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Editorial

SOME PROBLEMS IN PUBLIC HEALTH

Some recent happenings connected with health of the people have put the spotlight on the state of public health services in the country, in general, and some problems, in particular, as perhaps never before. This could partly be due to the fact that, by coincidence, these happenings followed on the heels of each other in quick succession, and partly because of the media overplay.

In the late eighties, the fortuitous discovery of HIV infection in some commercial sex workers of Madras, and a couple of coronary bypass patients in Pune who had got blood transfusion overseas, heralded the entry of the HIV pandemic into India, It is creditworthy that a nationwide surveillance system was soon set up under the ICMR to monitor HIV infection among the high risk groups in the population. Thus, "hot spots" of the epidemic were quickly recognised, around Bombay, Madras and Manipur. Later, in the early nineties, the National AIDS Control Organisation (NACO) was established and an intensive health education programme was started for the vulnerable groups as well as the youth. Taking note of the nexus between AIDS and tuberculosis, some hospital based HIV studies have been conducted among patients of tuberculosis and respiratory diseases by individual researchers in Bombay, Madras and Pondicherry. Seminars and group discussions have been organised for different professional groups as well.

Despite these commendable efforts, it does appear that an epidemiological insight into the Indian epidemic and a sense of direction for it are needed. The present confusion arising out of the wide gap seen between the surveillance and other available data and the widely publicized estimates of the number of infected persons and AIDS cases in the country needs to be resolved. The AIDS epidemic being new to the country should be closely studied *in situ* by an epidemiological team, since the experiences from U.S.A., Africa, etc., though useful, may not be totally applicable. Our sexual mores, pattern of I.V. drug abuse, hospital practices in regard to care exercised over blood transfusions, disposal/sterilization of infected material, etc. are likely to be different. In other words, the Indian epidemic should receive a lot more epidemiological attention than being given at present.

Again, media has repeatedly focused on the widely prevalent "fear" among doctors,and health staff to deal with AIDS cases; lack of attention being given in hospitals, some of them prestigeous, to their daily refuse becoming u possible sources of HIV infection because "rag-pickers" have been found salvaging needles and syringes from hospital dumps, and the relative non-acceptance of the "safe sex" practice among the vulnerable high school/university youth and the "red light" area populations. It could, therefore, be presumed that the present efforts to control the epidemic, with the only tool available, are not equal to the stupendous task. Yet, large portions of the fund, including allocation received from the international community, apparently lie unspent. And NACO keeps stressing repeatedly upon die states to utilize their budget allotments properly and on time. It demonstrates our inability even to utilize funds fully and frutifully when these are provided adequately and accessed freely.

The usual story, however, is different. In regard to public health programmes, complaints about inadequacy of funds are frequent, which is true to an extent. It is well known that public health programmes often receive Cinderella treatment compared to medical services and that when scarce resources are being shared, health always gets lower priority compared with, say, agriculture, industry, etc. Nonetheless, what remains buried in statistics is the considerable non-utilization, even of scarce resources. The reasons of non-release of allocations on time, the Centre-State relationship bottleneck, frequent diversion of funds to other uses, etc. often cloud the sheer inability to fully use funds by health programme officials. It may not be an exaggeration to say that many programmes do not use their budgets fully but blame inadequate funding as the reason for the poor utilization of their services by the people and low achievement of programme objectives/targets.

After HIV came Plague. Going by the fear it generated nationally and the attention it received internationally, not to mention the tremendous economic loss to the country, the year 1994 may well go down in history as the Plague year. A large scale and well-organised effort was quickly put into action to fight the menace, which was overcome successfully. Followed soon by searching questions, many raised by experts. Was it Plague or something else? Was it tackled technically correctly, that is, from the epidemiological and bacteriological points of view, and so on? Eventually, the government appointed a high powered Technical Advisory Committee, under a former Director General of ICMR to re-investigate the "expired" epidemic. From the specimens saved from Surat, *Yersinia pestis* has been isolated in culture and genetically identified by the PCR method. The specimens from Deed and Delhi are being similarly examined. Also, the question how the bubonic Plague in Beed spread to Surat and became pneumonic remains to be examined. Perhaps, all these aspects could have been addressed simultaneously, as soon as the first case of Plague was notified in Beed, if our public health system was all that sturdy.

That government is alive to the need for strengthening the public health system is apparent from the setting up of a Committee, on the lines of other Technology Missions, to suggest measures to control diseases, especially cerebral malaria, water borne diseases and viral hepatitis. A sharp rise in malaria, especially the drug resistant cerebral malaria cases, has occurred in several states, notably in Rajasthan in 1994 and now in Assam. Since diseases like malaria, tuberculosis and leprosy have been receiving close attention for decades, their epidemiological and technical aspects are well covered. But repeated assessments have established that their below expectation performance is due to inadequate and/or ineffective administration as well as health care management. It is not as if the concept and importance of proper health care management are new to India. Several centres of excellence are offering academic courses in this field. But their market value so far is low because, by tradition, senior physicians and surgeous are being appointed as health administrators,. In the process, they mostly lose their professional skills and may prove to be indifferent administrators causing loss on both the counts. Obviously, something more needs to be done. But, how long will it take for diseases posing a grave danger to public health to receive much needed national attention as to get appropriate health care administration?

Lastly, why should public health remain the concern of the government alone? Recently, our President, Dr. Shanker Dayal Sharma, gave a very sage advice in this regard, at the time of giving away Dr. B.C. Roy National Awards. He underlined the great need for private sector to participate in public health programmes of the nation. He further warned that failing such an involvment, the dream of Health For All by the year 2000 could remain a mere slogan. Already, in the megapolis of Bombay, several business houses are understood to have come forward to set up TB Clinics, and assist in other public health programmes. This is a step in the right direction, which should be taken after full discussion, in a phased and planned manner.

D.R. Nagpaul

ALTERNATIVE APPROACHES TO IMPROVE TREATMENT ADHERENCE IN TUBERCULOSIS CONTROL PROGRAMME

Summary: Non-adherence to treatment by patients is a major impediment, worldwide, in controlling tuberculosis. Faliure of approached attempted so far, in effectively tackling the problem of non-adherence, has led to the inclusion of directly observed or supervised chemotheraphy as an essential element of the World Health Organization's revised strategy for global tuberculosis control . Supervised chemotherapy has also been made the most important compotent of India's National Tuberculosis Programme (NTP) being revitalized with the help of a loan from the World Bank and technical assistance from WHO.

The reason for advocating supervised chemotherapy in India is the failure to ever achieve desirable cure rates, under a well designed NTP in operation for over three decades . The demonstration projects of several Non-Governmental Organizations (NGOs) claiming success in achieving high cure rates, rarely provide hard data, as evidence, and their results are often considered anecdotal and unsuitable for wider application.

This paper presents alternative approaches adopted by two NGOs providing services to large populations in different settings- one a most backward area if rural Gujarat and the other in the slums of Bombay. Both organizations could ensure reasonably high levels of treatment completion and cure rates under field conditions. While the urban NGO used pre-registrations screening and motivation as tools to ensure trearment completion and cure, the rural NGO successfully employed the services of the female Anganwadi Workers (AWWs) of the Integrated Child Development Services (ICDS) scheme. The reproducibility andwider applicability of some important elements of these approaches are discussed.

INTRODUCTION

While tuberculosis has always been a major and persistent public health problem in the poor countries, its re-emergence related to HIV in the West has led to a renewed interest in its control worldwide[1]. India bears almost half of the world's total burden of lung tuberculosis and although a well designed National Tuberculosis Programme (NTP) is in place since 1962, there has not been any significant change in the epidemiological situation of tuberculosis in the country[2]. Major efforts are now under way to revitalize the tuberculosis programme with a goal to detect 70 per cent of the incidence cases and cure at least 85 per cent of the detected cases[3]. With the acceptance of passive case-finding as a method of choice for detection of new cases, the main focus has been on improving case-holding. Encouraging initial results in some settings, of making every patient swallow each dose of the anti-tuberculosis drugs in the presence of a health functionary, and failure of any other method to achieve desirable cure rates, has led WHO to include directly observed or supervised chemotherapy as an integral component of its revised global tuberculosis control strategy[4] Supervised chemotherapy has also been made one of the most important components of India's revitalized NTP.

Supervised chemotherapy, though effective in improving treatment adherence, is operationally more demanding. Would it, on a wider scale and in diverse settings, be sustainable and produce similar results as in pilot projects which are generally executed with initial vigour and close vigilance? Could there be alternative approaches suitable for wider application? In India, many non-governmental organizations(NGOs) are also engaged in tuberculosis control activities, in isolation or as part of general health programmes, operating on modest scales and restricting their activities to small localities. However, documented literature on their approaches and effectiveness is rarely supported by hard data. Few qualitative

accounts of NGOs undertaking tuberculosis control activities in India have been published[5].

This paper discusses alternative approaches successfully employed by two NGOs - one urban and the other rural - to achieve desirable levels of treatment completion and cure rates. While both NGOs had maintained excellent records, none had ever performed cohort analysis - the only way of knowing the effectiveness of a tuberculosis treatment programme. This was done for the first time in the present study.

The Urban NGO

This Bombay based organization is a network of three projects - treatment and rehabilitation of tuberculosis and leprosy patients and community development - catering to the poor. It initiated its tuberculosis control project in 1979 by opening a TB clinic. Presently, there are eight clinics, located in six different localities in the slums of the western suburbs of Bombay, which collectively cover a population of about 1 5 million. Each clinic is run for a few hours, two or three times a week. The mode of operation of all the clinics is similar. The functioning of their tuberculosis activities was studied by discussions at the headquarters and the satellite clinics and by an in-depth study of the clinic with the highest number of patients on its treatment register. Qualitative information was obtained by participatory observation, informally talking to the functionaries of the clinic and those working in the field, examination of available records and a cohort analysis of all the patients registered for treatment during the period 1 January 1992 to 31 December 1992.

The Rural NGO

This organization is a philanthropic venture of a rich family, in and around their native town in one of the most backward and drought-prone districts of the state of Gujarat, for more than two decades. Starting with drought relief activities, it has, over the years, been undertaking several programmes in die areas of health, social welfare and rural development. The; tuberculosis programme, started in 1984 in free tehsils, is operated in conjunction with the Integrated Child Development Services (ICDS) Scheme of the Central Government in 550 villages spread over six blocks of the district, covering a population of 600,000. The detailed functioning of the programme was studied in the same manner as given above in one of the tehsils with a population of about 90,000 and cohort analysis of patients registered for treatment between 1 January 1993 and 31 December 1993 was carried out.

Results

The mode of functioning of the tuberculosis programme of both NGOs is given on P. 69.

The urban NGO caters to the poor living in the well-defined area around each of its clinics. Confirmed patients of tuberculosis are started on treatment by the medical officer at the clinic. Prior to registering the patient in its treatment programme, and to ensure optimal treatment adherence, a screening is done to exclude non-residents of the area and temporary or migrant residents. This is done with the help of social workers who visit each patient's house to elicit the information and for locating the house for future visits. Patients found unsuitable for registration are requested to seek treatment at other public or private health facilities. At the end of each week, the social workers list out the defaulters, who are visited for defaulter retrieval and necessary health education. The quality of the services offered by the NGO appeared satisfactory.

The rural NGO caters to the population of about 600,000 in the three tehsils, from three centres. The supervisory staff comprises thirteen TB Workers and four TB supervisors who function through the village-based part-time ICDS Anganwadi Workers (AWW) - one for every 1000 population - employed by the government for delivering Maternal and Child Health (MCH) services to pregnant and lactating mothers and children in the pre-school age group. The AWW of the newly diagnosed patient's village is informed about the patient. The AWW is then expected to periodically visit the patient and ensure treatment regularity. In the event of treatment default, the concerned AWWs are intimated for retrieving the

URBAN NGO	RURAL NGO
Case-Finding	
Referrals from private doctors, other NGOs and old patients and self reporting; Identification of other patients by health workers during their home visits to patients under treatment.	Self reporting, referrals by old patients and identification by ICDS Anganwadi Workers (AWW) and TB workers. An incentive of Rs 15 is offered to/ AWWS for every case detected.
Diagnosis	
X-ray facility in one of the clinics is used by 6 centres and for the other 2, arrangement exists with a local private radiological centre. Two overnight sputum specimens are collected and examined at the central laboratory run by the organization.	NGO has facility for both x-ray and sputum examinations. Only one spot sputum specimen is examined but if negative, and also for those positive, repeat sputum examinations are done at each visit made for drug collection (weekly, fortnighly and then monthly).
Treatment	
After confirmation of the diagnosis, patients are visited by health workers to identify and exclude potential defaulters (migrants, temporary dwellers in the area, etc). Only permanent residents of the locality are registered. The regimens used are : 2 HRZ/4 HR or 2HRZ/6 HE for fresh cases, 2 SHERZ/1 EHRZ/ 5 EHR for relapsed cases and the standard 2 SHE/ 10 HE for a small proportion of cases. Patients report for drug collection at fortnightly interval.	All patients receive unsupervised intermittent short course regimen - 2 $(HRZE)_3$ / 4$(IIR)_3$ and report for drug collections initially after one week, then after a fortnight and later at monthly interval.
Case-holding	
After pre-registration screening, intense motivation of patients and their family members is done by health workers, social workers and doctors at each visit. Defaulters identified at the end of each week are visited by the health workers.	For each patient started on treatment, a postcard is sent to the area AWW. A village TB register is maintained by the AWWs who visit patients regularly. Whenever a patient fails to attend for drug collection, a postcard is sent to the AWW for his retrieval and motivation. Tuberculosis Workers also visit patients and defaulters. An incentive of Rs 30 is paid to the AWW for every case completing treatment. Each TB worker also maintains a register.
Cure	
Sputum is re-examined of all those who are smear positive at the start of treatment. If sputum is found to be negative at fourth and sixth month of treatment, he is discharged as cured at the end of sixth month of treatment.	Sputum is re-examined of all those who are smear positive at the start of treatment. If sputum is found to be negative at fourth and sixth month of treatment, he is discharged as cured at the end of sixth month of treatment.
Records/Reports	
Treatment cards and patient registers are maintained at each peripheral clinic and a sputum register at the central laboratory. Index cards arc prepared at the time of stopping treatment and all the information is fed into a computerized database. Monthly reports are sent to the City Tuberculosis Programme (the NGO is recognised as the Area TB Centre and supplied with a small quality of anti-tuberculosis drugs)	Treatment cards are maintained at each centre and Monthly reports are sent to the central clinic. All AWWs and Tuberculosis Workers maintain village TB registers.

Figure 1. Distribution of Sputum Positive Patients of Urban NGO on SCC (1.1.92 to 31.12.92)

Number of Adult Patients : 119 Number of Patients included : 117

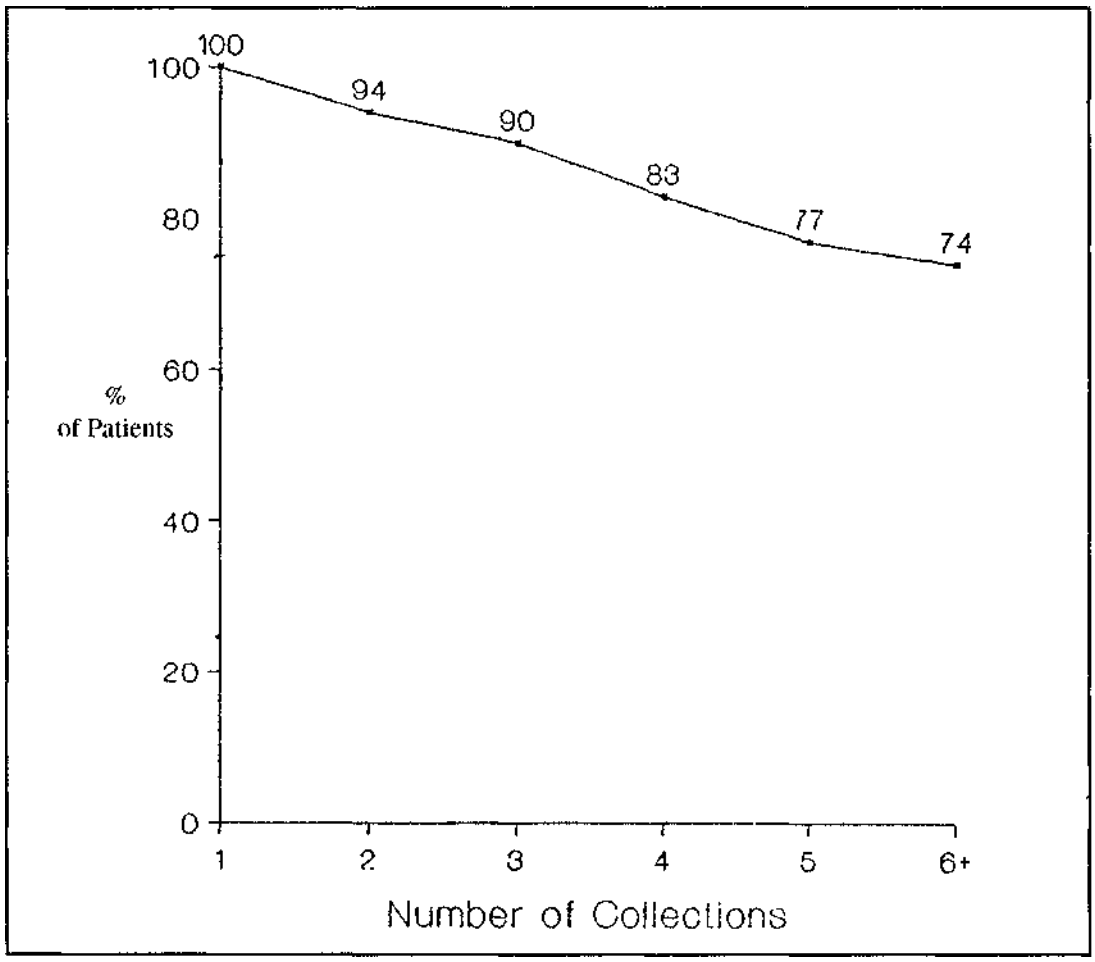

Table 1. Treatment adherence during six months' treatment

	Treatment Period (months)					
	1	2	3	4	5	6+
Patients collecting drugs at start of period	117	110	105	97	90	86
Patients discontinuing drug collection at end of period	7	5	8	7	4	
Drug collection rate (%)	100	94	90	83	77	74

Summary of results:

100% drug collection rate	74%
>80% drug collection rate	77%
Cure rate	70%

Figure 2. Distribution of Sputum Positive Patients of Rural NGO on Intermittent SCC (1.1.92 to 31.12.92)

Number of Patients Treated : 239 Number of Patients Included 223

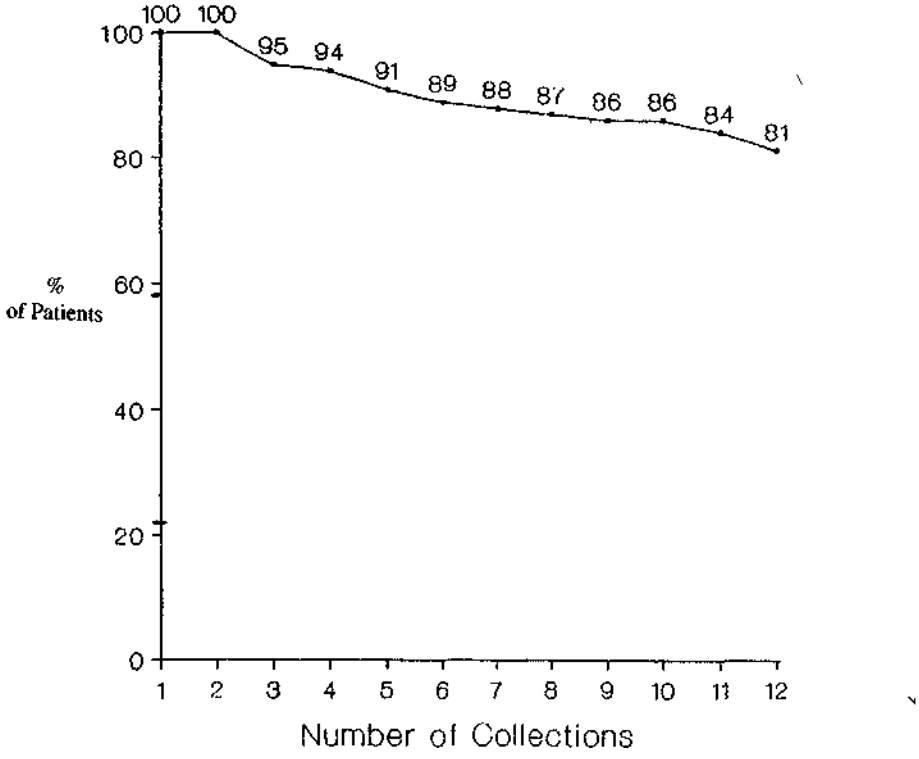

Table 2. Treatment adherence during six months' treatment

	Treatment Period (fortnights)											
	1	2	3	4	5	6		8	9	10	11	12+
Patients collecting drugs at start of period	223	222	211	210	202	199	196	193	191	191	187	181
Patients discontiniiing drug collection at end of period	1	11	1	8	3	3	3	2	0	4	6	-
Drug collection rate (%)	100	100	95	94	91	89	88	87	86	86	84	81

Summary of results:
100% drug collection rate 81%
>80% " " " 86%
Cure rate 84%

defaulters. The full-time TB Workers, each in charge of 45-50 villages, supervise the case-finding and case-holding activities of AWWs and discharge these responsibilities in areas where there are no AWWs. Their functioning, in turn, is supervised by the four full-time TB Supervisors. Since the three centres operate only on specific days of the week, the captive waiting crowd of patients is subjected productively to health education by encouraging patients - defaulters, those taking treatment regularly as well as those cured - to share their experiences and outcome of their treatment. This is claimed to have had a very positive effect on improving treatment adherence. Over and above their remuneration for part-time ICDS activities, each AWW is given a fixed sum of Rs 100 every month for tuberculosis work by the NGO, plus a modest incentive of Rs 15 for every new tuberculosis case detected and Rs 30 for every case successfully completing treatment.

