Special Articles and Technical Information on Tuberculosis

SOCIOLOGICAL RESEARCH CONDUCTED IN THE FIELD OF TUBERCULOSIS IN INDIA

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SUMMARY

The paper presents a comprehensive analysis of the sociological research on tuberculosis conducted in India between 1956-1998. Humans suffering, health seeking behaviour, factors affecting and improving treatment compliance are the important sociological aspects of tuberculosis that have been investigated. The genesis of Directly Observed Treatment Short course (DOTS) has been traced to the long – standing efforts to try different strategies to overcome the problems associated with treatment completion for e.g., development of supervised, intermittent and short course chemotherapy regimens. Following are the salient conclusions given in this paper:

In the early 60s, the visionary approach of researchers to focus on the sociological and epidemiological aspects of tuberculosis ensured that the National Tuberculosis Programme (NTP), from its inception, was socially relevant and epidemiologically effective.

The level of knowledge of tuberculosis does not necessarily lead to patients seeking relief or taking treatment regularly. It is the physical suffering which is found to be associated with the action taking. Cough is found to be one of the most important chest symptoms of tuberculosis as it prompts patients to take action for relief.

Organizational and administrative factors such as insufficient facilities for management of tuberculosis, inadequate & irregular supply of anti TB drugs, long distance to travel for seeking relief, drug intake or drug collection act as barriers and prevent patients to be adherent for treatment. Training of health providers is essential so that they give accurate advice to patients concerning treatment and manage the tuberculosis activities. Certain other actions to improve treatment adherence include decentralization of tuberculosis services while ensuring regular supervision of programme activities.

Increased research efforts in sociological aspects of tuberculosis are needed for successful implementation of DOTS programme. There is a need to explore the feasibility of including diverse groups such as private practitioners, social & leprosy workers and dais (birth attendance), as DOTS supervisor. We can also investigate the utilization of the other agencies like STD booths and pan shops. The barriers to the expansion of DOTS programme should be removed.

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Introduction

The main objective of social sciences, which comprises of sociology, history and economics, is to study the human society. The application of social sciences to health problems is known as public health. Research in health is being done on the basis of data collected by observations made in real life-conditions or in experiments. The design of the experiment depends upon the complexity of the system under observation and on the possibility of observing one or more factors of the system under study (variables) after isolation or equalization of the other variables. Since it is not possible to isolate all variables in human beings without introducing bias, a control group is needed in which all other variables (which are not being studied) are equalized. This is being done in controlled trials - laboratory or clinical.

Sociological research is carried out mainly through interviews and observational studies. They represent a method which is closer to real life but consider only one or more aspects (sub system) of a community health problem i.e. the action taking pattern of tuberculosis (TB) patients without considering all other aspects. which play a role in determination of this trend such as economic, cultural and other factors related to the health systems\(^1\). However, the objective should be to study all or only key variables, which are involved in public health by systems analysis (operations research). National Tuberculosis Institute (NTI), Bangalore, having understood this concept, included and regarded the sociologist as an equal member of the interdisciplinary team of scientists, ensuring that the programme focused on people rather than on disease alone, making the National Tuberculosis Programme (NTP) sociologically acceptable and epidemiologically effective. A large number of studies conducted in India have shed light on various epidemiological, sociological, bacteriological and organizational aspects of the programme.

NTI has given due importance to the NTI have sociological and economic aspects of the disease in formulation of the NTP. Many break-through studies\(^2,3,4\) (including pilot studies) in understanding human suffering have been responsible for the integration of the NTP with the general health services and in the formulation of other important principles of the programme. Human behavior is a complex subject and it is important to learn about the sociological aspects of the disease. Extensive research carried out in India, over a period of time, on human behaviour related to TB, needs a wider dissemination among the TB workers globally. This paper presents a comprehensive view of the research on the sociological aspects of TB conducted in India between 1956 and 1998 under the following sub-headings: a) Studies on human suffering - level of human suffering and health-seeking behaviour, b) Treatment behaviour of patients – factors affecting and improving treatment compliance, c) Genesis of Directly Observed Therapy.

