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Guest Editorial

Tuberculosis Control in India : The Urban Viewpoint

If the oft-repeated expression that the National Tuberculosis Control Programme (NTP) being an integrated programme cannot but “sink or sail” with general health services is considered valid, we might be justified in saying that all is going well for tuberculosis control in India. In fact, the estimated around 30 per cent efficiency of NTP suggests that the programme is performing too well as it is most unlikely that any model would estimate the efficiency of our general health services to be over 30 per cent.

However, seen as a disease control programme, we have to admit that very little of the written or spoken word about NTP has been put into effective action. The blame for the deficient implementation of such a well designed programme, built on an appropriate epidemiological, sociological and technological base, has to go to the general conditions under which the programme has to function. Does it not, then, provide a clue to those who wish to improve the functioning of the NTP? Plainly, instead of wasting their energies tinkering with the NTP, they should direct them to improving the general health services.

What is happening in the urban areas where general health services are regarded as well developed? Given a rather weak rural integrated programme, it is reasonable to expect the virtually vertical tuberculosis programme in big cities, along with the concentration of public as well as private services, to have performed well. However, this does not appear to have happened. In fact, today, no “working” model of a city tuberculosis programme exists in the country. And, there is an obvious paucity of information since all that is available is no more than a dozen documents, elaborating more on concepts than concrete experiences in actual implementation of urban tuberculosis programme.

Three trends clearly emerge out of the present scenario of urban tuberculosis control in India. Firstly, notwithstanding an excellent and well-researched concept and design of District Tuberculosis Programme, which could be suitably applied to any geographic area, urban or rural, our experience of its implementation for over three decades has not produced desirable results, even at the lowest scale of expectation. The blueprint suggested by NTI for tuberculosis control in big cities is also close to two decades old, but attempts at its implementation in a few places have been half-hearted and virtually ineffective. Minor inter city modifications entail “more of the same” approach, with public health services-governmental or municipal-coping with the problem independently, without effectively co-opting the other health provider agencies in the control activities.

Secondly, within the said modest achievements, what stands out is the performance of a few, small, non-governmental agencies (NGO) and groups of private doctors. In Bombay and Delhi, these organizations seem to have been successful in delivering far more effective services, albeit on a modest scale. Their achievements appear to be due to well-organized services carried closer to the patients, through motivated workers, and, in some places, by the preferred health providers viz. private doctors.

Thirdly, in no urban area has any meaningful coordination among the various health providers been ever demonstrated. And, the underlying causes appear to be reluctance on the part of municipal and government health services to provide whole-hearted support to NGOs and private doctors as well as unwillingness of these small health provider groups to be controlled by the public health services. Reservations about each other's mode of functioning and individuals continue to persist.

Clearly, the extent and nature of the problems of tuberculosis control in urban areas are such that no single agency-public or private-is able to successfully deliver the goods. Minor experimenting with the existing system, like managing regular drug supply or improving diagnostic facilities, though important, may not fetch big returns. The present scenario calls for a major overhaul if any worthwhile improvement in urban tuberculosis is intended. The faith people have in their own doctor-round-the-corner ought to be made use of. Only a consensual approach based on mutual understanding towards achieving a common goal could bring about the desirable change.

The obvious set of interventions would include the "networking" of public-voluntary-private health provider agencies, ensuring decentralized services of a commonly acceptable pattern with adequate central support (and not control). In operational terms, this entails better management of public health services, slimming down the unit area of operation as well as bringing diagnostic and treatment facilities from Area Tuberculosis Clinic down to Peripheral Dispensary, forming "area networks" of all private and public health provider agencies and individuals and entrusting them with clearly spelt-out tasks, agreed upon mutually. All these under a central umbrella agency providing technical, research and training support and a platform for interaction.

Little is known about the city-dwellers' perceptions of tuberculosis and its control. Any programme that does not give precedence to user perceptions is unlikely to meet with success. The emergence of HIV has further complicated the tuberculosis situation, particularly in urban areas. Available today are some projections, presenting the horrendous picture likely to emerge, and the resultant panic reaction. There is danger of the immense stigma attached to HIV being transferred to tuberculosis. This could only complicate the matters still further for urban tuberculosis control.

With increases in the amount and nature of external inputs needed for revitalizing the NTP in India, as in other developing countries, there is an urgent need to first revamp the internal support system, if any concrete action has to follow. Isn't it time we reversed the said depressing expression to "primary health care will sink or sail with NTP"!

M.W. UPLEKAR

A SOCIAL SCIENCE APPROACH TO STRENGTHENING INDIA'S NATIONAL TUBERCULOSIS PROGRAMME*

Debabar Banerji¹

Introduction

I thank the Tuberculosis Association of India for asking me to deliver this oration. I wish to specially record my gratitude to D.R. Nagpaul, Vice-Chairman and Honorary Technical Advisor of the Association. In preparing this presentation, I have freely drawn on his vast experience right from the time of conceptualisation of the National Tuberculosis Institute (NTI). I am also honoured that the name of Robert Koch is associated with this oration. He initiated a major revolution, a paradigmatic change in the medical sciences, making massive contributions to the disciplines of microbiology, immunology and pathology, and opening up new fields in therapeutics which culminated in the development of chemotherapeutics and antibiotics. On account of his famous "Koch's Postulates", he was also instrumental in the conceptualisation of the narrowly focused single etiology theory which dominated the medical fields for more than half a century. This narrow approach has, however, been challenged during the past four decades, and the tendency now is to favour a more broad-based, multifactorial etiology of health problems, as was advocated by another great German scholar, Rudolf Virchow, half a century before Koch. At that early stage (1848), Virchow made his famous declaration: "Medicine is a social science and politics is nothing but practice of medicine on a grand scale". This multifactorial philosophy of Virchow has influenced the formulation of India's National Tuberculosis Programme (NTP), and later, the National Health Policy of the Government of India¹.

It is almost three decades that I left NTI to further strengthen the interdisciplinary thinking I had acquired there and to apply it on a wider scale.

This meant getting involved in the wider dimensions of public health concepts, practice, and research. This included holistic approaches to health and health services; interdisciplinary approach to the study of a community as a patient, and solving community health problems; systems approach to health services, starting from the village level to the national level; population growth and family planning and maternal and child health services and other national health programmes; health manpower development; social planning for health and health services; use of systems analysis and operational research for optimising health and health service systems and so forth. The Centre of Social Medicine and Community Health at the School of Social Science of Jawaharlal Nehru University helped me to weave social science inputs with inputs from other disciplines of public health. This led to the development of a body of knowledge of public health that is rooted in the epidemiological, socio-cultural, economic and political setting of the country.

The said endogenous body of knowledge has given a qualitatively different content to the discipline of public health in India which can be termed as the New Public Health.² For this overview of health and health services, I would use the perspective of New Public Health to briefly recall the rich heritage of tuberculosis work in India and make a social analysis of the forces which led to the neglect of this heritage. I would also use this analysis to understand the problems encountered in implementing NTP during the past two decades and a half, and suggest possible ways of overcoming them. Being away from the field of tuberculosis for such a long time, even though I have made special efforts to seek out the relevant literature on the subject, I am not

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sure whether I have been able to include at least the key writings.

SOCIAL SCIENCE INPUTS IN HEALTH PROGRAMMES

Social Sciences Disciplines

India is the first country in the world where social science inputs have been used at the conceptualisation stage of a national health programme. As a consequence of the social data collected for the National Tuberculosis Programme, primacy was given to the people rather than a pre-packaged technology imported from industrialized countries. Technology was subordinated to the people, rather than the other way round. This set the stage for the endogenous formulation and development of NTP. The social science concepts developed in India have also influenced tuberculosis work in many countries of the world as well as the WHO. Providing social dimensions to epidemiological parameters of the problem of tuberculosis, social orientation of the technology needed for dealing with the problem, and adapting the organisational and management systems to deliver the chosen technology within the socio-cultural setting, have been the major outcomes of the use of social sciences in NTP development.

Over the past three decades and a half, since the use of social sciences in NTP's formulation, there have been considerable growth and development in these concepts and methods. Incidentally, sociology (i.e., how a society is structured and how it functions) is only one of the many disciplines included in the social sciences. Cultural anthropology (i.e., study of the way of life of the people), social psychology (i.e., study of the behavior of individuals in a socio-cultural setting), political science (i.e., study of power structure and political and public institutions), economics (i.e., finding most effective ways of using resources) and history are the other major social science disciplines that are relevant to health fields. Besides, in the application of social sciences, comes the social science study of health and health services. This involves study of the wider socio-cultural, political and economic forces which influence health and health services. Socio-cultural and political analysis of the decision to develop a public health approach to the problem of tuberculosis in India, the advocacy of use of mass radiography for tuberculosis con-

trol, and the popular trend of finding technocentric solutions to the problems of implementation of NTP, fall within the purview of this approach. The other aspect is the more focused study of social science issues *within* the studies of health programmes and policies. The three major areas of epidemiology, technology, and delivery system, cited above, are examples of this approach.

Interdisciplinary language : On the basis of the enormous work done in this country, it has been possible to develop a blend of social science issues with the issues derived from other relevant disciplines. This blending has now reached such a refinement that one can talk of the formation of an "interdisciplinary language" for describing the integrated interdisciplinary ideas or approaches. For instance, the sentence, "In the programme, priority ought to be given to those areas where there is overlap between felt needs' and epidemiologically assessed needs" covers the issues of planning and health administration (programme, priority), leading to sociology (felt need) and going on to epidemiology. This ^interdisciplinary language has been used extensively in my presentation covering issues relating to all the social science disciplines, as well as the approaches of social science study, both *of* and *within* NTP. The input of social sciences in the formulation of NTP is indeed a valuable heritage of tuberculosis work in India. As this heritage will be useful for the analysis of the present state of NTP, it is briefly outlined below.

HERITAGE OF TUBERCULOSIS WORK

Epidemiological

Even to this day, India does not have a reliable tuberculosis notification system to estimate the incidence and prevalence of the disease. Scholars like J. Frimodt-Moller and P.V. Benjamin³ in Madanapalle had made preliminary efforts to determine the size of the problem which finally led to the well known National Sample Survey of Tuberculosis in India (NSS) in 1955-58.⁴ NSS was a pioneering effort and the findings led to a fund of ideas about the public health aspects of the disease in the country-in terms of the size, age-sex and rural-urban distribution. From the political and societal perspectives, NSS also brought into focus the gross inadequacy of the tuberculosis work being carried out at that time.

The NSS also provided the springboard for more detailed epidemiological studies concerning measurement of infection, the important role of non-specific allergy, and reliability and validity of tuberculin test and radiographic diagnosis, which culminated in determining a definition of a tuberculosis case.^{5,7} An even more ambitious study was the launching of a longitudinal epidemiological survey in Bangalore rural district in the 1960s.⁸ Apart from estimating the incidence of infection and disease, it provided valuable insight into the natural history of tuberculin positive individuals and of persons with radiologically or bacteriologically active disease.

Another ambitious study in experimental epidemiology was the inquiry into the protective value of vaccines prepared from some of the common strains of BCG. That its findings led to the abandonment of BCG vaccination in adults, on a global scale, attests to the capacity of tuberculosis workers of this country to carry out epidemiological studies of the highest quality.

It has also been possible to bring together pieces of epidemiological data to point to the probability of a declining trend in the natural history of tuberculosis in India, though the longitudinal survey⁸ did not yield statistically significant data on the declining trend. The NSS had revealed that there had been an age shift in the prevalence of pulmonary tuberculosis, from being a disease mainly of the earlier age groups to being a disease of the older age groups. A comparative study carried out at the Tuberculosis Chemotherapy Centre, Madras showed that the tubercle bacilli isolated from south Indian patients were less virulent than those isolated from British patients⁹. The possible influence of non-specific allergy on the incidence of tuberculosis, though not definitive, suggests that it will be rash to presume that only a nation wide control programme will have an epidemiological impact on the problem of tuberculosis in India. This, incidentally, strongly reinforces the case for building the NTP on the foundations of felt need among the tuberculosis patients. A felt need oriented programme deals essentially with the problem of tuberculosis as a problem of suffering. As will be pointed out later, this also has the potential of being a more cost effective approach towards tuberculosis control, not simply because diagnostic and treatment processes are remarkably inexpensive, but also because the im-

pact on the problem is made in harmony with any impact that might be made due to a declining trend in the natural history of the disease.

Domiciliary Treatment

Long before Streptomycin, PAS and INH became accessible to the general population, B.K. Sikand had pioneered Organised Home Treatment on a large enough scale through the New Delhi Tuberculosis Centre. When the specific drugs did become freely available, he and other tuberculosis workers conceptualised the need for a scientific study of all the facets of domiciliary treatment. A comparison of sanatorium and home treatment of cases of pulmonary tuberculosis at the Tuberculosis Chemotherapy Centre (TCC),¹⁰ Madras was the culmination of their efforts. Based on one of the most rigorous research designs for field clinical research, the findings revolutionized tuberculosis treatment all over the world. The findings also led to the abandonment of the age-old concept of isolation; value of fresh air and good diet, the serious social consequences of long term hospitalization of patients and that epidemiological consequences of domiciliary treatment were similar to that of treatment in sanatoria.

Mass BCG Campaign

From hindsight, it is now clear that the millions who were vaccinated during the mass BCG campaign in the early 1950s had virtually received no protection.¹¹ This, however, should not obscure the fact that, at that time, BCG campaign was the biggest public health programme ever launched anywhere in the world and showed the capacity of the tuberculosis workers of the country to launch a programme of such dimensions. By 1962, 178 million had been tuberculin tested and 68 million vaccinated.¹²

National Tuberculosis Institute, Bangalore

The establishment of the NTI in 1959 was the culmination of the path breaking efforts made in the earlier years. NTI brought together the available relevant data and initiated special studies to fill in the vital gaps in the information needed for formulation of NTP. With so much ambivalence in thinking these days about ways to strengthen tuberculosis work in India, and in many parts of the

world, it is worthwhile to recall briefly the intellectual ferment there was among the workers in NTI at that time.^{13,14,15} Some social science inputs are mentioned here because these form the basis of this presentation:

1. *Political mandate* : NTI had received the political mandate to design a nationally applicable, socially acceptable and epidemiologically effective tuberculosis programme for India.¹⁴ Therefore, the entire work of the institute was tuned to attain the social goal set for it.
2. *Interdisciplinary teamwork* : It is significant that at that early phase of the development of public health research, the organisers had visualised the formation of an interdisciplinary team, covering the wide range of disciplines required for programme formulation. Of particular significance, sociologists came to be regarded as equal members of the team. The other disciplines included epidemiology, biostatistics, phthisiology, bacteriology, radiological engineering and public health nursing.
3. *International collaboration* : A WHO team of international workers as counterparts to the Indian personnel, was headed by Halfdan Mahler, who later became the Director General of WHO. This turned out to be one of the most outstanding instances of international cooperation, involving intense interaction between the nationals and their international counterparts as equal members in both disciplinary and interdisciplinary contexts. Understandably, in the early phase, there was a tendency to project Western oriented technocentric solutions, like the use of mass radiography and mass vaccination drives. However, counter suggestions from the Indian members of the team led to the development of "endogenous" solutions to the problem of tuberculosis in India, under the conditions prevailing at the time. The NTP is the outcome of that collaborative exercise.¹⁶
4. *Social science inputs* : These turned out to be crucial for the formulation of NTP resulting in a total overturning of the approach to programme formulation from top downwards to bottom upwards. Primacy was given to the people and not technology, as is usually the case. Because of their different orientation, the social scientists asked different types of

questions regarding the problem of tuberculosis in India. They did not follow the traditional line of finding ways of manipulating tuberculosis patients so that they participate in "case-finding" and "case-holding" operations launched through mass radiography or tuberculosis clinics. Nor did they follow the footsteps of scholars like Carstairs¹⁷ in writing detailed accounts of exotic health practices in "traditional" societies. They decided that formulation of a national tuberculosis programme should start from an understanding of the people concerned; they "went to the people to learn from them". The research questions were : how do tuberculosis patients in a rural community respond to the disease?; how many are at least conscious of the symptoms of the disease?; to how many do the symptoms cause worry and how many take action about their symptoms? In other words, research was meant to give a sociological dimension to the epidemiology of tuberculosis in the country. Closely following an epidemiological survey of tuberculosis in Tumkur district of Karnataka, a sociological study was designed to measure the degree of awareness of the patients in terms of "consciousness", "worry" and "action".¹⁸

The findings from that study were very revealing. At that time when there was a tendency to seek the help of social scientists to "catch" people for mass radiography, it was found that motivated by the suffering caused by the disease, as many as a half of all infectious cases in the population had sought assistance from government rural health institutions, and almost invariably they were sent back with a bottle of cough mixture. One quarter of such cases were worried about the symptoms (chronic cough, fever, chest pain and blood in sputum). The implications of these findings were of far reaching significance :

(1) *Concept of felt need; area of overlap of felt need and epidemiologically assessed need.* This gave an entirely new direction to programme formulation-farther away from the conventional approach of mass radiography, mass BCG vaccination and specialised tuberculosis clinics. It enjoined that first priority be given to those epidemiologically important cases who also had felt need for

services. As the principle can be generalized to cover a wide range of community health problems, it forms the corner stone of a new social science approach to health problems.