The results of cohort analysis of sputum positive patients from available treatment cards of one clinic from each organization are given in Tables 1 & 2 and Figures 1 and 2.

DISCUSSION

NGOs, considered to be playing a small but significant role in health care delivery in India, are often regarded as "laboratories of learning"[6]. Many innovative and successful endeavours of non-governmental health efforts caught public notice in the 1970s and 80s. However, the common deficiency of many NGOs has been poor maintenance of records and weak documentation of the effectiveness of their interventions. As a consequence, very few reports are available which deal in detail with the effects of the NGOs' health efforts on individual disease problems, including tuberculosis.

For tuberculosis, in particular, more attention is often paid to detecting as many cases as possible than on curing those detected. This could well be a reflection of the government's own programme implementation strategy, where the stress has always been on case-finding, with specific targets laid down for sputum examination. Equal, if not greater, emphasis on case-holding is of relatively recent origin. Holding camps to detect cases of tuberculosis has, thus, been a favourite activity of many NGOs, including state level branches of the Tuberculosis Association of India - the largest NGO in tuberculosis in the country. Both the NGOs studied herein, however, refrained from active case-finding. About a third of the suspect cases attending the rural NGO centres were directed there by the patients who had benefitted from the NGO's tuberculosis services. Proper emphasis on sputum examination was being given by both NGOs in diagnosing tuberculosis and monitoring treatment.

It was observed that the urban NGO was exercising "case selection" for purpose of treatment to exclude patients belonging to the floating migrant population, non-residents and cases staying too far outside the project area. However, such cases were started on treatment and advised to continue treatment from a public health facility. The proportion of such patients turned out to be small (5.5% during the latest year). This policy of selecting cases may be considered unacceptable on ethical grounds and even artificially improving the treatment outcome. Yet, if the criteria are laid down carefully, "case selection" may deserve serious consideration in urban areas because such an approach may improve treatment adherence by curbing the well known "shopping for treatment" by tuberculosis patients. This may not be unethical, particularly, when such patients have an equally easy access to other free and for-profit health providers, and are explained the benefits they would derive by choosing a more appropriate place for continuing treatment. Effective networking among public and private agencies offering services to tuberculosis patients could help in operationalizing "case selection" on a larger scale.

Most importantly, both NGOs working in entirely different settings, evolved ways of achieving high treatment completion and cure rates by adopting innovative ways of treatment adherence. Our observations and discussions could reveal some factors contributing to their commendable performance. First, and foremost, was the reputation of the NGOs and the confidence their clients had in them. Both NGOs could reach

their present performance levels after years of consistent, good quality service to the people.

Second, all the patients were subjected to sputum examination as well as X-ray of the chest before making a diagnosis. It is believed that the association of X-ray chest, as an investigation necessary for diagnosing tuberculosis, is so strong in people's mind that subjecting them only to sputum microscopy, as envisaged under the revised strategy of NTP might fail to convince people about the veracity of the diagnosis of tuberculosis, resulting in the loss of confidence in the service.

Third, both organizations provided short course chemotherapy to all their patients, and ensured regular drug supply. Patients often believe SCC drugs to be of a better quality - "imported" in the case of the urban patients - than those made available at the public health services. The fourth factor was the ample time and efforts that were being spent on educating the patients (and incidentally their peers) about tuberculosis and their motivation, by both health workers and the attending doctors.

The rural NGO adopted the method of educating and motivating the patient and his peers through group meetings, at the time of drug collection. Patients - cured as well as defaulting - narrating their own experiences, seemed to have (lie desired impact on the minds of those undergoing treatment. On the other hand, the urban NGO was employing an approach suited to more sophisticated people. The social workers of the urban NGO had more intense initial and periodic interaction with the patients and their family members, strengthened by advice given by the attending doctor during the patient's visits to the clinic. The common factor between the approaches adopted by the two NGOs, as observed by us, was that education and motivation was not restricted to patients alone. We observed that consciously or otherwise, in both the approaches, the peers and the family members were also exposed to the process of education and motivation. Whether this resulted in exerting some kind of peer pressure which favourably influenced treatment adherence deserves investigation.

The ICDS workers of the rural area were given monetary incentives by the rural NGO. The issue of giving incentives is complex in the Indian context, particularly with the background of the negative effect this measure has had in achieving targets in the family planning programme. In integrated programmes, alternative methods of appreciation of the work performance, such as open felicitation - jointly by the health services and the villagers, opening avenues for further training, promotion and entrusting higher tasks like co-workers' motivation, may have to be considered.

The weakest component of the tuberculosis programmes of both the NGOs was the ineffective use of their records. This, however, was not deliberate and appeared to be chiefly due to ignorance. The lack of knowledge or inclination to conduct a cohort analysis on the part of the both the NGOs is noteworthy. This is a very important area wherein encouragement given to NGOs could significantly enhance their performance and contribution to tuberculosis control.

The oft-repeated question is whether such closely managed NGO programmes are replicable and suitable to be adopted nationally through the public health system? If the success of these two NGOs provides any indication, it is primarily the locally suitable alterations, made within a sound framework, that help such organizations to enhance their performance considerably. If so, efforts need to be directed to modify the revised NTP strategy, to the extent possible, so as to afford flexibility by allowing for local alterations and adaptations, like involving ICDS workers or leprosy programme workers without disturbing the basic tenets of the programme. It is only then that the social and operational constraints that continue to plague the NTP may be effectively addressed. The recent Panchayati Raj legislation passed in both the houses of Parliament, which empowers villages and town administrations to run their own programmes, may provide an excellent opportunity for experimenting locally. Lessons learnt from the NGOs - the laboratories of learning - could then prove useful.

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REFERENCES

1. Paul PNunn and Donald A Enarson, Tuberculosis from neglect to control, Transactions of the Royal Society of Tropical Medicine and Hygiene; 1994, 88, 129.

2. A. K. Suri: National Programme for Control of Tuberculosis, National Health Programme Series 10, National Institute of Health and Family Welfare, 1988.

3. WHO/Geneva, Tuberculosis Unit, First Programme Report (1989-1990) and Future Plans (1991-1995) - Global Tuberculosis Situation and Tuberculosis Control Programme, World Health Organization, 1991.

4. World Health Organization, Treatment of Tuberculosis - Guidelines for National Programmes, World Health Organization, Geneva, 1993.

5. M. Kamphuis: Case Study of three Voluntary Organizations doing Anti-Tuberculosis work in Gujarat, Indian Journal of Tuberculosis; 1990, 37, 21.

6. Meera Chatterjee, Health for Too Many : India's Experiments with Truth, In Jon Rohde, Meera Chatterjee, David Morley (editors), Reaching Health for All, Oxford University Press, Bombay, 1993.

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TUBERCULOSIS CONTROL PROGRAMME IN INDIA: PROGRESS AND PROSPECTS*

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I am thankful to the Tuberculosis Association of India for inviting me to deliver the Lupin-TAI Oration for the year 1994. It is a matter of great pleasure for me to deliver it in person. This has enabled me to meet a large number of tuberculosis workers and share with them the mutual experience of our fight against tuberculosis. I talk to you, today, at a time when we are threatened with a possible escalation of the problem at hand due to the spectre of HIV infection looming large. However, without trying to sound overly optimistic, I take this opportunity also to highlight the efforts the Government has initiated during the course of the last couple of years, keeping in view the nature and extent of the challenge.

PROBLEM OF TUBERCULOSIS

a) *World Situation*

Nearly four decades after the introduction of specific chemotherapy for tuberculosis, it is disheartening to note that the tuberculosis situation is deteriorating globally, over the years. It is estimated that at present nearly eight million cases occur annually and India and China together account for about half of them. Approximately, three million people die of the disease which kills more adults each year than any oilier infectious disease. Even in the industrialized countries, where it was considered to be on the decline not so long ago, the disease has been registering an increase in recent times. In the USA, for example, the disease has increased by 20% between 1985 and 1992, from a declining trend of 6% per year. The tuberculosis case rates from some countries (1990), both developed and developing (Table 1), illustrate this point further.

b) *South-east Asian Scenario*

The notification rates in some countries of South-east Asian region are given in Fig. 1. It can be seen that within the region the tuberculosis situation varies from country to country, India having amongst the highest rates.

Table 1

Tuberculosis case rates from some countries

Country	Case rate (Per 100,000 population/year)
Philippines	280
South Africa	250
India	180
China	166
Pakistan	150
Malaysia	67
USA	10

c) *Indian Situation*

It is estimated that about 1.5% of India's population, or about 14 million persons, could be affected with pulmonary tuberculosis. It is also known that nearly half of the population in the country is infected with tubercle bacilli, who form the reservoir of those who would break down into active cases in the future. The chain of infection in the community is maintained primarily by a proportion of the patients who are smear positive, estimated to be about 3 to 3.5 million.

Some epidemiological aspects of the disease are such that it deserves a high priority among

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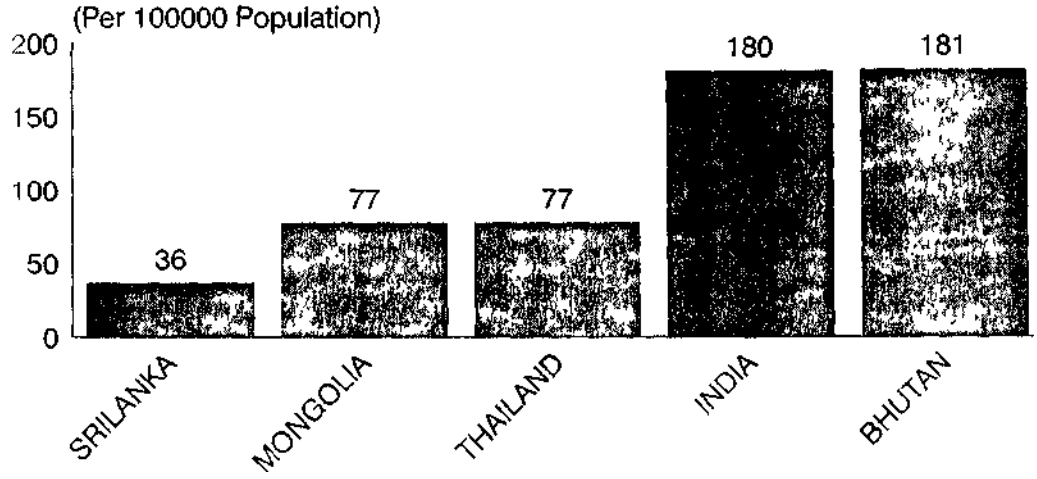

(1991)

Fig. 1. Notification rates in some countries of south-east Asian region

the communicable diseases. For one tiling, it is a disease mat largely affects young men and women in their most productive period of life, i.e., 20-55 years. Apart from considerable morbidity caused by it, nearly 10% of mortality from all causes is attributed to pulmonary tuberculosis, the case fatality rate being around 14% in the untreated cases. Most significant of all, one has to take note of the possibility that tuberculosis is a long term epidemic, to last several centuries, unless effectively combated. Hence, the overall strategy of fight against tuberculosis should be a near permanent one, having a goal to be achieved over a period of several decades. Of course, the goal has to be approached through premeditated efforts to work towards and achieve a set of intermediate objectives

Socio-economic factors

Tuberculosis is a disease, commonly associated with poverty, overcrowding and malnutrition. The resistance of the body is compromised by the aforesaid factors which results in break down of tuberculosis infection into disease. Over crowding enhances the chance of transmission in the community. The National Sample Survey found evidence that the tuberculosis problem was worse among the economically weaker section. Further, there is definite evidence to suggest that some industries like stone crushing, mica mining, coal mining, etc. are associated with increased occurrence of the disease. Lack of education, environment of pollution and poor sanitation compound the problem. The condition of relative deprivation among economically weaker sections of the society and the high tuberculosis case rates in them seem to form a vicious cycle, one aggravating the other.

HIV-Tuberculosis

There is a rapidly expanding TB-HIV co-infection and with the spread of HIV, the epidemiological situation of tuberculosis would deteriorate as both are synergistic. HIV infection has emerged as the strongest identified risk factor which allows latent tuberculosis infection to progress to overt clinical disease. The chance of developing tuberculosis in HIV-TB co-infected people increases to 10% every year from 10% for lifetime in people having only tuberculous infection. With nearly half of the Indian population having tuberculosis infection and HIV infection increasing with time, there is nothing in sight as to how bad the dual epidemic might get.

Development of NTP

The strategy of our organized fight against tuberculosis was developed for the first time in 1962 to meet the demands of the situation as defined above. The strategy has been the result of a series of significant research findings of the

then Tuberculosis Chemotherapy Centre, Madras (TCC) and the National Tuberculosis Institute (NTI), Bangalore. The programme had taken into account the scarcity of resources, social customs and prejudices of the people finding expression as their 'felt need', and the technological breakthrough that domiciliary chemotherapy was as good as that administered institutionally. The operational aspects of the strategy, to deliver the services through primary health care, were demonstrated to be both feasible and applicable, its potentials were worked out and NTP was finally approved by the Government of India.

OBJECTIVES OF NTP

The National Tuberculosis Programme has the following objectives :

i. To detect as large a number of tuberculosis patients as possible.

ii. To effectively treat all patients so as to render infectious cases non-infectious, and prevent non-infectious active cases from becoming infectious.

iii. To establish a District Tuberculosis Centre in every district.

iv To extend Short Course Chemotherapy (SCC) to all districts.

v To strengthen existing state TB Training & Demonstration Centres by providing laboratory culture facilities in them.

vi. To augment health education activities.

ORGANISATION OF NTP

Since 1962, the socio-political unit of the country, i.e. a district with an average population of 1.5 million has been made the operational unit of the nation-wide programme against tuberculosis. In the district, the programme is implemented through the District TB Centre (DTC) and a number of Peripheral Health Institutions (PHIs).

The District Tuberculosis Programme (DTP) is supported by a state level organisation for coordination of the tuberculosis activities in the state and supervision of the DTPs. The central level (The Directorate General of Health Services) has the responsibility of framing the overall policies, formulating the programme and its planning, carrying out monitoring and evaluation, ensuring logistic support (drugs, supplies, etc.) and training. The central level also has the responsibility for obtaining international support for the programme. The organisational scheme is given in Fig. 2.

FUNCTIONS OF DTC

The functions of DTC are given in Table 2. A series of manuals is produced for the key functionaries of the DTC, who are trained at the NTI, Bangalore. Microscopes, reagents and drugs are supplied to every participating DTC throughout the country besides vehicle for supervision by the district supervisory team.

Table 2

Functions of District TB Centre

1.	Diagnosis (both by laboratory & X-Ray)
2.	Management of tuberculosis cases
3.	Co-ordination & supervision of NTP within the district
4.	Monitoring and evaluation of DTP
5.	Provision of logistics (drugs, equipment & other supplies)
6.	Provision of referral services

PROGRESS OF NTP

a) *Infrastructure*

Of the 460 districts in the country, 390 have been implemented under the NTP, with a DTC in each to coordinate the programme activities. This means, a population coverage by services of about 85% (Table 3). However, it is reported by Nagpaul[1] that not more than 63% of the peripheral health institutions (PHIs) are implemented as participating units. There is no doubt some more progress has been made in die infrastructure development under the NTP over the years, by way of implementation of the district programmes. The budgetary allocation under the programme has been increased from

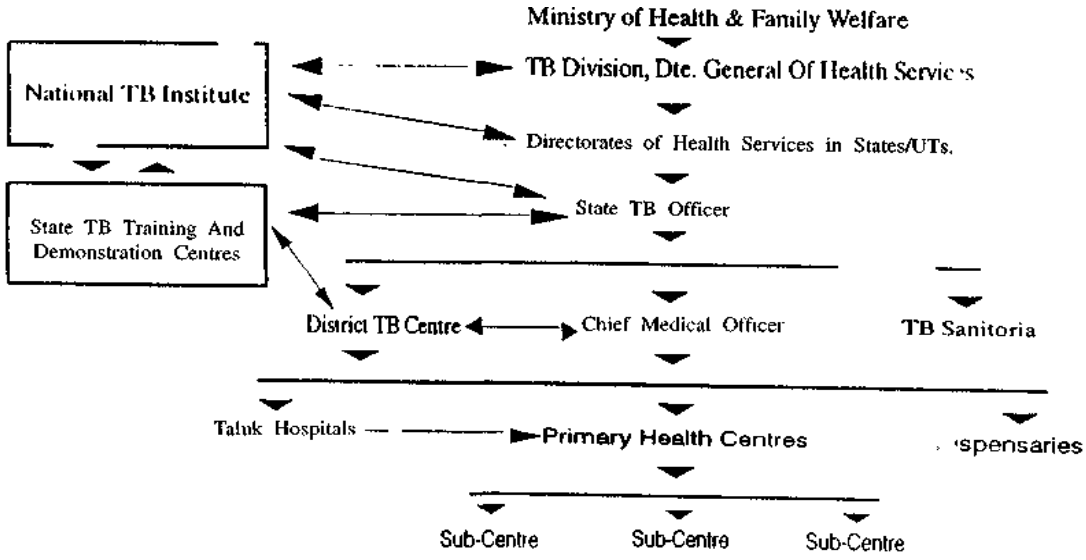

FIG. 2. Organizational set-up of NTP

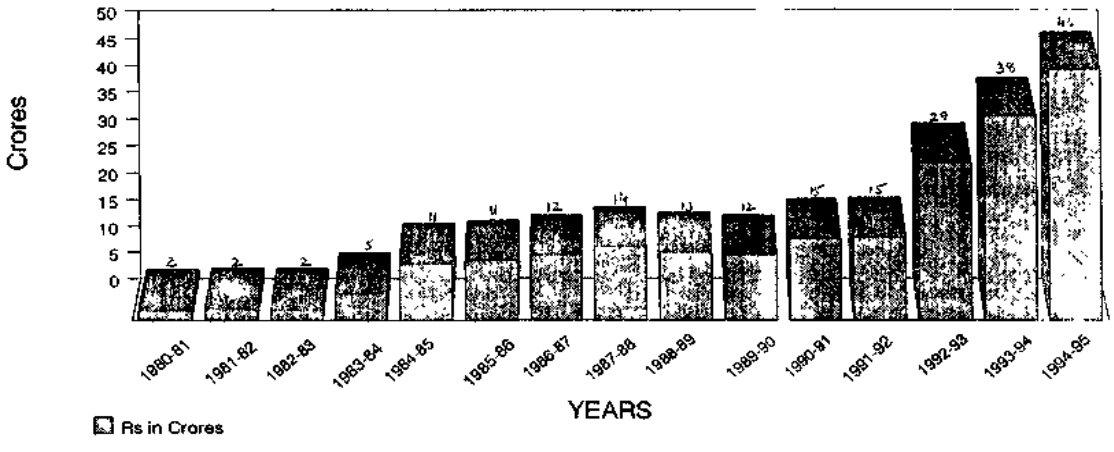

FIG. 3. Budgetary Allocations

about Rs. 10 crore in 1989-90 to Rs. 46 crore in 1994-95 (Fig. 3).

Table 3

NTP Performance

Districts	- 460
DTPs functioning	- 390(85%)
DTCs offering SCC	- 253
Patients completing treatment	
On standard regimens	- 35-40%
On SCC	- 50%

b) Case-finding Activities

There is a substantial rise in the number of tuberculosis patients diagnosed, both sputum positive and negative (Table 4), as well as in the proportional contribution made by the PHIs to the total diagnosed in a district as a whole. The level of performance of DTCs remain more or less the same over the years, at around 3000 sputum examinations carried out (Fig. 4) and detection of 400 smear positive patients (Fig. 5). On the other hand, performance of PHIs shows a substantial increase in terms of sputum examinations and diagnosis of sputum positive cases. Proportional contribution (%) by PHIs out of the total achievement for the district, both in sputum examination as well as diagnosis of new cases, has been rising since 1978 through 1992 (Fig. 6).

c) Treatment

The failure to obtain a high treatment completion rate and absence of information on treatment results remain a serious problem to be reckoned with under NTP. Only about 30% of DTP reports contain information on treatment completion after cohort analysis. Not more than 27% of the patients were found to complete twelve monthly drug collections or more (Nagpaul[1]), which is reported to have increased to 40% in 1992-93 (NTP), as shown in Fig. 7.

d) *Short Course Chemotherapy*

Until 1983, only conventional regimens (SR) were used under the NTP for all categories of patients. With the introduction of Short Course Chemotherapy (SCC), on a pilot basis in 18 districts initially, to be followed in more in stages, it was envisaged that a potent tool had been brought into operation. Currently, the SCC regimens are available in 253 of the 390 districts. Even though treatment completion, on an average, has improved to about 50% with the introduction of six months SCC drug regimens (NTP), it is realized that in effect it still falls far short of the compliance required to obtain a cure rate of 85%, i.e., the expectation from a well managed SCC treatment programme.

e) *Supervision and Monitoring*

One of the key deficiencies in the functioning of the supervision and monitoring systems of the programme activities under the NTP is the fact that not more man 50% of the PHIs are being supervised any time during the year, even though each needs to be visited by the DTP supervisors every quarter. The reporting by both the DTCs and the PHIs, to the respective monitoring agencies, is also deficient. These observations, of inadequate supervision by the DTCs along with deficiency in coverage of the available health institutions for tuberculosis activity arc considered to be significant lacunae in the process of rendering service to meet the 'felt need' (Fox[3]) of the people.