RESEARCH ON HUMAN SUFFERING & HEALTH - SEEKING BEHAVIOUR

With regards to human suffering, the inquiry into people’s awareness of TB has largely been done via two approaches. The first approach is focused on the extent of people's knowledge regarding the most important facts about TB such as the cause of the disease, the mode of spread of infection and the frequency of occurrence of the disease. The assumption in this approach is that ignorance and partial knowledge lead to prejudices, social taboos & stigma and inadequate response by patients to take action for relief\(^5,6\). The second approach to awareness centers on physical suffering caused by symptoms of TB. This hypothesis is also the basis for providing health education. On utilizing the above approach, it was observed that the health behaviour of the people was independent of their level of knowledge of the disease and, even when their level of knowledge was high, prevailing negative social attitudes were strong deterrents for people to take action for relief\(^5,6\). The second approach to awareness centers on physical suffering caused by symptoms of TB. This approach has been highlighted by a series of studies done by NTI in the early sixties while formulating the programme\(^2,3,4\) and subsequent studies by NTI and others to evolve it\(^7,8,9,10\). Research efforts in NTI have also been directed towards
standardization of the tools of investigations for sociological aspects. For instance, the interview as a tool has been found to be simple, accurate and amenable to use in real life situations provided the staff is trained and skilled\textsuperscript{11,12}.

Some of the studies carried out through the first approach based on the knowledge of the patients regarding TB, are detailed here. A study conducted by Geetakrishnan et al, 1988 to assess knowledge and attitudes towards TB in a rural area indicated that literacy did not influence knowledge about the disease. The researchers found that the symptomatics in their study were unsure of the correct duration of treatment while their general knowledge of the disease was high\textsuperscript{5}. Similarly, Purohit et al (1988) reported that both rural and urban groups were less knowledgeable about the preventive aspects of TB while diagnostic aspects were better known among the urban group when compared to the rural group\textsuperscript{6}. In partial disagreement to Geethakrishnan’s finding\textsuperscript{5}, knowledge was found to be related to socio-economic class and literacy level\textsuperscript{6}. Radha Narayan et al., (1982) further explored the differences in level of perception of suffering in a rural population and reported that illness perception and medical relief in rural communities varied among the people depending on cultural, ethnic and socio economic differences\textsuperscript{13}. Several studies have confirmed the prevalence of misconceptions about TB and varied attitudes of patients and providers\textsuperscript{14,15}. The belief that TB was caused by change of climate, unhygienic conditions, or because of smoking and consumption of alcohol were misconceptions held by symptomatics from rural, urban and metropolitan areas of Madras (Chennai) and resulted in behaviour such as denying breast milk to the baby of a TB patient\textsuperscript{5,8}. In a study concerning TB management in private practice and its implications, Uplekar et al (1996) found that there was mutual distrust between public health functionaries and private medical practitioners with regards to TB control activities. Irresponsible attitudes of the health functionaries were considered an important reason for the poor opinion patients had of the primary health centres, according to private practitioners\textsuperscript{16}.

