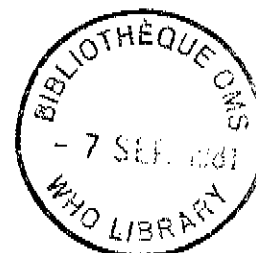




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TUBERCULOSIS CASE-FINDING

A Review of Case-finding Methods and Problems of Delay in Case-finding

by

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1. Role of Tuberculosis Case-finding in Tuberculosis Control Programmes

Tuberculosis case-finding in combination with an appropriate treatment programme occupies an essential part in the national tuberculosis control programme, as the chain of transmission of tubercle bacilli in a community could be cut by shortening the duration of infectiousness of tuberculosis patients.

Case-finding should not be initiated unless the treatment facilities for detected patients are provided, and this is particularly important in developing countries.

2. Significance and Limitation of Mass Miniature Radiography (MMR) and Importance of Passive Case-finding

MMR had been carried out as a spear-head of the tuberculosis campaign in several countries, and it contributed a lot to the promotion of the programme including the organization and cooperation of voluntary activities to the tuberculosis programme. The voluntary activities have been expanded to several other related areas such as respiratory disease, heart disease, etc. Indiscriminate MMR, however, was abandoned in many countries because of its low efficiency.

Mode of detection of newly diagnosed tuberculosis patients was investigated in several countries with MMR programmes. It was found that the majority of new cases were detected by symptomatic visits to clinics in spite of repeated MMR, and this trend was more marked in smear positive cases. The fact could be explained first by the quantitative and qualitative limitation in MMR, and secondly by the nature of tuberculosis itself.

It is often difficult to achieve high coverage in MMR programmes especially in the case of the general population, and if MMR is repeatedly done, those who are examined and not examined tend to be fixed, and high prevalence groups of tuberculosis are often found in the latter.

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The overall quality of MMR programmes is determined by the product of the quality of miniature film, its interpretation and guidance given to detected patients to send them to treatment. Assuming the full score of each process as 1.0 and actual score as 0.8, the overall quality is calculated as $0.8^3 = 0.512$. Accordingly, only 51% of all cases existing among those examined by MMR are sent to treatment, and the remaining 49% are missed.

Tuberculosis was once believed to be a disease with no or only slight symptoms. A survey on newly detected patients indicates that the proportion of patients complaining of symptoms spontaneously is rather high. This fact can be explained by the step by step progression of pulmonary tuberculosis from cavity. During and soon after the progression, tuberculosis which is ordinarily a chronic disease shows an acute phase with symptoms of acute inflammation such as fever, tiredness and malaise, and symptoms of respiratory infection such as cough and sputum. These symptoms are similar to symptoms found in the common cold, but in the case of the common cold, they disappear within a few days or a week, while symptoms of tuberculosis progression persist for 2 weeks or longer. In many of the above cases, patients are motivated to visit clinics. If a disease develops to an advanced stage, symptoms are complained of constantly.

One other important factor is the speed of progression of tuberculosis. A retrospective study of previous chest MMR of newly detected patients revealed that approximately half of the new bacillary or cavitory cases showed normal or only healed findings in a previous picture taken within one year, and the disease progressed rapidly to bacillary tuberculosis.

The role of repeated MMR in detecting diseases could schematically be expressed as shown in Fig. 1. In this figure, a lapse of time is taken in horizontal axis and the severity of disease in the vertical axis. A detectable limit can be set, below which lesions cannot be detected. A curable limit can be set for different diseases with different treatment efficacy. From this figure it is quite clear that the repeated MMR is effective to find out and cure only cases with slow progression, and the faster the progress of the disease, the lower the efficiency of MMR. The quality of MMR is expressed in a height of detectable limit, and the wider the range between a curable limit and a detectable limit, the better the efficiency of MMR. Moreover, several slight lesions, the real origin of which is unknown, may come up, and they very often disappear spontaneously and only a part of them develop to bacillary pulmonary tuberculosis. If MMR is repeated, such slight lesions might be detected and treated as tuberculosis.

Considering all these facts, a passive case-finding or symptomatic visit to clinics is essential in case-finding of tuberculosis, and MMR is to be confined only to high risk groups.

3. Priority in Case-finding

As all the facilities are already provided in developing countries not only bacillary cases of tuberculosis but also abacillary tuberculosis suspects are subjected to a routine case-finding programme without any difficulty.

In developing countries, however, the situation is quite different. As the budget, health manpower and other facilities are limited in most of the developing countries, priority is to be given to a certain group of patients. Priority in case-finding is to be determined by medical and social factors. From the medical point of view, the grade of risk to the public and to the patient himself is important. It is a well known fact that smear positive cases are most dangerous as a source of tuberculosis infection. As to the prognosis of patients, smear positive cases showed the worst prognosis, and the next culture positive cases. These facts indicate that the priority in case-finding in developing countries should be given to smear positive cases of tuberculosis, then to bacillary tuberculosis including culture positive cases.

