The Rationale of T.B. Control Programme

Epidemiological Perspective

- Prepared by "ARCH" Mangrol
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Like all other infectious diseases, T.B. has its own peculiarities and characteristics. Unless this is firmly grasped, the adequate understanding of T.B. Control programme is impossible. One of the ways these peculiarities manifest themselves is to be seen in the fact that only in T.B. and Leprosy (which in many respects is like T.B.) the control of the infection in the community is very closely linked with treatment of individual cases. In all other infections, treatment of individual cases either has no place in control programme or has marginal role in the over-all strategy of the control programme. In T.B., treatment of individual cases dominate the strategy almost completely. This may create a misunderstanding in our minds that T.B. control programme is, after all, curative medicine with no preventive component.

For a group that is committed to primacy of prevention over cure, this state of affair may not be intuitively satisfactory. This note is also an attempt to dispel such misgivings, if they are there.

(I) T.B. - infection and disease:

T.B. is unique amongst all the infectious diseases in that its germs, having entered the human body multiply in the lungs and various organs, producing what is called infection, but not overt disease in all the victims in whom they have managed to enter. The Tuberculous germs, thereafter, may be overcome by the body's defence system and eliminated completely or may be forced to go into a dormant state. In a small proportion of cases where the body's defences are overwhelmed, Tuberculous disease is manifested, which is the only portion of the total cases of T.B. infection that is apparent to our day-to-day common perception.[1]

The things get a bit more complicated, because the portion T.B. infection in a community, which is dormant can get reactivated any time during life, producing the overt disease T.B.. This gives T.B. infection an extraordinarily large variability of incubation period. A person once infected, and in whose body the germs lie dormant, can become diseased anytime during life.

The spread of T.B. infection:

* The spread of the T.B. infection occurs by transmission of bacteria mostly from person to person and in some cases from cattle to human being, (bovine T.B.). The spread from person to person occurs almost exclusively through air.

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[1] In a situation like ours there are 300 per 1000 who are infected but only 4 to 6 per 1000 who are diseased

* All the infected persons cannot excrete the germs in the air. Only those infected and who have T.B. disease of the lung and who are actively coughing out the T.B. germs in the sputum are the ones who spread infection. The T.B. disease of organs other than the lungs (extrapulmonary T.B.) occurs through blood following primary infection. The proportion of extra pulmonary T.B. disease is quite small compared to lung T.B. disease. Extra pulmonary diseases are, therefore, of little consequence in so far as spread of T.B. infection is concerned.

  Two important points, from the point of T.B. control may be made here.

  (a) Only lung cases who are coughing out T.B. germs in their sputum (Sputum positive- open cases of T.B.) are responsible for spread of infection in a community.

  (b) These open cases of T.B. arise at different intervals and at different rates from those who are infected with T.B. germs.

* T.B. infection is a very slow infection, i.e. it spreads very slowly. A prolonged contact with a case of T.B. is necessary, which explains concentration of cases in families.

(II) <u>Factors responsible for the spread of infection in families</u>:

(a) Infection in family contact is closely related to the extent of disease and sputum positivity of the source case.

(b) Next in line is overcrowding- measured as cubic feet per person and subjective assessment of intimacy of contact -.

(c) Surprisingly enough, the household income purse is not of much importance, while what household furnishings the families purchase with their income seems to be a factor of considerable significance.

(d) Contrary to our expectations, nutrition is not a factor of any importance in the spread of infection.

(e) Infectiousness of T.B. patients decline rapidly by adequate treatment. Thus a patient who is on chemo-therapy stops infecting others although he may still be sputum positive. This is so because germs in the sputum do not remain viable once the chemotherapy starts. This is, what is called, 'Chemical isolation' - an important point from the point of view of prevention of transmission in practical terms.

(III) Factors responsible for manifestation of T.B. disease:

Contrary to T.B. infections where the risk factors are extrinsic, the risk factors in the development of the disease are largely intrinsic.

(a) Different infected populations develop T.B. disease at very different rates. e.g., risk of developing T.B. disease in Eskimos is 20 times more than that in the infected, non-urban Danish population.

(b) Young, adult, infected women are at higher risk of developing T.B. disease than young, adult, infected males.

(c) Housing, including overcrowding and ventilation, is of no importance.

(d) Importance of nutrition is also of a peculiar character. Only those who weigh 10% or more of their average expected weight are at lower risk of developing T.B. disease. Those with lower weights have proportionately increased rate of T.B. disease.

(IV) Strategy of T.B. Control in the light of Epidemiological Insights:

Theoretically to control the infectious disease in a community the strategy should be directed at :

i) source and reservoir of the infectious germs;

ii) the routes of transmission of the germs to the susceptible human beings via media like water, food, air, insects;

(iii) strengthening the defence mechanisms of susceptible individuals against the invading germs, e.g. - Vaccination -.

The most important components of T.B. control programme are:

i) Case detection, and

ii) Case holding for the whole length of time during which chemotherapy is instituted. How does this strategy help control T.B. in a community ?

(a) We know that the germs of T.B. theoretically are to be found in all the open cases of pulmonary T.B., in all the cases of extra-pulmonary T.B. and in all who are infected and have T.B. germs lying dormant in their bodies, which can become active any time during the life in a most unpredictable manner and produce the disease. However the open cases transmit the infection most and also T.B. germs

can be detected much more easily in the open cases. It is also true that the suffering and death is to be found only in T.B. disease, pulmonary or extra-pulmonary, and not in the third category in which the germs are lying dormant. In the T.B. disease category, also, overwhelmingly large proportion of the disease is pulmonary T.B.

In practice, therefore, an attack against the source of infection has to be confined to the open cases of T.B. And as long as the detected open cases are treated adequately, they are effectively removed from the most active part of the part of infection in a community. And this matters most. This explains the emphasis given in T.B. control programmes to case detection and case holding. This also explains why case detection is most reliable by microscopic examination of sputum to detect T.B. germs directly and unumportance of X-ray as a method of diagnosis. (Screening of the chest is not even worth mentioning.) This also explains the apparent curative orientation of control programme which, in fact, is the best available means to check the transmission- the best possible way to prevent T.B.

(b) The reason why T.B. control programme ignores the classical, preventive measures like improving sanitation housing etc. has also to do with the peculiarities of its epidemiology. Improvement in housing, specifically reducing the over-crowding has an influencing effect on T.B. infection. But, it cannot influence sufferings and deaths. It also cannot have any influence on the clearing of a huge backlog of existing infection in the community which will continue to generate hundreds of thousands of new cases of T.B. disease for many decades to come. It is also of secondary importance in checking the transmission of the infection of T.B. germs, when compared with the chemical isolation of active cases of T.B. disease in a family. This, however, should not lead to an interpretation that improvement in housing should be outside the limits of the strategy of T.B. control, as is the case to-day. In fact, improvement in housing does not only affect transmission of T.B., but also cuts down transmission of many other infections. No community health movement of some worth can drop the demand for the improvement of housing for poor.

(c) This brings us to the thrid component of strategy of controlling infectious diseases in the community: protection of all individuals against the infection by vaccination. What is the role of B.C.G. vaccine in T.B. control programme ?

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