Studies related to human suffering using the second approach, namely, by measuring physical suffering caused by the disease, have been carried out mainly by using two parameters - (a) level of awareness of symptoms and/or (b) action-taking pattern to seek relief studied at the community as well as at the out-patient levels in various health institutions\textsuperscript{17,18,19,20}. A seminal research study drawing attention to the aspect of human suffering caused by TB was conducted by Banerji et al\textsuperscript{2} at the community level in Tumkur district in Karnataka. The sociological study was designed to measure the degree of awareness of Symptoms suggestive of pulmonary TB in terms of awareness, symptoms causing worry and action taken for relief (“consciousness”, “worry” and “action”) among 2,106 persons, aged 20 years and above. Each person in the experimental and control groups was interviewed by social investigators. The findings of the study when combined with epidemiological data revealed that 95% of bacteriologically positive cases were aware of symptoms, 72% indicated “worry awareness” and 52% took action-seeking assistance from government rural health institutions. Cough was found to be the most important single symptom. The measurement of symptom suffering, taken along with the epidemiological measurements of TB in this study provided an accurate and detailed picture of the various aspects of TB\textsuperscript{12}. These results indicated that a case-finding programme based on symptoms of the disease could help in diagnosing about 40% of prevalent cases in the community. The findings also resulted in NTP taking a felt-need-oriented approach, wherein primacy is given to those epidemiologically important cases who also felt the need for services. Subsequent studies carried out in different parts of the country focused mainly on two aspects measuring the extent of human suffering and the level of action-taking. Besides attempts were made by some researchers in identifying various factors influencing action – taking\textsuperscript{3,4,5,6,8,10,17,18,19,20,21}. 
Since the above studies were community-based, a corroboration of the above findings was needed from studies conducted at the outpatient level. Such corroboration was obtained from several investigations. Baily et al (1967) confirmed the findings of Banerji et al that half of the cases of TB seek relief and 80% of them can be diagnosed by simple smear examination. Subsequently, Seetha et al found that the intensity of physical suffering influenced the behaviour of patients towards action taking at the outpatient level too. Nagpaul et al (1970) in their study in an urban TB clinic in Bangalore city reported that a majority of the out-patients were in the age group of 20-30 years of age, were wage earners and most of them were having 2-3 symptoms. Sixty-one percent of the urban and 42% of the rural patients attended the clinic within three months from the onset of their symptoms. It was found that 20% of the outpatients came of their own, 32% had previous contact with other health institutions, 31% were actually referred by other institutions and 17% were sent by the BCG workers. The data obtained further suggested that both urban and rural patients, in seeking relief, preferred general health services as their first contact and therefore, the general health institutions should be strengthened with adequate means for diagnosis and treatment of TB. In a sample survey in Madras (1990), 90% of symptomatics utilized the health facilities for relief despite having no knowledge of causation of TB but being aware of the symptoms, as services provided by health services were prompt and good. Some factors that encouraged early action included social preference and accessibility of medical services. The socioeconomic value of the patient to his or her family that prompted action, for instance, wage earners and housewives sought relief early. Similar observations have been made by other workers carrying out research in the community in different parts of the country, in rural as well as urban settings. Certain other factors that were barriers to action taking included financial reason, symptoms not being considered severe, domestic reasons or pressure of work preventing them for seeking relief from the health facilities, lack of transport, dissatisfaction with facility. In a study by Balasangameshwara et al on case-finding to determine the patients and providers delay, showed that 80% of chest symptomatics had taken prompt action while only 27% of them were offered sputum examination by the doctors. Thus a minimum delay of 20% by the patients and maximum delay of 73% by the providers was observed. The overall preference for health facility by patients was public health centers. Training of providers has also been found important for case-finding. In a study conducted by Aneja et al on the average increase in case-finding as a result of providing training to medical officers by two different methods, in four districts in Karnataka, was found to have increased case-finding from 8.5% to 17.8% and from 9.7% to 12.3% respectively.

The measurement of human suffering by other parameters like specific mortality, sick mandays, absence from work and loss of wages, hiring alternative labour, cost of treatment etc. were observed in studies carried out by Nagpaul et al in Bangalore city. The results indicated specific mortality due to TB of 17.6% compared to 2.2% of the overall crude mortality. There was a significantly higher proportion of completely bed-ridden days among the sputum positives and, the economic hardship on those with TB was about five times greater than for those sick with other illnesses. The findings of this study along with those from a two-year TB survey in the Philippines have resulted in suggestion by Nagpaul et al that specific mortality could be used as a sociological parameter to assess NTP. Other measures include utilizing suffering mandays with cough as the index symptom. The third parameter is to calculate the proportion of the prevalence cases under current treatment of NTP on a routine basis, as prevalence of bacteriologically positive cases is already known in the country. On similar lines, a re-survey conducted in Tumkur district, after a lapse of 12 to 16 years from the initial study, yielded similar results concerning symptom awareness and action taken, leading to the conclusion that despite the advantage of the
District Tuberculosis Programme (DTP) for decades, the people’s behaviour had not changed as they had not received actual and total benefits implying that there has not been any change in the prevalence of cases in the community and the programme has not reduced the problem of TB in terms of both epidemiological and sociological aspects.

