo, Sec. F. Health	40,5%	among 2.532 new cases evaluated in 1994 in the State of São Paulo. Grades 1,2 e3(*)).

(*) That means grade 1 and 2 according to the new grading system suggested by WHO. In Brazil this system is yet not in use.

taking into consideration the high rate of defaulters in Brazil, we can infer that the problem of disabilities and deformities among individual in the cumulated prevalence should be greater than one can initially estimate. In this connection, a fall in the prevalence rate of leprosy and a reduction in the proportion of new cases showing disabilities do not necessarily mean a fall or reduction in the global prevalence of disabilities (17). This can be explained by the natural tendency of deterioration of disabilities and by the withdrawal of cured cases from official records. With the introduction of MDT and the related improvement of health services (early diagnosis) it is understandable a reduction of disability prevalence among newly detected cases. However, and to some extent, the deterioration of disabilities is a natural and

of the disease, an intrinsic potential which develops in a rate tied to some factors such as clinical form of the disease, sex, age, onset of the disease, social condition, treatment compliance, availability of effective actions of health education and POD, among others. One should note that this rate varies from a fixed non-evolutive grade zero (most desirable) to a progression from zero to grade 3 (grade 0 to 2 as for the new WHO grading system) with all sort of intermediary steps.

For these reasons, the estimate for demand of services should be calculated on the accumulated prevalence and not on the point prevalence. This is by far more important in the future phase of low prevalence of leprosy.

In this connection, in the period 1989-1993 the accumulated prevalence in Brazil is

392,593 individuals. In this same period 128,359 are RFT cases. This are those individual mentioned above whose data are not available anymore and where the potential to develop disabilities/ deformities is still present. If they are not in the official records, the official estimation for demand of services (health education, POD, rehabilitation) is severely biased.

Taking into consideration data and projections discussed hitherto, table 6 shows an hypothetical estimation for demand of the above mentioned services that would be necessary by the end of 1993 in Brazil.

Table 6 - Estimation of number of individual (patients and ex-patient) in need for specific actions in December 1993 in Brazil.

actions	estimated number (absolut)
health education	392.593
POD	117.778
rehabilitation	78.519

If we hypothetically considered that the leprosy control program in Brazil has been implemented from 1989 and on and being 266,578 the prevalence of leprosy in Brazil in December of 1989, the acumulated prevalence (392,593) at end of the analyzed period (December 1993) means an quadrennial implement of 47.27 percent. In this regard, we may used this percentage of increment as a basis for a global estimation of the size of the problem in each period of 4 years, although some bias do exist due to a possible significant decrease in the detection rate that may occur in years to come.

Back to the specific issue of rehabilitation actions, we should mention that in the same period (1989-1993) approximated 400 surgical procedures of strict rehabilitation purpose (tendon transfer, arthrodesis, nerve releases) were performed in the Instituto Lauro de Souza Lima, in Bauru, Brazil. This figure is derisory if one consider the estimated demand for such services in Brazil in the same period (78,519 patients or ex-patients in need of one or more procedures!). It is interesting also to know that, from non-published data, in a 12 years period (1982-1994) only 2,193 rehabilitative surgical procedures where performed in the top 6 centers in Brazil were specialized surgeons and related staff are available for leprosy surgical procedures. The mentioned centers are Rio Branco, Belem, Guarulhos, Recife, Salvador and Bauru. Of course, other procedures have being performed in known or unknown centers but data is not available for analysis. However, these other procedures do not exceed 10 % of the mentioned figure.

Again, the analysis of figures reveal a derisory number of procedures facing the estimated demand, moreover because the period in which these procedures were performed is by far great (12 years) than the period (1989-1993) used to calculate the estimation of the demand.

To corroborate the above discussed estimations, we present data for the State of São Paulo, Brazil (18) where 911 RFT cases presented disability grade 2 or 3 (that is, grade 2 by the new designation of WHO) at the moment of release from treatment only in 1994 (Table 7). They also estimate that in the past years more than 7,000 patients were released from treatment showing grades 1, 2 or 3 (*).

Table 7 - Leprosy patients RFT in 1994 in the State of Sao Paulo in relation to the disability grade at the moment of release from treatment.

GRADE	PB	MB	TOTAL
0	1360	2937	4297
1	203	801	1004
2+3(*)	144	767	911
TOTAL	1707	4505	6212

(*) Grade 2 by the new designation of WHO.

In conclusion, rehabilitation actions have a place in the future low prevalence phase, some strategies have already been settled (9,19,20) and managers should anticipate to the future needs and start discussing the implementation of rehabilitation actions mainly by means of liaisons with specific community based health facilities in order that, when the low prevalence era arrives, an adequate referral system will be concretely available to cope with the needs that will certainly be present in the future.

11. CONCLUSION

With the rapid progress in the control of leprosy due to the implementation of WHO-MDT and the positive modification carried out in the health services system that accompanied MDT introduction, the prevalence of leprosy is facing a steady reduction worldwide, making possible that in the next 10 years leprosy becomes a low prevalence disease in endemic countries.

At this stage, components of a leprosy control program should be reviewed as concern their priority. Maintenance of diagnosis and treatment services, supervision and an attentive

surveillance system are important elements in this future stage. Support to Reference Centers is fundamental to guarantee their role as reservoir of knowledge and for the development of research still in need. POD and rehabilitation will play a predominant role provided leprosy is, at that time, to be regarded as a disability-and deformity-producing disease and, due to the decrease in prevalence and detection rate, there will be more time and funds available to be allocated to these activities since a significant load of cases in need for these activities will do exist, which should not and must not be ignored.

Lastly, we should warn that comments and estimates presented in this paper have been made upon scarce available data, lacking, to some extent, homogeneity and, mainly those regarding disabilities, most likely to suffer influences of many intervening variables (21) which could modify significantly its analysis. However, the aim of this article is to warn managers of leprosy control programs to the urgent need for reviewing components and priorities in order to anticipate programs to the new challenges they will be facing in the near future of leprosy as a low prevalence disease.

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