- (ii) *Integration of tuberculosis programme with general health service.* Tuberculosis patients showed the way : motivated by the suffering caused by the disease, they sought assistance mostly at rural health institutions.
- (iii) *Social orientation of technology.* The problem was: how to diagnose and treat tuberculosis patients in remote rural health institutions? By using data concerning prevalence of chronic cough in the general population (i.e., controls), it was possible to devise a simple way of diagnosing a case, by making smear examination of sputa of chronic cough cases visiting the institutions, because all tuberculosis cases were at least conscious of cough. This was, thus, one of the first instances of subordinating technology to the needs of the people—deprofessionalisation, demystification of medicine and increasing the capacity of the people to cope with their own health problems. One outcome of the adoption of this approach was that there has been a sharp and sustained decline in the number of physicians who specialise in tuberculosis.
- (iv) *Dynamics of felt need.* Any given level of awareness, consciousness, worry or action is an equilibrium in the socio-cultural situation. Introduction of a felt need oriented tuberculosis programme will alter this equilibrium : When people find that there is an effective way of alleviating the suffering caused by the symptoms of the disease, many who were earlier only worried will be motivated to take action; similarly, those who were only conscious will get worried and may even join the group having action awareness. A felt need oriented programme, thus, has a built-in system for generating more felt need in the community.
- (y) *Concept of health culture.* The findings showed that health behaviour of a community cannot be studied in isolation : It is influenced by the degree of access to effective services. These two (i.e., health behaviour and access) also interact with cultural perception and meaning of a health problem. Thus, with improvement in the access to effective services, the earlier perception that tuberculosis is a stigmatising disease which almost invariably ends in death, has changed considerably. Therefore, all these factors should be considered together. This interacting complex has been termed as health culture.
- (vi) *Epidemiological strategy, acceptability and cost effectiveness.* The data on awareness revealed that a felt need oriented programme has the potential of covering almost all the infectious cases in a community.¹⁸ Its potential for coverage is, thus, much higher than what could be expected from a mass campaign.¹⁹ Further, there is evidence that the incidence of tuberculosis had declined significantly in many parts of the world long before the tubercle bacillus was discovered.^{20,21} The possibility cannot be ruled out that this is happening in India too.^{8,20,22} If so, the mass campaign approach will turn out to be an even more costly and wasteful venture. And, this contingency is avoided when the approach is based on the community, which is far less expensive.
- (vii) *New approach to health education.* Data have indicated that a large proportion of tuberculosis cases are literally knocking at the doors of health institutions, ruling out the need for mass health education drives which amount to practising motivational manipulation. As pointed out by Foster,²³ the data underline the need for a change in the bureaucratic manner when meeting the felt needs of the people. The fact that even after three decades of National Tuberculosis Programme in India, a substantial proportion of tuberculosis cases is still being turned away with a bottle of cough mixture^{24,25} shows that it is far more difficult to change the behaviour of the health administrators and teachers of tuberculosis and chest diseases. The question of generating additional felt need through education of the public should, therefore, arise only when (a) the organisation has met all the existing felt needs and (b) the organisation has additional capacity to meet extra needs that are sought to be generated through health education.

(viii) *Tuberculosis as a problem of human suffering.* By imparting a sociological dimension to epidemiological data, it was possible to visualize the problem of tuberculosis, indeed any community health problem, as essentially a problem of human suffering. By measuring a health problem in terms of the suffering it causes to an individual, it was possible to develop an alternative perspective for social planning for health in the country.²⁶ NTP is visualized as an integral part of general health services and, therefore, the suffering caused by tuberculosis ought to be assessed along with the suffering caused by other community health problems. In other words, this ensures that investments in NTP are made proportionate to the degree to which it alleviates the suffering caused by health problems as a whole.

(ix) *Improvement in precision of diagnosis of a case.* By measuring the problem of tuberculosis in terms of human suffering, it has been possible to develop a "feedback correction factor" to improve the precision of radiology as a diagnostic tool. Over-diagnosis is a well known phenomenon in radiological diagnosis.⁶²⁷ By giving primacy to suffering (i.e., to felt need) it is possible to selectively avoid the fake cases, because false cases are likely to cause very little suffering or no suffering.¹⁸

(x) *Development of inexpensive tools for prevalence survey.* Prevalence of sputum smear positive cases can be estimated by examining cases with chronic cough detected in a house to house cough survey in a representative sample of the population. Using an accepted ratio of culture positives to smear positives, it is possible to calculate the prevalence of culture positive cases. This offers an inexpensive methodology for making prevalence survey of tuberculosis.

5. *Integration of NTP with general health services*

: Consideration of tuberculosis as a problem of suffering and patients' recourse to general health services provided the basis for integration of NTP with general health services. There is, in addition, a sound administrative justification for dealing with all the health problems of a community as an integrated whole, demanding an integrated approach.^{27,28}

Thus, NTP was made to "sink or sail" with general health services. As a result, if the latter are inadequate, NTP also suffers from the same inadequacies. **The solution, thus, does not lie in attempting to remove inadequacies in NTP alone but rather in the entire health services system.**

6. *Development of referral system through regionalisation of service:* Since NTP purposely subordinates technology to the people rather than the other way round, the programme formulators took special care to ensure that technology used in the programme was based on consideration of (a) limitation of the resources, (b) knowledge about cultural meaning and cultural perception of the* problem, and (c) the health behaviour generated by the cultural factors and access of people to technology. The people-oriented approach to technology enabled NTP to withstand pressures for inclusion of the then emerging technical advances such as tomography, mass radiography, advanced thoracic surgical techniques and large scale use of expensive second line drugs in NTP.

Based on data on the cultural, social, economic and epidemiological situation in the country, the diagnosis of tuberculosis patients through examination of sputum smears of symptomatics and treatment of cases at home with effective but not very expensive combinations of anti-tuberculosis drugs formed the sheet anchor of NTP. This led to a considerable decrease in the dependence of people on specialists and sophisticated, imported, equipment, apart from drastically reducing the cost.³⁰ However, the more sophisticated services available at the higher levels were also utilized on referral to those agencies, to support the services at the periphery dealing with the bulk of the patients. Thus, those needing special attention were referred to the District Tuberculosis Centre (DTC) which, in turn, services available could count on the support of the at the State Tuberculosis Centre or the teaching hospitals, to deal with a very small fraction of the cases requiring such intervention.³¹ These specialised agencies formed an integral component of the NTP with reverse referral

linkages with the periphery, involving patients, records and personnel. Thus, while avoiding unnecessary specialization and mystification, the NTP made most effective use of the sophisticated technology that already existed in the country.

7. *A health information system* : There are two notable features of the health information system of the NTP : its postulates identified the items of information to be collected and its details were worked out on the basis of the capacity of the programme organization to generate, transmit and process the information. The information system is used for monitoring, evaluating and taking the indicated corrective actions.^{1,2} Of its three major components, one relates mainly to administration and operational aspects of the NTP, the second deals with the actual process of implementation of NTP, such as preparing index cards, monitoring treatment and keeping track of the cases that are transferred from one institution to another and the third relates to epidemiological impact of the NTP.
8. *Team training*: A team approach to the training of personnel is another distinguishing feature of the NTP. Led by a District Tuberculosis Officer (DTO), the DTC team comprising a treatment organiser, an x-ray technician, a laboratory technician, for a few years a BCG team leader and a statistical assistant undergoes an effective programme of common training covering the general philosophy underlying the NTP in such a way that each member of the team can identify what his/her role is and how his/her work contributes to the programme as a whole. This is followed by separate training of individual members in their own specific fields on the aspects that are particularly relevant to the NTP. Finally, the reassembled team is trained to work as a DTC team under actual field conditions.”
9. *Use of operational research methodology for solving a community health problem* : This approach was adopted by the NTP not because it had been so enunciated by the experts of operational research³⁴ but, as it turned out, the approach of operational research was found to provide a very valuable framework for finding a suitable solution to the prob-

lem.^{35,36} It was realised quite early that the solution of the problem required the consideration of a large number of variables pertaining to a number of disciplines which are in complex interaction with one another. Incidentally, when some key data were needed for making a forecast concerning the outcome of an alternative (e.g., natural history of tuberculosis or infectiousness of the disease), recourse was taken to intelligent “guesstimates” on the basis of a careful interpretation of the available data by well informed scholars in that field. This, in course of time, came to be called the Delphi method by the Rand Corporation of USA, and is now gaining respectability through its use by WHO in estimating the incidence of AIDS in different parts of the world.³⁷

For formulating the NTP, the steps taken were:

- (a) The problem of tuberculosis in India was defined both in the conventional epidemiological terms as well as in social terms (as a problem of suffering or as felt-need).
- (b) The factors considered relevant for finding a solution to the problem were identified and special studies were conducted to obtain data concerning those factors. Intelligent “guesstimates” were used where it was not possible to get reliable data.
- (c) An attempt was then made to put these factors together in the form of a model (not necessarily “mathematical”) to depict the major interactions amongst them in order to work out alternative ways of solving the problem, through alternative ways of influencing the different components of the model, within the constraints of the available resources.
- (d) The model was then used for making forecasts concerning the outcome of the alternative ways of problem solving in order to choose the one which offered most effective use of the available resources.
- (e) The chosen alternative (solution) was then put in practice (test run) to test the validity of the assumptions made in choosing the solution, including reliability of the “intelligent guesstimates”.
- (f) The findings of a test run were fed into the chosen solution and the latter was then put into normal field operation. A feedback sys-

tem built into the programme ensured continuous monitoring of the implementation. The above steps constitute the approach which is followed in operational research, and this experience can also be used for formulating solutions to other health problems e.g. programmes to deal with malaria, leprosy, maternal and child health, family planning or programmes for improving the working of health organizations such as hospitals, rural health centres and the community Health Volunteers Scheme.^{26,35}

10. *Sociological study of treatment "default" or "non-compliance"*: The NTI sociologists also questioned the traditional definition of a treatment defaulter, as one who does not continue the treatment prescribed by doctors for at least twelve months,³⁸ as too technocentric, arbitrary and, obviously, value-loaded. Instead, they offered a more realistic definition: a defaulter is one whose actions cause suffering to him/her or other members of the community, over a time span. Field studies revealed that health administrators were by far the worst defaulters.³⁹⁻⁴¹ For example, they allow hundreds of thousands of tuberculosis cases to be treated with a bottle of cough mixture; they cause enormous suffering among the diagnosed cases through failures in the maintenance of supply of drugs and unsatisfactory implementation of NTP; they accept incorrect diagnostic criteria and dogmatic attitudes towards treatment which lead to cases discontinuing their treatment⁶⁻⁸ and finally, some patients who indeed inflict suffering on themselves, as on others in the community, because they fail to take their treatment. This, therefore, became an issue for a sociological study—why is it that some patients adopt such an obviously destructive or even suicidal attitude? This approach contrasts sharply with the "victim blaming" studies of "case-holding" by the "traditional" medical sociologists.⁴²

National Tuberculosis Programme and Primary Health Care

Some of the basic postulates of NTP, developed in the early 1960s, bear a strong resemblance to the Alma Ata Declaration on Primary Health

Care.⁴³ Starting from the people, developing a holistic (epidemiological) approach to the problem of tuberculosis, developing a people oriented technology and the system to deliver it to those who have a felt need and specifically designing the programme to be an integral component of the health services, are the postulates of NTP which are in common with those of primary health care. By linking NTP with the general health services, it also gets linked up with still wider issues of intersectoral action and social control over the health services. Indeed, speaking at the Silver Jubilee celebrations of NTI, Halfdan Mahler, who was the moving spirit behind the Alma Ata Declaration, declared that the health philosophy generated at the NTI had led straight into the concepts used in the Alma Ata Declaration.⁴⁴

FORMULATION OF NTP : A WATERSHED IN PUBLIC HEALTH PLANNING AND PROGRAMMING

The research and action work in the tuberculosis field in India show the astonishing range of creative work done within only a decade and half (1950-65). By any reckoning, this could be considered as an outstanding chapter in the history of public health. Three of the research studies—comparison of home and sanatorium treatment¹⁰, field trial of BCG vaccines¹¹ and development of a felt need oriented tuberculosis programme—have dramatically changed the earlier approaches being followed all over the world, both in the developed and the underdeveloped regions. These major inputs in research and practice have given a new shape to the discipline of public health. Being rooted in specific social, cultural, political, economic and technological settings and related to the phase of development of the country, these endogenous efforts have brought forth a number of wider public health concepts and methods, of key importance, not found in the conventional discipline of public health developed in Western countries. Locating public health problems and programmes within the socio-cultural and political settings, starting from the people, rather than a pre-determined technology package, developing people-specific technology and systems for delivering that technology to the people and the use of operational research for programme formulation are some of the areas which have

given new dimensions to the discipline of public health. As mentioned earlier, this has been called New Public Health² to differentiate it from the still dominant conventional public health discipline.

What, then, is the sociology of the remarkable public health practice developed in the field of tuberculosis during that decade and a half? There were at least two important factors. It may be recalled that at that time there were severe constraints of resources of all kinds in the country. Yet, those were the heady immediate post-independence years, when the political leadership still had some of the idealism and commitment of the Freedom Movement. They had visions of a better India, which enabled them to take daring decisions. One such decision was to provide political initiative for actions to deal with tuberculosis as a public health problem. The initiative (may be, on the advice from specialists) was taken by the then Union Health Minister, Rajkumari Amrit Kaur, who received strong encouragement and support from the then Prime Minister, Jawaharlal Nehru. Another crucial element was that there were senior tuberculosis workers who shared the vision of the political leadership and who had public health competence to develop a blueprint for action.

Persons like P.V. Benjamin, B.K. Sikand, P.K. Sen, M.D. Deshmukh belonged to this category. There were also workers from abroad, like Halfdan Mahler, Stig Andersen and Wallace Fox, who joined their Indian counterparts in this challenging venture. Many of them might have been in favour of a specialised tuberculosis programme, as it was then practised in Western countries. However, they were open minded enough to subject their ideas to scientific test. When the NTP presented a better alternative, after some initial hesitation, they strongly supported it, including the then nascent sociological orientations. They took the ideas to the WHO Expert Committee on Tuberculosis and could convince them to bring about fundamental changes in the WHO programmes.