Thus, overall, it can be stated that even though the DTP presents a picture of encouraging progress, especially when seen in the context of a developing economy with its own pressures and compulsions, its policies and operations need some corrective actions.

SHORTCOMINGS OF NTP

Over the years, the programme has been continuously monitored and reviewed. I would like to highlight here some of the observations:

i) large proportion of human and financial resources is utilized to treat cases diagnosed mainly on clinical or radiological basis. The highest priority group of bacteriologically positive cases amounts to a mere 22% of the pulmonary tuberculosis patients diagnosed under NTP,

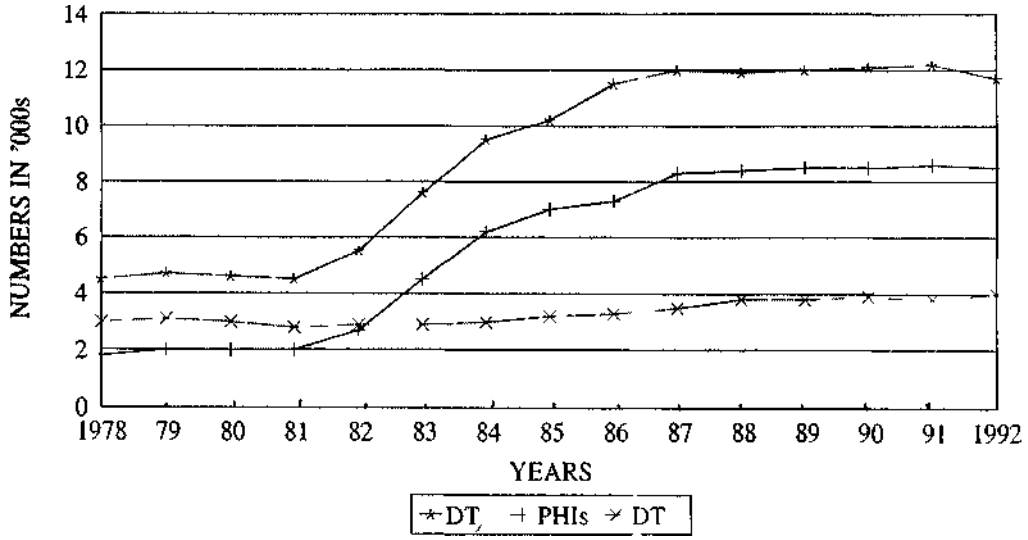

FIG. 4. New sputum examinations per DTP
(At DTC and PHIs, 1978-1992)

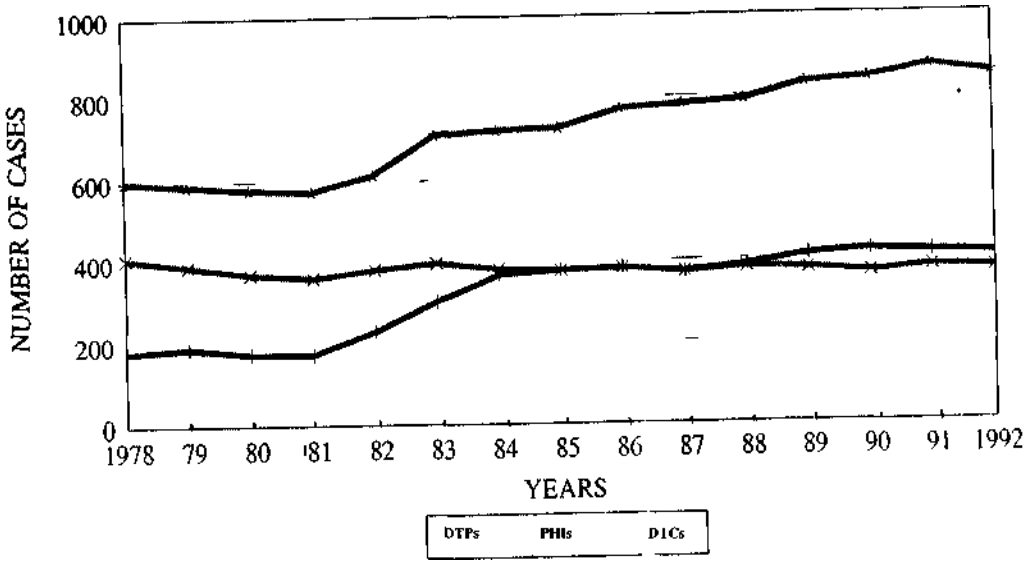

FIG. *5.* Sputum positive cases diagnosed per DTP
(At DTC and PHIS, 1978-1992)

Table 4

Case-finding activity under NTP during various plan periods

S.N0	Activity	Plan period IV	V	VI	VII
1.	Diagnosis of TB Patients (100.000):				
	a) Pulmonary TB Patients	19.2	28.0	43.0	62.5
	b) Sputum Positive Patients	6.3	8.6	11.0	14.5
	c) Sputum Negative Patients	12.9	19.4	32.0	48.0
2.	Contribution of PHIs (%) in respect of :				
	a) Sputum Examinations	NA	NA	54	71
	b) Diagnosis of Sputum Positive Patients	NA	NA	41	50

ii) though treatment is given free, treatment compliance is unsatisfactory and information on cure rates in mostly not available,

iii) the cure of a patient, which is the prime aim of management, has not received sufficiently high priority under the NTP,

iv) the evolution of NTP in time has not kept pace with the development of health services system. For example, the outreach of services has enlarged over the years through the creation of sub-centres, implementation of multipurpose health workers and community health volunteers schemes and increase in the number of health facilities, but the NTP has not utilized them,

v) multiplicity of drug regimens is an area of concern, because it causes confusion,

vi) follow-up by bacteriology is not adequate,

vii) training is not broad-based enough, the NTI being the sole organization rendering training for district level personnel,

viii) system of procurement and supplies of anti-tuberculosis drugs needs appropriate corrective actions,

ix) organization of the programme in metropolitan areas and cities is variable and not well structured. Moreover, it is barely monitored.

Evaluation of NTP

In October, 1992, a joint GOI-WHO-SIDA evaluation of National Tuberculosis Programme was conducted and the following shortcomings were highlighted:

i) Inadequate budgetary outlays and shortage of drugs,

ii) Undue emphasis on x-ray instead of sputum testing for diagnosis,

iii) Poor quality of microscopy,

iv) Emphasis on detection of new cases instead of achievement of cure,

v) Poor organizational set up and support for tuberculosis, and

vi) Lack of consensus among practitioners regarding treatment regimens.

THE REVISED STRATEGY OF NTP

In view of those recommendations, steps have been taken since 1993 to take remedial actions to revise some of the activities under the NTP, with a goal to.

i) reduce morbidity and mortality due to tuberculosis, and

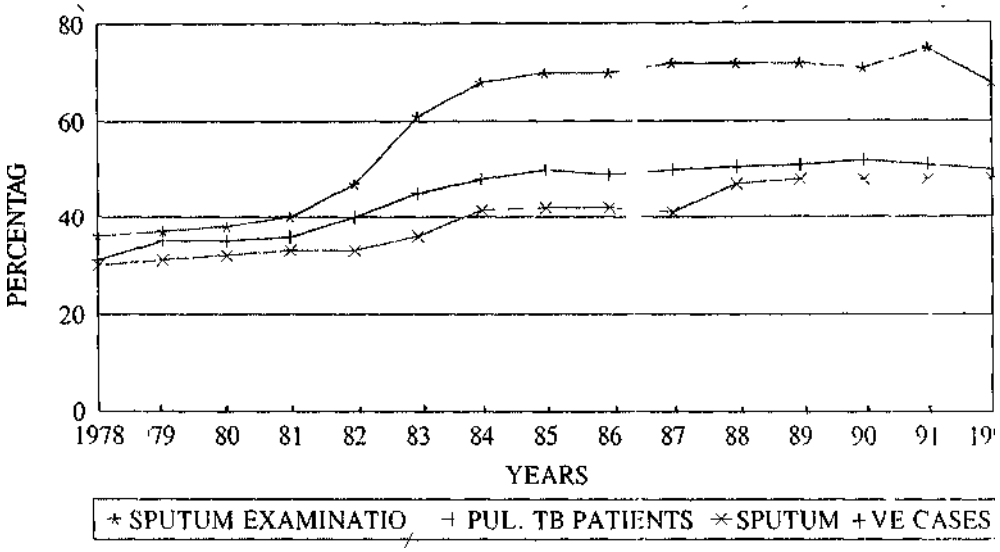

Fig. 6. Proportional contribution from PHIs (Sputum Examinations & Cases, 1978-1992)

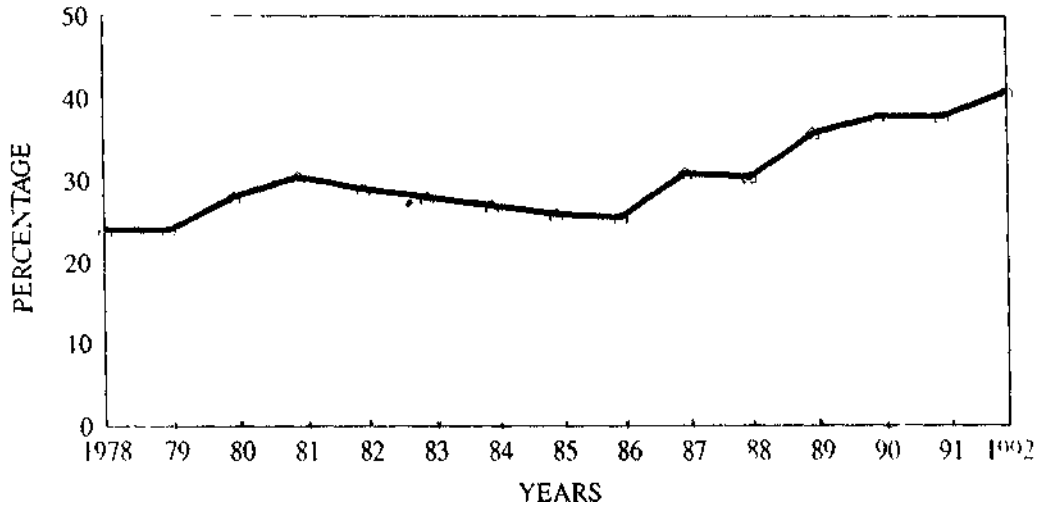

Fig. 7. Treatment completion among sputum positive cases with standard regimens

ii) cut the chain of transmission.

The objectives of the revised strategy of NTP are :

a) emphasis on the cure of infectious and seriously ill patients of tuberculosis, through administration of supervised Short Course Chemotherapy, to achieve a cure rate of at least 85%,

b) augmentation of the case-finding activities to detect 70% of the estimated cases, only after having achieved the desired cure rate.

To achieve the above objectives the following strategy has been adopted:

i) Use of sputum testing as the primary method of diagnosis among self reporting patients.

ii) Augmentation of the peripheral level supervision through the creation of a sub-district supervisory unit.

iii) Ensuring a regular and uninterrupted supply of drugs, upto the most peripheral level.

iv) Augmentation of organizational support at central and state levels for meaningful coordination.

v) Training of_programme personnel at all the levels.

vi) Intensive health education campaign.

vii) Involvement of NGOs and private practitioners.

viii) Operational research.

PILOT PROJECTS UNDER REVISED STRATEGY

With WHO assistance, pilot projects on the above given lines are currently being run in Delhi, Bombay, Calcutta, Bangalore and Gujarat in a total population of 2.3 million. The Project Areas already show signs of achieving a high sputum conversion rate of around 97% among the first cohort, results of which are just available, with a case fatality rate varying between 0-1%. The ratio of sputum positive to negative patients is currently 1:1 in the project areas, as against 1:4 in rest of India. It is envisaged to extend the project in phases in 5 states and 10 metropolitan cities covering a population of 187 million (Fig. 8), with World Bank support/

INFORMATION, EDUCATION & COMMUNICATION (IEC)

Under the revised NTP, the IEC activities will be augmented so that proper messages reach the target groups and to those who are put on treatment so that they continue their treatment for the entire duration of treatment and get cured. It is expected that with a higher cure rate and with continued availability of drugs, more and more people will volunteer to come to the microscopy facilities for early case detection and treatment. A detailed and appropriate IEC strategy is being formulated separately.

NGO's INVOLVEMENT

At present, under the NTP, the NGOs which are involved in tuberculosis control activities are provided with drugs as a 100% central assistance.

Under the revised strategy, if there are active NGOs in the geographic region where NTP is being implemented, efforts would be made to harness their assistance in achieving better drug compliance and drug distribution through establishing a proper machinery of cooperation and collaboration among the government and NGOs. Dialogue has been initiated in this regard and a mechanism of cooperation and collaboration with NGOs would be worked out. NGOs thus registered with NTP, would be given anti-TB drugs in kind and free of cost. It is envisaged that NGOs will be properly guided and supervised to offer Short Course Chemotherapy to sputum positive cases. However, NGOs will have to follow the standard guidelines for diagnosis of sputum positive cases and their follow-up as per the operational procedures prescribed under the revised strategy. In addition, an appropriate mechanism will be followed with regard to registration and notification of cases as followed under the revised strategy.

Metropolitan Cities

Name of City	Population Covered
Calcutta	4.50 million
Bombay	10.00 million
Madras	4.00 million
Bangalore	3.00 million
Hyderabad	4.00 million
Delhi	9.00 million
Pune	1.60 million
Jaipur	1.40 million
Bhopal	1.30 million
Lucknow	1.70 million
Total	40.50 million

States

During the first phase the following 60 districts and their population will be covered

Name of State	Total No. of districts	No. of districts and population to be covered
West Bengal	17	11 51.56 million
Himachal Pradesh	12	10 5.07 million
Bihar	50	12 28.95 million
Kerala	14	10 22.20 million
Gujarat	19	17 38.85 million
Total	112	60 146.63 million

The total population being covered is 187.13 million.

Fig. 8 **: Pilot Project areas under revised NTP**

OPERATIONAL RESEARCH

For development of the programme on the right lines, bottle-necks need to be constantly identified and appropriate solutions found for them. For this purpose, a systems research capability needs to be built into the framework of the NTP. The Central Programme Division is developing an operational research programme for tuberculosis, networking a large number of researchers working in different parts of the country. Utilization of results of the research will be made in the programme through the Central Programme Division.

CONCLUSION

It is contended that both good and poor treatment programmes are capable of achieving good clinical successes as measured by the marked reduction in the number of deaths and a much larger number of patients who are cured (Grzybowski[14]). However, this is not enough for the purpose of obtaining epidemiological impact expressed as reduction of the risk of infection in the community. Scientists have suggested that the balance between the bacillus and a given community can be shifted in favour of the latter by a series of measures with the focus on identification of the infectors and their cure by chemotherapy. No doubt, socio-economic factors play a dominant part, but effective anti-tuberculosis measures are, nevertheless, capable of bringing in a significant and continuing reduction in the risk of infection in as short a time as 10-15 years, as envisaged, say for Tanzania (Styblo[5]). Marked progress in this direction is being made in China as well, with population size larger than ours. It is hoped that the pilot experiment being currently undertaken in India, viewed in the global context, is a move in the right direction. We hope to start extending the pilot areas, if the results from the initial phase are successful. However, till such an extension is generally possible for large parts of the country, the efficiency in the performance of activities under the NTP must be stepped up. These should be continually supervised and monitored. Training should be intensified and logistic problems attended to at all levels. It is to be realized that the proper implementation of the NTP is a strength on which it is possible to build up subsequently, by making revisions here and there. Unless the NTP itself has been implemented, and functioning well, it is difficult to weld it into a potent structure to lead the final assault.

I would like to conclude here, no doubt with a note of hope, in view of our progress in experimenting with the new strategy and the interest it has been able to generate towards tuberculosis control among tuberculosis workers in this country and a helping hand from the agencies abroad. I would request the experts gathered here to organize the respective health programmes, including that for tuberculosis, as per the National Guidelines and raise them to a state of high efficiency through supervision and monitoring.

I take this opportunity to thank the Tuberculosis Association of India (TAI) for making it possible for me to present my oration. The TAI, as all of us are aware, has been the fountainhead of most of the voluntary activities for tuberculosis control in the country. We are justifiably proud of our association with this august body, whose overall goal is to fight the scourge of tuberculosis.

References

1. Nagpaul, DR. India's National Tuberculosis Programme - An overview. Ind. J. Tub. 1989 36, 205.
2. National Tuberculosis Institute Bangalore, The Year Book (1992-93).
3. Fox, Wallace. Tuberculosis in India, Past, Present and Future. Ind. J. Tub.; 1990, 37, 175.
4. Grzybowski, S. Impact of chemotherapy on the epidemiology of pulmonary tuberculosis. Ind. J. Tub.; 1988, 38, 50.
5. Styblo, K. Tuberculosis programmes in developing countries in the light of further discoveries in tuberculosis epidemiology. Ind. J. Tub.; 1987, 34, 57.

Original Article *Ind. J. Tub., 1995, 42, 87*

SOCIAL AND OPERATIONAL DETERMINANTS OF PATIENT BEHAVIOUR IN LUNG TUBERCULOSIS*

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Summary: Two hundred and ninety nine patients registered for treatment with the public health services – 103 with rural PHCs and 196 with urban TB clinics – in Pune districts were interviewed in order to understand social and operational determinants that influence treatment behaviour in lung tuberculosis. Detailed quantitative as well as qualitative information was elicited. The study shows that despite weak, if not missing, health educational inputs, patients' understanding of tuberculosis is satisfactory. Their preference of private doctors over public health services for tuberculosis, their frequent change of health providers for diagnosis as well as treatment, their poor treatment adherence despite knowledge of its ill-effects and their related actions perceived clearly as deleterious to their own good are influenced more by social, economic, and operational factors than by their self-destructive attitudes and behaviour.

The study concluded, that it is the availability, affordability and acceptability of health facilities for tuberculosis – factors related primarily to the provider behaviour – that deserve greater and priority attention. Attempts at rectifying provider behavior are likely to the more productive than those at disciplining patients.

INTRODUCTION

Tuberculosis continues to rank among the world's most serious health problems despite the remarkable biomedical achievements of discovering effective diagnostic and treatment measures. Some countries where the disease was under control are now experiencing an increase in cases[1,2]. In developing countries, because clinical facilities and health personnel tended to be concentrated in urban areas, tuberculosis was formerly considered as a disease of the crowded, economically depressed, urban neighbourhoods. However, it is now as much, if not more, a problem in the rural areas as in the cities. For example, in a rural area of India, with inadequate facilities for the treatment of tuberculosis, the mortality rate is 90 per 1,00,000 population; in the metropolis of New Delhi, with vastly more adequate health facilities, a far lower tuberculosis mortality, approximating 40 deaths per 1,00,000 population, has been reported[3].

The combination of high cost of medication and difficulties in providing follow up services results in more people with active diseases contributing to reservoir of the disease, while those who receive inadequate treatment develop drug resistance and its ensuing problems. Despite occasional calls for further research on the cultural and behavioural factors that influence patient behaviour, most administrators continue to totally attribute poor case finding and treatment completion rates achieved by control programmes to patients' non-conforming behaviour[4,5]. Non-conforming patient behaviour is considered one of the major impediments to tuberculosis control and has led to the designing and practice of newer strategies such as directly supervised treatment. To what extent are patients' treatment-related actions determined by their own knowledge and behaviour and to what extent are these a result of social and operational factors, which often act as imperceptible barriers is an important

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question. Yet, today, we appear to have decided that the only option remaining with programme managers to improve the programme's performance and better treatment adherence of tuberculosis patients is by means of directly observed treatment (DOT).

This paper attempts to understand not only the social and cultural reasons but also operational determinants for the non-conforming patient behaviour during anti-tuberculosis treatment.

Methods and Material

Patients registered for treatment with 6 Primary Health Centres (PHCs) in rural areas of Pune district and those from Pune city, registered with 3 TB clinics (one being the District TB Centre (DTC) and the remaining 2 run by the Pune Municipal Corporation) formed the study population. The 6 out of 85 PHCs in Pune district were selected by stratified sampling technique so as to get a mix of X-Ray Centres, Microscopy Centres and Referring Centres with varying case loads. Urban and rural patients registering for treatment 3 or 6 months before the start of data collection (depending on the regimen) formed the study sample.

A total of 299 patients - 103 rural and 196 urban - were interviewed with the help of a pre-tested, semi-structured, interview schedule. Information was collected under the following major heads: socio-economic status, knowledge and acceptance of diagnosis, perceptions about and attitude towards tuberculosis, help seeking patterns for diagnosis and treatment of tuberculosis, expenses incurred on treatment and impressions regarding and experiences with the health providers. The data were coded and analysed using the software package SPSS-PC. Totals in the tables presented below vary due to inclusion of only those who responded to the queries. The totals in some of the tables add up to more than 100% due to multiple responses given by patients.

Results

Sodo-demographic Characteristics

The patients interviewed were mostly young (77%, upto 45 years), married (71%), had had some education (64%), were engaged in earning occupations (59%) and belonged to lower socio-economic class (59%).

Knowledge and Acceptance of Diagnosis

More than 81% knew that they were suffering from tuberculosis, as seen in Table 1. Stigma against the disease though not quantified was felt very strongly to exist, especially in rural communities. A few cases denied their identity and gave false name, and address to hide their identity, and some indulged in self stigmatization.