Based on the results of the above studies on human suffering and various related aspects, we conclude that TB causes enough physical suffering to create awareness among 95% of the patients in the community and 52% of them seek relief. Intensity of the suffering, presence of number of symptoms, their duration and quality of services provided by the government health services lead to action-taking. An increase in action-taking at some health institutions has been observed by research workers whenever services provided by them are quick, good and free. There was no significant correlation between patients’ action-taking and their knowledge, social status, education and other demographic factors. Studies have further shown that imparting health education to increase knowledge about the disease has not changed the symptomatics into an action-taking group. Making efforts to increase people’s knowledge without improving the quality of TB services could be counter-productive. Some studies suggest that distance, economic realities and quality of services offered by health providers are the over-riding factors for concern. More studies are required to understand the elements that translate knowledge into appropriate health practices so as to improve the action taking level.

**RESEARCH ON TREATMENT BEHAVIOUR OF TB PATIENTS**

**Adherence to TB treatment:** In India, the low treatment efficiency achieved in the NTP has been attributed to default or non-compliance to treatment by patients. Poor case holding is recognized as the NTP’s weakest component. Earlier, patients alone were blamed for irregular or non-completion of treatment. The terms ‘default’ and ‘non-compliance’ have been in use to describe patients’ behaviour in drug taking, implying that they were subservient to the providers. However, our expanded knowledge of the sociological aspects of the disease has led to the recognition that non-patient factors, namely, organizational and administrative lacunae of TB services, contribute to incomplete drug consumption. Hence, the term ‘adherence’ is used instead of ‘compliance’ in here as it reflects the active role of the patient in the self management of treatment. In the following section, the problem of non-adherence in India, the factors found to affect the adherence and intervention to improve it are discussed.

Long-term treatment for any disease including TB has the inherent problem of non-adherence. A review of the extent of the problem over three decades indicates that there is a wide spectrum of treatment completion rates ranging between as low as 20% and as high as 80% both with Standard Regimen (SR) and Short Course Chemotherapy (SCC) regimens in the programme situation. Baily et al reported a completion rate of 56% with SR while Jagota et al reported 77% with SCC, provided the technical guidelines for the DTP are strictly followed. However, in the actual field situation, Chaudhuri et al reported only 33.7% of treatment completion rate with SCC regimen. Similarly, TRC, Madras, in their 18 pilot district study reported a range of 22-80% of treatment completion rates with SCC regimens.

Factors, which can influence the treatment completion rates, are related to patient, drug regimen and treatment organization. Among patient factors, misconceptions about TB, lack of knowledge about duration of treatment, loss of wages, lack of funds, being ostracized or illtreated by family members or neighbours were responsible in discontinuing treatment. Negative social attitudes of family members towards TB patients were noted by Krishnaswamy et al (1977) from selected areas in Madras. In-laws (28%) had more of a tendency to turn hostile towards the TB patient followed by brothers or sisters (16%) and husbands (14%). Mothers overwhelmingly
(97%) retained a positive and sympathetic attitude towards their ailing children. Overall, 84-91% of the patients held an optimistic attitude regarding the disease resulting in their taking early action to seek relief\(^9\). A multidimensional comparison between patients who took treatment regularly and those who were irregular in treatment and their households confirmed that there was no difference in symptom awareness between the two groups and, for all patients, the physical suffering, namely, pain and discomfort was the most important factor in completing the treatment\(^10\). Also, seeking multiple sources of treatment was a common practice among the patients\(^{10,24,34}\).

From comparison of the profiles of adherent and non-adherent groups in a study indicated that distance to travel was a significant reason to stop treatment\(^34\). Similar observations related to the case-finding process were reported by Nagpual et al\(^7\). Other organizational and administrative factors in the TB control programmes have been identified as important barriers to the continuation and completion of treatment\(^{30,34}\). Some typical examples of organizational and administrative factors include insufficient, irregular supply of drugs or lack of facilities to retrieve patients\(^{13,30}\), prescribing inappropriate regimens or appropriate regimens for incorrect duration\(^16\) by both government doctors and private practitioners, incomplete addresses of patients preventing retrieval action\(^3,34\). Patients have reported that they interrupted their treatment because “Health Visitor behaved very rudely”, “Was advised special diet that I could not afford, therefore thought it no use taking pills”\(^3,34\). The working hours of clinics, when not adjusted to the local life style of the patients, also contributed to non-adherence\(^30\).