The crucial role of the public health competence of the then tuberculosis workers becomes more evident when it is recalled that, at that very time, with the same supportive political conditions, India embarked on several specialised mass campaigns against other major communicable diseases like malaria, smallpox, leprosy and filariasis, with consequences which have proved to be catastrophic to the development of the general health

services in the country. Unfortunately, even when these “vertical programmes” were integrated with the general health services, it was done on condition that these programmes would continue to receive the resources, required to “maintain” the programmes at the low prevalence level, on a priority basis.^{45,46} When the general health services were still weak, setting aside of resources on priority for the recently “integrated vertical programmes” proved to be very damaging. The “conditional integration” proved to be more counter productive than the earlier “pure” vertical programmes.²⁵ Expectedly, the NTP designed to grow and develop with the general health services was affected by the hemorrhage of resources due to the more favoured programmes. During the past three decades, there has been considerable qualitative expansion of the general health services. However, side by side, there has been an increase in the “hemorrhage”, because the massive, heavily funded family planning programme was launched as an additional conditionally integrated programme. The allocation for this programme skyrocketed from Rs. 653 million in the First Five Year Plan to over Rs. 62,000 million in the Eighth Plan.^{47,50} Monetary incentives were offered to the workers as well as acceptors and specific targets were assigned to the workers, along with threats of serious consequences if they failed to attain the prescribed targets. Incidentally, after the Twenty Point Programme,⁵³ specific targets were also set for NTP but there were no incentives and pressure for target achievement was very much less than for family planning work. As if that was not enough, another strong and conditionally integrated programme the Universal Immunisation Programme was launched in 1985, with built-in strong pressures for target achievement.⁵¹⁻⁵² The country awaits the consequences of the recently launched AIDS Control Programme, with its separate Control Board at the top.

ASPECTS OF HEALTH ADMINISTRATION

Changes in Structure and Accountability of Political Leadership

From the mid-1960s, the political leadership had started abdicating its responsibilities in many crucial areas of health administration. Most glaring among these was the abolition of the central

cadre of Indian Medical Service (IMS) without replacing it with an alternative one, as was done in the case of the Indian Civil Service.⁵⁴ Furthermore, it failed to realise the need for competent health administrators, with epidemiological, managerial, social and political competence, called the Managerial Physicians.²⁵ The cadre of Central Health Service had virtually no public health responsibilities at the grass-roots level and, dominated as it was by teachers from medical colleges or specialists from large city hospitals, key public health positions in the Directorate General of Health Services were filled by persons who lacked the needed competence in the field.²⁵ Concurrently, the political leadership allowed generalist administrators to have increasingly greater say in the formulation and implementation of health and family planning programmes for which they were neither competent, nor accountable, because most of them got transferred to entirely different posts by the time they got a commonsense understanding of the health issues they had been asked to deal with.⁵⁵ The indifferent quality of the technical personnel in key public health positions and rapid infiltration of generalist administrators into technical areas had a devastating impact on the administration of the health services at the central level. As degeneration of the political leadership in the states was even more advanced, the situation there is much worse.²⁵

Growth and Development of Rural General Health Services

Expectedly, despite the strong pleas in the Bhore Committee report²⁸, the development of public health was neglected. The class character of the population, health services for the rural population, and the socio-economic profile of physicians, as well as health workers, account for this neglect.²⁵ As late as in 1982, the Union Ministry for Health and Family Welfare frankly admitted that, till then, the health service system of the country had remained curative in orientation, urban based, and mainly for the upper classes.¹ Unfortunately, precious little has been done since 1982 to improve the situation. There is, perhaps, further deterioration.⁵⁵

It took more than a decade and a half to cover most of the country with a rudimentary type of primary health centre (PHC)⁵⁶. In the early sixties, there was a rapid expansion in PHCs because of

the conditional integration of malaria and family planning programmes,^{45,46} with the consequences already mentioned. The scheme to have one male and one female multipurpose worker per 10,000 people was introduced in the seventies. To respond to the political fallout of the Emergency period (1975-77), the plan to have one community health worker and a trained *dai* for every 1000 people was launched⁵⁷ in 1977. Later, presumably responding to political pressure from rural areas, there was further expansion: a male and a female multipurpose worker for every 5,000 people, a PHC with two physicians and six beds for every 30,000 people, a Community Health Centre with 25 beds and at least four types of specialists, and further strengthening of the taluk and the district hospitals.⁵⁸

However, as already discussed, because of the steep fall in the quality of the health leadership, the already inefficient rural health service system became even more inefficient, leaving a great deal of the rapidly increasing felt need for health services in the population unmet by the government,^{55,59} thus leaving an enormous "market" for the private sector to "exploit".⁵⁵

TARGET ORIENTED PROGRAMMES

Reference has earlier been made to the damage done to the general health services by the "conditional integration" of the National Malaria Eradication Programme (NMEP) and the Family Planning Programme. The anticipated eradication of malaria, once and for all, by the mid 1960s did not come about.⁶⁰ Instead, the country carried on, indefinitely, the very expensive malaria containment programme.⁶¹ Similarly, even though the allocations for family planning had shot up astronomically, the rise of the population continued for three consecutive decades: 109 million in the sixties; 137 million in the seventies and 160 million in the eighties—an increase of more than 400 million over the 440 million population of 1961.⁶² This catastrophic increase shows what it means to increase the worker/institution population ratios in general health services, apart from the profound effect on the patterns of human ecology and epidemiology.

Outbreaks of Epidemics

During the past two decades or more, there

have been numerous newspaper reports of outbreaks of “mysterious diseases”. That the information had to come through newspapers is an eloquent testimony to the state of the health intelligence system and vigilance of the public health workers. Worse still, very few of these epidemics were properly investigated and the “mysteries” remained unravelled. Of course, this failure ruled out any scientific approach to epidemic control. Most of the time, actions were nothing more than public relations exercises, having little scientific content.^{55,63} The epidemics probably died down on their own after extracting their “pound of flesh”. These uninvestigated epidemics are, thus, symptoms of the severity of the breakdown of the public health system in the country.

Kala-azar reappeared as a public health problem in the state of Bihar and adjoining areas in the early 1970s. Again, there was virtually no intelligence system, nor were prompt steps taken to obtain reliable epidemiological data. In due course, the problem became so massive that even with the obviously ramshackle information system, the number of cases was counted in hundreds of thousands and the mortality was very high.” Presuming that Kala-azar resurgence was due to the resurgence of the sandfly menace, which had got suppressed during the malaria work, little efforts were made to understand why the resurgence occurred in that area only, and the way it had spread to the other areas. Instead, the response was merely to get together some sort of a system, not very efficient at that, to spray houses with insecticides and to offer treatment to some of the cases who could reach the system, a far cry from the approach of operational research mentioned earlier. The sequences were painfully similar during the large outbreaks of mysterious (Japanese?) encephalitis around eastern Uttar Pradesh, meningococcal meningitis in the Bihar plateau and the notorious outbreak of cholera in the capital city of the country.^{63,64} Huge populations were literally left to their fate by the guardians of public health. And these guardians were allowed to get away with their ineptitude and inaction by the political leadership. Incidentally, at a time when tens of thousands of people were dying in what could be called a virtual epidemic of epidemics, the political leadership and the bureaucrats responded enthusiastically to the massive Rs. 3,500 million immunisation programme against six diseases, which account for a

very small fraction of mortality and morbidity caused by the epidemics.^{52,66}

Urban Health Services

The urban population in the country has some obvious advantages, e.g. concentration of the population, better civic facilities, much higher per capita allocation for health services, a very big private sector of medical care, and so forth. However, presumably because of these very advantages, there is a considerable waste of resources due to duplication and lapses in the organisation and management of the health services. In fact, urban services are in a state of chaos causing problems to the people who seek alleviation of suffering. The poor, as usual, suffer the most. Of late, the situation has deteriorated sharply because of a steep fall in the efficiency of the government health services as a result of the decline in the quality of the leadership at the various levels of the health administration. The 1988 cholera epidemic in Delhi⁶⁵ was a dramatic manifestation of the breakdown of public health systems in urban areas. This, coupled with the increasing buying capacity of the upper classes, has led to a rapid growth of the private sector in cities to grab the rapidly growing medical care “market”. The commercialisation of medicine has sharply increased.

International Initiatives

The struggle of the oppressed peoples of the world was at least partly responsible for the Alma Ata Declaration,⁴⁵ signed in 1978 by virtually all the countries of the world. It marked a watershed in the history of public health, calling for a new approach to providing integrated health service to all *the* sections of the population, all over the world. As pointed out earlier, its distinction lies in its advocating the formation of health services, built around the people rather than around predetermined packages of technology. People's response to their health problems forms the sheet anchor of these health services; they are to promote community self-reliance; they should be under social control; and they should form a component of a wider inter-sectoral action in health.

Expectedly, the reaction of the affluent countries to this daring declaration of self-reliance by the poor countries was sharp and swift. Reverting to their old patronising, technocentric, depend-

ence producing approach, they came forward with what they called "Selective Primary Health Care",⁶⁷ really a contradiction in terms. Even though this idea clearly lacked a scientific basis,⁶⁸⁻⁷⁰ it received immediate support. It is noteworthy that one of the most outstanding journals, the *New England Journal of Medicine*, chose to publish the paper on selective primary health care even though it fell far short of meeting the most elementary scientific requirements.⁶⁷ WHO and UNICEF were made to use the considerable goodwill they had earned among the poor peoples of the world⁶⁵ in the cause of selective primary health care; a good example of how knowledge is subverted to subservise the interests of the dominant classes.

A virtual barrage of "international initiatives" has been let loose on the people of the South to make them forget about their "unrealistic" dreams: the concept of selective primary health care was launched in big international get-togethers, at Bellagio, Italy⁷¹ and later in Colombia (Bellagio II),⁷² by the affluent industrialized countries, taking UNICEF and the World Health Organization in tow. UNICEF launched a series of "initiatives" in quick succession in the form of GOBI (growth monitoring, oral dehydration, breast feeding, and immunization),⁷³ GOBI-FFF (to include food supplements, female education, and family planning),⁷⁴ the Child Survival Development Revolution,^{74 75} and then the Global Programme of Immunization.⁷⁶ WHO, the other parent of the Alma Ata Declaration, dutifully participated in all these efforts. As if to keep up with the imposition of technocentric, dependence-producing, and very expensive programmes on the peoples of the South, WHO has developed its own "international initiatives": the quixotic programmes of polio eradication (Polio Plus), Diarrhoeal Diseases Control⁷⁷ and the Acute Respiratory Infections Programmes⁷⁸ and the World Bank led Safe Motherhood Initiative.⁷⁹ There appears to be a method in the imposition of ill-conceived, unimaginative and ill-designed programmes by the Western/international health czars on the peoples of the South: there are massive media assaults,^{73,80} the high-profile but intellectual lightweights of the South are co-opted,⁸⁰ the attempted diversion of attention from the commitments made at Alma Ata; the creation of markets for the goods and services from the affluent countries;⁵² the creation

of dependence of the South on the North and, above all, the political control over their victims—"follow the line or else we withdraw our assistance".

It is remarkable that strong and persistent criticism, based on scientific analysis, has failed to make any impression on the decision makers. Some respected physicians (not necessarily scientifically competent in epidemiology and health administration) have lent their support to these proposed global ventures. On the recommendations of the technical "experts" in the secretariats of WHO and UNICEF, their respective general bodies have endorsed such initiatives^{73,76} and UNICEF launched a massive publicity drive to "market" the "social" product of child survival.⁸¹ In fact, social marketing has become a hallmark of this programme.⁸⁰

As with the other "initiatives", the top bureaucrats responded enthusiastically to the proposal to launch the immunisation programme in India ignoring the very serious objections raised against the proposal within India and the political leadership accepted the Universal Immunisation Programme "as a living memorial to our late Prime Minister, Indira Gandhi".⁸²

A systematic, nation-wide evaluation of the Universal Immunisation Programme, which was to cover a population of more than 90 million pregnant mothers and 83 million infants living in more than 57,000 villages during 1986-90, has shown it to have failed dismally.⁸³ The coverage has been less than one-fifth of the requirement in more than half of the population. From a purely public health standpoint, the disaster was inevitable. No efforts were made even to define the problem of the six immunisable diseases; there was no understanding of their natural history; the efficacy of the vaccines used was not well-known; the cold chain meant to retain the potency of the vaccines till the time of inoculation had frequently broken down; there was confusion about the dosage; and even where the programme was most successful, the ecological conditions could erode much of the benefits from immunisation. That such a technocentric programme was imposed on the people of the third world by their own governments is bad enough; the more frightening aspect is that these countries were persuaded to follow the line developed in affluent countries, by influential agencies such as UNICEF, WHO, World

Bank, Rockefeller Foundation, and Rotary International.

Since tuberculosis is the latest “victim” of such “initiatives”, two recent examples- those on health research and AIDS - are briefly mentioned.

A Commission on Health Research for Development with eight of its twelve members belonging to the countries of the South has made its own efforts to confuse the research scene.⁸⁴ It has coined the phrase Essential National Health Research (ENHR), without defining “national health” and identifying “essential research”. Experience of the past three years has shown that there is nothing new in the concept : it is more of the same, a mere reinvention of the wheel.⁸⁵ The ENHR does not analyse why UNICEF, WHO and many governments of affluent countries had imposed several large programmes without bothering to gather even the most elementary data about them; why it has ignored the rich heritage of health research in India and other countries of the South; why the message of self-reliance contained in the Alma Ata Declaration must be obscured.⁸⁶ A vivid example of this distorted form of international health research will be given later while discussing the trend of tuberculosis research and practice as suggested by WHO, World Bank, and some affluent countries.

The latest international initiative, the Global Programme for AIDS of the WHO, follows the same trend of programme formulation, without a reasonably sound epidemiological data and without any effort to optimise the systems to be followed in different countries.⁸⁷ India and Thailand are the most vulnerable countries in Asia because, it is alleged, these two countries have big “commercial sex industries”.³⁷ The data base for making such a pronouncement is very fragile, if not non-existent.⁸⁷ Yet, with the assurance of a massive loan from the World Bank and the so called “technical assistance” from WHO, India is reported to have set up an AIDS Control Board at the Centre, separate even from the already separate family planning department and been assigned a budget which is almost a fourth of the union health budget.

Education, Training and Research in Public Health

Decline of public health institutions : Correspond-

ing to the neglect of public health at the political level, there has been a sharp decline in the quality of work done at the key public health institutes of the country, like the All India Institute of Hygiene and Public Health, the National Institute of Communicable Diseases and the National Institute of Health and Family Welfare.⁵⁵ This has affected the quality of the persons trained in public health. That not even a murmur was heard when the poorly conceived, technocentric, dependence producing Universal Immunisation Programme was imposed on the people by the international and other foreign agencies, provides an instance of the state of public health institutes in the country.⁸⁸ It may be argued that scholars of these institutes did not raise their voice for fear of inviting retribution from the nexus of the foreign agencies, bureaucrats and politicians. This underlines the sorry state of affairs of these institutes in the country.

Decline of the National Tuberculosis Institute : The sharp decline in the quality of work done in NTI is particularly unfortunate even though it is a part of the neglect of our key public health institutions by the top health administrators. Besides the limitations of the new generation workers at NTI who took over from the pioneers, it is the insensitivity of administrators to the crucial need of maintaining the “critical mass” which has led to the decline of NTI and near loss of a national asset. Young aspiring tuberculosis workers have been transferred to work in totally different fields just because they were in the Central Health Service (CHS), as other totally unsuitable persons have been posted to key positions in NTI simply because they were due for promotion, and NTI had a CHS vacancy of that seniority. There is no career planning for the key public health institutions of the country, perhaps because top health administration do not realise the worth of such institutions.

Decline in medical education : Expectedly, there has also been a decline in the quality of medical education. The rush to open new medical colleges in the private sector in many states under the capitation fee scheme, with full political support, is a pointer to the present state of affairs. Many teachers of preventive and social medicine and phthysiology are almost totally unaware of the basic postulates of NTP, what to speak of the seminal research studies which led to its formulation. A collective amnesia about our heritage of

tuberculosis work of a rather recent past seems to be overtaking some key tuberculosis workers within the country and abroad. This can explain why some obviously untenable suggestions are being tossed around by some well established tuberculosis workers in the country. Incidentally, there is lack of interest in tuberculosis work done earlier in India and other countries in WHO as well. Many regional offices of WHO have abolished the post of tuberculosis officer and in the WHO Headquarters, till lately, the Tuberculosis Unit had a lone tuberculosis officer along with an assistant.