Table 1

Acceptance of Diagnosis of Tuberculosis

	Number	%
Accepted spontaneously	243	81.3
Denied on probing	19	6.4
Accepted on probing	15	5.0
Total*	299	100.0

* *Includes some who did not answer.*

Perceptions about and attitude towards tuberculosis

Cough, weakness and breathlessness were considered, in general, to be early symptoms of tuberculosis; about one-fourth also included fever and loss of appetite. While reporting on their own symptoms, cough, fever and loss of appetite were the most common. Very few patients reported hemoptysis as a symptom (Table 2).

Germs and infection, followed by alcohol, physical stress and smoking were mentioned as the important causes of tuberculosis, in general. However, physical stress followed by germs and infection, alcohol and mental stress were reported to be the causes for own disease (Table 3).

More than half the patients knew how the disease is transmitted and mentioned contact with a patient and through air and germs. Majority (88%) believed that tuberculosis is completely

Table 2

Perceptions about Symptoms of Tuberculosis

Symptom	In general		In self		Critical Ratio	Significance
	Number	Percent	Number	Percent		
Cough	218	83	218	74	2.52	Significant at 5% l.o.s.
Weakness	149	57	31	11	11.63	Highly significant
Breathlessness	67	26	72	25	0.27	Not significant
Fever	64	24	141	48	5.77	Highly significant
Loss of appetite	*64*	24	114	39	3.64	Highly significant
Blood in sputum	34	13	48	16	1.13	Not significant
Chest Pain	30	11	75	26	4.25	Highly significant
Others	49	19	101	35	4.18	Highly significant
Total	262	100	293	100		

Note : Others include jaundice, patch on lung, giddiness and pallor
Multiple symptoms reported

Table 3

Perceptions about Causes of Tuberculosis

Cause	In general		In self		Critical Ratio	Significance
	Number	Percent	Number	Percent		
Germs/infection	145	50	57	21	7.25	Highly significant
Alcohol	86	30	49	18	3.28	Highly significant
Physical stress	76	27	116	43	4.06	Highly significant
Smoking	68	24	33	12	3.53	Highly significant
Sex related	45	16	22	8	2.74	Highly significant
Mental stress	25	9	39	14	2.11	Significant at 5% l.o.s.
Food/water	11	4	5	2	1.40	Not significant
Total	287	100	271	100		

Notes : Multiple causes reported
Physical stress includes physical exertion, weakness, eating less food, work - related physical stress, less blood (anemia)
Germs/infection includes pollution, bad sanitary condition, bad personal hygiene, air-borne infection, germs and infection, contamination/contact with a patient
Sex related causes include loss of semen/masturbation, unsanctioned sexual experience/activity, excessive sexual activity
Mental stress includes work related mental tension, family tensions, chronic stress/tension, acute stress/shock/bereavement

curable. Only 7% denied curability, probably due to their experience of persistent symptoms, not getting any relief from drugs, suffering from side-effects of drugs, etc. (Table 4).

Table 4

Perceptions about Curability of Tuberculosis

	Number	%
Completely curable	262	88
Not curable	20	7
	298	100
Don't know	16	5
Total patients	298	100

More than two-thirds of the patients could tell the correct period of treatment (Table 5). Majority of the patients (83%) were of opinion that health deteriorates or disease worsens due to irregular/intermittent treatment. Very few (2%) perceived the consequences of irregularity as leading to death (Table 6).

Table 5

Perceptions about Duration of Treatment for Tuberculosis

	Number	%
Don't know	30	10
Less than 3 months	29	10
6-18 months	186	64
More than 18 months	39	13
As per doctor's advice	26	9
Till symptoms disappear	9	3
Total patients	290	100

Note : Multiple responses included

Table 6

Consequences of Irregular Treatment

	Number	%
Disease will worsen	237	81
Person will die	6	2
Don't know	23	8
Others	32	11
Total	291	100

Note : Multiple responses given

Sources of Information

Apart from telling about treatment duration and regularity, the health services were apparently not responsible for imparting any other area of information about tuberculosis; patients' own experiences and their interaction with other members of the community were responsible for their knowledge regarding aspects like cause, spread, cure etc. The mass media was seen to be playing a negligible role in informing people about tuberculosis (Table not put up).

Help Seeking and Treatment Behaviour

The first source of help, contacted by 63% of patients, on developing suggestive symptoms had been the private doctor. The private doctor had also been responsible for revealing the diagnosis in half of the patients and referring the patient to the public health services for 44% (Table 7).

Table 7

Help and Treatment Seeking

	Public Sector % Patients	Private Sector % Patients
First source of help contacted	29	63
Diagnosis revealed by	48	52
Referral to current source	7	44

Note: Some patients did not respond

All except 8% of patients had visited more than one source of treatment after developing chest symptoms. The mean number of treatment sources visited by patients was 3 (Table 8). The main reason for changing the sources of treatment was referral, and almost all those patients who had changed sources were referred at least once. Referral was also an important reason for change from one public facility to another, while patients changed from one private source to another because they did not experience improvement in their condition. The main reason for changing from private to public source was non-affordability

of the high cost of private treatment.

Rural PHCs very rarely performed the diagnostic tests for tuberculosis even when facilities were readily available; they invariably referred patients directly to the DTC. This was true even in the case of urban TB clinics. Non-availability of diagnostic facilities at all the clinics led to patients being shunted from one clinic to another.

Table 8

Frequency of Change of Treatment Source

Frequency	Number	%
Never Changed	22	8
Changed once	81	28
Changed twice	76	26
Changed thrice	62	21
Changed more than 3 times	48	17
Total	289	100
Mean number of sources :	Rural patients - 3.6	
	Urban patients -2.8	
	Total - 3.0	

Information on treatment was obtained from a limited number of patients' treatment cards. It was seen that about a third of the patients interviewed had defaulted during their treatment. Further, by the time patients were contacted for the interview, 26% had stopped taking treatment totally. Improvement of symptoms, economic problems and health services related problems were given as the major reasons for treatment non-adherence (Table 9).

Table 9

Reasons for Default in Treatment

	Number	%
Felt better	30	27
Economic problems	25	22
Unforeseen problems	21	19
Health Services related problems	19	17
Got bored of treatment	13	12
Side effects of drugs	11	10
No improvement in condition	2	2
All who defaulted	112	100

Note : Multiple reasons given

Unforeseen problems include being out of town and too unwell to attend the clinic.

Health services related problems included unsuitable timings, bad behaviour of staff and drugs/doctor not available. Some of the reasons given by patients for their irregularity/non-adherence are worth examining verbatim :

"... We are poor. Travelling requires money. Morever, in the hospital where I get medicines, the doctor issues drugs for a maximum period of 1 month at a time and asks me to buy some medicines from outside".

"I was pregnant. I got admitted for an abortion and tubal ligation. Hence, I could not collect drugs for some days. I knew that when I go back, the compounder would shout at me for not coming on the correct date. How can I explain to him why I could not attend".

"... When I do not have enough money to eat food, how can I take these powerful medicines which cause acidity?"

".,. I do not want to live any more. I have been suffering from this disease for more than 6 years and am tired of going to doctors and taking medicines."

"Everytime I went to tile PHC, they would tell me that they did not have the drugs and would send me to some other PHC. Twice I believed them and went to other PHCs, but I was told that since my card was not with them they could not give me the drugs, I got sick of this shunting up and down and stopped taking medicines altogether".

"... I did not have any proper place to keep the drugs and they would become wet and sticky and become discoloured. Since I felt that these would not be effective, I stopped collecting medicines."

"I was pregnant and was advised by my relatives and neighbours not to consume any drugs because it would have a bad effect on my baby".

Treatment Expenditure

Patients incurred an average expenditure of Rs. 900 from the time of developing symptoms to the time they were interviewed (about 3-6 months after being registered with the public health services): about two-third upto Rs. 1000 and the remaining even more (Table 10). Of the one-third who had taken loan for their treatment, about three-fourth were indebted upto Rs. 5000.

Table 10

Treatment Expenditure

Expenditure Range (Rs)	Number	%
Upto 500		
501-1000	42	19
1001-2000	34	15
2001-3000	22	10
3001-4000	10	4
4000 +	13	6
Total	225	100

Note: Some patients did not respond

Help providing Behaviour

X-ray and sputum examinations were the main diagnostic tests performed by health providers to confirm the diagnosis, often accompanied by blood and urine analysis (Table 11). When those who reported having undergone a sputum test were asked to explain the method of sputum collection, only 19% could give an adequate explanation. Several patients reported having given their sputum/saliva on paper, tree leaves, a broken cup or dish and directly on a glass slide. Eightysix percent reported that they had received the above mentioned instructions for sputum collection from the public health functionaries.

Discussion

The key to successful tuberculosis control is patient adherence to treatment recommendations. This study has looked into the connected aspects like knowledge & perceptions, attitude & beliefs, help & treatment seeking pattern of tuberculosis patients as well as the operational aspects of help seeking.

Table 11

Tests carried out for making diagnosis

	Number	%
X-ray	275	94
Sputum	250	85
Blood	206	70
Urine	161	55
Total patients	293	100

Note : Multiple tests performed

Social stigma plays an important role in the acceptance of a disease and adherence to its treatment. A large number of patients in the present study accepted that they were suffering from tuberculosis, though there were a few instances of stigmatization by the community and denials that they had tuberculosis.

This study shows that patients have enough knowledge about the disease so as to recognize the symptoms and take action when they get the symptoms. But their inability to adhere to and complete the entire course of treatment is due to social, economic and health services related problems. Similar findings have been reported from other parts of India and some other developing countries[6,12].

Despite the common dismissal of the role of the private sector in tuberculosis control, more than two thirds of our patients had visited private doctor first when they developed chest symptoms, and more than half had been diagnosed by private doctors. It is also believed that the private sector has a very poor opinion of the public health facilities but close to half of our study patients had been referred to the public sector clinics by the private sector. The programme managers need to be aware of this finding, and assign a definite role to private doctors in the programme so as to take advantage of the "preferred providers" of patients in improving treatment adherence.

It is seen from this study that it is the public sector which is failing to perform its defined role in the programme. Sputum examination, on which the control programme hinges, had not

been performed in 15% of our patients. Further, the quality of this vital test as performed in the public sector is definitely not upto the mark as observed from sputum collection and patients' inability to recount the method of sputum collection.

Patients registered with the public sector were expected to have adequate knowledge of treatment duration. That more than 30% of patients were unaware of this information shows that there is a communication gap between health providers and their patients. Our observations at the District TB Centre also showed that the health personnel hardly spend any time on talking, explaining or counselling.

Moreover, the non-availability of the anti-tuberculosis services more widely (which suggests non-conformance with the programme guidelines by the providers) results in patients having to travel from one centre to another in search of diagnosis and treatment. This, when more than two-thirds of patients were from the lowest strata of society and had to incur avoidable expenses and indebtedness, makes us wonder how those who adhered to the treatment guidelines managed to do so. The concept of regularity of treatment and the consequences of irregular or incomplete treatment were known to most patients. But, what are the messages that the health services send to their patients when they are unable to provide them with drugs or investigations as they should do? Are these not important issues to be discussed when one deals with the concept of shopping for treatment and non-adherence to treatment?

Treatment adherence has been rightly defined by Chaulet as the outcome of a process involving a long chain of responsibilities extending from the decision-makers at the Health Ministry to the treating physicians[13]. And the success of the tuberculosis programme in Malawi demonstrates this - the high cure rate of 87% was achieved due to political stability, favourable government health policies, adequate food, standardized tuberculosis services and strong supervision and training of the programme staff[14].

Our tuberculosis programme can no longer continue to blame patients alone for their ignorance and their self-destructive behaviour. This study shows that inspite of having the correct knowledge and taking the correct action, initially, patients were forced by the service providers, public as well as private, to become non-adherent. There is a very clear need to improve the availability and quality of the anti-tuberculosis services, before deciding on undertaking measures like directly observed treatment, which pre-supposes that patients cannot be relied upon to take their medicines in a responsible manner.

Thus, while it is important to understand the social and cultural determinants of patient behaviour in tuberculosis, it seems far more pertinent to study the obvious operational problems in the programme and sort them out on a priority basis.

ACKNOWLEDGEMENTS

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REFERENCES

1. Guidelines for tuberculosis treatment in adults and children in national tuberculosis programmes, World Health Organization, Geneva, 1991.
2. A strategic plan for the elimination of tuberculosis in the United States, MMWR 1989 16 : 269, Apr. 28.
3. Pamra, S.P. : Problems of tuberculosis in developing countries, Clin, Chest Med 1980, 1: 265.
4. Kochi, A ; The global tuberculosis situation and the new control strategy of the World Health Organization Tubercle 1991, 72 : 1.
5. Haynes R.B. et al (editors) : Compliance in Health Care, Johns Hopkins ffniversity Press, Baltimore, MD, 1979.
6. Geetakrishnan, K; Case holding and Treatment

Failures under a IB Clinic Operating in Rural Setting, Ind. J. Tub. 1990, 37.

7. Srivastava V.K., et al; A study of drug default in patients attending Tuberculosis Clinic in a rural area, Ind. J. Tub. 28, 1981.

8. Barnhoom F, et al; In search of factors responsible for non-compliance among tuberculosis patterns in Wardha District, India, Social Science Medicine, 1992 34, 291.

9. Menegoni, L.A; Tuberculosis and health care in highland Chiapas, Mexico : an ethnographic study, University Microfilms International, Ann Arber, 1990 p. 332.

10. Mata, J.I. : Integrating the client's perspective in planning a Tuberculosis education and treatment programme in Honduras. Medical Anthropology, 1985 9, 57.

11. Corcoran R; Compliance with Chemotherapy for Tuberculosis, Ireland Medical Journal, 1986 79, 87.

12. Farmer P; et al; Tuberculosis, Poverty, and "Compliance" : lessons from rural Haiti. Seminar Respiratory Infections 1991 6, 254.

13. Chaulet P; Compliance with Chemotherapy for Tuberculosis : Responsibilities of the Health Ministry and of Physicians. Bull. Int. Union Tuberc, 1990 66 (Suppl) ; 33.

14. Nuyangulu D.S., et al; Factors contributing to a successful tuberculosis programme in a developing nation. Am. Rev. Respiratory Dis. 1990, 142, p. 1301.

INDIAN NATIONAL TUBERCULOSIS PROGRAMME: REVISED STRATEGY*

Rohit Sarin & L.B.S. Dey

Summary : The NTP has been continuosly monitored and reviewed over the years revealing several shortcomings. In view of these, the NTP strategy has been revised since 1993 in consultation with WHO and World Bank. And, with their assistance, pilot projects have been started in several large cities and States to test out the revised strategy. This paper described the objectives and *modus operandi* of the revised strategy which encompasses non-governmental organisations (NGOs) as well as private medical practitioners.

Introduction

The NTP has been in operation for more than 3 decades. Even though 85% of the districts (390/460) are covered under it, the performance is below the level of expectation. Short Course Chemotherapy has been made available in 253 districts but it has a very low coverage of PHIs due to non-availability of adequate quantity of drugs. It is also clear that though the NTP lays stress on detecting more sputum positive cases, this, in i effect, has resulted in increasing the smear negative cases. The ratio of smear positive to negative cases has consequently declined from 1:2 in the 1960s to 1:4 at present (reflecting a continued over-reliance on X-rays).

With the average case finding of 30% and treatment completion rates of 35-40%, in any case, there was no expectation of a substantial epidemiological impact, and the incidence and prevalence of the disease have remained more or less static over the years. In fact, with the population growth, the absolute number of tuberculosis cases has been on the increase. The impending threat of HIV further adds to the urgency of the situation, and it is very likely that with the spread of HIV the epidemiological situation of tuberculosis would deteriorate.

Against this backdrop, the Government of India has accorded a renewed priority to the NTP and it was critically reviewed in 1992 by a group of national and international experts. Some of the observations of the Review Committee are as follows :-

i) Inadequate budgetary outlays and shortage of drugs.

ii) Undue emphasis on X-rays instead of sputum testing for diagnosis.

iii) Poor quality of sputum microscopy.

iv) Emphasis on detection of new cases instead of achievement of cure in patients under treatment.

v) Poor organisational set up and support for NTP.

vi) Lack of consensus amongst private medical practitioners regarding treatment regimens to be followed.

On the basis of the recommendations of the Review Committee, a Revised Strategy of NTP has been formulated by strengthening the identified weak areas in the existing programme.

The revised NTP takes advantage of the technology revolution which took place by the introduction of Directly Observed Therapy (DOT). In countries like Tanzania, it was shown that DOT had reduced the annual risk of infection (ARI) to 4-5% annually and, consequent to this, it was estimated that there would be a reduction in infectors (diseased) and infected (potential) by 50% in 15 years. The revised strategy of NTP also effectively utilises the enhanced availability

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of infrastructure and manpower developed in the primary health care system over the years, but not fully utilised under the NTP.

Objectives of Revised NTP

a) Overall
   i) To reduce mortality and morbidity from tuberculosis,
   ii) To interrupt the chain of transmission of infection.

b) Operational

   (i) To cure at least 85% of all newly detected cases of pulmonary tuberculosis with supervised Short Course Chemotherapy.

   (ii) To detect at least 70% of the estimated incidence of smear positive pulmonary tuberculosis cases.

However, effort at increasing case detection would be made only after achieving 85% cure rate in the already detected cases.

Strategy

To achieve the above objectives of the revised NTP, the following strategy is being developed:

1. To change the current practice of radiological diagnosis to diagnosis by sputum microscopy
2. To treat all smear positive cases and seriously ill sputum negative cases with Short Course Chemotherapy directly supervised in the intensive phase and appropriately supervised in the continuation phase, through involvement of peripheral health functionaries.
3. To make available the required anti-tuberculosis drugs in appropriate blister combipacks, uninterruptedly to all peripheral areas.
4. To strengthen the capability of DTC and State TB Demonstration and Training Centres for effective implementation, monitoring and evaluation of the programme, including cohort analysis of patients under treatment.
5. Strengthening supervision beyond the district level.
6. Augmenting training capabilities both at national and state levels.
7. Introducing a professionally managed Information, Education & Communication (IEC) campaign.
8. Aim at involvement of NGOs and private medical practitioners.
9. Operational research.

The revised strategy is in line with the recommendations made by WHO.

Operational Components

Some of the important operational components of the revised strategy are :

1. To strengthen sputum microscopy facilities so that good quality sputum microscopy becomes available, as close to the people as possible. This would be achieved by :
   - Establishing a sputum microscopy centre for every 100,000 population,
   - Training and retraining of laboratory technicians,
   - Diagnosing on the basis of at least 3 sputum smear examinations instead of one,
   - Establishing an appropriate cross-checking mechanism for ensuring quality control of procedures,
   - Providing good quality equipment and necessary logistic support for sputum microscopy.
2. To involve the most peripheral health functionary in Directly Observed Therapy (DOT) during the intensive phase. This peripheral health functionary could be the MPW (multi-purpose worker), Anganwadi Worker, Trained Dai, Village Health Guide or Community Volunteer. In this way, drug delivery would be established very close to a patient's residence.
3. To improve the drug procurement and distribution system so as to make available all categories of anti-tuberculosis drugs on a regular and uninterrupted basis right upto

the periphery. The drugs would be packed in blister combipacks to facilitate drug intake as per schedule.

4. To create a sub-district supervisory level for every 0.5 million population so that the quality of supervision, monitoring and evaluation can be improved. This team would comprise one Senior Tuberculosis Supervisor (STS) and One Senior Tuberculosis Laboratory Technician (STLT).

5. To decentralise district tuberculosis registration to the sub-district level.

6. To strengthen capability in cohort analysis, etc. through proper training and strengthening of the infrastructure.

7. To involve NGOs and private medical practitioners in the NTP, as a large majority of patients avail of their services.

8. To strengthen the existing State TB Demonstration and Training Centres so as to serve as a nodal point for training within the State and to augment training facilities at the national level through expansion of existing infrastructure.

9. To augment operational research activities to improve the efficiency of the implementation of the programme.

10. To establish professionally designed IEC activities to support the activities of the programme.

Method (Annexures I, II & III)

A chest symptomatic reports to the nearest health facility, where his sputum is tested. In case sputum examination facility is not available there, the patient is referred to the nearest NTP Microscopy Centre. After three sputum specimens have been examined, the patient is put on anti-tuberculosis treatment when at least two of the three specimens are positive. If only one specimen is positive, an X-ray of chest is taken. The Medical Officer decides the treatment to be given on the basis of sputum, X-ray and clinical examinations. If all the three sputum specimens are negative, then the patient is given a course of antibiotics for 7-10 days. In case symptoms still persist, an X-ray is taken and the Medical Officer decides the subsequent treatment.

Anti-tuberculosis treatment is administered depending upon the categorisation of the patient, as per details given in Table 1. During intensive phase, directly observed therapy is administered with the help of a peripheral health functionary; while in the continuation phase a patient collects the drugs on weekly or fortnightly basis. Drugs are taken 3 times a week throughout.

Drug administration is appropriately recorded on the treatment cards which are prepared and kept at the place of diagnosis and treatment. The information from the treatment card is transferred onto the TB Register which is kept at the sub-district level and is updated from time to time by the STS. Quarterly reports on case-finding and treatment outcomes are prepared at the sub-district and sent to the district for compilation and onward submission to state and central levels. Analysis of data would take place at district, state and central levels and information would flow, back to the sub-district for corrective action.