From the social point of view, as the majority of the population in developing countries are living in the rural area, the priority is to be given to the rural area, where several unfavourable conditions for the implementation of a case-finding programme, such as the lack of electricity supply, and poor transportation facilities, exist.

4. A Review of Techniques Used for Case-finding

Factors which are used for reviewing techniques used in case-finding are sensitivity, specificity, reliability, feasibility, cost, acceptability and safety. Tuberculin testing is very sensitive to detect tuberculosis infection, easily feasible, not expensive, acceptable and safe, but because of its low specificity, it cannot be used in detecting tuberculosis patients.

Chest X-ray examination is very sensitive. Specificity is better than tuberculin testing, but less specific than sputum examinations. It is quite suitable to screen tuberculosis suspects in developed countries, but its cost and maintenance are major obstacles to its use in developing countries, especially in the rural area.

Bacteriological examinations are major tools used for case-finding. Smear examination of sputum is less sensitive, but it is enough to detect the most dangerous sources of tuberculosis infection, and it can be carried out in any part of the developing countries. Culture examination is more sensitive than smear examination, and identification and drug sensitivity tests can be done only after obtaining culture positive results. The diagnosis as tuberculosis is confirmed only by culture examination. Major obstacles to introducing culture examination in case-finding programmes of developing countries are its cost and the need for trained laboratory technicians and an incubator.

The minimum requirement for tuberculosis case-finding in developing countries is to provide facilities for sputum smear examination of tubercle bacilli to be implemented in any part of the country, and if this target is reached, the adoption of culture examination might be considered as the next step. X-ray examination facilities, if they exist, can be used for screening patients with persisting respiratory symptoms with negative results on smear examination.

5. Quality Control of Techniques Used for Tuberculosis Case-finding

The quality control of techniques used for case-finding in most peripheral parts of the country is very important to keep its technical standard above a certain level.

In the case of sputum smear examination, it is usually recommended to keep all positive slides and randomly selected negative slides to be checked by the expert, and to give in-service or special training to those who showed rather unsatisfactory results in a routine checking. If a culture examination could be done for a certain number of sputum specimens simultaneously with smear examination at the central or regional laboratories, it is also a good occasion for the quality control of both smear and culture examinations.

In the case of X-ray examination, the quality of X-ray picture is to be evaluated, and an independent dual reading of X-ray films is recommended to avoid overlooking causes by human error.

6. Delay in Case-finding

Delay in case-finding is divided into the delay in visiting health facilities after the appearance of symptoms (patient's delay), and the delay in making diagnosis as tuberculosis after the patient's first visit to health facilities (doctor's delay).

In developed countries, the delay in case-finding is in general not serious. Experience in Japan indicates that far advanced cavitory cases occupied only a few per cent of newly detected cases. A matched pair study of far advanced cases and the control (moderately advanced or slight cases) showed that the proportion of cases making their first visit to clinics within one month after the appearance of symptoms was 20% in far advanced cases and 76% in the control, while the proportion of cases diagnosed as tuberculosis within one month after the first visit to clinics was 72% and 76%, respectively. The fact indicates that the delay in case-finding is caused mainly by the patient's delay, but such cases are rather rare.

On the contrary, the delay in case-finding is a serious problem in developing countries. Patient's delay is caused by the following factors:

- (1) Insufficient motivation of patients: due to lack of, or insufficient, health education programmes, most of the patients with persisting cough or sputum do not visit health facilities, and they come to clinics only after they have severe symptoms such as bloody sputum, hemoptysis, high fever or severe chest pain.
- (2) Social stigma and worry of diagnosis as tuberculosis: even though patients suspect that they have tuberculosis, social stigma or worry about the future life of the family or expenses for treatment after the diagnosis as tuberculosis is made prevent patients from visiting health facilities.
- (3) Shortage in basic health care facilities: though patients wish to visit health facilities, distance to clinics, transportation, poor quality of available health services, etc., discourage patients from visiting health facilities.

