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POPULATION SCREENING FOR EARLY DETECTION OF LEPROSY

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The objective of the study of the epidemiology of leprosy is to obtain the information required for the correct planning and implementation of a realistic control programme.

1. The first objective is therefore to identify the population "at risk", as distinguished from the population "not at risk". Such distinction has various aspects, and is at the basis of the screening process of the whole population at large.

1.1 The first activity related to this objective consists in defining the size and location of the population harbouring the cases (foci). It is therefore a geographical mapping process. Such mapping is restricted in rural and urban areas to the human communities where cases have been reported. As an example, if in a country we have a population of 5 million and a total number of 500 cases, of which 450 rural and 50 urban, we may like to ascertain the usual residence of each case prior to its detection and therefore to its transfer elsewhere. Such place of residence (focus) may be either a medium-size village, or an urban community. Assuming as in the example given above, that we have identified 250 localities of origin with an average population of 500, we may say that the population at risk is 250 x 500 or 125 000. We have therefore restricted our population subject to screening to 2.5% of the total population. Furthermore, we know from other studies that most of the undetected cases are within the first and second levels of contact. As we may recollect, we had arbitrarily restricted such levels to an average of 10 persons at the first level (household) and an average of 50 persons at the second level (working environment). This would indicate that the highest probability of finding cases would be through the examination of approximately 5 000persons at first level (500 x 10) and 25 000 persons at the second level. It should be recalled that the third level corresponds to the size of the population at risk, i.e. as calculated above , approximately 125 000 persons.

1.2 The second activity of the epidemiological study consists in finding out the reasons why "at risk" population groups still harbour the disease while other groups living in similar environments are relatively free. This implies detailed clinical and ecological studies among the affected population groups as compared to the others.

The epidemiologist has to compare general ecological conditions such as social, racial, economic, nutritional, environmental, hygienic, climatic, etc. likely to be significantly different among apparently similar areas. Such study may reveal further elements likely to help in understanding the risk factors, as well as to bring into light those constraints, mostly social and educational, which might be an obstacle to the implementation of epidemiological surveillance and to the combined therapy programme.

1.3 The third activity of the epidemiological study aims at quantification of the transmission of the disease, practically giving a numerical value to the main epidemiological indices of prevalence and incidence of the disease. Such quantification is not only necessary at the beginning of the control programme, but needs to be continuously established for the purpose of evaluating the programme. The quantification of these two indices has to be made in relation to the population at risk but is most important and can be restricted to the first and second levels which are the most productive of new cases. The slow process of development of the disease, and the long asymptomatic interval make it necessary to conclude that a continuous evaluation based either on prevalence or on incidence might require long periods of observation (5-10 years) for an appropriate and accurate evaluation in the course of time.

In reality if a large scale control programme is initiated at time t_0 the next realistic evaluation for comparison purposes t_1 may be as far as five years from t_0.

A more immediate index for the purposes of evaluation is the follow-up of the multibacillary cases which are responsible for the reproduction of the disease.

It can be generally accepted that the reduction of the relative numbers of multibacillary cases is correlated to the reduction of transmission of the disease. Present therapeutic resources, particularly the combined multidrug therapy are expected to result in a drastic and rapid fall of this index. The important evaluation aspect is not as much the rapid reduction of the index as it is its maintenance at low levels for a sufficiently long period of time up to complete disappearance.

This activity therefore implies also clinical/bacteriological examination of multibacillary cases and estimate of repeated prevalence rates over the total population at risk at third, second and first levels.

2. The second objective of the epidemiological study is to evaluate the programme on the basis of the clinical status of the cases. This objective implies on the part of the examiner an adequate knowledge of differential dermatological diagnosis as well as the availability of laboratory facilities.

2.1 The first activity related to this objective is the identification and classification of the cases encountered. While accurate classification would be desirable, the large gamma and the variety of clinical aspects may be an obstacle to precision. It should be noted nevertheless that a relative precision may be as good a tool for evaluation as a very accurate one. In practice the simple distinction between multibacillary and paucibacillary may be sufficient for the purposes of evaluation as indicated above, (1.3).

2.2 The second activity aims at verifying the likelihood of the cases to infect others. Therefore, viability and quantity of mycobacteria excreted by multibacillary cases is an essential evaluation tool. This aspect implies the existence of accessible simple laboratories where bacteriological and morphological indices can be repeatedly derived from treated patients during the whole course of the control programme. Part of this process is the early identification of failures which may either be due to irregularity of treatment as well as to the occurrence of resistance to drugs. Appropriate laboratory facilities should be accessible for this purpose.

2 3 The third activity of the second objective concerns the location and mapping of cases showing resistance to drugs. This is an essential study as it indicates that these areas require early and well experienced multidrug treatment in order to prevent the spread of primary resistance and contain secondary resistance to drugs.

To summarize :

Two main objectives of the epidemiological study have been identified :

1. Identification of population at risk.
2. Evaluation of the control programme through clinical and bacteriological examination and follow-up of individual cases.

Six specific activities have been identified :

1.1 Identification and mapping of foci.

1.2 Identification of the reasons for persisting transmission.

1.3 Determination of indices of transmission.

2.1 Classification of cases for evaluation.

2 2 Determination of viability of mycobacteria.

2.3 Mapping of resistance to drugs.

The epidemiological service aims therefore at providing at all stages that kind of information necessary for planning implementation and continuing evaluation of the programme.

The mapping of the population "at risk" and of the foci of persisting transmission as well as the quantification of population and localities allows proper planning for the estimation of staff, facilities, transport and drugs required.

The identification of the likely reasons for persisting transmission allows the appropriate planning of those parallel measures of hygiene, health education, social, behavioural, and environmental changes required for the implementation of the programme and possibly stimulate that type of social and economic development which has made the disease disappear in many countries.

The determination of indices of transmission allows the continuous evaluation of the programme and the bacteriological follow-up ensures that the programmes do not result in the loss of the present valid therapeutic tools for control.

Finally, the epidemiological studies are necessary to ensure, since the onset, the baseline information for the organization of the logistics of the programme and an accurate forecast of the required financial resources.