Pilot Projects

The revised strategy of NTP is being implemented as a pilot phase in 5 project areas in Delhi, Bombay, Calcutta, Bangalore and Mehsana district of Gujarat, covering a population of 2.35 million. The initial results have been very encouraging, with an average sputum conversion rate of around 95% at 2 months (Table 2). Also the ratio of sputum positive/negative patients is nearly 1:1 in all project areas as against 1:4 in the rest of India (Table 3).

This success has prompted the Government to seek World Bank assistance for implementing the revised strategy on a larger scale in 15 project areas of 10 cities and 5 states, covering a total population of around 14 million and it is planned to expand it in a phased manner throughout the country.

Table 1

Short Course Chemotherapy under Revised NTP

(All drugs are given thrice weekly)

Category of patient	Duration	Regimen
Cat-I For new sputum positive and seriously ill sputum negative pulmonary & extra-pulmonary patients.	Intensive phase (2 months) Continuation phase (4 months)	INH + Ethambutol + Rifampicin + Pyrazinamide INH + Rifampicin
Cat-II Relapse and treatment failure patients	Intensive phase (3 months)	2 months - INH + Rifampicin + Ethambutol Streptomycin + Pyrazinamide 1 month - INH + Rifampicin + Ethambutol + Pyrazinamide
Cat-Ill New Smear negative (not seriously ill) pulmonary and extra-pulmonary patients	Intensive phase (2 months) Continuation phase (4 months)	INH + Rifampicin + Pyrazinamide Rifampicin + INH

Table 2

Sputum Conversion results of new sputum positive cases

Project Area	Reporting Quarters	New smear +ve patients diagnosed	Follow up results available	Sputum Conversion	
				2 mth	3 mth
Delhi (Gulabi Bagh)	3 Qtrs.	260	259	247 (96.5%)	252 (98.4%)
Bombay (H/West)	1 Qtr.	36	36	34 (94.4%)	36(100%)
Gujarat (Mehsana)	2 Qts.	393	329	297 (90.2%)	308 (93.6%)
Calcutta (Tangra)	1 Qtr	40	38	23 (64%)	-

Table 3

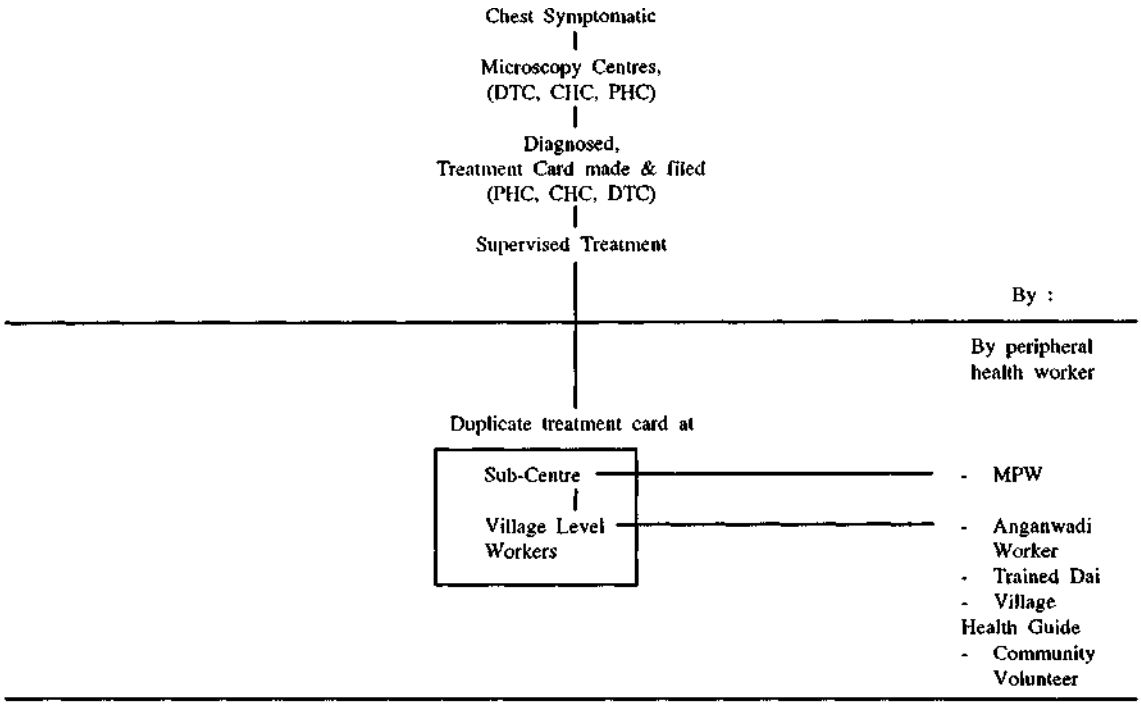
Ratio of smear positive to new smear negative pulmonary TB cases in project areas

State/City	Project Area	Reporting Quarters	New pulmonary TB POS.	NEG.	Ratio POS. : NEG
Delhi	Gulabi Bagh	3 Qtrs.	260	263	1:1
Bombay	H/West	2 Qtrs.	65	62	1:1
Gujarat	Mehsana	3 Qtrs.	432	619	0.7:1
Calcutta	Tangra	1 Qtr.	39	13	3:1

Annexure I

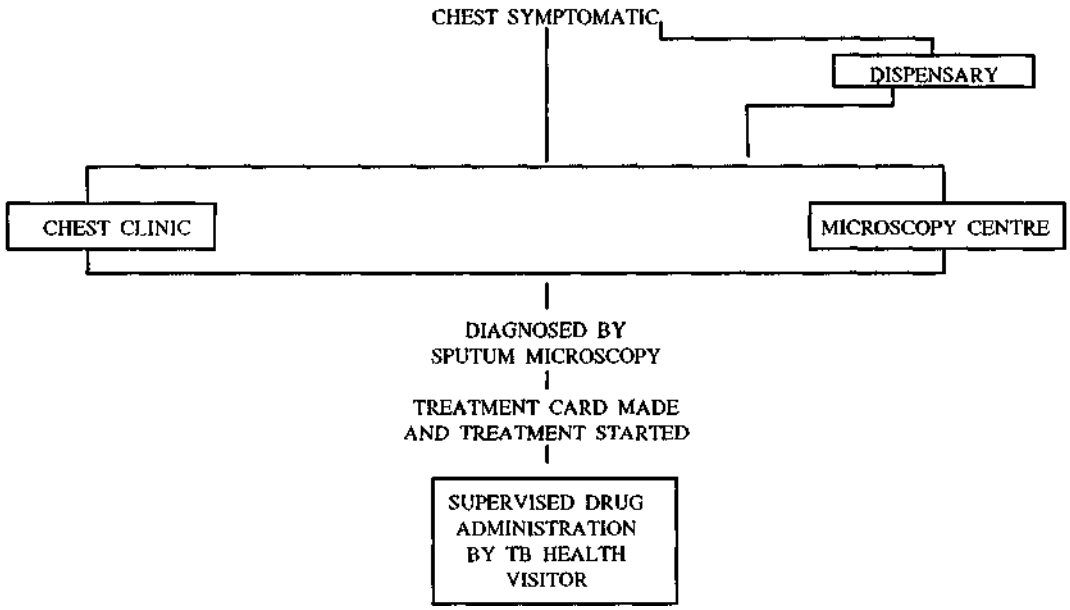
ILLUSTRATIVE DIAGRAM DETAILING THE SCHEME OF DIAGNOSTIC AND TREATMENT ACTIVITY AT PERIPHERAL LEVEL AND THE ROLE OF PERIPHERAL HEALTH FUNCTIONARY

a) General Model



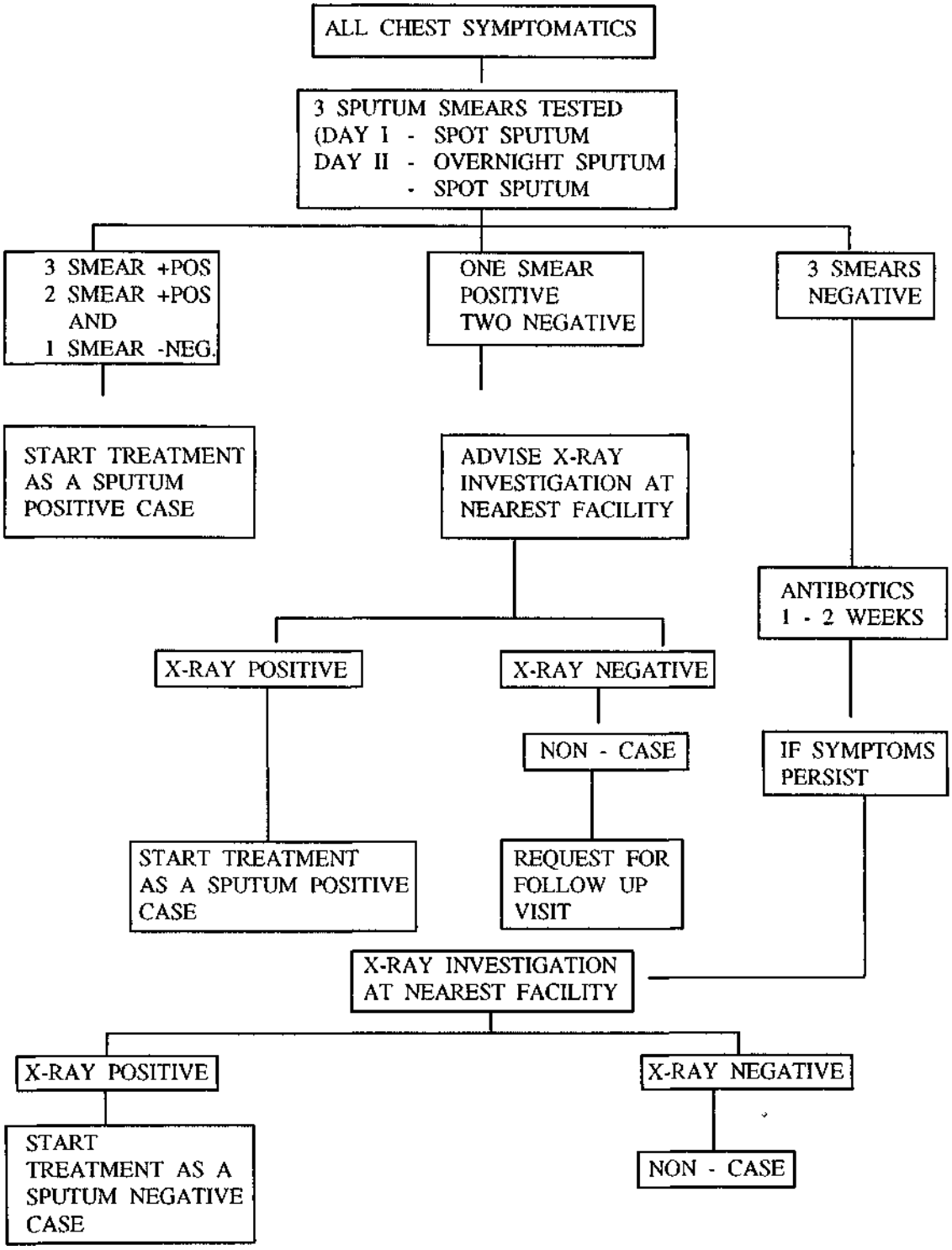
Annexure II

b) Alternative Model
(where Primary Health Care is not in position)



Annexure III

DIAGNOSIS AND MANAGEMENT OF CASES OF TUBERCULOSIS FROM AMONG CHEST SYMPTOMATICS



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PERFORMANCE OF NATIONAL TUBERCULOSIS PROGRAMME IN 1993: AN APPRAISAL*

L. Suryanarayana[1], K. Vembu[2], R. Rajalakshmi[3] and C. Satyanarayana[3]

Summary: National Tuberculosis Institute (NTI), Banglore has been monitoring the National Tuberculosis Programme (NTP) since 1978. Districts Tuberculosis Prograrnnes (DTPs) numbering 390 registered by Directorate General of Health Services (DGHS), are covered under such monitoring. The percentage of DTP's implemented accounts for 81% of the total districts and 64% of such DTP's have been covered under Short Course Chemotherapy (SCC). As far as Peripheral Health Institutions (PHIs) are concerned, 56% of the available health institution (HIs) have been implemented. Reporting efficiences of the DTPs and the PHIs are 78% and 70% respectively. Only 41% of the PHIs have been supervised by the respective Districts Tuberculosis (DTCs) (i.e., at least once in a quarter). The smear positivity rates are 12.3% and 4.8% at DTCs and PHIs respectively., As far as case detection efficiency of smear positive cases is concerned DTCs have achieved an efficiency of 71%, and PHIs 36%. Quality of X-ray reading and smear microscopy, as reflected by smear confirmation rates , among the pulmonary cases diagnosed are 20% and 24% respectively. Treatment completion rates derived from the annual cohort analysis reports are 34% for standard regimens, 44% for SCC Regimen A and 52% for REgimen B. Out of the 276 DTCs reporting on the availability of trained man-power and equipment, trained District Tuberculosis Officers (DTOs) are posted in 56%, X-ray Technicians in 60% Laboratory Technicians in 73% Treatment Organisers in 73% and Statistical Assitants in 46% of the DTCs. Only in 15% of the DTCs is there a full complement of trained staff. As far as equipment is available in 84%, microscopes in 96% and vechiles in 76% of the DTCs. Achievements in all aspects the objectives set for NTP; therefore, concerned authorities have to take appropriate remedial measures to achieve the goal of NTP.

Introduction

NTI has been monitoring the NTP since 1978. Monitoring is a continuous assessment of certain key indicators of the programme through periodic reports. Reports contain information on case-finding and treatment activities and other related aspects. The reporting under NTP involves two tiers: the first tier is the PHIs which report to DTC and the second tier is the DTCs which reports to the state and national levels. Reports received at the NTI are analysed in respect of some key indicators developed as a result of operational studies carried out at the NTI. The results of the analysis are communicated to the concerned districts/states for taking necessary corrective actions.

Objective

This paper appraises the performance of NTP in terms of implementation, reporting, supervision, performance of case-finding and treatment activities and availability of trained manpower and equipment, for the year 1993.

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Material & Methods

Four quarterly DTP Reports on case-finding and treatment activities and Annual DTP Reports on cohort analysis of the treatment results for the prescribed cohort periods emanating from the different DTPs constitute the material for this paper. Reports received at NTI have been scrutinised and consolidated state wise and on All India basis. Incomplete and/or grossly incorrect reports have been excluded from die analysis. In all, 1194 Quarterly Reports out of 1223 received (1560 expected) have been considered for assessing the case-finding activity. For the determination of the treatment outcome, only 152 out of 378 Annual Reports expected for Standard Regimen (SR) for the cohort period July 1990 to June 1991,and 94 out of 234 reports expected from SCC-DTPs (cohort period Jan-Dec 91) have been considered. Data are presented for DTC and PHIs separately, representing the average performance of each district in a State for 17 big States and collectively for 8 small States and 5 Union Territories (as si. no. 18) in each Table.

Efficiency of a DTP is assessed by comparing its achievements with the expectations. Expectations from various activities are as follows :

A. Implementation, Reporting efficiency & Supervision

The expectation in respect of implementation, reporting by DTCs to higher levels, and by PHIs to DTCs and supervision of PHIs by DTC is 100%.

B. Case - finding

Efficiency of case-finding is measured in terms of

(a) Sputum examinations, and
(b) Detection of smear positive cases.

Expectations for the above indicators are arrived at on the basis of :

(i) Population aged 5 and above as per mid 1993 estimated population.

(ii) Prevalence rate of bacteriologically positive cases of 0.4% in the community[1]

(iii) 52% action taking by the tuberculosis patients[2].

(iv) Coverage of PHIs under DTP and

(v) Achievements of a reasonably good performing DTP in the country.

(c) **Sputum Smear Positivity Rate**

Smear positivity rates, out of total sputa examined are expected to be as follows:

(i) At DTC : 18%[3]
(ii) At PHI : 8%

It is expected that in an average district with a population of 1.8 million, DTC detects 500 smear positive cases per year @ 18% of the total number of sputum examinations conducted and PHIs detect 2,000 smear positive cases on the basis of 8% smear positivity rate.

The above figures of expectations (based on achievements of reasonably good performing DTPs) are lower than the potential arrived at in the operational studies conducted at NTI[4,5].

(d) **Smear Confirmation of Pulmonary Cases**

The expectation is that 35% of pulmonary cases detected are smear positive[3] which is less than 55% potential as per studies conducted at NTI[4].

C. Treatment outcome

i) *Treatment Completion Rate*

Standard Regimen (SR): Expectation here is determined by percentage of patients making/ completing 12 or more drug collections/ consumptions over the treatment period of 18 months and is 100%.

Short Course Chemotherapy (SCC) : Expectation is determined by the percentage of patients completing 75% and above of the expected drug collections/consumptions and is 100%. This is based on the fact that cure rate of 85% and

above can be achieved only when all the patients comply with the collection/consumption of >75% of the expected drug collections[6].

ii) *Cure rate*

Cure rate is percentage of smear positive patients converting to negative status at the end of treatment period out of those initiated on treatment. Expected cure rate is > 85% among newly diagnosed patients according to the WHO Guidelines[7].

OBSERVATIONS & DISCUSSION

1) Implementation of DTPs (Table 1)

At national level, 390 DTPs out of 480 districts (81.2%) in different States/UTs (as per 1991 census) have been registered by DGHS. Only 12 out of 17 big States have implemented 80% or more of the districts available in the respective States. Assam has implemented only 48% of the districts. Small States & Union territories put together have only 45% of the districts implemented. No new DTPs were implemented during 1993.

Some States have reorganised the originally implemented districts (DTPs) into varying number of smaller districts for administrative and other reasons. Certain States have created additional DTCs within the existing DTPS. It has come to the notice of the NTI that certain States have sanctioned/created splinter DTPs without the stipulated infrastructure. This needs to be avoided. DTPs functioning in such districts may get registered by DGHS in course of time, after they fulfill the prerequisites. Registration by DGHs enables the DTPS to get assistance from the Central Government such as vehicles, X-ray equipment, 50% of the drugs and Mass Miniature Radiography (MMR) film rolls. Ninety districts in the country remain unimplemented due to administrative and financial constraints, though they are providing tuberculosis services through chest clinics or in some other form. It is essential that all the districts in the country are implemented under the programme to have full coverage of tuberculosis services.

Out of 390 implemented DTPs, (64.6%) 252 DTPs have been covered under SCC. Only Gujarat has the distinction of covering 100% of the districts under SCC. Only 5 States (including Gujarat) have covered 80% or more of the DTPs under SCC. Four States have implemented less than 50% and Bihar accounts for the lowest percentage of 19. Small States/UTs have a coverage of 77% of DTPs under SCC.

Here, it is suggested that emphasis should be on consolidating the gains of SCC in the entirety of the implemented districts instead of extending it piecemeal to new districts (DTPs).

2) Implementation of PHIs

It is expected that there should be one Primary Health Centre (PHC) for a population of 30,000 in plain areas and 20,000 in hilly areas. The expected number of PHIs in the country works out to 29,794 but there are about 29,500 health institutions (His) of various categories available for implementation. Out of these, only 16,830 i.e. 56% of the His, have been implemented under the programme. Only four States have 80% or more of the His implemented under DTP. Four other States have achievement of less than 50% in this respect. Small States & UTs have a coverage of 56%. Among the DTPs covered under SCC, the coverage of PHIs under SCC is 47% at all India level (not given in Table).

Since the His situated mostly in rural areas cater to large proportion of population in the country, the stress should be on implementing all of them under DTP, in general. In case of DTPs covered under SCC, all PHIs should be brought under SCC, before extending the SCC to other DTPs.

3) Reporting by DTPs (Table 2)

At national level, 78% efficiency of reporting is overall. Only 10 big States and all. Small States and UTs put together have a reporting efficiency of > 80%. Bihar has less than 50% efficiency.

Reporting is a prerequisite for effective monitoring of the programme. Hence, it is

Table *1* : *Implementation of DTPs & PHIs and introduction of SCC according to States - 1993*

SI No	States/ UTs	No. of dis-tricts	Functioning DTPs		DTPs under SCC		% of Pills imple-mented
			No.	%	No.	%	
1	2	3	4	5	6	7	8
1.	Andhra Pradesh	23	23	100	19	83	59
2.	Assam	23	11	48	8	73	41
3.	Bihar	51	32	63	6	19	15
4.	Gujarat	19	19	100	19	100	89
5.	Haryana	16	11	69	3	27	58
6.	Himachal Pradesh	12	11	92	6	55	224
7.	Jammu & Kashmir	14	10	71	7	70	44
8.	Kamataka	20	20	100	14	70	111
9.	Kerala	14	12	86	7	58	55
10.	Madhya Pradesh	45	45	100	36	80	83
11.	Maliarashtra	30	30	100	26	87	75
12.	Orissa	13	13	100	8	62	63
13.	Punjab	12	12	100	4	33	56
14.	Rajasthan	28	27	96	10	37	53
15.	Tamil Nadu	22	16	73	14	88	77
16.	Uttar Pradesh	63	56	89	30	54	30
17.	West Bengal	17	16	94	11	69	36
18.	Small States and UTs	58	26	45	20	77	56
	INDIA	480	390	81	248@	64	56

@ Excludes 4 districts monitored by TRC, Madras

Table 2. *Position of Reporting & Supervision in DTPs according to States-1993*

SI No	States/ UTs	Quarterly DTP Reports			PHIs Reported %	PHIs Supervised %
		Expected	Received	%		
1	2	3	4	5	6	7
1.	Andhra Pradcsh	92	81	88	86	43
2.	Assam	44	41	93	57	28
3.	Dinar	128	56	44	37	17
4.	Gujarat	76	73	96	97	47
5.	Haryana	44	37	84	84	36
6.	Himachal Pradcsh	44	27	61	50	23
7.	Jammu & Kashmir	40	24	60	68	29
8.	Karnataka	80	68	85	77	59
9.	Kerala	48	36	75	46	18
10.	Madhya Pradesh	180	129	72	57	16
11.	Maharashtra	120	92	77	87	69
12.	Orissa	52	49	94	81	34
13.	Punjab	48	43	90	62	31
14.	Raja&than	108	88	81	52	36
15.	Tamil Nadu	64	63	98	62	39
16.	Uttar Pradesli	224	196	88	67	42
17.	West Bengal	64	35	55	22	14
18.	Small States & UTs	104	85	82	66	44
	INDIA	1560	1223	78	70	41

expected that all the implemented DTPs submit their quarterly and other reports to the Central and State authorities in time. As such, States have to achieve the desired expectation of 100%. About 3% of the reports received from DTPs could not be considered for analysis due to large number of discrepancies and inconsistencies. Shortcomings in reporting, in terms of quantity and quality are attributable to lack of trained Statistical Assistants in DTPs. Also, reminders/ feed-back reports sent by NTI to the DTPs do not seem to have been taken note of by State/ District authorities.