**Research on intervention to improve adherence**

i) **Influence of motivation on patient behaviour**

Motivation is a pre-requisite for putting any TB patient on treatment. Some essential information has to be imparted for patient to abide by the instructions by the treating doctor. Regarding the influence of motivation on treatment behaviour of patients, three studies with the different results have been detailed below. The positive influence of motivation on the treatment behaviour of patients was observed by the results of a controlled study conducted by Seetha et al (1981) at Lady Willingdon State TB Centre, Bangalore (LWC)\(^37\). A comparison of treatment behaviour between the motivated group (where patients were motivated by Clinic staff) and the control group (where patients did not receive motivation) indicated that the drug collection pattern and sputum conversion among the patients in the motivated group was better than the controlled group\(^37\). An investigation by Aneja et al (1980) examined the impact of providing three different schedules of Motivation on pulmonary TB patients in terms of regularity of drug collection and pattern of non-adherence for three months at the urban TB clinic. The patients without history of previous treatment were randomly allocated to three groups based on type of motivation given. The findings of the investigation disclosed that, patients those who received simple, brief instructions only were more regular and made less number of defaults than those motivated as per the procedures of the DTP manual or those motivated with reduced contents. However, no significant differences in treatment behaviour were observed as a result of the particular type of motivation given\(^38\). Sophia et al reported the negative influence of improper motivation in drug taking. The staff at the Centre in the study placed undue emphasis on patients taking a high protein diet and tonics. As a result, the patients had belief that taking anti-TB drugs without consuming a special nutritious, high-protein diet was futile. This reduced patients adherence to treatment even when knowledge of the disease was high\(^34\).

ii) **Defaulter retrieval action**

Under the DTP, there is a provision for two defaulter retrieval actions for patients who do not report on the due date for drug collection / consumption. The first action is through a reminder letter while the second is preferably
by a *home* visit to the patients’ house*. Patients failing to collect or consume the drugs for a period of one month are referred as "LOST" under the NTP and "DEFAULTED" under the RNTCP if they absent for a period of two months. The impact of the retrieval actions were measured for the first time in the study conducted by Baily et al, wherein, it was reported that 67% of the defaulting patients were retrieved by first action and 70% of the remaining patients by taking second action in the form of home visit along with vital information about the patient being hospitalized or dead. Jagota et al also reported similar retrieval pattern for SCC regimen. In a retrospective study of domiciliary management of TB patients in Bangalore, Seetha et al found that the defaulter actions taken by the staff resulted in differences in patients’ treatment behaviour. They examined the interval between diagnosis and initiation of treatment, regularity in collection of drugs, role of motivation in drug collection and pattern of defaulter retrieval actions by health institutions. It was observed that in the entire district about 94% of patients were put on treatment within 10 days of diagnosis. A total of 2479 patients were divided into three groups (DTC, Urban PHI & Rural PHI) based on the place of treatment. The motivation was provided to all the three groups. About half of the patients lost for treatment had made only one default during second or third collections indicating loss from treatment was early. A high rate of treatment completion rate was observed among patients for whom defaulter retrieval actions were taken. Time of default was found to be crucial to treatment. An important finding emerging from the study undertaken by Jagota et al was that there was a co-relation between the time of default and the completion pattern. Those patients who defaulted for the first time during the first month of treatment ("First Timers") had higher number of "lost" cases than the rest of the patients. They showed inferior results for all the parameters of case-holding. These results indicated that First Timers could serve as predictors of default. Retrieval action of this target group through various means was expected to improve case holding upto 30% for SCC regimens. The results of another study also indicated that 30% of the defaulters could be retrieved through defaulter actions. Chauduri et al reported that in spite of observing a high retrieval rate of 60-90% of defaulting patients during an eight month SCC regimen, only 33.7% of the patients had completed treatment because there was a continuous loss of patients every month during the treatment period due to a high default rate. Pamra et al (1967) observed that an additional visit by a senior member of the staff could further retrieve 58% of those defaulters who were not retrieved even after three visits by the Health Visitors. The accurate address is the first prerequisite for the successful defaulter retrieval action. An innovative methodology to increase the retrieval rate through the address card was tried by TRC, Madras in four large towns of south India with illiteracy levels of 26-40%. The aim was to overcome the problem of inaccurate addresses. Each patient was given an address card to take home and to have his/her address noted accurately on the card by a knowledgeable, literate person of the patient’s choice. The card was then returned by the patient to the treatment Centre. In this manner, 98% of the patients returned the card and of them, 84% had accurate addresses in comparison to the 66% addresses obtained by the registration clerk. The difference between the two groups was highly significant.