MONITORING AND EVALUATION OF NTP

NTP and General Health Services

NTP being integrated with the general health service system, it should have been almost mandatory that those made responsible for implementation of NTP should have closely studied the trends in the growth and development of the health services in the country. Indeed, proposals were made about widening the scope of the NTI to make it a full fledged public health institute. This was a particularly apt idea because the injection of the NTP philosophy would have made some contributions towards improving the declining health of the public health system of the country. It could have been, in addition, a much needed complement to the All India Institute of Hygiene and Public Health in Calcutta. The proposals were, however, swiftly nipped in the bud because some tuberculosis "specialists" were not prepared to give up whatever was left of their "empire", nor were the leaders of public health left with enough of a vision to pursue such ideas.

Expectedly, there have been very serious problems in the implementation of the NTP. Perhaps, the very failure in the implementation of the NTP, because of the failures in the general health services, has been NTP's "success". Because, otherwise, the alternative specialised tuberculosis programme would have become parasitic to the already emaciated health services. And, at the same time, it would have met a fate much worse than the NMEP, the Family Planning Programme or the UIP which had the backing of more powerful political forces. Indeed, proceedings of the annual Tuberculosis and Chest Diseases Workers' Con-

ferences reveal that proposals for reverting to the specialised tuberculosis programme had been made, from time to time, and from influential quarters. Incidentally, the NTI did take the initiative to organise short-term orientation courses for district chief medical officers and other key senior administrators in the general health services. But, the overall culture of mediocrity in public health practice, from the central Directorate General of Health Services downwards, has seriously eroded this kind of effort.

Halfdan Mahler⁴⁴ had once remarked, "..... the National Tuberculosis Programme was made to sink or sail with the general health services. Because, even the simplest technology, if not properly deployed and utilised by the infrastructure, just will not move; will not control tuberculosis; will not meet peoples' felt needs. So, if technology is only available to the privileged few, as we know is very simple in all developing countries, then, obviously, I would maintain, that it is not properly used..... I suppose we can say that we have a half sunk tuberculosis ship sailing slowly forwards in the waves of integration. I put this to you, because I believe it will be an arduous task for all of us to continue to help each other to go on with the battle". It is ironical that the same Halfdan Mahler had to preside over many of the "international initiatives" of WHO, which have weakened the infrastructure of the health services of the developing countries.⁸⁸

Monitoring of NTP

NTI has a good system for monitoring of the NTP. The very basis of formulation of NTP has enabled NTI to identify the variables to be used for monitoring and acquire the competence to use these variables to provide a reasonably good insight into the functioning of the NTP in the country, notwithstanding the serious problems of reliability of the data from the different parts of the country.

Overall, the monitoring shows that by the end of 1989, NTP had been implemented in 378 out of 438 districts, each having on an average, 40 Peripheral Health Institutions (PHIs). Only 76% of the quarterly reports from DTCs and 71% from PHIs were received on time. Again, on an average, 835 (22%) sputum positive patients were diagnosed while the number of sputum negative tuber-

culosis patients diagnosed was 2,883 (78%) per District Tuberculosis Programme.⁸⁹ This shows a pronounced trend towards over-diagnosis. Further, the sputum positive cases diagnosed were only a third of the estimated potential of case finding in an average district. As regards treatment, only 45% of the cases had made 12 or more drug collections. No account was taken of those who took the treatment outside the NTP framework. As pointed out already, if “faults” in the organisation and management of the programme are rectified, the percentage of “default” among the patients will go down considerably.³³ Besides, there are many who choose to take treatment from outside the NTP system.⁴⁰

These data raise serious doubts regarding the WHO strategy to achieve “by the year 2,000, 85% cure of all sputum positive cases under treatment and 70% cases detection”.⁹⁰ How did WHO come to these percentages? Why not 85% case detection and 70% cure? WHO ought to have based its goals on operational research data. In the Indian context, the questions for operational research would be : how much emphasis can be put on discovering the remaining 67% of the uncovered potential of sputum positive cases, how to raise the efficiency of the system and how much to increase the motivation among patients for treatment acceptance?

In depth Study of NTP

In 1988, the South-East Asia Regional Office of the WHO sponsored a non-government organisation, the Institute of Communication, Operations Research and Community Involvement (ICORCI) to make an in depth study of NTP.²⁷ This covered five states according to their population size and their performance, good, medium or poor, in terms of NTP. A criterion of good and poor, performance was adopted in the selection of two districts in each of the five states, and two PHCs and two sub-centres from each of the ten districts, in consultation with local officials. In addition, four villages were selected from each of the PHCs for studying social aspects. Data used in the study included the NTI monitoring data, collected from 1978 onward, other data available with NTI and other organisations, in depth interview of 281 state officials, starting from the central level to the sub-centre level. Quantitative social science data were

collected from each of the selected villages by administering a questionnaire.

Expectedly, this systematic and systemic (systems analysis) field study confirmed the very disturbed state of the NTP, because of the very poor state of the general health services. The study categorically stated that **“unless, radical improvements are effected in the General Health Service system, it will be unrealistic to expect lasting improvement in programmes like NTP, NMEP etc.”** Concerning the NTP, it pointed out that none of the NTP officers could give all the essential features of the referral system. The situation at PHC and sub-centre levels was even more dismal; the number of positives per 100 persons X-rayed had shot up from 27.4 in 1981 to 36.7 in 1986 and in the case of Bihar and Nagaland “the number of reported 'suspects' was equal to or even more than the number X-rayed at DTCs (District TB Centres) and DTP (District TB Programme)”. It was conjectured, therefore, that this remarkable increase might have something to do with the meeting of targets set for NTP under the Twenty Point Programme in the context of the NTI study which showed that 50-60% of the “suspects” diagnosed on the basis of X-ray alone may not be suffering from tuberculosis. If so, as many as 5,00,000 to 6,00,000 persons, who do not have tuberculosis are labelled as such and have to undergo the harrowing consequences of the blunder committed by physicians. Apart from what it costs to the victims of wrong diagnosis, the report estimates that about Rs. 80 to 90 million are being wasted in providing treatment to the wrongly diagnosed cases.

Micro-Studies of NTP

I have been involved in a long term (1972-88) study of 19 villages in eight states of India to obtain community eye views of their health problems and health practices compared with the availability and accessibility of health institutions of various kinds.^{91,93} Eleven of these villages had a PHC : Gujarat (1), Karnataka (2), Kerala (2), Rajasthan (1), Tamil Nadu (1), Uttar Pradesh (2) and West Bengal (2). The data on health practices and health institutions were correlated with extensive qualitative and quantitative data on cultural, social, political, economic and demographic settings of the study villages. The NTP was one of the many programmes studied against this wide back-

ground. Not even one of the eleven PHCs came anywhere near the norm in implementing the NTP, namely, screening of the cough cases coming to PHCs, sputum examination, supervised treatment of the diagnosed cases and to and fro referral of the cases needing further investigations or consultation. At most, some PHCs referred their patients with compelling symptoms of tuberculosis (e.g., haemoptysis or prolonged fever with emaciation) for X-ray to the district hospital and offered treatment whenever they happened to have supply of some anti-tuberculosis drugs. The devastating consequences of such neglect by the PHCs were observed in many in depth interviews of the proved tuberculosis patients. Failure of the NTP to meet the felt needs of the tuberculosis patients created a thriving "market" for all sorts of exploiters who extracted large sums of money from the victims as charges for X-ray, ESR and other relevant or irrelevant tests, medicines and tonics.

These patients were also enjoined by the physicians (including PHC physicians in their private practice) to take good food, rest and fresh air. There were instances of entire families ruined in the process of meeting the exorbitant cost of the "prescribed" diagnosis and treatment. Often, as the prescribed treatment was scientifically flawed, or as the family reached a state of total bankruptcy unable to afford the expensive treatment any longer, some who happened also to be bread-winners had died, leaving the rest of the family devastated. The irony is that **while in the course of the over 16 years of the study there was a noticeable increase in the number of persons seeking alleviation of suffering due "to tuberculosis, the quality of the services provided under the NTP has declined sharply, leaving the "private sector" free to exploit the "market" created by the unmet felt needs.**⁵⁵ Similar findings have been reported in village studies by Foundation for Research in Community Health⁹⁵ Imrana Qadeer (personal communication) and Mankodi and Van Der Veen.⁹⁴

PAST EFFORTS TO STRENGTHEN NTP

One of the most remarkable aspects of an account of NTP is that even though its implementation was so closely related to the growth and development of health services, tuberculosis workers took such limited interest in this field. As pointed out, massive changes have taken place in the gen-

eral health services which have profoundly affected the implementation of NTP. These changes did not receive adequate attention from tuberculosis workers. A study of the social and political forces has seldom figured in the research agenda for improving NTP. Reference has earlier been made to the study establishing the close linkage between the general health services and the NTP.²⁷ Meant to be a systems analysis of NTP, the ICORCI study²⁷ ought to have been considered as a sub-system study of the wider system - the general health services. From such wider, systemic perspective it ought to have been easy to point out some of the basic weaknesses in the general health service system. For instance, the study team was denied the benefit of the "valuable experience" of the Health Secretary of Gujarat, when it could be that the high official had only a very short stint in the field of health. Similarly, the Director of Health Services could as well have been a professor of medicine or of ophthalmology, risen in the cadre by virtue of his seniority. Indeed, the reference to such "square pegs in round holes" is a datum on the sad state of the general health services in the country, but the supremacy of the Secretary in the health department is taken as a given. How could the study expect effective leadership of the NTP from such "birds of passage", who are neither technically competent, nor can they be held accountable for their decisions? It may also be pointed out that the report pays relatively greater attention to the Kartar Singh Committee report on Multi-purpose Workers⁹⁶ and not the process which led to the recommendations. That committee comprised of generalist administrators with the only "technical" person a former professor of pathology. What was the scientific basis of their recommendations? What was the process of optimisation? These questions ought to have been raised in the ICORCI report.

It is often overlooked that the breakdown of the public health system in the country has also affected the quality of leadership at every level of the organisation for implementation, including the NTI as well as non governmental organisations. And, as pointed out earlier, the erosion of competence in public health research and practice has led to a virtual collective amnesia about the rich heritage of tuberculosis work done in the first decade and a half after Independence. This sociological analysis of NTP can explain the present state

of ambivalence, confusion and frustration among the tuberculosis workers in the country. One outcome of this condition was that organisations like NTI sought help from experts from abroad for strengthening the NTP and even the NTI. Those experts might be highly competent workers in their special areas in the context of their own countries, but could hardly be expected to have an insight into the scientific bases of NTP and its current situation within the general health services to provide direction to the lost and beleaguered Indian workers. An example is the invoking of assistance from specialists in the US to set up an animal house in NTI. That animal experimentation is an important field of research in tuberculosis is not being questioned; the question is: how relevant was it to NTI's research agenda according to the mandate given to it? How useful or cost effective has that research been in strengthening NTP?

From the standpoint of sociology of knowledge, it was inevitable that this vacuum in the minds of the tuberculosis workers was exploited by the market forces: the pharmaceutical industry offering the technocentric solutions of introducing Rifampicin for resuscitating the ailing NTP⁹⁷ ignoring such key variables as maintenance of supply of drugs and other crucial inputs or a strengthening of the referral system or even the orientation of the PHC physicians and their teams.

Significantly, the second major effort to strengthen the NTP was also related to the market interests: The Tuberculosis Research Centre of Madras (TRC), the new incarnate of Tuberculosis Chemotherapy Centre (TCC) introduced short course chemotherapy (SCC); once again a technocentric solution, once again placing the cart before the horse. NTI was also roped in for conducting the field trials.¹⁵⁸⁹ An outcome of TRC's involvement in operational implications of implementing SCC was its belated realisation that placement of the cart before the horse does not make the horse-cart move forward.⁰⁸ If TRC is to contribute to NTP, it has to develop a much wider interdisciplinary approach to conducting operational research for optimising complex systems.

Wallace Fox⁹⁷ has also pointed out the role of the pharmaceutical industry in influencing priorities for strengthening NTP and mentions how he and his BMRC colleagues, Mitchison and Ellard, were involved by a drug firm to develop drug combinations with higher "bio-availability". Appar-

ently, this was done by the firm to score over its competitors and, in the bargain, demand higher price for its potential product. It may be noted that the focus was on serum levels and not on operational field trials. In the context of the involvement of prestigious scholars with drug firms, Chakraborty¹³ has appropriately commented on excessive pre-occupation with issues of chemotherapy in discussing present and future of NTP compared with more crucial variables.

Recently, a "Think Tank" was organised by the Directorate-General of Health Services⁹⁹ at Surajkund near Delhi. Thirty-five senior, experienced tuberculosis workers and public health administrators participated in the "Surajkund Conclave". The conclusions were refreshing: (a) it supported "the present technical, organisational, operational and administrative set up of NTP"; (b) it called for strengthening of the laboratory component of the PHIs and ensuring timely, regular and adequate supply of drugs; and (c) most importantly, it called for a broad based Task Force to ensure the implementation of the recommendations. It maintained that, "case-finding" and "case-holding" form a single entity in NTP and they must not be considered separately.

EFFORTS AT THE INTERNATIONAL LEVEL

WHO Initiative

Reference has already been made to the deleterious effects of the conditional integration of WHO-UNICEF initiatives on the growth and development of the health services. NTP also suffered because priority was assigned to the WHO-UNICEF initiatives. WHO has virtually lost its long standing base in global tuberculosis work because of changes in priorities. It is significant that WHO has not been able to show whether the many initiatives in conjunction with UNICEF had made any epidemiological impact, because *the programmes* were launched without reliable baseline data. Particularly, at a time when there is so much exhortation for "operational research",⁹⁰ one can ask what were the operational research bases of the multi-million dollar initiatives? Similarly, what operational research studies went into the formulation of its recent, "new global strategy" for tuberculosis control? Ralph Henderson now "estimates", from yet unknown data base,

that during the previous six months, "1.5 million died from tuberculosis and 4 million new cases occurred, unfortunately without drawing much attention from the world".⁹⁰ The "Estimates" are based on very fragile epidemiological data; strategy formulation did not involve operational research studies, involving all the key variables; and the propensity to impose such a scientifically unsubstantiated programme on countries of the South continues. Unfortunately, Henderson seems to forget that the deaths and new cases have been occurring for the many years when WHO was busy drumming up support for its other, ill-fated "vertical" initiatives, while neglecting tuberculosis work. WHO has now made tuberculosis control a programme of top priority : increasing its budget by a third and vastly strengthening its Tuberculosis Unit." In the formulation of future plans, oblivious of the research bases of the earlier Expert Committees on Tuberculosis reports, it has come out with a surprising statement that the earlier "control policy was successfully implemented in the industrialised countries and in some middle-income developing countries... The implementation of this policy in the majority of the developing countries has not been successful".⁹⁰ This is factually incorrect. Without caring to analyse the causes of failure of tuberculosis programmes in developing countries and without carrying out any operational research, WHO has come up with a "new strategy" : "to reduce death by 40% and morbidity by 50%, by achieving an 85% cure rate of all detected sputum positive cases and 70% detection of all existing cases by the year 2000! This astonishingly unsubstantiated and unwarranted statement comes from apex global health organization reflecting an effort to wish away all the research efforts made in the developing countries and offering an unsubstantiated and scientifically questionable alternative package. Obviously, it is doomed to fall, but it may cause a great deal of damage and create a great deal of confusion before that.

World Bank Initiative

The World Bank has extended a loan of US \$ 102.5 million to initiate an intervention from outside in China's tuberculosis programme. It covers 550 million people and has an allocation of \$68 million for diagnosis, chemotherapy, and case management and \$34.3 million for "capacity build-

ing" which includes operational research, programme implementation, health education and training. The Coordination, Advisory and Review Group on Tuberculosis (CARG) of WHO^{99,100} has strongly commended the initiative, surprisingly to a country like China without apparently, any data on optimisation by the World Bank/WHO. What is the relation of the World Bank tuberculosis project to the general health services? What are the social dimensions of the epidemiology of tuberculosis in China? Is this the most effective way of using the \$ 102.5 million for China's tuberculosis programme?