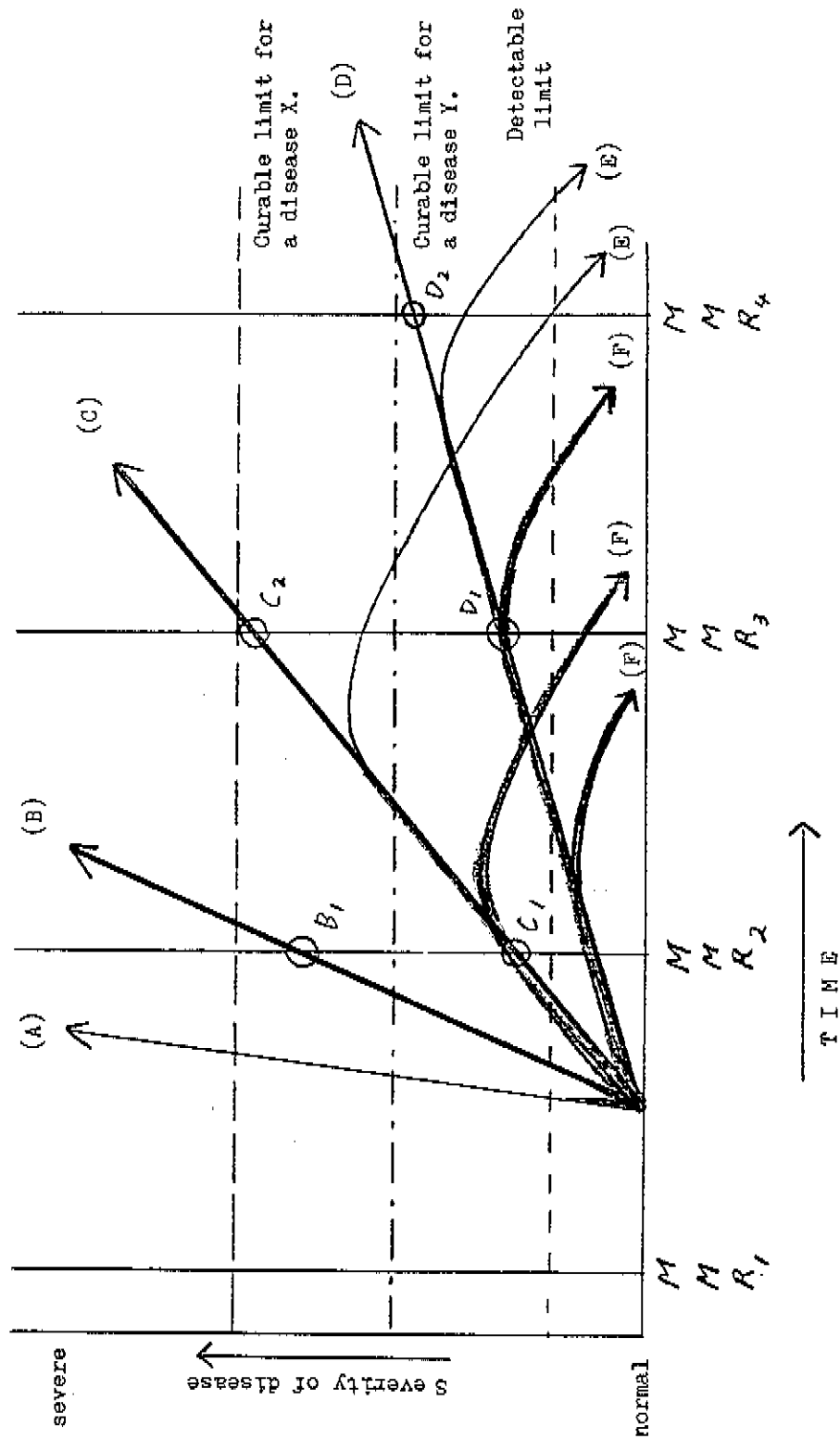
Doctor's delay is also often encountered in developing countries due to the following causes:

- (1) Poor quality of health staff; if health staff working in basic health services are not instructed properly, many patients complaining of symptoms suggestive of tuberculosis might be overlooked and expectoration of sputum is not requested.
- (2) Poor quality of examinations: even though sputum specimens are brought for examination, many cases might be missed if the technical level of examination is low.

To overcome the delay in case-finding in developing countries, it is important first to provide a basic health care service covering the whole country, and to integrate the tuberculosis control programme into the basic health care service. The training of staff working in basic health care services about the new concept of tuberculosis control and techniques used in the control is also very important. Thereafter, the health education and organization of voluntary activities to motivate the general public are to be tried.

Each country has so different a background that such a trial is to be tested in a model district in each country to elucidate obstacles in its implementation and to find out how to overcome them. Such a medico-sociological study is to be encouraged in each country, and one of the good examples is a cooperative Korean-Japanese study in the delay in case-finding and defaulter problems during treatment.

FIGURE 1. A MODEL TO EXPLAIN THE ROLE OF REPEATED MMR IN DETECTING NEW LESIONS ACCORDING TO THE SPEED OF PROGRESSION OF DISEASES.



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