4) **Reporting by PHIs (Table** 2)

At all India level, only 70% of the PHIs have reported to their respective DTCs compared with the expectation of 100%. Only five big States have achieved an efficiency of >80% in this respect. Reporting by PHIs is particularly poor (less than 50%) in three States viz., Kerala, Bihar and West Bengal.

Shortfall in this regard is mainly due to inadequate supervision of PHIs by the personnel of the DTCs and higher dstrict level officers. Medical Officers of PHIs need to be suitably motivated by district level officers in despatch of monthly reports to DTCs regularly and in time.

Taking into account the efficiency of reporting by DTPs (78%) and PHIs within them (70%), the overall picture is truncated, reflecting only 55% of the expected reports from all the DTPs in the country. Steps are to be taken by the administrative authorities at State/UT level to improve the performance in this respect.

5) **Supervision (Table** 2)

At national level, only 41% of the PHIs have been supervised by the DTC staff at least once in a quarter. Only Maharashtra (69%) and Karnataka (59%) have achieved efficiency of more than 50%. Seven States could not achieve even 30% efficiency on this score. Supervision of the PHIs by the key personnel of the DTC, at least once in a quarter is the backbone of the programme to ensure maintenance of work standards, replenishment of supplies and equipment throughout the district. Reasons for the low performance in this regard are: i) non-availability of trained personnel in the DTC, ii) non-availability of vehicle, iii) diversion of available vehicle to other programmes, iv) inadequate provision of budget for vehicle and travel expenses and v) lack of motivation of concerned staff even though facilities are available. State authorities have to take appropriate measures to overcome the above deficiencies.

PERFORMANCE OF NTP

Efficiency of Case-finding

At DTCs

At national level, though the efficiency of sputum examinations is more than 100% (not shown in Table), the efficiency of case detection (sputum positive cases) is of the order of 71% only. Four States and all small States and UTs put together have achieved more than 100% efficiency. Eight other States have achieved more than 50% efficiency and five States could achieve only less than 50% efficiency. The performance of Bihar is the lowest (15%), closely followed by West Bengal (21%). Since trained personnel are expected to be available at DTCs, performance of 71% case detection is inadequate. Suitable remedial measures need to be taken by concerned State authorities.

At PHIs (Table 4)

At all India level, the efficiency of sputum examinations is 61%. While Maharashtra and Small States and UTs could achieve more than 80% efficiency, the performance of all other States is not satisfactory. Eleven out of 17 States could achieve efficiency of less than 50% [performance of West Bengal (10%), Assam (15%) and Bihar (18%) being very poor]. As regards detection of sputum positive cases, the all India average is only 36%. Only two big States (Gujarat & Maharashtra) have achieved more than 50% efficiency. The performance of 14 States is even below 30% efficiency.

It is relevant to point out that all the eligible chest symptomatics attending the PHIs

should be subjected to smear examination. The observed shortcomings are due to non-availability of Laboratory Technicians/Microscopists in most of the PHIs. Generally, it is expected that about 2.5% of the new outpatients would be chest symptomatics. Vast improvement is needed in most of the States to step up the efficiency of case detection, both at DTC & PHI levels.

Achievement of Sputum Positivity Rates (Tables 3 & 4)

At DTC level, only Maliarashtra has achieved sputum positivity rate of about 20.7%. Gujarat, Andhra Pradesh and Rajasthan have more than 15.0% sputum positivity. Seven other States have sputum positivity rate in die range, of 10.0%-15.0%. Six big States and small States and UTs could attain smear positivity rate in the range of 5.8% to 9.8%.

At PHI level, the national average is only 4.8%. Only West Bengal & Gujarat have achieved more than the expectation of 8.0% sputum positivity rate. Karnataka, Maharashtra and Punjab have attained > 5.0% sputum positivity rate. The performance of all other States and UTs which ranges from 1.9% to 4.6% is not satisfactory.

Expecting that DTCs should achieve 18% positivity in detection of smear positives among all smear examinations carried out, while PHIs should achieve at least 8% positivity. the all India average of 12.3% for DTCs and 4.8% for PHIs is quite discouraging.

The poor performance by the States in achieving the desired sputum positivity rates calls for strengthening of laboratory services, both at DTC and PHIs. And proper and adequate supervision by DTOs. This could be achieved by providing adequately trained Laboratory Technicians both at DTC and PHI levels and ensuring supply of good quality chemicals and stains. Microscopes also need to be maintained in proper working condition.

Smear Confirmation among all pulmonary cases

Table 5 gives percentages of sputum positive cases confirmed among pulmonary cases, (smear positive and X-ray suspects), both at DTC and PHIs.

It may be observed that the confirmation rate is only 20% in the case of DTCs and 24% in respect of PHIs, at national level. It is expected that this rate should be about 30-35% (as in a reasonably good performing DTP) at DTC level. This confirmation rate is more relevant in DTCs where case-finding is based upon MMR screening followed by smear examination. In the case of PHIs, the diagnosis is by smear examination preceded by symptom screening.

At DTC level, only the performance of Andhra Pradesh, Karnataka, Maliarashtra and Orissa could be considered as satisfactory. Five other big States have achieved confirmation rate in the range of 20-29%'. The performance of Assam and Bihar is very poor (i.e. below ten percent).

At PHI level, three States - Andhra Pradesh, Orissa and Mahrashtra have achieved >35% confirmation rate. Six other big and all small States and UTs have attained 20-29% confirmation rate, while all other States are below that level. The performance of Bihar and Himachal Pradesh is very poor.

Bacillary confirmation rate of pulmonary cases reflects the quality of X-ray reading by Medical Officers. Confirmation rate around 35% could be considered as reasonably good, while rates below 35% indicate over-reading of X-rays, assuming that the quality of laboratory services is of reasonably good standard. In such cases, quality of X-ray reading by Medical Officers needs to be reviewed. The NTP aims at detection and treatment of smear positive cases on priority basis in order to cut the chain of transmission of the disease. But, in reality, it is the X-ray cases (smear negative but' X-ray positive) which outnumber the smear positive cases by about 3V2 times. This causes wastage of scarce resources as all may not be tuberculosis cases.

Table 3. *Case-finding in DTCs (Average per District) according to States-1993*

SI No.	States/ UTs	New sputa examined (No)	+ve cases found	Positivity rate (%)	Expected sputum +ve cases	Effi-ciency %
1	2	3	4	5	6	7
1.	Andhra Pradesh	3558	581	16.3	812	72
2.	Assam	1293	96	7.4	274	35
3.	Bihar	1036	71	6.9	476	15
4.	Gujarat	4077	711	17.4	610	117
5.	Haryana	4743	493	10.4	289	171
6.	Himachal Pradesh	2207	129	5.8	121	107
7.	Jammu & Kashmir	925	91	9.8	155	59
8.	Karnataka	2278	270	11.9	631	43
9.	Kerala	2627	273	10.4	583	47
10.	Madhya Pradesh	1703	243	14.3	413	59
11.	Maharashtra	3889	804	20.7	739	109
12.	Orissa	2931	387	13.2	684	57
13.	Punjab	2356	307	13.0	474	65
14.	Rajasthan	1897	298	15.7	441	68
15.	Tamil Nadu	5882	393	6.7	713	55
16.	Uttar Pradesh	3435	335	9.8	620	54
17.	West Bengal	1657	231	13.9	1124	21
18.	Small States & UTs	2151	173	8.0	89	194
	INDIA	2851	350	12.3	495	71

Table 4. *Efficiency of sputum examinations & sputum positive cases diagnosed in PHIs according to States-1993*

SI. No	States/ UTs	New sputa examined			Sputum + ve cases diagnosed			Sputum positivity rate %
		Expected	Performance	Efficiency	Expected %	Performance	Efficiency %	
1	2	3	4	5	6	7	8	9
1.	Andhra Pradesh	23950	8705	36	1916	397	21	4.6
2.	Assam	6838	995	15	547	26	5	2.6
3.	Bihar	11888	2125	18	951	42	4	2.0
4.	Gujarat	27162	14229	52	2173	1193	55	8.4
5.	Haryana	8375	4881	58	670	181	27	3.7
6.	Himaclial Pradesh	6050	1608	27	484	30	6	1.9
7.	Jammu & Kashmir	3875	1133	29	310	35	11	3.1
8.	Karnataka	31575	8372	27	2526	528	21	6.3
9.	Kerala	16050	4226	26	1284	112	9	2.7
10.	Madhya Pradesh	17125	4194	24	1370	124	9	3.0
11.	Maharashtra	27700	23226	84	2216	1346	61	5.8
12.	Orissa	21538	10265	48	1723	361	21	3.5
13.	Punjab	13288	9653	73	1063	484	46	5.0
14.	Rajas than	11688	2705	23	935	111	12	4.1
15.	Tamil Nadu	27450	18641	68	2196	562	26	3.0
16.	Uttar Pradesh	15500	9966	64	1240	351	28	3.5
17.	West Bengal	28112	2744	10	2249	262	12	9.5
18.	Small States & UTs	3342	3588	107	267	117	44	3.3
	INDIA	13862	8416	61	1109	404	36	4.8

Table 5. *Confirmation of sputum positive cases among pulmonary cases in DTCs and PHIs according to States-1993*

SI No	States/ UTs	DTC			PHIs		
		Pulmonary cases	Sputum +ve	%	Pulmonary cases	Sputum +ve	%
1	2	3	4	5	6	7	8
1.	Andhra Pradesh	1918	581	30	1087	397	37
2.	Assam	1088	96	9	260	26	10
3.	Bihar	1098	71	6	538	42	8
4.	Gujarat	2546	711	28	5061	1193	24
5.	Haryana	1786	493	28	832	181	22
6.	Himachal Pradesh	783	129	16	436	30	7
7.	Jarnmu & Kashmir	341	91	27	241	35	15
8.	Karnataka	826	270	33	2148	528	25
9.	Kerala	1530	273	18	698	112	16
10.	Madhya Pradesh	1306	243	19	589	124	21
11.	Maharashtra	2670	804	30	3886	1346	35
12.	Orissa	1136	387	34	986	361	37
13.	Punjab	1244	307	25	1687	484	29
14.	Rajasthan	1177	298	25	506	111	22
15.	Tamil Nadu	2057	393	19	3852	562	15
16.	Uttar Pradesh	2802	335	12	1808	351	19
17.	West Bengal	1504	231	15	2375	262	11
18.	Small States & UTs	919	173	19	484	106	22
	INDIA	1711	350	20	1704	404	24

TREATMENT OUTCOME

Cohort Periods

Analysis of treatment outcome is done with reference to smear positive patients diagnosed in a given cohort period which is fixed on the basis of optimum treatment period.

In this paper, the Annual Reports for the year 1992, received from DTPs during 1993 have been considered. The prescribed cohort periods are as under:

a) For standard regimens, for which the optimum treatment period is 18 months, the cohort period considered is 1.7.1990 to 30.6.1991, as the patients diagnosed during this period were expected to complete optimum treatment period in the course of 1992.

b) For SCC, tlie cohort period is from 1.1.1991 to 31.12.1991. Patients diagnosed and put on treatment during this period were expected to complete the treatment latest by December 1992.

(a) **Standard Regimens (Table** 6)

For the year 1992, out of 378 Annual Reports expected, (from DTPs relevant for the cohort period), 247 Reports (65.3%) were received and 152 of them (61.5% of received and 40.2% of expected) were analysed. Based on the analysed reports, out of 81,180 patients included in the cohort, treatment cards-of 74,210 patients were available for analysis at the DTPs and 72,075 patients were initiated on treatment. It could be seen that only 34% of patients initiated on treatment could make 12 or more monthly collections of drugs. As patients making 12 or more collections/consumptions are likely to have favourable outcome in terms of bacteriological conversion and hence deemed to have completed satisfactory level of treatment, only 34% of the patients could be considered to have completed treatment. Completion rate is above 50% only in 4 States, between 40-49% in 4 States and below 40% in other States. The completion rate is the lowest in West Bengal. It has not been possible to work out cure rates due to non-availability of results of final follow-up smear examinations for most of the cases.

Cure rate is the best method for analysing treatment outcome. It is determined by percentage of patients becoming smear negative at the end of the treatment period out of those initiated on treatment. Availability of final follow-up results of smear examinations of all the patients initiated on treatment is a prerequisite to arrive at cure rates. Most of the DTPs do not subject the patients to final follow-up of smear examinations. In the absence of such data the next alternative-but less reliable indicator - i.e. treatment completion rate, has been considered. As the treatment completion rate is very low, it is necessary that case-holding is improved considerably by all Medical Officers and Treatment Organisers 'concerned.

It should be ensured that all cases diagnosed are effectively treated for the full period so that the chain of transmission of disease by the smear positive patients can be checked to a great extent. It is mandatory to subject patients to final follow-up smear examination and results recorded on the treatment card which will facilitate calculation of cure rates.

(b) SCC Regimen (Table 6)

A total of 119 Annual Reports were received against 234 reports expected for the year. Out of these, only 94 (79% of received and 40.2% of expected) reports were analysed.

As per the analysis, 2055 patients put on Regimen A (2 $S_2H_2R_2Z_2$/4 H_2R_2) and 35,097 patients put on Regimen B (2 EHRZ/6 TH or 6 EH) were considered for analysis. It is observed that only 44% of the patients put on Regimen A and 51.8% of the patients put on Regimen B had collected > 75% of the doses/collections expected.

The completion rate is above 50% only in 2 big and one small State for Regimen A. Number of patients put on Regimen A is too small in many of the States reported.

As regards Regimen B, the completion rate

Table 6. *Treatment completion* on SR and SCC regimes according to States-1993*

SI No	Suites/ UTs	SR Regimen			SCC Regimen				
		Reports analyed	Initia-ted	Comple-ted 12+ collec-tions %	Reports analyse c	Regimen A		Regimen B	
						1 Initia-ted	Comple-ted %	Initia-ted	Comple-ted %
1	2	3	4	5	6	7	8	9	10
1.	Andhra Pradesh	20	10296	33	13	391	47	4380	46
2.	Assam	7	780	42	6	0	-	378	44
3.	Bihar	3	308	36	0	-	-	-	-
4.	Gujarat	14	14729	25	12	56	36	8732	56
5.	Haryana	3	1388	28	1	0	-	25	32
6.	Himachal Pradesh	1	84	52	2	0	-	68	19
7.	Jammu & Kashmir	1	78	47	1	0	-	155	78
8.	Karnataka	14	6223	22	11	911	53	1291	40
9.	Kerala	4	789	40	5	6	33	1849	28
10.	Madhya Pradesh	10	4283	52	2	25	40	258	47
11.	Maharashtra	8	3723	63	9	0	-	11869	56
12.	Orissa	10	5084	40	4	140	29	1201	40
13.	Punjab	7	3696	53	3	19	63	738	59
14.	Rajas than	13	5558	25	2	40	0	308	60
15.	Tamil Nadu	6	1541	28	7	415	33	1596	46
16.	Uttar Pradesh	15	11267	36	4	23	9	351	44
17.	West Bengal	2	1363	14	3	14	29	1361	61
18.	Small States & UTs	14	885	39	9	15	67	537	57
	INDIA	152	72075	34	94	2055	44	35097	52

* Cohort period: SR:
1st July 90 to 30th June 91
SCC: Year 1991

is above 50% in six big States besides all small States and UTs. The percentage varies between 40 to 49 in 7 States. Three States have achieved completion rate less than 40%. It could be seen that only 2,055 patients out of 37,152 (i.e. 5.5%) have been put on intermittent SCC Regimen A. This indicates the poor acceptability of this regimen. Retention of this regimen in the chemotherapy policy needs to be re-examined.

The completion rate of 51.3% in respect of both Regimen A and Regimen B put together is neither commensurate with the effort put in nor cost effective. This is not likely to have an impact, on the epidemiological situation by way of 5% reduction in Annual Risk of Infection, which is defined as the proportion of population getting infected with *M. tuberculosis* over a period of one year. To achieve this reduction rate, it has been suggested that countries like India should first achieve 85% cure rate among all the smear positive patients before enlarging the scope of case-finding activity further. Efforts should be made to improve the treatment compliance by patients to achieve a higher rate of completion and consequent higher cure rate.

It would also be useful if follow-up examinations are conducted for all patients completing treatment period so that the cure rate can be worked out to assess the real impact of the treatment activity. The Medical Officers and all concerned para-medical staff have not only to motivate the patients suitably but also carry out the work as prescribed in DTP Manuals. Greater awareness and better devotion to the tasks assigned, by all personnel involved in (lie programme, would help in achieving better results.

Availability of trained key personnel & equipment

Table 7 furnishes the position of availability of trained key personnel and equipment in the DTC as on 31st December, 1993. It could be observed that only 276 out of 390 DTPs have reported particulars on these aspects. Only 43 DTCs (i.e. 15% of reporting DTCs) have full complement of trained team.

It is pertinent to note that only 127 (46%) out of 276 DTCs had trained Statistical Assistants (SAs). This would reflect both on the quality and the number of reports received. Only 73% of the reported DTPs had trained Laboratory Technicians (LTs) and Treatment Organisers (TOs) which would affect adversely the quality of case-finding and case-holding activities.

Non-availability of trained key personnel at DTCs is due to : i) posts not being sanctioned by State Governments, ii) sanctioned posts remaining vacant, iii) lack of budget to depute key personnel for training, iv) diversion of trained staff to other schemes/programmes.

The State Governments concerned have to ensure that all key personnel are trained in die DTP and those trained are deployed in the programme, avoiding diversion outside the DTP.

It may also be seen that some of the DTPs have not reported the information on the availability of trained manpower and equipment. It is observed that out of those reported, vehicles and X-ray equipment are not available in some DTPs. It has also come to notice that allotted vehicles are diverted to other purposes not connected with TB Programme. It is also observed that adequate budget for petrol and oil expenses, repair and maintenance is not allotted which affects the supervision and maintenance of the programme. It is essential that the equipment is maintained in good condition so that the overall efficiency of the programme does not suffer.

Conclusions

a) Measures are to be taken to implement all the districts in the country under District Tuberculosis Programme (DTP) and all the health institutions available under the existing DTPs.

b) Reporting by DTPs needs vast improvement, both in number and quality.

c) It has to be ensured that trained key personnel, as full team, are available in all DTCs.

Table 7. *Posting of trained key personnel & availability of equipment in DTCs as on 31.12.1993 according to states*

SI No.	States/ UTs	Func-tioning DTPs	Staff position reported	Availability of trained staff					DTCs with full trained teams	Equipment in order (No. of DTPs)		
				DTO	XT	LT	TO	SA		X	M	V
1	2	3	4	5	6	7	8	9	10	11	12	13
1.	Andhra Pradesh	23	21	18	20	20	18	15	10	10	21	17
2.	Assam	11	10	7	6	8	8	7	3	10	10	8
3.	Bihar	32	6	0	0	3	5	0	0	4	5	4
4,	Gujarat	19	19	12	18	14	3	11	1	19	19	18
5.	Haryana	11	9	2	1	5	6	4	0	8	8	8
6.	Himachal Pradesh	11	7	4	3	4	4	1	1	5	6	5
7.	Jarmmu & Kashmir	10	5	3	1	3	3	0	0	4	4	3
8.	Karnataka	20	17	6	11	15	13	9	2	13	17	14
9.	Kerala	12	11	5	1	3	9	1	0	8	10	10
10.	Madhya Pradesh	45	30	25	23	26	22	21	7	22	29	18
11.	Maharashtra	30	24	5	19	20	18	3	0	22	23	22
12.	Orissa	13	11	1	8	11	9	9	1	10	11	6
13.	Punjab	12	11	1	3	3	5	3	0	9	11	2
14.	Rajasthan	27	18	8	2	12	14	2	0	15	18	12
15.	Tamil Nadu	16	16	11	12	14	15	15	8	15	16	15
16.	Uttar Pradesh	56	35	30	20	26	30	9	6	32	32	27
17.	West Bengal	16	7	2	6	4	6	4	1	5	7	6
18.	Small States & Uts	26	19	16	13	11	15	13	3	13	19	17
	INDIA	390	276	156	167	202	203	127	43	232	266	212

X = X-ray equipment (Col. 11); M = Microscope (Col. 12); V = Vehicle (Col 13)

d) Effective and adequate supervision of PHIs by the DTC personnel is very much required to maintain the programme.

e) Case-finding activity in DTPs has to be improved both quantitatively and qualitatively, after ensuring that the cases already detected are treated adequately. Priority is to be given to detecting smear positive cases and initiating patients on treatment based on X-ray evidence alone needs to be discouraged.

f) Case-holding activity needs improvement through considerable comprehensive steps to achieve higher cure rates.

g) For achieving the above objectives, adequate organisational, administrative, financial and technical supports are very essential.