The World Bank may support similar projects for Bangladesh and India.⁹⁰ Even if India is in a position to provide satisfactory answers to the type of questions raised above, the question still remains: with its own endogenous capacity, should India go for a loan from the World Bank for its tuberculosis work? The obvious answer is "no". However, with the strong political clout of the World Bank and the strong possibility of some uninformed and technically not so competent technical support, the Union Health Ministry might be persuaded to accept an obviously faulty project. That would be very unfortunate for India and for NTP. If the World Bank insists on assisting India, and India must take the loan, then the World Bank team must first work with their Indian counterparts, and use tools of systems analysis and operational research to develop an optimal project to strengthen the Indian NTP, on the lines suggested by the Surajkund Conclave⁹⁹ and the pattern of international cooperation developed at NTI in 1959.

CONCLUSIONS & SOME SUGGESTIONS

The above account shows how a well researched and reasonably simple and straight forward programme can get hopelessly confounded due to an interplay of a variety of social, political and economic forces. NTP essentially offered diagnosis and treatment to the very substantial portion of tuberculosis patients actively seeking treatment in various health institutions, both in rural and urban areas, with a referral support system which extended right up to the super-specialists in post-graduate teaching hospitals. The State Tuberculosis Centres and NTI and other tuberculosis research and teaching institutes were meant to

provide support to NTP in the form of training, monitoring, evaluation and operational research.

But as pointed out by Halfdan Mahler, "even the simplest technology, if it is not properly deployed and utilised by the infrastructure, just will not move, will not control tuberculosis, will not meet people's felt-needs." This is what has befallen NTP. The infrastructure has been grievously damaged because of a sharp decline in the quality of public health practice and research, filling up of key public health posts by the persons who do not have technical competence, by the imposition of target oriented specialised programmes on an already weak infrastructure and a correspondingly sharp fall in the quality of administrators and research personnel in the field of tuberculosis.

From the basic premises presented above, some important suggestions are made:

1. While tuberculosis workers cannot take on themselves the onerous task of rejuvenating the moribund health and family planning service systems, the crisis has become so profound that there are good chances that the political leaders will have to wake up to it. I have detailed a programme for the rejuvenation of the health services in my B.C. Dasgupta Oration at the Indian Public Health Association in 1988.⁵⁴ Some important components are :
 - (a) **Building up a "critical mass" of public health workers in the fields of education, training, research and practice.**
 - (ft) **Restructuring to place competent public health specialists in key public health positions.**
 - (c) **Concurrent removal of the "square pegs in round holes" of the system.**
 - (d) **Making the "conditional" integration of the target oriented family planning and other programmes "unconditional".** This will lead to a much higher priority accorded to NTP, as the problem is responsible for a substantial part of the total suffering caused by health problems as a whole.
2. Tuberculosis workers can help i rejuvenation of the health and family planning service system by insisting that this process is critical for providing good tuberculosis services to the suffering masses of the country.
3. Considering the constraints of the general health services as given, there **is still considerable scope for improving the NTP system**

through the use of operational research and systems analysis. The Surajkund Conclave recommendations can serve as a starting point.

4. The very improvement in the NTP system might stimulate improvement in the wider health and family planning service systems, by providing an example.
5. NTI can be rejuvenated by bringing together a competent interdisciplinary team of workers to play a role in strengthening the NTP. **NTI can extend its activities to serve as one of the many institutions necessary to strengthen the general health services.**
6. Concurrently, competent tuberculosis workers are placed as heads of tuberculosis wings of the central and state health services.
7. **Other tuberculosis institutions, such as TRC, should be tuned to serve the NTP, i.e. the problems it deals with must emerge from the field situation, and not the other way round,** as is often the case at present.
8. The idea of a Task Force,⁹⁸ vested with power and resources to act as watchdog for the implementation of NTP, blends well with the other suggestions for improving NTP.
9. Again, **there is considerable scope for optimising the urban components of the NTP.**
10. **Tuberculosis Association of India and its state affiliates can be revamped to perform a complementary role in the strengthening of NTP—** e.g. conducting independent evaluation, offering technical assistance, providing logistic support, providing training, and so forth.

In sum, we must take steps to unleash the social forces which ensure that simple and efficacious technology developed in India is made accessible to the hundreds of thousands of sputum positive cases who are actively seeking relief for suffering but who are still being thrown out of the health institutions with a bottle of useless cough mixture. Sociologically, it is contended that the very meeting of the felt need generates more needs, and if that does not happen, active educational steps are taken to generate more needs to reach a level when it starts having an epidemiological impact. This epidemiological impact will occur in consonance with the impact that might occur as a result of changes in the natural history of tuberculosis in India.

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RESULTS OF TREATMENT WITH A SHORT COURSE CHEMOTHERAPY REGIMEN USED UNDER FIELD CONDITIONS IN DISTRICT TUBERCULOSIS PROGRAMME

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Summary. The treatment results of an unsupervised Short Course Chemotherapy (SCC) regimen used under conditions of District Tuberculosis Programme (DTP) are presented. The District Tuberculosis Centre (DTC) Kolar and six of its peripheral health institutions (PHI) formed the study area. No extra efforts except ensuring of adequate availability of drugs at the participating centres were made to obtain patients' compliance. In all, 584 smear positive tuberculosis patients were diagnosed during the study period but 283% of the patients could not be initiated on treatment with the chosen self-administered SCC regimen -2EHRZ/6TH (EH). Of the 382 put on treatment, only 33.2% completed over 75% drug collections in both intensive and continuation phases. The pattern of treatment compliance did not vary with the place of treatment, i.e. DTC or PHI. Irrespective of treatment compliance, nearly 72—77% of the patients attained smear negative status at the end of the period of treatment, there being no difference between PHI and DTC. However, deaths were higher in the PHI patients. This could be attributed to a significantly higher proportion of aged patients taking treatment at PHI than at DTC. Patients with drug sensitive bacilli had a higher rate of culture negativity (70%) as compared to those with drug resistant bacilli (48%). It was concluded that unsupervised SCC could give encouraging results in a DTP setting provided adequate drug supply was ensured.

Introduction

Short Course Chemotherapy (SCC) is being gradually introduced in the District Tuberculosis Programme (DTP) since 1986. However, its initial acceptability, extent of treatment compliance, and the resulting efficacy of treatment, obtained under the organizational structure and functional efficacy of DTP appear to be important considerations which

are making the results of treatment obtainable under DTP conditions vastly different from those under controlled clinical trial situations.^{1,2} The earlier studies conducted by the National Tuberculosis Institute on the efficiency of SCC were done mostly in urban centres. The present study was meant to find out the treatment results of an SCC regimen in a largely rural DTP under the routine operational situations.

Objectives

The objectives of the study are to observe :

(i) Treatment compliance with a self administered SCC regimen in a DTC and its PHIs, and
(ii) Response to treatment assessed in terms of bacteriological status on completion of the period of treatment and relating the treatment response to the initial sputum culture and drug sensitivity status.

Material and Methods

The district of Kolar was selected since it is a typical Indian district in terms of its development, urban-rural demography as well as a predominantly dry land area. The centres selected for the study were District Tuberculosis Centre (DTC), Kolar and six of its peripheral health institutions (PHI) namely Gauribidnur, Bagepalli, Kaiwara, Chintamani, Nyamagondlu and Chikkaballapur. The period of intake of patients lasted from April, 1988 to June, 1989.

All patients aged 15 years and more, diagnosed freshly as sputum positive cases of tuberculosis on direct smear examination at DTC Kolar as well as the six PHIs were eligible for intake irrespective of the history of previous treatment. In all, 584 sputum positive patients were diagnosed, of whom 51 were

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not eligible for inclusion in the study. Of the remaining 533 patients, treatment with the SCC regimen could not be initiated in 151 (28.3%) because either the patient did not come back for result of examination (21.6%) or refused (6.8%) to be treated with the drug regimen offered (Figure in Appendix), leaving 382 patients for analysis.

Pre-treatment Investigations

Apart from the initial sputum smear examination done at the DTC/PHI just before the intake, one spot specimen of sputum was collected by the PHI/DTC staff at the time of initiation of treatment to be independently examined at the National Tuberculosis Institute (NTI) laboratory, by direct smear and culture. These specimens were stored at the respective centres in a refrigerator till collected by NTI messengers, once a week.

SCC Regimen

The study patients were offered the following self-administered 8-month oral SCC regimen (2EHRZ/6TH or 6EH) which is also the regimen B recommended for DTP :

<i>(a) Intensive Phase</i> 2EHRZ			
Ethambutol	(E)	1g	All drugs consumed together, daily, for 2 months
Isoniazid	(H)	300 mg	
Rifampicin	(R)	450 mg	
Pyrazinamide	(Z)	1.5 g	
<i>(b) Continuation phase</i> 6TH or 6EH in case of hypersensitivity to Thioacetazone			
Isoniazid	(H)	300 mg	Both drugs taken orally together, daily, for 6 months
Thioacetazone	(T)	150 mg	
or			
Ethambutol	(E)	800 mg	

Drugs were issued to the patients fortnightly for self-administration at home. The treatment period was eight months, without additional time granted to defaulting patients for completing the prescribed treatment, as is done in the DTP.

The supply of antituberculosis drugs in adequate quantities was ensured by NTI.

Management of Drug Default

A patient was considered a defaulter if he did not attend the centre on the due date for drug collection. First defaulter action was a letter posted on the due

date itself or the next day. Second action was taken on the fourth day of default, as a second letter or home visit or message sent through a multipurpose health worker (MPW).

Adverse Reactions

The prescribed regimen was continued in spite of minor adverse reactions like itching, nausea, vomiting, etc., which subsided with or without symptomatic treatment. Major reactions like anaphylactic shock, jaundice, exfoliative dermatitis, etc. were managed by withdrawal of the offending drug.

Follow-up Examination

Two follow-up examinations, one at the end of the intensive phase and the other at the end of chemotherapy were to be done. Sputa collected at the respective centres were examined at the NTI laboratory by direct smear & culture and drug sensitivity tests were performed for positive cultures. While the spot/overnight sputum specimen at the end of "intensive phase" was collected within 15 days of the due date, the "treatment end" sputum specimen was collected between 15 days prior to and 1½ months after the prescribed date of end of chemotherapy. In case of death, special efforts were made to obtain the history of previous treatment and the probable cause of death, from the relatives.

Results

Table 1 gives the age/sex distribution of the 382 patients analysed.

Table 2 gives the coverage for sputum follow up examination after the end of treatment. It is seen that 297 (77.7%) patients could be followed up, of whom 45 were dead (15.2%) and sputum was examined for 252 persons (84.8% of eligibles).

Level of Treatment Compliance

Table 3 shows the distribution of patients by levels of treatment compliance. A patient making less than 75% of drug collections due in the intensive phase as well as in the continuation phase was considered to be in the compliance level 1. Those making less than 75% of the due collections in intensive phase, but 75% and more in continuation phase were considered to be in level 2. Of the total

Table 1 *Distribution of patients by age and sex*

Age group	DTC			PHIs			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
15-24	11 (12.8)	6 (15.4)	17 (13.6)	21 (12.1)	18 (21.4)	39 (15.2)	32 (12.3)	24 (19.5)	56 (14.7)
25-44	42 (48.8)	25 (64.1)	67 (53.6)	60 (34.7)	42 (50.0)	102 (39.7)	102 (39.4)	67 (54.5)	169 (44.2)
45+	33- (38.4)	8 (20.5)	41 (32.8)	92 (53.2)	24 (28.6)	116 (45.1)	125 (48.3)	32 (26.0)	157 (41.1)
Total	86	39	125	173	84	257	259	123	382

Difference in age structure of patients between PHI & DTC significant ($X^2 = 6.93$, df 2, $P < 0.05$)

Table 2 *Coverage for sputum examination at follow up on conclusion of treatment period*

Initially sensitive patients	Total patients
Followed up	148(79.6) 297(77.7)
Examined	125(84.5) 252(84.8)
Dead	23(15.5) 45(15.2)
No response	38(20.4) 85(22.2)
Total	186 382

(Percentages in brackets)

382 patients who were initiated on treatment, 86 (22.5%) had made less than 75% of drug collections in the intensive phase, irrespective of the collections in the continuation phase. They (levels 1 and 2) were not eligible for analysis under the study. Therefore, their compliance with treatment in the continuation phase is not presented and patients in levels 1&2 have been combined in Table 3. Their follow up results at the end of treatment period have, however, been presented.

In the third level of treatment compliance, (i.e. 2: 75% collections in intensive phase but < 75% of due collections in continuation phase), there were 169 patients (44.2%). Compliance level 4 comprised

Table 3 *Distribution of cases by level of drug collection & initial culture status*

Compliance level	Proportion of expected no. of collections made during 8 months		Number of patients			Total
	Intensive phase	Continuation phase	Sensitive	Resistant	Others	
1	<75%					86*
2	44 <75%	20	22			(22.5)
3	≥75%	<75%	79	43	47	169 (44.2)
4	≥75%	≥75%	63	30	34	127 (33.2)
Total	186	93	103			382

(Percentages in bracket)

*No. of patients not eligible for continuation phase-86 (see text)

patients who had collected 75% or more drugs due in both the intensive as well as continuation phases. Of the patients initiated on treatment, 127 (33.2%) had completed the fourth level of treatment compliance.

There is no difference in the treatment compliance patterns between the patients collecting drugs at the PHIs in comparison with those at the DTC (Table 4).

Bacteriological response related to treatment compliance levels

Table 4 presents the status of 382 patients at the end of treatment period, by place of treatment, compliance level, and bacteriological response as judged by sputum smear examination. For the Kolar district, out of the 382 patients, 36 could not be followed up and 45 were dead. Thus, sputum could be examined by direct smear only in 301. Of these, 228 were sputum negative after the completion of treatment period (75.7%); the proportion for DTC Kolar was 72.8% and for all PHIs taken together, 77.3%. However, considering that death is an unfavorable outcome of treatment, the proportions having favourable results i.e. those in whom sputum was negative, excluding only the non-response group from the denominator, 69.4% could be seen to have favourable result at the DTC compared to 64.3% at PHIs.

Considering sputum conversion on the basis of smear results, according to levels of treatment compliance for Kolar District as a whole 58.5% with compliance levels 1&2, 70.2% for level 3 and 88.7% with level 4 had converted. There were no differences between these proportions, i.e. treatment compliance at various levels and sputum conversion by these levels, between DTC & PHIs.

Also in Table 4, the deaths are shown according to place of treatment and compliance level of treatment. Five of the 125 (4%) patients undergoing treatment at Kolar DTC had died; only one of them was in the treatment compliance level 3 and none in level 4. Of the 257 undergoing treatment at PHIs, 40 had died (15.6%) and half of them were in levels 3&4. The proportion of deaths was higher at PHIs than at DTC but not high enough to affect the respective proportions of favourable results. The distribution of deaths by age and sex as proportion of patients put on treatment showed no difference (Table not put up).

Table 4 Fate of patients at the end of treatment period by compliance levels & place of treatment

Kolar District					
Treatment compliance level	8th month sputum smear status				
	Neg.	Pos.	Dead	ND	Total
1&2	31 (58.5)*	22	24	9	86 (22.5)
3	87 (70.2)*	37	20	25	169 (44.2)
4	110 (88.7)	14	1	2	127 (33.2)
Total	228 (75.7)*a	73	45	36	382 (100.0)
DTC					
1&2	11 (50.0)*	11	4	5	31 (24.8)
3	26 (66.7)*	13	1	10	50 (40.0)
4	38 (90.5)*	4		2	44 (35.2)
Total	75 (72.8)*b	28	5	17	125 (100.0)
PHIs					
1&2	20 (64.5)*	11	20	4	55 (21.4)
3	61 (71.8)	24	19	15	119 (46.3)
4	72 (87.8)*	10	1		83 (32.3)
Total	153 (77.3)*c	45	40	19	257 (100.0)

*Proportion among sputum examined after excluding deaths and not followed up

ND Not done

a,b,c : Proportion of favourable results (death being unfavorable outcome)

a-65.9 b-69.4 c-64.3

Bacteriological response according to treatment compliance level and drug sensitivity status.