**ii) Involvement of NGOs**

Certain other actions that would improve adherence have been identified and recommended through examination of alternative approaches utilized by two NGOs in rural and urban areas respectively. Rural NGOs provided services to large population in one of the backward areas of rural Gujarat and the urban NGOs in the slums of Bombay. Both the organizations could ensure reasonably high levels of treatment completion and cure rates under field conditions. While the urban NGO used pre-registration screening and motivation as tools to ensure treatment completion and cure, the rural NGO successfully employed the services of the female Anganwadi Workers of
the Integrated Child Development Scheme (ICDS). Rural NGOs also studied the benefits of monetary incentives. It was found that giving monetary incentives to voluntary workers contributed to the success obtained by the NGOs in achieving high treatment completion and cure rates. Where monetary incentives were not possible, it was recommended that open felicitation of the concerned staff and avenues for promotion could be considered as alternatives. The flexibility to make local changes and adaptations, for instance, allows the involvement of other health functionaries such as the Anganwadi Workers or those personnel working in leprosy programmes. In a similar study, it was found that Dais (traditional birth attendants) were able to provide supervised regimens effectively and can be used as an alternative method of providing DOTS in the programme.

The findings of the studies on both human suffering and treatment behaviour of patients lead to the conclusion that even with a high level of awareness, the diagnosed patients may not seek or continue treatment due to poor treatment organization, relief of symptoms, or various socio-cultural factors. Despite the NTP functioning for about 30-35 years, health seeking behaviour of chest symptomatics and TB cases have not changed significantly as shown in the studies carried out on these aspects in various parts of the country. But wherever and whenever the quality of services was good, an improvement in utilization of services by the patients had been reported.

**Post Treatment Scenario**

Pulmonary TB in a large proportion of cases leads to damage of lung tissue by way of fibrosis and cavitation. Such patients are prone to get chest symptoms even when they are cured. The physical suffering and the lurking fear of relapse compel them to visit various health institutions repeatedly. Based on the radiological findings, doctors may keep on treating them with anti-TB drugs. A study was conducted by Radha Narayan et al in the urban TB clinic to find out the proportion of smear positive patients remaining symptom free during 14 intervening years between 1961-1974. It was observed that of the 20.3% of the patients who could be followed up, 29.7% had symptoms. Jagota et al also reported that 30% of the patients after 5 years of treatment had persistent chest symptomatics. Further analysis of the same data reported elsewhere revealed that 30% of the bacteriologically negative cases had recurrent chest symptoms. Considering the above observations and the fact that in the DTP, 70% of the patients are treated on the basis of radiological evidence alone, there would be substantial proportion of over-diagnosis and unnecessary treatment to the patients. This would lead to undue strain on the organization, wastage of anti-TB drugs and resources apart from the financial and psychological burden on the patient and his family. It is, therefore, recommended that old TB cases should be given symptomatic treatment unless the sputum is positive by smear/culture examination.