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REFERENCES

1. Indian Council of Medical Research : Tuberculosis in India - A sample survey, 1955-58, Technical Report series No. 34; Indian Council of Medical Research, New Delhi, 1959, 49.

2. Banerji D & Stig Andersen : Sociological study of awareness of symptoms among persons with pulmonary tuberculosis; Bull. Wld/Hlth/Org.; 1963; 29, 665.

3. National Tuberculosis Institute : Report on performance of National Tuberculosis Programme for the year 1993, National Tuberculosis Institute, Bangalore.

4. Baily G.V.J.; Savic D, Gothi G.D., Naidu V.B. and Nair S.S: Potential yield of pulmonary tuberculosis cases by smear microscopy of sputum in a district of south India; Bull. Wld. Hlth.Orgn. 1967, 37, 875.

5. Nagpaul D.R., Naganathan N & Prakash M: Diagnostic photofluorography and sputum microscopy in tuberculosis case finding, Proceedings of the combined 29th National Tuberculosis Workers' Conference & 9th Conference of Eastern Region of IUAT, New Delhi, 1974, 330.

6. Chaudhuri K, Jagota P and Parimala N: Results of treatment with a Short Course Chemotherapy regimen used under field conditions in District Tuberculosis Programme; Ind. J. Tub. 1993, 40 83.

7. World Health Organisation : Tuberculosis research and development - Report of a WHO working group meeting, Geneva 9-11 Sep. 1991, WHO, Geneva.

8. Baily G.V.J., Rupert Samuel G.E., and Nagpaul D.R. A concurrent comparison of an unsupervised self administered daily regimen and a fully supervised twice weekly regimen of chemotherapy in a routine out patient department; Ind. J. Tub. 1974, 21 152.

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CHANGING TREND OF HIV INFECTION AND TUBERCULOSIS IN A BOMBAY AREA SINCE 1988*

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Summary : Since November 1988, 5,024 patients, in all, were admitted for various respiratory ailments to J. J. Hospital Bombay. Of them 296 were found HIV positive by ELISA test.

Of the 296 cases, 260 had coexisting pulmonary tuberculosis. Seropositively in tuberculsosis patients incresed from 2.56% in 1988 to 10.15% in 1994, the rate being more or less the same for the last three years.

Heterosexual promiscuity was the major risk factor (95.95% and commercial sex workers accounted for 70% of the female tuberculosis patients with HIV infection.

In all, 73.07% of seropositive patients responded favourably to "standard" chemotherapy. Fifty three patients with HIV and tuberculosis died during the study period.

Introduction

Since the discovery of human immunodeficiency virus (HIV) in mid-1981, the prevalence of tuberculosis and HIV infection is on the rise. It is now widely appreciated that the epidemiology, clinical manifestations, management, and prognosis of tuberculosis are radically altered in patients with HIV infection.

Allowing for underdiagnosis, incomplete reporting and the reporting delay, it is estimated that around 16 million persons worldwide are infected with HIV[1], with 60% of these being resident in sub-Saharan Africa[2]. The gravity of the situation can be judged from the fact that a third of the world population has been infected with *M. tuberculosis*[3].

Until 1984, the trend of tuberculosis in the Western world had demonstrated a regular yearly decline. This downward trend halted and then reversed in 1985 e.g. in the United States, there were, between 1985 and 1991, an estimated 39,000 excess cases of tuberculosis[4,5,6] and it is estimated that half of these excess cases resulted from co-infection with *M.tuberculosis* and HIV[5].

In India, tuberculosis is commonly reported among HIV infected persons[7]. More than 60,000 adults in South and South East Asia are estimated to have been co-infected with HIV and tuberculosis. The rapid spread of HIV in India, Thailand and Myanmar has raised the concern that TB/HIV epidemic in parts of South East Asia may soon rival the TB-HIV epidemic in sub-Saharan Africa.

Material and Methods

All the patients admitted to the Respiratory Diseases Ward of the JJ. Hospital, Bombay, were screened for HTV Infection by ELISA (Wellcozyme) test from November 1988 onwards. There were no preferential admissions connected with HIV infection related with tuberculosis.

The study protocol included complete biodata, presenting symptoms, history of recognised risk factors and immuno-suppressive conditions (e.g. alcoholism, diabetes mellitus, etc.) and detailed clinical examination.

Apart from two ELISA tests for HIV, all patients underwent tuberculin test, blood counts,

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chest roentgenogram and sputum examination by Gram and Ziehl-Neelsen staining.

Complications developing during stay in the hospital and response to therapy at the time of discharge or death were also recorded.

Results

All the patients examined were Indian nationals except two of African origin. The period of study extended from 1-11-1988 to 31-10-1994. The total number of patients hospitalised during this period was 5024; of these 3878 were tuberculous patients. Among 5024 cases, 296 were seropositive for HIV. Of the 296 seropositive cases 260 had co-existing tuberculosis

As shown in Table 1, the proportions of HIV positive cases were approximately the same in the first two years of surveillance but increased remarkably in the subsequent years and attained almost a plateau during the last 3 years.

Table 2 shows that the maximum number of HIV seropositive cases was" in the age group 21-30 years followed by those in 31-40 years, for both sexes.

Majority of the female patients (70.2%) were commercial sex workers. The percentage of seropositive commercial sex-workers in seropositive female patients has fallen in recent years (not shown in Table).

Table 3 shows that heterosexual contact with multiple partners formed the most frequent mode of transmission (96%) of HIV infection.

Among 260 seropositive tuberculosis patients, 42 had generalised lymphadenopathy, 2 had tuberculosis menengitis, one had tuberculosis of the spine and one 'had tuberculous liver abscess apart from pulmonary lesions.

Table 1. *Year wise distribution of HIV seropositivity in male and female tuberculosis patients*

Year	T.B. Patients Screened			HIV Seropositive		
	Male	Female	Total %	Male	Female %	Total %
1988-89	374	94	468	2.67	2.13	2.56
1989-90	505	202	707	2.77	2.48	2.68
1990-91	453	188	641	4.2	3.20	3.90
1991-92	527	151	678	9.68	9.27	9.59
1992-93	481	115	596	9.98	9.56	9.90
1993-94	594	194	788	10.27	9.80	10.15

Table 2. *Age and sex distribution of HIV seropositive patients*

Age Group (Year)	Male	Femals	Total
11-20	26	19	44
21-30	88	39	127
31-40	59	8	87
41-50	14	8	22
51-60	10	1	11
>60	5	0	5
Total	202	94	296

Table 3. *Distribution of HIV infected cases according to risk factors*

Risk Factor	No.	%
Heterosexual	284	95.95
Homosexual	4	1.35
Blood and Blood Products	6	2.03
Contaminated instruments	2	0.67

Of the 3,618 seronegative tuberculosis cases, 92.02% were tuberculin positive (1 TU PPD) while 52.30% of 260 seropositive tuberculous patients had tuberculin induration of at least 10 mm. In our study, sputum positivity for AFB was less in seropositive tuberculous patients (Table 4) as compared to seronegative tuberculous patients even though cavitary lesions were fairly common among both the groups.

Table 4. *Distribution of HIV seropositive and seronegative tuberculosis patients according to tuberculin, bacteriological and radiological status*

	Seropositive 260) %	Seronegative (3618) %
Tuberculin positive	52.30	92.02
A.F.B. positive	48.08	70.01
Chest X-ray Cavitary	55.38	59.09
Focal infiltrate	22.69	10.17
Fibrotic	12.31	20.43
Miliary	2.31	1.05
Pleural effusion	4.61	4.12
Hydropneumothorax	2.70	5.14

Response to treatment with "standard" chemotherapy was good in 190 out of 260 (73.07%) HIV positive tuberculous patients.

There were 53 deaths among the 260 seropositive tuberculous patients during the study period. All the deceased except two were tuberculin negative. The average case fatality rate in seropositive tuberculous patients was 20.4% as compared to 9.6% in scronegalive tuberculosis patients.

Discussion

The presence of HIV infection in tuberculous patients admitted in our hospital has increased from 2.56% in 1988 to 10.15% in 1993-1994. A similar trend has been reported in other studies among the high risk populations in India like promiscuous females[8] and patients attending STD clinics[9], as also reported by Liard et al[10].

As reported from countries in sub-Saharan Africa[11,12,13], we also found that sexual promiscuity among HIV infected patients or their sexual partners was the single most important risk factor. It is estimated that 4% of global tuberculosis is HIV related and 10% of those having dual infection (HIV & TB) develop active tuberculosis[14].

Among the HIV seropositive tuberculosis patients, 52.3% were tuberculin positive as compared to 92.02% of the seronegative patients. Similar observations, have been reported in the literature[15,16].

Only 48.08% of the seropositives showed sputum AFB positivity as compared to 70.01% of the seronegatives. More or less similar observations have been reported[17,18] by others.

The case fatality rates among seropositives and seronegatives were 24.7% and 9.6% respectively during their hospital stay. The response to "standard" chemotherapy was good in 73.07% HIV positive tuberculous patients.

References

1. Centres for Disease Control. HIV prevalence estimates and AIDS case projections for the United Slates. Report based upon a Workshop. M.M.W.R. 1990; 39(RR 16) 1-31.
2. World Health Organisation; Update on AIDS Weekly Epidemiological Record 1991; 66: 353.
3. Sundre P. ten Dam G, Kochi A. Tuberculosis; a global overview of the situation today. Bull. WHO 1992; 70: 149.
4. Jereb J.A., Kelly G.D., Dooley S.W. et al. Tuberculosis morbidity in the United States: Final Data, 1990 MMWR 1991; 40 (SS-3): 23.
5. Bloom B.R., Murray C.J.L. : Commentry on a re-emergent killer. Science 1992; 257: 1055.
6. Slutsker L., Castro K.G., Ward J.W., Dooley S.W. Epidemiology of extrapulmonary tuberculosis among persons with AIDS in the United States. Clin. Infect. Dis. 1993; 16 : 513.
7. Kaur A, Babu P.G , Jacob P.M. et al. Clinical and Laboratory profile of AIDS in India J.Acq. Immune Def. Syn. 1992; 5:883.

8. Bhave G.S. Tripathi S.P. Wagle V.D. et al. IIIV serosurveillance in promiscuous females of Bombay, India VI th International Conference on AIDS, 1989 FC 612. Abstract.

9. Jaypaul. Kundaswami et al. Sero- epidcmiological study of HIV infection in and around Madras, Vlth International Conference on AIDS 1989 FC-613, Abstract.

10. Liard R., Harf R., Korobaeff M., Schwoebel V., Neukrich F., HIV Infection and Tuberculosis: An epidemiological study from a French register. Tubercle and Lung Diseases 1994; 75 : 291.

11. Quinn J.C. Mann J.M. et al. AIDS Africa: An epidemiological paradigm - Science 1986; 234 : 955.

12. Clumeck N. Van de Perre. Ray M.A. et al. Retrospective epidemiology of IIIV infection in Nairobi population Infect. Dis; 1987 : 155, 1108.

13. Malbye, M. Njclasani E.K., Bayley ct al.Evidence for heterosexual transmission and clinical manifestations of HIV infection and related conditions in Lusaka, Zambia, Lancet 1986; 2: 1113.

14. WHO Bulletin : Tuberculosis in the present time - A global overview of the tuberculosis situation; WIIO/TB Bulletin, Geneva 1991.

15. Colebunder, R.L., Ryder K.W., Nzilambir N et al : HIV Infection in patients with tuberculosis in Kinshasa, Zaire. Am. Rev. Res. Dis. 1989; 139 : 1082.

16. Theuer P. Ilopewell PC, Elias D et al. HIV Infection in tuberculosis patients. J. Infect. Dis. 1992; 165 : 87.

17. Klein N.C., Duncanson P.P., Lenox TH et al. The impact of IIIV on the usefulness of sputum smears for the diagnosis of tuberculosis. Am. J. Public Health 1991; 81: 1326.

18. Elliott, A.M., LUO A., Tembo, G. et al. Impact of HIV on tuberculosis in Zambia: A cross sectional study. B. Med J. 1990; 301 : 412.

19. Perriens J.H., Colebunders R.L., Karahunga *C,* et al. Increased mortality and tuberculosis treatment failure among HIV seropositives compared with HIV seronegative patients with pulmonary tuberculosis treated with "standard" chemotherapy in Kinshasa Zaire. Am. Rev. Respir. Dis. 1991; 144 : 7jO.

20. Di Perri G., Cadeo G.P., Castelli F., et al Transmission of IIIV associated tuberculosis to health care workers. Infect Control Hosp. Epidemiol 1993; 14: 67.

21. Castro K.G. Dooley S.W. *Mycobacterium tuberculosis* transmission in health care settings: Is it influenced by co-infection with HIV? Infect Control Hosp. Epidemiol. 1993, 14, 64.

22. Centres for Disease Control. Nosocomial transmission of MDR tuberculosis lo health care workers and HIV infected patients in an Urban Hospital, CDC, Florida MMWR 1990, 39; 718.

Ind. J. Tub., 1995, 42, 121

SUMMARIES OF THE PAPERS PRESENTED AT THE 49TH NATIONAL CONFERENCE ON TUBERCULOSIS AND CHEST DISEASES HELD AT PONDICHERRY FROM 6TH TO 9TH OCTOBER, 1994

PERFORMANCE OF NATIONAL TUBERCULOSIS PROGRAMME, 1993: AN APPRAISAL

L. Suryanarayana, K. Vembu, R. Rajalakshmi and C. Satyanarayana

(Paper is being published in full)

A STUDY ON RESPIRATORY DISORDERS AMONG WORKERS IN A RAILWAY WORKSHOP

S.K. Gupta

(Paper will be published in full in a subsequent issue)

INDIAN NATIONAL TUBERCULOSIS PROGRAMME : REVISED NTP

Rohit Sarin and L.B.S. Dey

(Paper is being published in full)

EFFECT OF INHALED STEROID BUDESONIDE ON PULMONARY HYPERINFLATION IN CHRONIC BRONCHIAL ASTHMA

M. Das, S.N. Tripathy, N.K. Gachhayat and S. Das

In bronchial asthma much significance has recently been attached to submucosal oedema, airway inflammation and bronchial hyperreactivity (BHR).

Thirty two chronic asthmatics partially refractory to routine bronchodilators but in stable state were taken into a study to find out the prevalence of lung hyperinflation and the effect of Budesonide on it. Static and dynamic pulmonary functional parameters were measured, before starting Budesonide and after 2 weeks and 4 weeks of inhalation therapy with the steroid delivered as 2 puffs (200 meg) 6 hourly through a 750 ml spacer. Mean TLC was 127% and R.V. 201% of predicted values in the pretreatment phase, falling to 114% and 146% respectively after 4 weeks, of treatment. Dynamic values rose correspondingly after 4 weeks' treatment, PEFR going up from 62.98% to 94.34% and FEV, from 64.62% to 93.44% of predicted values.

It is concluded that considerable hyperinflation exists in chronic asthma, and that Budesonide inhalation results in significant improvement in respiratory functions.

PNEUMO-MEDIASTINUM AND PNEUMOTHORAX COMPLICATING ASTHMA IN CHILDREN - AMARGADH EXPERIENCE

A.L. Anand

Of about 1,000 asthmatic children followed over a period of time extending to 20 years, 20 developed pneumothroax and/or pneumo-mediastinum following acute exacerbations. Five had pneumo-mediastinum while pneumothorax was seen in 15, unilateral and non-recurrent in 6 and unilateral recurrent in 3, bilateral in one case, and partial in 6. Small pleural effusions were ecountered in 4 cases. These complications are suggested when dyspnoea is very severe and there is pain in chest. Pneumo-mediastinum can be diagnosed by hearing a crackling sound after or during the systolic phase of the heart beat, crackling feel at the root of the neck, and roentgenogram, where streaky translucency is seen over the cardiac opacity. Sometimes, we can see a border of air between the heart shadow and the lung. Pneumothorax is usually benign and self-limiting, but intercostal intubation may be required. Pneumo-mediastinum can be life threatening as mcdiastinal vessels may get compressed, leading to lowered cardiac output and hypoxia of vital structures. Immediate decompression by surgical intervention is necessary, especially in infants.

IMPACT OF PREVIOUS BCG VACCINATION ON ADULT PULMONARY TUBERCULOSIS

Samresh Sahu find B.N. Panda

All serving soldiers admitted to an Armed Forces Chest Disease Hospital were examined with special reference to presence or absence of BCG vaccination scar. Nearly 60% of them had BCG scar over left deltoid area, and 26% had 2 scars or more. Analysis showed a significantly higher incidence of cavitary disease and sputum positivity in vaccinated group than non-vaccinated group. However, disseminated disease was evenly distributed in vaccinated and non-vaccinated groups.

TREATMENT COMPLIANCE IN RURAL CASES OF PULMONARY TUBERCULOSIS WITH FREE DOORSTEP DRUG DELIVERY ORGANISED FROM A MOBILE CHEST CLINIC

S.K. Katiyar, R.P. Singh, Sudhir Chaudhri, K.P. Singh, R.S. Pal and H.M. Kansal

An attempt was made to assess various factors contributing to poor treatment compliance in cases of pulmonary tuberculosis in the rural population of Kanpur District. A mobile van equipped with 100 MA X-ray plant with screening facilities, pathology lab, E.C.G. machine etc. and a jeep for use by a team of doctors including consultant, medical officer, residents and interns, a social worker and technicians were deployed. A detailed survey of 91 villages was undertaken. Each household was visited and details of family were recorded in a pre-set proforma. All individuals were questioned for symptoms, screened and fully investigated. Besides the survey in the 91 villages, 58 case-finding camps were held in the same area. Tuberculosis cases among them were registered for anti-tuberculosis treatment. Drugs were given at the time of registration and, thereafter, distributed fortnighly from nearby drug collection centres. When patient did not turn

up on scheduled date to collect the drugs, three defaulter actions were taken : Action 1st : 1 to 7 days after, Action 2nd : 8 to 14 days after and Action 3rd : 15 to 21 days after. The patients were labeled as "Lost Cases" if they did not turn up even after the third defaulter action.

In all 14 treatment centres were established, each reachable from the villages, mostly within a kilometer and others within one to four kms. The treatment centres were visited by the mobile medical team regularly once a week. Thus, from July 1992 to June 1994, 104 visits were scheduled and paid to these centres. Doth traditional and short course regimens were offered using Isoniazid, Rifampicin, Streptomycin and Thioacctazone.

Five hundred tuberculosis cases were detected among the 1,35,650 screened rural population and were registered for treatment One hundred sixty two cases defaulted, once or several times. There were 9 patients who made multiple defaults. The total number of defaults was 177. However, 50 (30.91%) cases were retrieved after defaulter action. Among 112 (69.1%) not retrieved cases, defaulter action could not be completed in 70 due to inadequate or wrong address. Treatment compliance was found to be associated with sex, socio-economic status, regimen and distance of residence of patient. However, it was not associated with marital status, literacy and type of service offered. Maximum default was observed within the initial 3 months of chemotherapy (61.72%), and, 88.8% patients defaulted within 6 months of chemotherapy. Default rate was significantly higher in regimens having Thioacctazone and not containing Streptomycin. However, regimen had no impact on retrieval of defaulters. Among various cases of default, unawareness (19.7%), forgetfulncss (6.2), relief of symptoms (4.3%) and adverse reactions (6.2%) came out as important factors. Multiple defaulters (9) were mainly alcoholics and/or drug addicts. Door to door services proved to be better than the camp services.

RESULTS OF THREE YEARS' FOLLOW-UP OF PULMONARY TUBERCULOSIS CASES TREATED WITH SHORT COURSE CHEMOTHERAPY

T. Shaw and P.A. Deshmukh

Outcome of follow-up for a minimum period of three years after the successful completion of short course chemo-therapy of 500 patients of pulmonary tuberculosis, selected during the period 1989-90 from A.D.M. Hospital, Jamshedpur, is presented. All the patients were previously untreated, sputum positive, and were treated with EiHR & EHRZ regimens on daily basis, in the hospital initially during the intensive phase of chemotherapy and later through domiciliary treatment. After completion of chemotherapy, there was complete radiological clearance of lesions in 188 (37.6%) cases. Residual cavity persisted in 56 (11.2%) out of 236 initial cavitary disease.

Relapses occurred in 13 patients i.e. 2.6% during the follow-up period of 3 years after cessation of therapy and a majority of them (9 out of 13) had relapsed during the first year of follow-up. Eight patients out of 56 cavitary cases relapsed whereas only 5 out of 444 non-cavitary cases relapsed.

MANAGEMENT OF DRUG RESISTANT TUBERCULOSIS

S.N. Tripathy, N.K. Das, R.N. Mania and Jyoti Patnaik,

A retrospective study of 77 cases who were found to have multidrug acquired resistance was undertaken. Of the 77 cases, 47 were resistant to Rifampicin, 44 to Isoniazid, 31 to Streptomycin,

22 to Ethionamidc and 4 to PAS. Mullidrug resistance was : to H and R 39 (50.7%), to S, H and R 25 (32.5%) and to SHRE 16 (20.8%).

Of the 77 cases, only 24 cases agreed to be hospitalized and-get treated with suitable regimens using Kanamycin, Isoniazid, Ethionamide, Cycloserine, PAS and Ciprofloxacin. At the end of 6 months of treatment, 19 had converted to negative sputum and 4 were dead.