Table 5 presents the bacteriological response to treatment at various levels of compliance according to drug sensitivity status at start of treatment. Out of 382 patients, the initial culture was positive only in 279, whose results are presented in Table 5. In the remaining 103 patients, culture was either not done

Table 5 Bacteriological response at various levels of treatment compliance according to initial drug sensitivity

Treatment compliance level	8th month culture status					Total
	Pos-S	Pos-R	Dead	Not done	Neg	
Initially drug sensitive						
1	11	10	6	11	6	44
2						
3	31	15	3	11	19	79
4	46	2	1	1	13	63
Total	88 (70.4)*a	27	10	23	38	186
Initially drug resistant						
1	6	1	4	7	2	20
2	12	3	11	5	12	43
3	11	1	11		7	30
Total	29 (48.3)*b	5	26	12	21	93
All	117 (63.2)*c	32	36	35	59	279**

*Proportion among sputum examined; (P<0.05)

a,b,c: *Proportion of favourable results (death being unfavorable outcome)

a-59.5

b-40.3

c-53.2

(P<0.05)

**Initial culture neg/contaminated/not done, excluded-103

S-Drug sensitive; R-Drug resistant

or was contaminated. However, 10 of the 103 patients were dead; 54 were culture negative; 13 were culture positive (resistant 9), and in 26 patients the follow-up examination could not be carried out at the end of treatment period (not on Table).

Of the 279 patients in whom pre-treatment culture was positive, 220 alone could be followed up (Table 5). Of the latter, 117(53.2%) were culture negative, 35(15.9%) were dead and 68(30.9%) were still culture positive at the end of the period of treatment (drug resistant 36). Therefore, unfavorable response was 46.8%; by leaving out the dead and non-response group from the denominator,

63.2% were found to have converted compared with 53.2% over all result.

Of the 186 initially drug sensitive patients, sputa could be cultured for 125 at the end of treatment period. Of them, 88(70.4%) were converted. However, the proportion of favourable results (in 88 out of 148 patients) fell to 59.5% when death was considered as an unfavourable result.

Among the initially resistant group of 93 patients, follow-up sputa could be examined for 60. Of them, 29 were culture negative at the end of treatment period (48.3%). Considering death as unfavourable result, 29 out of 72 patients (40.3%) had favourable results.

Major toxic and side effects were infrequent in the study; only 7 required stoppage of treatment due to these (1.8%) reactions.

Discussion

The present study was conducted to investigate the efficiency of a short course regimen, accepted for DTP, in terms of initial acceptance, treatment compliance and result of treatment in a typical Indian district. While carrying out the study, no interference was made by NTI research staff, either at the DTC or PHIs except that adequate drugs supply was maintained at the respective centres for the study period. Care was taken at the outset to explain to the programme staff the criteria of admission of patients to the study and other requirements. Therefore, the situation was similar to any DTP using short course regimens but lack of drug supply was not allowed to become a constraint.

Despite the methodology of the study having been fully explained to the participating medical officers, 28 patients otherwise eligible were excluded by them without valid reason and 23 were correctly excluded from 584 patients diagnosed during the period.

Of the remaining 533 patients, 151(28.3%) either did not come back to receive the results of investigations or refused the SCC regimen. It is not known why such a substantial proportion of patients behaved as they did. The place of treatment (DTC or PHI) did not matter because the proportions not initiated on treatment were 32.4% and 26.1% respectively (not on Table).

Of the 382 patients in whom the SCC could be initiated, 22.5%, 44.2% and 33.2% respectively complied with the treatment at levels 1 and 2,3 and

4 respectively. There was no difference in the pattern of treatment compliance, whether the patient was treated at DTC or at PHIs (Table 4). The proportion of patients complying at level 4 was only about one third of the patients initiated on SCC, whether at the DTC or PHIs.

In spite of the low compliance at level 4, the sputum smear negativity achieved at the end of period of treatment, among those for whom sputa could be examined ranged between 73% and 77% (Table 4), irrespective of the level of compliance, initial drug sensitivity status, and whether the patients was treated at the DTC or PHIs.

In Table 5, it could be observed that the patients with drug sensitive organisms initially achieved a significantly higher rate of sputum culture negativity (70.4%), than those with drug resistant bacilli (48.3%). Further, among 49 out of 63 patients with sensitive organisms initially who completed level 4 of treatment and whose sputa could be examined, 46 were culture negative (93.8%). The corresponding figure for patients with drug resistant bacilli was only 47.8% (11 of 23). Thus, SCC can achieve good sputum culture negative status in patients with initial drug sensitive bacilli even in patients taking unsupervised but adequate treatment, i.e. the patients in level 4. Even the overall treatment result of 75.7% (Table 4), expressed as sputum smear negativity and without considering level of treatment compliance, is quite considerable. Besides, deaths were almost equal in both the sensitive and resistant groups (12.4% and 12.9% respectively). The results, though far short of the expectations raised by controlled clinical trials, are, nevertheless, favourable

keeping in mind the operational conditions of the programme, where culture and sensitivity test are not applicable.

Deaths among patients put on treatment were higher at the PHIs (16%) compared to DTC (4%). However, considering that death is an unfavourable result of treatment, along with persistent sputum positivity among the patients followed up, the proportion of those who had favourable result, on smear examination, was similar for the DTC and the PHI, i.e. DTC : 69.4% and PHI: 64.3% (Table 4). The possible reason for higher death rate at PHIs despite similar drug compliance patterns observed at DTC and PHI is not clear. One possibility is that a significantly higher proportion of aged patients were on treatment at the PHIs than at the DTC (Table 1).

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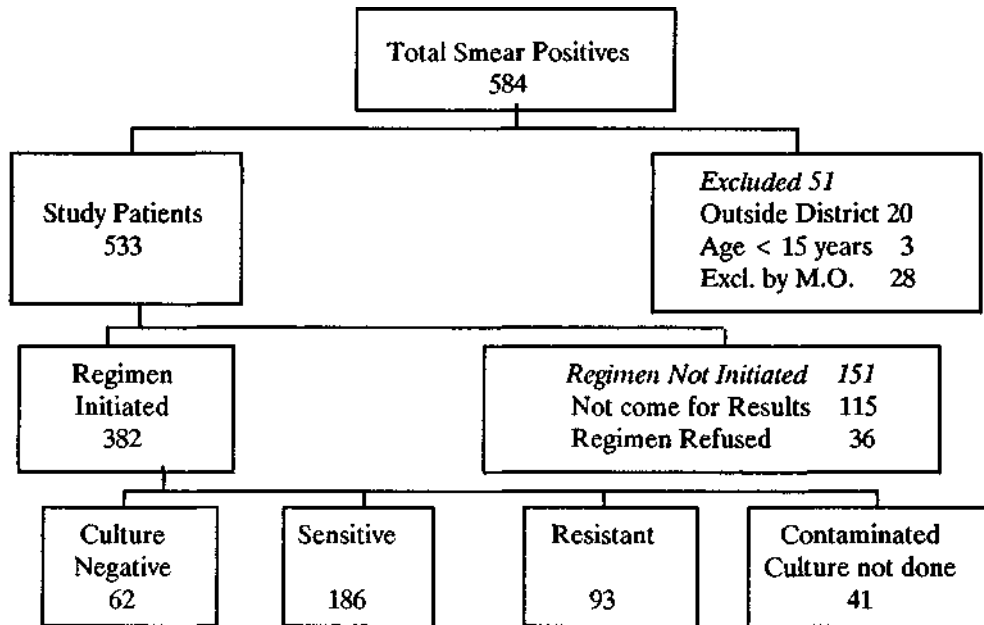
Appendix Table : Age-Sex distribution of smear positive patients

Age Group	DTC			PHI			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total
15-24	16 (12.9)	6 (9.8)	22 (11.9)	22 (9.5)	23 (19.8)	45 (12.9)	38 (14.7)	29 (16.4)	67 (12.6)
25-44	56 (45.2)	42 (68.9)	98 (53.0)	80 (34.5)	55 (47.4)	135 (38.8)	136 (38.2)	97 (54.8)	233 (43.7)
45+	52 (41.9)	13 (21.3)	65 (35.1)	130 (56.0)	38 (32.8)	168 (48.3)	182 (51.1)	51 (28.8)	233 (43.7)
15+	124	61	185	232	116	348	356	177	533*

*Excluding 51 not eligible for intake

APPENDIX FIGURE

Classification of smear positive patients diagnosed during April 1988-June 1989



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HIGH COVERAGE FOR LONG TERM FOLLOW-UP OF PATIENTS WITH SPINAL TUBERCULOSIS

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Summary: A total of 303 patients treated for spinal tuberculosis were systematically followed up for a period of 8 years. There were a total of 2243 attendances due during the period; the patients attended on the due date on 70.9% of these occasions, and after defaulter actions on 27.7% occasions. The coverage of 98.6% for an 8-year follow-up was obtained even though on 50% of these occasions, patients attended from a suburban area or from outside the city. An average of 1.2 visits per default were made and 0.9 letters were posted to retrieve those who did not attend on the due date. Thus, the high coverage obtained can be attributed to effective motivation of the patients by the clinic staff and intensive defaulter actions.

Introduction

A collaborative controlled clinical trial to assess the efficacy of short course chemotherapy in the treatment of spinal tuberculosis with or without surgery was undertaken by the Tuberculosis Research Centre, Madras. The results up to three years have been published¹. In all, 303 patients were admitted to the study and are being followed up at regular intervals. A very high coverage, more than 98%, in the long term follow-up of patients has been achieved even among patients residing outside Madras city and from other states. The efforts made to achieve this high coverage are described in this paper.

Material and Methods

Patients with radiologically active spinal tuberculosis, without paraplegia, involving the body from the first thoracic to the first sacral vertebrae were allocated at random to one of the following regimens:

(1) *Rod 6HR*. Radical excision of the diseased

vertebrae and bridging the gap with autologous bone graft plus chemotherapy with Isoniazid and Rifampicin given daily for 6 months.

(2) *Amb 6HR*. As in (1) but without surgery.

(3) *Amb 9HR*. As in (2) but with chemotherapy for 9 months.

Patients were residents of Madras city, its suburbs, other districts or other states. Patients were admitted to the study between May, 1975 and December, 1978. They were divided into three groups, according to their place of residence at the time of the check-up, viz. city, suburban and out-station patients, as given below:-

(a) *City*: Patients residing within the Corporation limits of the city of Madras (about 10 km radius from the Centre).

(b) *Suburban*: Patients residing beyond the City Corporation limits and within approximately 50 km radius from the Centre.

(c) *Out-station*: Patients residing beyond 50 km from the Centre (distance range 51-950 km). The scheduled attendances for the follow-up of patients after chemotherapy were quarterly up to 2 years, half yearly up to 5 years and annually thereafter. For this analysis, annual assessments done for 8 years were taken into account. All patients were reminded about their check-up one week prior to the due date, by visit by a health visitor for the city patients and letter by a social worker for suburban and outstation patients.

At each attendance at the Centre, the patients were motivated by the doctor, social worker, clinic nurse and health visitor who stressed the need for regular follow-up. For city patients, visits by health visitors were made once a month for the first 5 years and once in three months thereafter, to find out whether the patient continued to reside at the same

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address, trace the new address if patient had shifted, and to check up on the well-being of the patients. For suburban and outstation patients, letters were posted by social workers, enclosing self-addressed post cards; patients were instructed to post back the card after signing it.

If the patients failed to attend for the check up on the appointed date, the following defaulter actions were taken:

For city patients, a health visitor visited the patient's house initially and if the attempt failed, a social worker made a visit to find out the reason for default. Subsequent motivation, if required, was done along with health education. Visits to the patient's workspot, other contact places, etc. were made by the social worker, whenever required. If still unsuccessful, a visit by a doctor was made in addition to the routine defaulter actions; if the default was due to medical reasons, a doctor visited the patient for necessary assessment. Efforts were made to contact the patient over the telephone, whenever possible. For suburban and outstation patients and for city patients who were unwilling for home visits for various sociological reasons (such as 'newly married', 'marriageable age', etc.) letters were posted by the social worker. If there was no response to letters, a letter was sent to the patient from the surgeon who had operated upon him or her. Whenever required, visits were made by a social worker, sometimes accompanied by a doctor. Despite making all these efforts, if the patient continued to be a defaulter, a questionnaire was sent (from 72nd monthly examination onwards), to be filled up by the patient and sent back by post, or given to a social worker to fill up during a home visit. The questionnaire contained questions regarding

general health, back pain, difficulty in walking, ability to undertake routine activities and additional chemotherapy received elsewhere.

Results

The mean age on admission was 23.7 years (range: 18 months to 60 years); 47% of the patients were male. Twenty-three percent were illiterates and 44% had education up to primary school level. Fortyfive percent of the patients were employed, and of these 52% were unskilled labourers [agriculturists, daily wage earners, etc.]. The family income was less than Rs. 300 per month in 56% of the patients.

Regularity of attendances : Table 1 gives the total number of attendances due for the annual check-ups for 8 years (2243 :1125 city; 503 suburban and 615 out-station). On 1590 (70.9%) occasions (75.8% city; 68.2% suburban; 64.1% out-station), the patients attended on the due date (punctual attendance). On 143 (6.4%) occasions (8.7% city; 5.2% suburban; 3.1% out-station), the patients attended within 6 days of the due date. The corresponding figures were 374 (16.7%) for 7 to 30 days late (13.2% city; 20.7% suburban; 19.7% out-station) and 105 (4.7%) for late beyond a month (1.5% city; 4.2% suburban; 10.9% out-station).

One-fourth (25.0%) of the patients attended on the due date for every one of the eight annual check-ups, one-third (33.2%) defaulted on only one or two occasions, 28.0% defaulted on three or four occasions and the remaining (13.8%) defaulted on five or more occasions.

Defaulter actions : Over the 8 year period, 228 patients defaulted on 653(29.1%) occasions (24.2%

Table 1 Patient attendances during the 8-year period, according to place of residence

	City		Suburban		Outstation		Total	
	No.	%	No.	%	No.	%	No.	%
No. of attendances due	1125	100	503	100	615	100	2243	100
Punctual attendances	853	75.8	343	68.2	394	64.1	1590	70.9
No. of defaults	272	24.2	160	31.8	221	35.9	653	29.1
Attended late by 1-6 days	98	8.7	26	5.2	19	3.1	143	6.4
“ 7-30 days	149	13.2	104	20.7	121	19.7	374	16.7
„ > 30 days	17	1.5	21	4.2	67	10.9	105	4.7
Missed	8	0.7	9	1.8	14	2.3	31	1.4

Table 2 Regularity of attendances for follow-up year by year

Total patients in analysis	Year of follow up							
	1st 303	2nd	3rd	4th	5th	6th 277	7th	8th
Death	9	3	3	4	4	1	3	1
Discharge	3*	0	0	0	0	0	0	0
Due for follow-up	291	288	285	281	277	276	273	272
Attended punctually	No. 236 % 81.1	226 78.5	223 78.2	204 72.6	188 67.9	175 63.4	169 61.9	169 62.1
Attended after efforts	No. 52 % 17.9	61 21.2	58 20.4	71 25.2	85 30.7	97 35.1	98 35.9	100 36.8
No. Missed	3 % 1.0	1 0.4	4 1.4	6 2.1	4 1.4	4 1.4	6 2.2	3 1.1
Questionnaires received**	-	-	-	-	-	3	1	1

•All in the first month of treatment.

*Questionnaires were sent from the 6th year of follow-up. city; 31.8% suburban; 35.9% outstation), for which defaulter actions were taken. Even though there was an increasing trend in the number of defaulters, with effective defaulter actions, there was no increase in the number of patients who missed attending for a due check-up (Table 2).

Considering the type of defaulter action (Table 3), 802 visits (average : 1.2 total : 2.1 city; 0.8 suburban; 0.4 outstation) were made to patients or contacts, by health visitor, social worker and/or doctor; 25 outstation visits were made covering a maximum distance of 800 km, to and fro. In addition to these visits, 591 letters (average 0.9 total: 0.2 city; 1.0 suburban; 1.6 out-station) were posted and 51 phone calls (13 city, 17 suburban, 21 out-station, to local contacts) were made.

The coverage was very high throughout, ranging from 97.8% to 99.6% (mean 98.6%) for each of the annual examinations over the 8 year period.

