NEW CASE DETECTION AND PREVALENCE RATES IN LEPROSY

To measure the extent of a given disease, certain parameters are needed to describe its existence and concern in an area. Such measures are incidence and prevalence among others. In leprosy, since incidence is difficult to measure in the absence of identifying the population at risk, a proxy parameter like new case detection rate (NCDR) is considered for all practical purposes for incidence of leprosy. However, the population denominator at risk is always less in incidence than in prevalence. While measuring NCDR, population denominator is the same as in period prevalence. Epidemiologically, new cases detected are added to the existing pool of cases to compute period prevalence; thus, period prevalence should not be smaller than the NCDR. However, many studies\(^5\)-\(^7\) have reported higher NCDR than prevalence (probably point prevalence) and others\(^5\)-\(^7\) reported lower NCDR than prevalence (probably period prevalence). Many studies do not mention clearly whether they are reporting point or period prevalence, and this often leads to confusion. This letter attempts to explain that NCDR be always lower than period prevalence of leprosy.

Using any standard text book definitions of incidence and prevalence, one can define incidence, NCDR and prevalence of a disease as below:

(1) Incidence = Number of new cases detected/Population exposed (I = NC/Pe)  
Pe would be less than total population P in most cases.
(2) NCDR = Number of new cases detected in a year/Mid-year population (NCDR = NC/P)
(3) Period prevalence = (Number of active existing cases from the previous year + Number of new cases detected during current year)/Mid-year population [Pr P = (EC + NC)/P]

Point prevalence is simply total cases at a given point of time/population. Given points can be, say, 1 January or 31 December. The denominator in point prevalence may be different from that in period prevalence or NCDR, thus they are distantly connected with each other.

The period prevalence is thus the sum of two components (EC/P + NC/P), whereas NC/P is NCDR during the year. EC/P should equals to point prevalence in case population growth during a 6-month period is zero, otherwise it would be lower than point prevalence. Obviously, period prevalence in a given year thus can never be smaller than the NCDR in the same year.

How should prevalence be computed in leprosy?

In practice, there is a backlog from the previous year of leprosy cases, all or a fraction of which would be on treatment in a given year (namely EC); some of these cases would be treated as cured clinically during the year (CC) and due to increased/repeat investigation or population surveys, there would be new cases detected (NC). For convenience, the population denominator is the same and taken during mid-year for time reference. Thus, the period prevalence per 10,000 population during the year \( t \), would be equal to \( \frac{[EC(t) + NC(t) - CC(t)]}{P} \times 10,000 \). Period prevalence is a more stable indicator for measuring disease trends in comparison to point prevalence.
Example

Data\textsuperscript{3–10} used from Madhya Pradesh (India) and West Bengal (India) have been shown in the existing format and modified format using above method (Figure 1). One can clearly see the distinction between the curves of NCDR and prevalence. While NCDR exceeds at several places in left panel of figures and NCDR never touches the (modified) prevalence curves on the right hand side. A reduced gap between the two curves indicates the impact of treatment causing decline in the reported prevalence.

However, data\textsuperscript{3–7} from Zimbabwe, Taiwan and Brazil (Figure 2) have computed prevalence as it should be, and their NCDR has not been higher than prevalence, thus causing no concerns of ambiguity.

Conclusion

The computed NCDR can never be higher than the period prevalence of leprosy in a given year, thus care needs to be taken to publish the correct figures to avoid misunderstanding among readers and programme managers. This would help maintain clarity in the performance indicators such as prevalence and NCDR of a given country.
Deputy Director  
Central Jallna Institute For Leprosy (ICMR)  
Taj Ganj, Agra 282001  
Email: biostat@sancharnet.in

References

10. NLEP Status Report, March 2000, West Bengal, India.

**Figure 2.** Prevalence and NCDR in Zimbabwe, Taiwan and Brazil.