ARTIFICIAL PNEUMOPERITONEUM IN DRUG RESISTANT CASES OF PULMONARY TUBERCULOSIS

B. Raj, Kamal Arora, K.B. Gupta & Ashok Janmeja

Eight patients of pulmonary tuberculosis secreting resistant mycobactcria, evidenced by failure to convert after 2 years of all usual drugs, static or deteriorating X-ray picture and/or laboratory evidence, were chosen for this study. All patients were given indicated drugs but no reserve drugs were possible. In 40 of them, pneumoperitoneum (P.P.) was administered, slarting with 200 ml on day one, 800 ml on day two and maintained by weekly repeats of 1000 ml of air. The other 40 served as controls, the drug regimens being the same in both the groups.

Thirty one of the 40 patients on P.P. showed clinical improvement after 12 months compared to 19 of the 40 controls. Sputum conversion (3 smears) was obtained in 59.3% of P.P. cases against 22.1% of controls among those who completed 12 months under the study. Radiological improvement was rather slow, in 56.8% of P.P. cases and only in 16.8% of controls. Two PP cases died and 6 dropped out during study period as against 6 deaths and one drop out among controls. It is concluded that P.P. can be useful in the treatment of dru" resistant cases.

DIAGNOSTIC YIELD FROM FLEXIBLE FIBREOPTIC BRONCHOSCOPY IN SPUTUM NEGATIVE PULMONARY TUBERCULOSIS CASES

B.N. Panda, K.E. Rajan, J. Jeana, S.K. Nema, M. Murali and A.P. Patil

(Paper will be published in full in a subsequent issue)

SAFETY EVALUATION OF FIBREOPTIC FLEXIBLE BRONCHOSCOPY IN ADULTS

V.K. Arora, K. Gowrinath and V. Balu

The 167 subjects who underwent FFB under Lidocaine topical anaesthesia on elective basis were divided into two groups in a randomised study: 133 with premedication (group A) and the rest without premedication (group B). Special emphasis was given to reassuring explanations before the procedure than to drugs in group B. Overall incidence of complications was the same in both the groups . Most of the complications were minor in nature. Mean recovery time was significantly less in those without premedication (less than 30 minutes) when compared with subjects who received premedication. Young subjects (<30 years) showed anxiety reactions more often. The low incidence of complications and high degree of compliance confirm the safety of elective FFB.

TUBERCULOSIS AND HIV INFECTION

R. Jayaswal, P.N. Arora and B.N. Panda

Out of 243 HIV seropositive patients, 15 (11.9%) were diagnosed to be suffering from tuberculosis. And out of 3502 cases of tuberculosis, random HIV testing revealed HIV infection in 0.8%. Clinical and laboratory findings of all the 29 HIV infected male patients with tuberculosis, registered between January 1990 and March 1994, were evaluated.

The age group most affected with both infections (86.2%) was in the 3rd and 4th decades of life. Of them, 82.8% were married; 6.9% volunteered history of extramarital sexual exposure, and 6.9% had received blood transfusion. The mode of presentation comprised PUO in 62.1%, loss of weight in 24.1%, STD in 13,8%, lymphadcnopathy in 6.9%, cough with expectoration, haemoptysis, diarrhoea, cataract and herpes zoster in 3.5% each and 10.4% were diagnosed at the time of blood donation. Mantoux test was found to be negative in 55.1% of which 17.2% converted to Mantoux positive status (during six monthly follow up) within two years. Sputum for APR was positive in 27.6%. FNAC done in 31.0% of lymph glands revealed AFB in 13.8% and lymphnode biopsy done in 20.7% revealed tuberculous pathology in 17.8%. Radiological examination revealed parenchymatous lesions in 58.7%, pleural involvement in 24.2%, hilar and paratracheal lymphadenopathy in 17.3%. Abdominal tuberculosis was diagnosed in 3.5% and disseminated tuberculosis in 10.4%.

Therapeutic schedules followed were 2 EHRZ + 7 to 10 HR with satisfactory response. The associated diseases recorded during the period of hospitalisation were viral hepatitis, kala-azar, reactive depression, cryptococcal and cytomegalovirus infection in 3.5% each, mucocutaneous candidiasis in 6.9%, seborrhoeic dermatitis in 10.4%, herpes zoster in 13.8% and STD in 48.4% patients. A total of 6.9% cases died. Post-mortem examination revealed generalised cryptococcal infection in these.

CHANGING TREND OF HIV INFECTION AND TUBERCULOSIS IN A BOMBAY AREA SINCE 1988

K.C. Mohanty and P.M.M. Basheer

(Paper is being published in full)

THORACIC EMPYEMA - PROSPECTIVE ANALYSIS OF TREATMENT TECHNIQUES

V.K. Arora and B. Bhargav Prasad

Sixty-five subjects with thoracic empyema were treated on predetermined criteria by three different techniques.

Technique I involved repeated thoraco-centesis with systemic antibiotics, usually Penicillin and Gentamycin, subject to change after sensitivity pattern of infecting organism was available. Technique II consisted of inserting drainage tube in most dependent part of the empyema cavity along with systemic antibiotics for organisms grown on aerobic culture. The third technique was reserved for cases where thick, foul smelling pus was aspirated on diagnositc paracentesis. This involved repeated irrigation with Metronidazole, leaving Metronidazole solution in place for 6 hours, and oral Metronidazole.

In all, 14.8% of admissions for chest

conditions had empyema thoracis. The "cure" rate with technique I was 8/20 (40%), technique II 10/20 (50%) and technique III 20/25 (80%). Intercostal drainage tube placed in most dependent part with Metronidazole irrigation of pleural cavity were considered reasons for the high cure rate in technique III. Delayed treatment of respiratory infection in primary health care delivery system was found to be the major cause for this complication.

PERIPHERAL LYMPH NODE TUBERCULOSIS IN ADULTS IN NORTH KERALA

C.M. Shyam, V. Achuthan, K.P. Govindan, N.V.V. Warrier, K.S. Menon, C. Ravindran and K.M. Ramesh Chandra Babu

This study assessed the efficacy of a short course regimen of 2 EHRZ/4HR in adult patients presenting with peripheral lymph node tuberculosis. In all, 50 consecutive adult cases of peripheral lymph node tuberculosis seen at the Department of Tuberculosis and Respiratory Diseases of Medical College, Calicut from June 1992 onwards were included in the study. All patients were fully investigated and in those with a history of extra-marital sexual contact or surgery or blood transfusion, serum was examined for HIV 1 and 2 antibodies by the ELISA test. Histological confirmation was sought by the demonstration of caseating granulomatous lymphadenitis and fine needle aspiration biopsy of the largest involved node.

Only 33% of the biopsied nodes were sent for culture and 6.7% of the 15 aspirates sent for culture grew acid fast bacilli.

Transient enlargement of the nodes occurred in 5 cases (13.6%), a new node appeared while on treatment in 1 case, and 3 cases needed surgical intervention of tense abscesses. Ulceration of the overlying skin occurred in 3 cases and sinus formation in 1 case. All these healed with continuation of chemotherapy. At the end of chemotherapy, 4 cases had residual lymphnodes (more than 0.5 cm in diameter): of these 1 disappeared in the 9th month of follow up. In the other cases, the nodes remained, but none increased in size or developed constitutional symptoms.

SOCIAL AND OPERATIONAL DETERMINANTS OF PATIENT BEHAVIOUR IN LUNG TUBERCULOSIS

S.K. Juvekar, S.N. Morankar, D.B. Dalai, S.G. Rangan, S.S. Khanvilkar, A.S. Vadair, M.W. Uplekar and A. Deshpande

(Paper is being published in full)

IPRATROPIUM BROMIDE IN COPD PATIENTS UNDERGOING FIBREOPTIC BRONCHOSCOPY - COMFORT, COMPLIANCE AND COMPLICATIONS - PILOT STUDY

V.K. Arora, Uma Sankar and K. Gowrinath

Ipratropium Bromide (125 ug) was given by nebulisation premedication in 10 COPD cases submitted to fibreoptic bronchoscopy and various parameters compared with 10 others who were not given this drug. Six patients in study group were comfortable and compliant during the procedure as against 3 among controls. No major complications were observed in either group.

EFR showed very minor post-bronchoscopy changes after Ipratropium nebulisation, compared to controls, where the fall was significant, and there was an improvement in EFR after nebulisation. However, tenacious secretions after nebulisation were frequent.

EFFECTIVENESS OF BCG VACCINATION AGAINST PULMONARY AND EXTRAPULMONARY TUBERCULOSIS - A CASE CONTROL STUDY

A.G. Dehankar, B.R. Maldhure, S.P. Zodpey and S.P. Papinwar

A hospital based pair matched case-control study was carried out at Government Medical College Hospital, Nagpur on 375 cases of tuberculosis (125 cases of extra pulmonary tuberculosis, 125 bacillary con finned cases and 125 radiologically suspect cases of pulmonary tuberculosis) below 30 years of age and non tuberculous controls, matched for age, sex and socio-economic status, to evaluate the effectiveness of BCG vaccination. Each group of cases was compared with 3 separate 'groups of controls. BCG vaccination status of both the cases and their matched controls was recorded. The study suggests a beneficial role of BCG vaccination in the prevention of tuberculosis, in this population.

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I, Ashok Sachdeva, Secretary-General of the Tuberculosis Association of India, 3, Red Cross Road, New Delhi-110 001, hereby declare that the particulars given above are true to the best of my knowledge and belief.

ASHOK SACHDEVA
On behalf of the Tuberculosis Association of India.

HIV AND IMMUNE SYSTEM

A new direction to research on AIDS has recently been given by some articles published in the prestigeous science journal, *Nature.* Researchers were measuring the effectiveness of and-AIDS drugs by counting the number of HIVs (free virions, the viral infection units) and T cells circulating in the blood of AIDS patients, before and after administration of the drug being tested. The findings suggested that the HIV number may go up to 100 million or a billion everyday (representing 30% of the total virions in the body) killing a similar number of T cells, but the immune system fights back, replacing the dead T cells and killing 99% of the original HIV invaders. It also appears that the HIVs that are not destroyed are genetically different mutants. And, when the mutant strain multiplies to a sufficient number (within a month), there is reciprocal T cell response. Thus, the cycle repeats, till the defensive response starts to lag behind and becomes generally inadequate over a period lasting upto 10 years.

The new finding suggests the development of new strategies that could hold the HIV replication sufficiently in check so as not to debilitate the immune system. Originally, the perception was that the virus holds on to and destroys some T cells (CD 4-helpers) in the blood, thus, gradually reducing their number, which upsets the CD4-CD8 balance among the T cells allowing the HIV to get the upper hand, over a varying period. The new picture of the replication of HIV virions, and the turnover of CD 4 T lymphocytes, in patients undergoing treatment with various anti-viral drugs, reveals a titanic struggle waged between the virions and the immune system. Therefore, if the drugs were administered to the HIV positives during the asymptomatic phase, it could reduce the rate of replication of HIVs, and the number of surviving mutant virions, accompanied by a sufficient increase in the number of circulating CD4 T cells allowing the immune system to get the upper hand.

The above results, therefore, call for a re-assessment of die earlier conclusion made following the apparent failure of the AZT preventive treatment of HIV, in the Anglo-French Concorde Trial. It was then said (Ind. J. Tub.; 1994, 41, 271) that while symptomatic patients may have some reason to try out AZT treatment (or a "cocktail" of chemotherapeutic agents) for its supposed benefits, such a course would be irrational for the asymptometies.

FUNGUS GENE FOR PCR TEST

Based on the sequence of the 185 ribosomal RNA gene *of Aspergillus fumigatus* and *Penidllium notatum,* some Japanese scientists have successfully developed a polymerase chain reaction (PCR) test. With this method, it is possible to detect infection by most *Aspergillus* and *Penidllium* species from clinical specimens in patients with respiratory diseases. The medically important yeasts like *Candida* could also be specifically identified. This method can detect as small an amount as 1 pg of DMA and is more sensitive than sputum culture for fungus.

NEWS & NOTES

OBSERVANCE OF ANTI-TB WEEK-17TH TO 23RD FEBRUARY, 1995

The Tuberculosis Association of India observed the anti-TB week from 17th to 23rd February, 1995. It was inaugurated by Dr. A.K. Mukherjee, Director General of Health Services, Government of India and Chairman, Tuberculosis Association of India, on 20th February, 1995. During this week, the TAI distributed a large number of handbills and pamphlets on tuberculosis to the general public, and arranged to show films on TB to the general public in association with the Delhi TB Association. The main purpose of the celebration was to help families and communities understnad how TB can be prevented and cured, and bring about awareness about the problem of tuberculosis.

The Delhi Tuberculosis Association also observed the anti-TB Week from 17th to 23rd February, 1995 with similar objectives. Messages were displayed and video cassetes were played during this week. A lecture was organised in Central Jail, Tihar, New Delhi. Dr. R.P. Bhagi, the Hony. General Secretary of the Association also delivered a lecture for the benefit of Employees State Insurance (ESI) patients at ESI Diagnostic Centre.

SYMPOSIUM ON "SOCIETY'S ROLE IN CONTROL OF TUBERCULOSIS"

The Delhi Tuberculosis Association in collaboration with the Regional TB Committee, Shahdara, organised a symposium on "Society's role in control of tuberculosis" on 19th November, 1994, at Bharti Public School, Swasthya Vihar, Delhi. Shri P.S. Ghatowar, Dy. Minister, Health & Family Welfare, was the Chief Guest. About 10-12 public school children were invited to speak on the above subject, followed by a drama on awareness about tuberculosis. About 50 guests were present.

REFRESHER COURSE ON TUBERCULOSIS & CHEST DISEASES

A Refresher Course on Tuberculosis and Chest Diseases, under the auspices of the Tuberculosis Association of Andhra Pradesh and the Tuberculosis Association, Hyderabad District, was held on 28th December, 1994 at the State TB Centre, Irrumnuma, Hyderabad. The Course was inaugurated by Dr. B. Nandraj Singh, Director of Health, Andhra Pradesh and presided over by Dr. K.J.R. Murthy, Chairman of the Technical Sub-Committee and President-elect for the ensuing 22nd Andhra Pradesh TB & Chest Diseases Conference. Dr. B. Ishweriah, Joint Director of Medical & Health (TB Control) proposed a Vote of Thanks. About 28 Medical Officers attended the Course.

GUEST LECTURES

The Tuberculosis Association of Andhra Pradesh organised two guest lectures by Dr. Basil Varkey, Prof, of Medicine, Medical College Wisconsin U.S.A. on pleural effusion and Dr. Butchi Babu Paidipati, Director, Critical Care Medicine & Respiratory Therapy, Michigan, U.S.A. on Acute Respiratory Disease Syndrome on 16th December, 1994 at the Indian Medical Association Hall, Hyderabad. About 50 doctors attended the lectures.

The Krishna District Tuberculosis Association, Machilipatnam, organised a lecture by Dr. S. Bhanu Prabhakar, Assistant Prof, of Chest Diseases, Siddartha Medical College, Vijayawada on 22nd January, 1995 on "Fibreoptic Bronchoscopy in Chest Diseases". About 70 doctors from Government and general private practitioners attended.

ANNUAL MEETING OF THE INDIAN ASSOCIATION OF MEDICAL JOURNAL EDITORS

The IInd Annual Meeting of the Indian Association of Medical Journal Editors will be held on 13th August, 1995. A Workshop on Scientific Writing will also be held on 12th and 13th August, 1995. For further details, kindly contact Dr. V.K. Kapoor, Department of Surgical Gastroenterology, SGPGIMS, Lucknow-226 014.

REFRESHER COURSE ON TUBERCULOSIS

The 4th refresher course on Tuberculosis, organised by Charu Chandra Das Trust, Gorakhpur, was held on Sunday, the 29th January, 1995 in L.N. Mishra Hospital Campus, N.E. Railway, Gorakhpur-6.

HONORARY TREASURER

Shri M.P. Gupta, IA AS Retd., has been appointed Honorary Treasurer of the Tuberculosis Association of India from 5th April, 1995.

GOLDEN JUBILEE NATIONAL CONFERENCE ON TUBERCULOSIS AND CHEST DISEASES-THIRUVANANTHAPURAM (KERALA)-1995

CALL FOR ABSTRACTS

The 50th National Conference on Tuberculosis and Chest Diseases is tentatively scheduled to be held at Thiruvanantliapuram (Kerala) in the first fortnight of December, 1995. The exact venue, dates and other relevant details of the Conference will be announced shortly. The subjects selected for this Conference are: (1) Management of bronchial asthma/fiberoptic bronchoscopy, (2) National TD Control Programme including its assessment (3) Follow-up studies on patients completing short course chemotherapy (4) Management of treatment failure cases under field conditions (5) Newer diagnostic methods in tuberculosis/controversies in respiratory- diseases (6) Smoking and tuberculosis (7) Role of Indian Systems of Medicine (8) Multidrug resistance and its management (9) Improvement of host factors in tuberculosis (10) Drug interactions and (II) Serum concentration of antituberculosis drugs and multi-drug resistance.

There will be a Continuing Medical Education Programme also during the Conference days. Free communications and poster presentations would, as usual, be eligible for presentation.

Those who wish to present papers on the above subjects may kindly send three copies of an abstract of their papers, latest by 16th June, 1995 to the Secretary General, Tuberculosis Association of India, 3 Red Cross Road, New Delhi - 110 001 for consideration by the Programme Committee.

It would be appreciated if the abstracts are sent by registered post/UPC so as to ensure their safe receipt. The guidelines for the authors are: (A) For preparing abstracts: 1. The length of an abstract should not normally exceed 250 words, including the heading. 2. The abstract should be as informative as possible, comprising the (a) objectives of the study, (b) methodology of investigation and (c) main findings. In respect of some papers (b) and (c) will comprise the ideal/hypothesis discussed and the conclusion. 3. If analysis is incomplete at the time, a revised abstract should be sent, at least six weeks prior to the Conference for printing in the Programme and Summaries for distribution among delegates. 4. An abstract which is considered inadequate may not be selected by the Programme Committee for presentation of the paper at the Conference. (B) For preparing project slides/overhead transparencies: 1 Material on the slide should be relevant, minimum, in bold letters/figures and either printed or typed. 2. Material should normally cover 3/5 of the available space on the slide, with margins on all slides, 3. Blue on white background is better than black and white slides. For multicolour slides, the preferable colours are red, black and green, 4. Overhead transparencies should preferably not be handwritten. Typed or computer composed printouts could easily by photocopied, to the desired size, on to a transparent plastic sheet for use on an overhead projector.

ERRATA

In the paper entitled "Monitoring trends in HIV Positivity in Tuberculosis patients" by B.N. Murthy et al published in the October 1994 issue of the Indian Journal of Tuberculosis (pages 253-257), kindly read as follows :

Page	Column	Line	Instead of	Read
253	2	19	Normally	Normally
		20	In p	$\ln \bar{p}$
"	"	"	P	$\bar{p}$
"	"	24	q	$\frac{q}{n\bar{p}}$
"	"	28	$\frac{}{N p_i}$	
254	1		normal	Normal
		7	$\sqrt{(Z\alpha + Z_\beta)^2 \bar{q}}$	$(Z\alpha + Z_\beta)^2 q$
"		6	$b^2 \bar{p} \sum (t_I - \bar{t})^2$	$b^2 \bar{p} \sum (t_I - \bar{t})^2$
"		17	$\bar{P}$	$\bar{p}$
			$\bar{P}$	$\bar{p}$
"	"	19	prevalence	prevalences
"	"	33	$t_I - t$	$t_I - t$

ERRATA

In the paper entitled "Status of Short Course Chemotherapy under National Tuberculosis Programme" by L. Suryanarayana et al published in the October 1994 issue of the Indian Journal of Tuberculosis (pages 211-221), kindly read as follows :

Sl. No.	Details	Instead of	Read
1.	P. 211: Summary; 2nd para, 9th line	74,459	75,459
2.	P. 212: Second column,; last para, 4th line	284	248
3.	P. 214: Second column; 1st para, 7th line	Small states	other states
4.	P. 214: First column, heading	(c) small	(c) capital
5.	P. 214: Second column, heading	(b)	(D)
6.	P. 216: First column; 2nd para, 2nd line	collected consumed	collected/consumed
7.	Same as above	^ 75%	≥75%
8.	Same as above, but 6th line	A75%	≥75%
9.	P. 216 : Second column; 1st para heading	(a)	(b)
10.	P. 218: Table 3; S1.5, Haryana under vertical column 7	C	A
11.	Same as above; SI. 15; Tamilnadu under vertical column 9	B	C
	- 11	B	C
	- 12	A	C
	- 13	C	A
	- 15	B	C
12.	P. 219: Second column; 1st para, 4th line	conpare to	compared to

ERRATA

In the paper entitled "Fate, of smear posHive patients of Pulmonary Tuberculosis at an urban District Centre, five years after treatment" by P. Jagota et al published in the October 1994 issue of the Indian Journal of Tuberculosis (pages 223-232) kindly read as follows :

Sl.	No. Details	Instead of	Read
1.	P. 223: Summary: 4th para 3rd line	Favourable outcome was reached among the SR lost who took subsequent tr-eatment to the same extent as among those who did not.	Among the SR lost, those who took subsequent treatment had better overall outcome in comparison to those who did not.
2.	P. 224: Second column: und-er the heading "Material" 8th line	address-20	address-200
3.	P. 225: First column: under overall outcome; 7th line	a similar	a favourable
4.	P. 229: Table 8: Lust row; Total: Column totals (vertical)	column totals are wrongly printed from 1st column	should be read from 2nd column
5.	P. 231: First column: First para; 3rd line	but looms	but death looms.