In all, 25 questionnaires (3 city; 6 suburban; 16 outstation) were sent. On 12 occasions, patients attended after receiving the questionnaires; 5 questionnaires were filled up by patient/social worker during visits and 6 filled up questionnaires were received by post. On one occasion, patient attended late and on another occasion, monthly examination was done at the Centre's clinic at Madurai, which

Table 3 Types of defaulter actions according to place of residence

Defaulter action	City	Sub-urban	Out-station	Total
Total no. of defaults	272	160	221	653
No. of visits made	583 (2.1)*	120 (0.8)	99 (0.4)	802 (1.2)
No. of letters written (0.2)	62	162 (1.0)	367 (1.6)	591 (0.9)
No. of phone calls made	13	17	21	51
No. of questionnaires sent	3	6	16	25

*Mean visits made/letters written per default are given within parentheses.

was close to the patient's residence.

On 31 occasions, 17 patients missed their due checkups (city: 8 occasions-4 patients; suburban: 9 occasions-4 patients and outstation: 14 occasions-9 patients). Out of 303 patients, only 17 (5.6%) missed one or more attendances-9 on one occasion, 4 on two occasions and 2 each on three and four occasions. Thus, 31 (1.4%) of a total of 2243 attendances were missed.

Three of the 17 patients who failed to attend were considered lost for follow-up. All three were females. One patient was 'lost' after the 48th monthly examination; her whereabouts were not known and she could not be traced. The second patient, staying 50 km away from Madras, could not attend after the 60th monthly examination as her husband was very unco-operative, and could not be convinced about the need for patient's periodic check-up. The third patient got married and migrated to Delhi. She did not want her husband or parents-in-law to know about her illness and she could not attend after the 72nd monthly examination.

Discussion

The results presented here show a very high coverage for long-term (8 years) follow-up of patients who were treated for spinal tuberculosis. The physical suffering and disability caused by the disease and the visible manifestations like gibbus, abscess, sinus, etc. experienced by the spinal tuberculosis patients could have contributed as a motivating factor to the compliance. The coverage for five-year follow-up in patients with pulmonary tuberculosis at our Centre has been 91% to 95% in different published studies^{2,3,4}. These patients resided within a 15 km. radius from the centre and were aged 12 years or more. In the spine tuberculosis study, 33% of the patients were under 14 years. Fifty percent of the patients were from outside the city, including other states. Ramachandran et al⁵ have reported the findings of long-term status, at one time point between 4½ years and 8 years, of 119 children who were treated for tuberculous meningitis. Of 102 patients eligible for follow-up, 2 (1.7%) patients could not be traced, while information was obtained through mailed questionnaire for 2 (1.7%) others. The remaining 98 (82.4%) patients were seen at the clinic. The long-term status findings were available for 100 of 102 (98%) patients. In the present study out of 303 patients, 3 (1.0%)*were discharged from the study in the first month of treatment. One (0.3%) could not be traced and 2 (0.7%) refused to attend. Thus, only 3 patients were lost to follow-up in this study. The coverage for 8th annual check-up was 269 of 272 (98.9%) patients.

The present study of spinal tuberculosis shows

that effective motivation, personal attention and intensive defaulter actions by health personnel could be of great value in achieving high coverage for long-term follow-up.

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USE OF CETYLPYRIDINIUM CHLORIDE FOR STORAGE OF SPUTUM SPECIMENS AND ISOLATION OF *TUBERCULOSIS*

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Summary. Of 220 sputum specimens collected from pulmonary tuberculosis patients, 85 were culture positive when the sputum aliquots were stored with cetylpyridinium chloride (CPC) and processed on 7th day (CPC method), whereas only 70 were culture positive when the aliquots of the same specimens were stored without CPC and processed by sodium hydroxide (NaOH) method. The difference in the culture positivity was statistically significant. The number of positive cultures obtained by the CPC method (85) was comparable to that obtained by the NaOH method before storage (95) and the difference was not statistically significant.

Introduction

The sputum specimens of chronic pulmonary tuberculosis patients who do not respond to treatment are usually sent to central mycobacteriology laboratories for culture and drug susceptibility tests. Since such laboratories are not many in this country, there could be delay between the collection of the specimen and its processing. It was shown earlier that storage of sputum specimens at room temperature, beyond 72 hours, would significantly reduce the isolation rate of *M. tuberculosis*.¹ So, a storage procedure for sputum specimens that would give better recovery of *M. tuberculosis* will be greatly useful. The present study was undertaken to assess the usefulness of cetylpyridinium chloride (CPC) for storage of sputum specimens at room temperature up to 7 days.

Material and Methods

Sputum specimens of sufficient quantity, when available, were selected for the study. A total of 220 sputum specimens collected from pulmonary tuber-

culosis patients were studied. Each specimen was homogenised using sterile glass beads and was divided into 3 aliquots of 4-5 ml each. One of these aliquots was taken up for routine culture by the NaOH method,² on the same day. The remaining 2 aliquots were randomly allocated to NaOH and CPC methods. To the sputum aliquot allocated to the CPC method, an equal amount of CPC(1%)-NaCl (2%) reagent was added and after shaking well, it was kept along with the other aliquot in a cupboard at ambient temperature. On the 7th day, these two aliquots were processed for culture by the respective methods.

CPC method : The procedure described by Smithwick *et al* was followed. In brief, the sputum aliquot, treated with CPC-NaCl reagent, was centrifuged at 3000 rpm for 15 minutes and after decanting the supernatant, the deposit was suspended in 1.8 ml of sterile distilled water. A loopful of this suspension was inoculated onto each of 2 Lowenstein Jensen (LJ) medium slopes. Cultures were examined every week up to the 8th week and any growth was recorded as described.²

Results

Comparison of the culture results obtained on 220 sputum specimens processed by the CPC and NaOH methods after storage, with that obtained by the NaOH method before storage is presented in Table 1. The numbers of culture positives before and after storage by the NaOH method were 95 and 70 and the difference was highly significant (McNemar test : $P < 0.001$). The number of culture positives obtained by the CPC method after storage (85) was comparable to that obtained by NaOH method (95) before storage and the difference was not statistically significant ($P = 0.08$).

Of the 83 specimens which showed more than 19

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Table 1. Comparison of culture results by NaOH and CPC methods after storage of sputum specimens with those obtained by NaOH method before storage

Before storage	After storage												Total
	NaOH						CPC						
NaOH	3+	2+	1+	Col.	Neg.	Cont.	3+	2+	1+	Col.	Neg.	Cont.	
3+*	4	12	4	—	.	6	11	12	.	.	.	3	26
2+	1	13	7	9	7	7	9	16	11	4	3	1	44
1+	-	1	1	4	4	3	-	3	3	4	2	1	13
Col.	-	-	1	4	6	1	-	1	-	3	7	1	12
Neg.	-	2	-	2	89	22	-	1	-	1	109	4	115
Cont.	-	3	2	-	2	3	2	2	1	1	3	1	10
Total	5	31	15	19	108	42	22	35	15	13	124	11	220

*3+ = confluent growth; 2+ = innumerable colonies; 1+ = more than 20 but less than 100 colonies; Col. = less than 20 colonies; Neg. = culture negative; Cont. = culture contaminated.

Table 2. Culture results according to NaOH and CPC methods after storage

Culture grades	CPC method						Total
	3+	2+	1+	Col.	Neg.	Cont.	
3+*	3	2	-	—	-	-	5
2+	13	14	1	-	2	1	31
1+	1	9	3	1	-	1	15
Col.	1	-	5	8	5	-	19
Neg.	1	2	3	2	93	7	108
Cont.	3	8	3	2	24	2	42
Total	22	35	15	13	124	11	220

*as indicated in Table 1.

colonies by the NaOH method before storage, 73 (88%) and 56 (67%) had positive culture by the CPC and NaOH methods respectively after storage. Among 12 specimens which showed less than 20 colonies before storage, 4 and 5 were positive for culture by the CPC and NaOH methods respectively after storage.

The culture results by the CPC and NaOH methods after storage are presented in Table 2. Of the 70 specimens which were positive by the NaOH method, 7 were negative and 2 were contaminated by the CPC method, whereas of 85 specimens which were

positive by the CPC method, 8 were negative and 16 were contaminated by the NaOH method. Of the 42 specimens which were contaminated by the NaOH method, 16 were positive by the CPC method whereas of the 11 specimens contaminated by the CPC method, only 2 were positive by the NaOH method.

Discussion

The use of CPC for decontamination of sputum specimens in transit in temperate countries was reported by Smithwick *et al.*³ and Tazir *et al.*⁴ In the

former investigation on 1602 specimens, which were transported from satellite centres to the central laboratory, the yields of positive cultures by the CPC and N-acetyl L-cystein-Sodium hydroxide (NALC-NaOH) methods were comparable (68 and 66 cultures respectively). In the present study, the CPC method was compared with the NaOH method which is generally followed in most of the referral laboratories in India. Using NaOH method, Paramasivan *etal*¹ had shown that the culture positivity decreased from 88% before storage to 68% after storage for 7 days. Similarly, in the present study, the number of culture positives decreased from 95 before storage to 70 after storage by NaOH method. By storing the sputum specimens with CPC reagent, the reduction in the culture positivity has been largely offset. This is evident from the observation that 85 of 220 sputum specimens were positive for culture by the CPC method compared to 70 by the NaOH method ($P = 0.01$). After storage, the culture positives obtained by the CPC method in the present study were comparable to the results obtained by NaOH method before storage. Similarly, Smithwick *et al*³ had shown, in a pilot study, that the culture positivity in the CPC method after storage was comparable to the results obtained by NALC-NaOH method before storage.

The advantages of the CPC method are that the reagent is stable at room temperature, easy to prepare, inexpensive and also self sterilizing. Moreover, the specimens need only a single centrifugation before inoculation whereas the NaOH method requires careful processing of the specimen in different steps which are time bound.

The results suggest that the yield of culture positives would be higher with the CPC method

than with the NaOH method when sputum specimens need to be processed after storage at room temperature up to 7 days. Hence, the CPC method may be applied under programme conditions.

Acknowledgments

We are thankful to Mr. P.R. Somasundaram, Deputy Director and Mr. G.S. Acharyulu, Assistant Director, Department of Statistics for their useful suggestions and help. The technical assistance of Mr. P. Peter and Mrs. Josephine Lima Raj and the secretarial assistance of Mrs. Jothi Segaran are gratefully acknowledged. We also thank the clinic nursing staff for the collection of sputum specimens from patients.

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TUBERCULOSIS PROGRAMME IN METROPOLITAN CITIES*

D.R. Nagpaul

Introduction

It could be said with justification that the National Sample Survey (NSS)¹ of 1955-1958 was a watershed in our perception of the problem of tuberculosis in India. It changed the policies and practices needed for its control, from the technical stand-point and appreciation of the realities of practicability and acceptability of the measures included in a control programme.

Before the NSS, tuberculosis was generally regarded as an urban problem, concentrated mainly among those who lived in slums or were poor and suffered from under-nutrition as well as malnutrition. The programme prepared by the Shore Committee (Health Survey & Development Committee)² for the control of tuberculosis, therefore, had the makings of an urban tuberculosis programme : a TB clinic for 100,000 population (in and around cities) and a TB bed for each annual death from tuberculosis. Beds for tuberculosis patients, mostly in far away sanatoria, had waiting-lists. And frequently patients diagnosed in TB clinics died before their turn came for admission and proper treatment. The other components of this programme were BCG vaccination and rehabilitation colonies. No special provision was made for metropolitan cities, perhaps because the numerical formula adopted by them could take care of their needs.

After the NSS, and advent of chemotherapy, the scenario changed completely. As if overnight, tuberculosis in India was seen as a rural problem. And 80% of the people, living in villages, had no provision made for them in the plan for receiving tuberculosis services. Besides, concentration of the disease among elderly males made the stress being placed then on school surveys meaningless. Similar was the position regarding periodic "active case-finding" by some urban TB clinics by using mobile MMR units sending into rural areas : grossly in-adequate. The precise disease preva-

lence rate revealed by NSS had *per se* very little effect on the altered consciousness about the disease. It was obvious, then, that radical re-thinking and different planning approaches were needed to meet the challenge uncovered by the NSS.

It could be argued that the almost equal prevalence of tuberculosis in urban and rural India, as revealed by a one-time survey, was accepted in haste. Grigg's monumental work "The Arcana of Tuberculosis"³ had evidence to show that urban and rural tuberculosis epidemics, in a country or area, could occur decades apart. If, coincidentally, the two epidemic curves intersected, the prevalence of urban and rural tuberculosis at that point of time would be same, after which the curves would diverge. The same could have happened with NSS too. Apart from the fact that an academic argument should not encourage inaction, in the face of a challenge, the point was examined.⁴ It was hypothesized, on the basis of information on tuberculosis mortality in an European country and the available data from India, that such could not be the case. Nor have the several smaller surveys, done after the NSS, suggested otherwise, although the span of three decades elapsed since then is relatively short.^{5,6,7,8}

District Tuberculosis Programme

The challenge before the country was addressed by the National Tuberculosis Institute (NTI), Bangalore. Of a piece with the NSS, it adopted the approach of operations research, and not *a priori* planning, for reformulating the National Tuberculosis Programme (NTP). After years of sequential research, coupled with some seminal sociological studies, the outline of an epidemiologically and technologically correct programme emerged, which appeared practicable and socially acceptable as well. That draft plan was put to a "Test Run", in Anantapur district of Andhra Pradesh, before recommending it to government

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as District Tuberculosis Programme (DTP).⁹ The DTP was adopted as the basic unit of NTP in 1962.

It is a fundamental principle of any operation that it is continually monitored and periodically altered to ensure optimal functioning. The central monitoring done by NTI, and a few independent assessments, have shown that DTPs have not performed as expected, chiefly because of poor management and inadequate corrective actions, due to indifferent administrative support.¹⁰ A technically refined operation has, thus, become a routine activity, as tuberculosis control was before advent of DTP.

Tuberculosis Programme For Big Cities

DTP was not conceived as a rural programme, but one for an average Indian district, with a large rural component of around 1,500 villages and upto 10 towns of which the district headquarters may have 60 to 100 thousand people. It may have a rural bias but is not meant to be a rural programme. The decision to make the politico-administrative basic unit of the country, i.e. the district, responsible for organising tuberculosis services and the salutary principles underlying the DTP had made a separate urban tuberculosis programme superfluous. The people, however, continued to think along separate lines, because the higher level of facilities available in urban areas, for historical reasons, called for, in their opinion, different kinds of TB programmes. Besides, the more sophisticated people, they thought, had to be given better services than those provided under DTP. Even the Text Book of Tuberculosis published by the Tuberculosis Association of India¹¹ had separate chapters, viz. Tuberculosis Control in Rural India and Tuberculosis Control in Urban Areas, despite the social injustice involved in promoting two different programmes for the same people.

Recognising the strong rural bias of DTP and the different environment in very large cities, the NTI prepared¹² an "Outline of a Tuberculosis Programme for Large Cities" for wider discussion. The salient features of this outline were: 1. A programme for large cities can not be outside of NTP : While it could be somewhat different, to meet the different needs of the city people, it has to be fairly similar to DTP to become an integral part of NTP.

2. Health institutions in big cities are normally well equipped and receive proportionately higher share of the health resources, than districts do. It would not be logical to invest still more resources in them, for expansion, etc., to organise a city tuberculosis programme, unless the existing facilities have been fully used. Besides, private practitioners in cities are a resource that needs to be utilized.

3. While x-ray diagnosis has to continue, as before, the epidemiologically more important sputum positive infectors should not get less priority, just because sputum examination is not "fashionable" in cities. All smaller institutions and dispensaries should provide sputum microscopy service.

4. Health institutions in cities have widely different staffing patterns, equipment, technical standards, etc., which leads to working in complete isolation, duplication of work and, consequently, waste of the scarce resources. To bring all health institutions into a single network, some of them may need upgrading and others given flexibility of action. Expansion of the net work should be done only after very careful thought.

While presenting the outline, it was stressed that operational as well as sociological studies would be needed to verify the assumptions on which the plan was based, and provide the working details. Therefore, it could be that the programme for each big city may look a little different.