**GENESIS OF DIRECTLY OBSERVED TREATMENT SHORT COURSE (DOTS)**

The concept of DOTS was developed in India as demonstrated by the studies conducted in various institutions. TB Research Centre (TRC), Chennai, first established the efficacy of domiciliary treatment and found it as effective as the sanatoria treatment. It was considered another major breakthrough after the discovery of anti TB drugs. These findings helped the NTP in offering treatment on ambulatory basis. Soon after the implementation of the NTP, Parthasarathy et al reported a loss efficacy to the extent of 20-30% of the regimens tried in control clinical trial mainly due to non-consumption of drugs. Fox voiced concern on general reliability of patients in the self administration of drugs over a long period of time. It was observed during the study that at any point of time 4% of the patients were negative for presence of INH in the urine thereby confirming non-consumption of the drugs in spite of intensive supervision at home. Research on both medical and social science was strongly recommended by him based on the above observations. In an attempt to
overcome this problem, the TRC developed a supervised intermittent regimen with high doses of 650 mg INH and injection Streptomycin with usual dosage of 1.0 gm (12 SHtw) twice weekly for one year. The efficacy of 94% was reported for the above regimen. This regimen was selected as one of the standard DTP regimen (former R$_2$). Gothi et al in 1971 tried to measure the amount of concealed drug irregularity and reported that those who collected the drugs, 30% did not consume at any given point of time. In a subsequent operational study to measure efficiency of two DTP regimens, i.e. (i) 12 TH (unsupervised daily), (ii) 12 SHtw (fully supervised intermittent), Baily et al (1974) reported that of 56% of the patients who made monthly collection of the TH Regimen, 60% became bacteriologically negative, with SHtw which required supervised drug intake, only 31.3% had consumed the drug of whom 68% became bacteriologically negative. The SHtw regimen was found to be robust and able to withstand the drug irregularity but compliance remained an unsolved issue. With the advent SCC regimen of short duration it was felt that supervised administration could be possible during intensive phase of two months. This was proved in an operational study conducted by Jagota et al (1989) to evaluate the efficiency of two SCC regimens (1 SHRZ/7 TH, 2 SHR/6 TH) under field situation (strictly adhering to the DTP guidelines) with supervised drug administration during the intensive phase. High treatment completion rates of 77.7% and 77.5% respectively were observed. In contrast to this, in another study examining the results of treatment with a SCC Regimen under actual field situations without any intervention, Chaudhuri et al (1993) reported a poor treatment completion rate of 33.2%. TRC, while reporting the findings of 30 pilot districts on SCC observed treatment completion rates ranging from 22% in Vidhisha to 80% in Pondicherry. This wide range of treatment completion pattern was being observed due to variations in treatment facilities. These findings indicated that it was possible to give drugs under proper supervision and achieve high completion rates provided the existing treatment organization for TB was strengthened and further decentralized to make it convenient for patients to take the drugs from the nearest health centres. Thus, the seeds of DOTS were sown in India. The operational factors either related to treatment organization or to the patients had created a barrier in the minds of the researchers and policy makers in accepting and recommending the DOTS as a strategy. This has resulted in believing that the concept of DOTS has come from outside. After following the introduction of DOTS in the country, NTI conducted research studies to find out other suitable DOTS workers and the feasibility of using the dais for supervised administration of SCC showed successful results.

Revised National Tuberculosis Control Programme (RNTCP), adopting the DOTS as the strategy is being implemented by the Government of India since 1993 in a phased manner. The high cure rates have been achieved so far. The quality of diagnostic services has dramatically improved and nearly 8 out of 10 patients’ put on treatment in RNTCP are being cured.

The present intensity of DOTS implementation would be sustainable when the ills of existing health system are removed. The fact that these factors have persisted as barriers over time indicates apathy towards control of TB at all levels including the political, health authorities and other concerned constituent groups. There is an urgent need to address the issues concerned and facilitate prompt remedial action. It is also essential to study various sociological issues related to effective implementation of DOTS such as exploring the possibility of including the private practitioners, grass-root level functionaries, chemist and other groups of people including paan sellers, STD/ISD booths etc., as DOTS Workers. TB control requires a long-term strategy and any intense involvement of the health staff on mass scale would not be sustainable unless the problems related to the manpower are also investigated. Hence, future sociological research should be focused on various aspects related to the health services.
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