Since 1970, when the draft plan was presented,¹² no city based studies of the kind envisaged appear to have been conducted. The votaries of urban tuberculosis programme have also not pushed forward and organised the socially demanded better tuberculosis services, as presumed by them, in most big cities. Meanwhile, it has become evident that a sizeable proportion of TB clinics in cities have even less facilities and lower work standards than available in district tuberculosis centres. There are city dispensaries which do not provide tuberculosis services at all. And large chunks of city populations (slums and outreach colonies) are underserved by health services in general and tuberculosis services in particular. Had these cities been brought under DTP, things could have been better. It has also to be kept in mind that the general health services are constantly but surely improving. And sophisticated services are gradually reaching the grassroots through the community health centres. Being an integrated programme, DTP is bound to come

qualitatively nearer to city services, till the differences disappear. It becomes logical, therefore, that those big cities which are part of recognised districts should implement DTP, with some suitable modifications.

Case of Metropolitan Cities

The case of metropolitan cities, however, stands on a different footing. Not only is a metropolitan city a big district in itself, which cannot be further bifurcated but is amenable to formation of zones/areas, but the structure of its health services has a different character. The leadership role in providing health services is shouldered by the municipal corporation, and not government. Besides, there is a plethora of organisations which run these institutions, such as corporation, voluntary organisations, government, health insurance agencies and private trusts. All these organisations have different objectives, organisational structure and funding which require close working together, constant dialogue, co-ordination and skilful personal relations to succeed. Only the major partner in the network could do all that. The government should extend its full administrative and logistic support to the programme. It becomes obvious, then, that size of the population or the sophistication of the people, as well as nature of the available facilities are less crucial than the operational environment in metropolitan cities. Of course, socio-behavioral studies would still be needed to measure how health conscious and knowledgeable the people are and what kind of services they expect the city programme to provide. And, despite good attempts made to organise metropolitan tuberculosis programmes, the tardy progress made and multiple constraints faced underlines the need for operational studies.

In 1975, NTI published a detailed plan for organising tuberculosis programmes in big cities, which is quite suitable for our metropolitan cities.¹³ It should be given a fair trial, after locally carried out studies have provided the working details.

Health Services Systems Research

However, at this point of time, it has become necessary to keep in mind the crucial importance of entire health services systems research, to meet

the health needs of the people, and not deal with tuberculosis alone. Metaphorically speaking, NTP as a system must sink or sail with the general health services. In the nineteen seventies, when NTI found that DTPs were not performing as expected, they found that operational studies into general health services were necessary, but were unable to do so, administratively. **It is desirable, therefore, that in metropolitan cities, the entire health services should be researched to formulate an appropriate tuberculosis programme,** with inputs from NTI. While making such a plea, it may be useful to stress a few points :

Operational Considerations

1. To put structurally and budgetwise different bodies into a single network, **it is imperative to recognise the independent existence of each institution, in return for agreement from them not to function in isolation.**
2. One way for health institutions to give up isolationism is to involve them in evolving **a work pattern which subordinates technology to the felt needs of the people, and not the other way around, as at present.** A qualitatively different approach to public health research is needed for this purpose. The results should mean greater operational efficiency of programmes on account of their wider acceptability and reach.
3. Comparatively poor management-supervision, staff training/re-training, monitoring, decision making and corrective actions have been the main reason behind below-expectation performance of DTPs. **Metropolitan cities, compared with districts, are rich in managerial competence : means have to be found to harness this resource.**
4. In some metropolitan cities, the area tuberculosis centres have appointed managerial teams to oversee the operation, and got them trained at the NTI on the lines of DTP. Their training should be different, and the City Tuberculosis Officer should have a team of somewhat different composition under him.

Sociological Considerations

1. How do the city dwellers perceive the symptoms suggestive of tuberculosis; what do they think is needed for them, and what do they actually do, and how much delay occurs before a source of treatment is contacted and correct diagnosis is established?

2. How do the poor, middle and upper class city people regard tuberculosis as a threat to their health? What facilities would each class like to avail of, if some one in their family had the disease, and what problems are likely to arise, including expenses, transportation, co-operation from the family and pressures from society?

3. Since motivation by health institutions' staff has repeatedly been shown to be insufficient, to ensure satisfactory completion of treatment, behavior studies are needed to suggest an optimal system of drug distribution which could remove this weakness.

In summary, it is patently clear why the predominantly rural average Indian district received greater attention under the NTP than large cities. Also, why the DTP, as the basic unit of NTP, has not performed upto the expectations, on account of management weaknesses and not technological shortcomings. It has been shown why it is not necessary to think in terms of separate rural and urban tuberculosis services. The manner in which the existing tuberculosis services in most big cities can and should be made a part of DTP/NTP has been discussed. In metropolitan cities, where the operational environment is different, the principles of NTP can still be applied, after due operational and sociological studies, but it is preferable if such studies are made a part of overall Health Services Systems Research.

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**SYMPOSIUM ON URBAN
TUBERCULOSIS CONTROL**

The National Tuberculosis Programme (NTP) while spelling out the steps to be taken for tuberculosis control in rural areas, where the majority of population lives, assumed that cities already having the infrastructure to tackle the problem needed no specific inputs. Urban tuberculosis control has, consequently, received modest attention from both planners and researchers. In order to discuss the various issues involved in urban tuberculosis control, share experiences of the people working in this area and also to discuss alternative strategies and interventions for effective urban tuberculosis control, a symposium was held in Bombay on the 26th and 27th of September, 1992. The symposium was organised by the Foundation for Research in Community Health, Bombay, a non-governmental research organisation which has been involved in social and operational research in the area of tuberculosis control, and sponsored by the International Development Research Centre (IDRC), Canada. The participants in the symposium comprised national experts in the field, programme managers from government and municipal bodies, representatives from several non-governmental organizations, private practitioners and researchers.

Following is a summary of the discussions that took place during the course of the symposium :

While the concept of DTP holds true for a geographic area, urban and rural, its meaningful application to large cities remains to be demonstrated even after 3 decades of its operation. Since the implementation of the DTP, which has a strong rural bias, there has been a 175% increase in the urban population. This rapid urbanization has given rise to slums and shanty towns in many cities. The poor socio-economic and environmental conditions in which these populations live make them a high-risk group. And these slum populations deserve proportionately greater inputs from the programme. Viewed against this background, tuberculosis control in the big and growing cities also deserves special consideration within the DTP.

Presentations on the status of TB control programmes in big and growing cities including Delhi, Bombay, Bangalore, Hyderabad, Pune and Auran-

gabad brought out the fact that the public health services alone - whether run by the government or municipal corporations - have not been able to properly tackle the problem of tuberculosis. And, it is the social, operational, economic and managerial rather than the technological constraints which have hampered the effective implementation of tuberculosis control services in urban areas.

A multitude of health services already exist in most of the cities. And, unlike in rural areas, access to health care services is rarely a problem. Under the DTP, while health services for tuberculosis control are offered to the people largely by the public health services, several studies have shown that people themselves prefer the services offered by non-governmental organizations : voluntary agencies and the private doctors. No city tuberculosis programme has succeeded in effectively involving these preferred providers of health services to the people in controlling tuberculosis.

Presentations on projects run by voluntary organizations and groups of private medical practitioners working in urban areas offered some thoughtful solutions to the present problems being encountered in organising tuberculosis control in urban areas. These agencies seem to have effectively employed innovative approaches that need to be studied further for replicability. The various approaches included : provision of well co-ordinated mobile anti-TB services, as applied by the Cheshire Home in New Delhi; having a special component offering diagnostic and treatment services for patients referred by private doctors in return for using their proximity to the patients for ensuring compliance, as done by the Maharashtra Lokhita Seva Mandal; a loose networking of private doctors, each of them providing treatment services to their patients, with records and reports maintained at a central place, as being operated by the Ashwinikumar Medical Relief Trust in Bombay; and a group of private practitioners belonging to the medical association of a municipal ward offering services through a common treatment centre. Compared with the performance of public health providers, these approaches seem to be yielding desirable treatment completion rates, to the tune of 80 per cent. This could be the outcome of a better provider-user rapport, compared with that offered by public health agencies.

It would appear that the solution to effective urban tuberculosis control may lie in incorporating

different provider bodies in "area networks", with the public health system not "controlling" these agencies, but providing them central support, monitoring and training components. It must be emphasized, though, that the success of such a networking will depend heavily on the consideration given not only to people's perceptions and their felt needs - areas which need careful research - but also to maintaining individual identities of provider bodies. A good beginning could be made by undertaking

small scale experiments in some urban areas and adapting the successful elements within the NTP. The city of Bombay provides excellent opportunities to take up such studies.

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ERRATA

In the January 1993 issue of the Indian Journal of Tuberculosis,

Page	Column	Para	Instead of	Read
14	1	1	21—0 age group	21-50 age group
14	1	2	446 (8.7%)	456 (60.0%)
14	1	2	314 (41.3%)	304 (40.0%)
14	1	3	446	456
14	1	3	(87.9%)	(86.0%)
14	1	3	1	15
14	2	2	314	304
14	2	2	18 (0.3%)	158 (52.0%)
15	1	1	314	304
39	1	1	Since these stages are not considered as phases of the disease, the condition inevitably progress to fibrotic lung.	These stages are not considered as phases which inevitably progress to fibrotic lung,

FORUM

Sir,

I am a subscriber of your esteemed Journal for the past eight years. I have greatly appreciated the pragmatic approach of the Journal on the problems affecting the National Tuberculosis Programme. The bottlenecks, however, continue to persist even after three decades. It is not easy to appreciate why something is not being done about these problems.

You recently touched on the problem of the National Drug Policy (April, 1992, Editorial). It encouraged us all very much and we were expecting something constructive to be done by the office of Drug Controllers, both at the centre and in the states, but in vain. You are probably aware that there is complete anarchy in the marketing of drugs in this country. There are over 60,000 formulations of drugs and the multi-nationals as well as the Indian drug manufacturers pay little heed to the demands of the All India Drug Action Network (of the Voluntary Health Association of India) and the Drug Action Forum (of West Bengal). Unscientific combinations, anabolic steroids, thousands of cough formulations that are not even recognised in the standard text-books and Pharmacopoeia, cyproheptadines as appetisers for children along with vitamins under numerous names are being prescribed indiscriminately both by the qualified practitioners and the quacks. The multi-nationals practise double standards in third world countries. Could you kindly focus on this burning problem in one of your future issues?

Dr. S.K. Basu
Bankura,
West Bengal.

In recent months the Editor had to return several otherwise suitable manuscripts to their authors since the accompanying photographs/X-rays were not suitable for reproduction. We would request all prospective contributors to pay special attention to the quality of the films while submitting their manuscripts.

NEWS AND NOTES

DR.M.D. DESHMUKH

Dr. M.D. Deshmukh, the grand old man of tuberculosis and chest diseases, doyen of the tuberculosis workers and a multi-splendoured personality is no more. He died on 25th January, 1993 at the age of 79. Few have achieved excellence in so many spheres. He was a brilliant academician, a gifted teacher, a prolific writer and a sound research worker.

Having graduated from the Grant Medical College, Bombay and awarded M.R.C.P. from London, he served as an army medical specialist during the second world war and as a teacher in Wales (U.K.) from 1947 to 1952. On returning to India, he was appointed as Hony. TB Specialist at the Grant Medical College and Sir J.J. Group of Hospitals, Bombay where he taught for 20 years. During this time he was examiner and inspector of examinations in tuberculosis in many medical colleges, all over the country. Always interested in research, he had over 100 scientific papers to his credit, of which the most noteworthy work was on Isoniazid Chemoprophylaxis and on Tuberculosis complicated with Diabetes. He presented technical papers on Tuberculosis in many international and national conferences.

He was a pillar of strength to the Maharashtra State TB Association, since 1962, where his most remarkable work was the pioneering services of anti-TB Shibir for rural areas.

He was closely associated with the Tuberculosis Association of India for many years and was a member of all its important Committees viz. Central Committee, Executive Committee and Technical Committee, Co-Editor of the Indian Journal of Tuberculosis and co-author of the Text Book on Tuberculosis published by the Tuberculosis Association of India. He presided over the 20th All-India TB Conference, at Ahmedabad in 1965. In recognition of his services to the anti-TB movement, the Tuberculosis Association of India awarded him its Gold Medal in 1974.

His demise is a great loss to the country, the medical profession, the Tuberculosis Association of India, the Maharashtra State Anti-TB Association and all those who came in contact with him. The void left by him will be extremely difficult, if not impossible, to fill.

FORTYEIGHTH NATIONAL CONFERENCE

The 48th National Conference on Tuberculosis & Chest Diseases is scheduled to be held at Bhopal (Madhya Pradesh) sometime during October-December, 1993. The exact venue and dates of the Conference will be announced shortly. The discussion-topics selected for this Conference are: (1) Panel discussion/session on NTP; (2) Session on Chemotherapy-a holistic approach; (3) HIV and Tuberculosis; (4) Non-tuberculous Chest Diseases; (5) Short Course Chemotherapy and National Tuberculosis Programme, and (6) Oration on Environmental Medicine/Pollution. In addition, papers on assorted subjects will be eligible for presentation. Those who wish to present papers may kindly send three copies of an abstract of their paper before 30th April, 1993, to the Secretary-General, Tuberculosis Association of India, 3, Red Cross Road, New Delhi-110 001.

ORATION ARRANGED BY THE TUBERCULOSIS ASSOCIATION OF ANDHRA PRADESH

Prof. Asim Dutt, Vice-Chairman, Department of Medicine, Alvin C. York Medical Centre, Murfreesboro, Tennessee, (U.S.A) delivered an Oration on "Management of Pulmonary Tuberculosis in the 90s" under the auspices of Tuberculosis Association of Andhra Pradesh on 31st December, 1992 at Hyderabad. The "TB Association of Andhra Pradesh Gold Medal" was presented to Dr. Asim Dutt on the occasion. About 50 physicians attended the Oration.

LECTURE ON "AIDS & TUBERCULOSIS"

Under the auspices of the TB Association of India, the Delhi TB Association organised a lecture on 'AIDS & TUBERCULOSIS' by Dr. S.P. Tripathy, Director-General, Indian Council of Medical Research in New Delhi, on 18th December, 1992. The lecture was presided over by Dr. D.R. Nagpaul, Vice-Chairman of the Tuberculosis Association of India. The lecture was attended by about 80 doctors.

WORLD CONGRESS ON TUBERCULOSIS

The World Congress on Tuberculosis was held in Bethesda, U.S.A. from 15th to 19th November,

1992, to take stock of the resurgence of tuberculosis in the wake of the AIDS epidemic in the developed countries. The Congress was organised by the National Institute of Health (U.S.A.) and supported by IUAT and WHO. The Congress was attended by about 600 delegates worldwide, of which 10 were from India. Dr. Snider (from Centres for Disease Control, Atlanta, U.S.A) stressed that some developed countries were wrong in forgetting about tuberculosis, after having brought it under control. Thus, the resurgence in tuberculosis after 1985 had brought them back to the truth (that tuberculosis is a global problem which knows no rip barriers).

The critical importance of further research for global tuberculosis control and the development of newer technologies to deal with the new challenges was stressed by all. As if to present the other side of the coin, the status of tuberculosis control programmes in developing countries and the financial and organisational difficulties they face were also discussed. More operational research and more intensive training activities were the obvious solution in those countries. It was concluded that in so far as developing countries were concerned, they have to be more selective in adopting new techniques and more enthusiastic in implementing routine programme activities.

SECOND INTERNATIONAL CONGRESS ON AIDS IN ASIA AND PACIFIC

The 2nd International Congress on AIDS in Asia and Pacific was held in New Delhi from 8th to 12th November, 1992. The Congress was preceded by a Satellite Session on "Managing AIDS with Available Resources". The Congress was inaugurated by Shri K.R. Narayanan, Vice-President of India addressed by eminent scientists. Besides several technical, operational and behavioral aspects that were discussed, the problems that may have to be faced in dual testing (for infection with HIV-I and HIV-II as well as ELISA and Western Blot techniques) in India came to the forefront. It appears that at this stage NGOs have to play a very crucial role in supporting the AIDS programme. It was noted that several kinds of vaccines against AIDS are being tested in animal models and one of them has been approved by the Food and Drug Administration of U.S.A. for testing in human volunteers.