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The

Indian Journal of Tuberculosis

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OURSELVES

With this issue the Indian Journal of Tuberculosis enters its nineteenth year of publication. In keeping with its objectives, the journal has all along, served as "the forum for the publication of Scientific articles on Tuberculosis and allied diseases" and tried to keep those interested in anti-TB work informed of the latest development in the fight against this White Plague. Original articles, case reports, reviews, abstracts and other scientific material published in the Journal are voluntarily contributed by workers in the various national and regional institutions. Besides high-lighting the research studies in the control of tuberculosis, publication of such articles has helped build up a fairly wide readership which include medical colleges, public libraries, the net work of TB Institutions and medical and para-medical personnel.

Published by the Tuberculosis Association of India, the Indian Journal of Tuberculosis has had on its Editorial Board experienced and eminent specialists. These persons have ungrudgingly devoted considerable time and energy to scrutinize the contributions and suggest improvements where necessary. We record our appreciation of the spirit of initiative and cooperation shown by numerous workers who have contributed, and still continue to con tribute articles for publication in the Journal. The Editorial Board has en deavoured to keep up the scientific standard expected of it. We are happy to feel that the Journal which has just passed the stage of adolescence, has been able to make a reasonable impact on its clientage.

The economics of publishing a technical Journal, needless to say, bristles with difficulties, and this is more so in the case of a publication devoted exclusively to a speciality. We deliberately fixed the subscription rate, as low as Rs. 11 per annum originally. In 1967 the Association had to raise the subscription rate to Rs. 15 to cope with the increasing costs. Today, the cost of production has shot up so much that it has become necessary to increase the annual subscription to Rs. 20 per annum. Simultaneouly the advertisement tariff has also had to be raised by about twenty per cent. We hope our Patrons, both Advertisers and Subscribers, will bear with us and continue their indulgence.

Tuberculosis today appears to have ceased to be only a specialists "pigeon". Social workers, administrators, law makers, non-medical technicians—all have to play their part in promoting tuberculosis control work as much as TB Specialists, general practitioners, para-medical personnel and pharmaceutical concerns. Everywhere in the world journals of this kind are supported not merely for the material they carry. Support is also given as a token of sympathy with the cause they seek to promote. In this matter we feel that our State Associations and their District branches have a special responsibility to enrol themselves as subscribers to this Journal and to popularise it among TB workers. We also appeal to the public, the TB Control Units, Research Centres, General Practitioners, Medical Colleges and all those who have interest in TB Control—to patronise the Indian Journal of Tuberculosis so as to enable it to constitute a strong and popular advocate of modern methods of tuberculosis control work.

TUBERCULOSIS CONTROL TEAMS

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Synopsis

A basic requirement for implementing India's National Tuberculosis Programme was training of a large number of medical and paramedical specialised tuberculosis workers reasonably quickly for the activities envisaged under the programme. The relatively few training resources made that task by no means easy. The concept of constituting one tuberculosis control team for each district and preparing its members for appropriate managerial functions and responsibilities—including training of general health workers to undertake tuberculosis case-finding and treatment under their supervision—has resolved this difficulty.

Introduction

A national Tuberculosis Programme (NTP) is a combination of anti-tuberculosis measures chosen on careful planning to bring about systematic and continuous reduction of the problem in the entire community. National Tuberculosis Programmes, therefore, fall within the broad field of medical care. Their immediate and distant objectives as well as the principles that should guide their planning are being discussed and evolved.[4] As it is, NTP of one country may be different to that of another on account of epidemiological and socio-economic differences. Not only epidemiological considerations and technical means and methods that are available for wider application decided the shape of India's NTP but also the social aspirations of the people and the socio-polititical decisions underlying overall national development.[1] As a result, two major problems were faced in 1961. One was to train a large number of tuberculosis workers to undertake tuberculosis case-finding, treatment of the discovered tuberculosis patients, and BCG vaccination of the susceptibles for a 500 million population. Another was that NTP was to be implemented as an integral part of the general health service. The rationale of such integration and how it could be brought about[2] are mainly appropriate and pertinent to conditions in India where the net work of general health institutions is also fairly dense. There are about 5,000 Primary Health Centres (each to cater to the curative and preventive health needs of 80-100 thousand population) and about 15,000 general hospitals, dispensaries, specialised institutions etc. It was impractical—considered even unjustified—to train specialised tuberculosis workers for each of these health institutions to bring them into the programme.

Essentially three groups were expected to help achieve the NTP objectives : specialised key programme workers whose main duty it would be to plan and implement the programme, train general health workers, ensure necessary supplies, supervise and help in programme assessment ; non specialised general health workers to undertake simplified and standardized programme activities such as case-finding, treatment, recording and reporting ; and programme supporters such as health administrators, voluntary tuberculosis workers, private medical practitioners, etc. The training needs of these three groups of workers would obviously be different.

To outline the respective training needs and job descriptions it was assumed that : (i) specialised training has to be comprehensive in order to impart the requisite skills and create favourable attitude and devotion to work which would enable key programme workers to perform efficiently under minimal or no supervision, (ii) in-service training—relatively limited in scope and duration—may be sufficient for simplified and standardized performance by general health staff working under regular periodic supervision to ensure efficiency in performance and (iii) formal training would be unnecessary for programme supporters since reorientation regarding NTP objectives, requirements, procedures and activities (through seminars or group discussions) may suffice to bring forth adequate cooperation.

District Tuberculosis Programme

The infra-structure of India's NTP is the District Tuberculosis Programme[2 3] which caters to the needs of an entire district. An average district has 1.5 million population and general health services are organised around 50 health institutions of all types, of which 20 are Primary Health Centres. Normally, in each district there is only one tuberculosis clinic with attached 50-100 tuberculosis beds.

The specialised experienced staff of the district tuberculosis clinic are constituted into a tuberculosis control team comprising a

medical officer (District Tuberculosis Officer), a tuberculosis health visitor (Treatment Organiser), an X-ray technician, a laboratory technician, a BCG team leader and a statistical assistant. This team of six key programme workers is deputed for special programme training on the understanding that after that training they would be posted as a team to a district to (i) plan and implement the programme from all the health institutions in the district in conformity with the local conditions, (ii) impart in-service training in tuberculosis case-finding, treatment, record keeping and reporting (BCG vaccination is not yet integrated fully into general health service) to the district general health staff, (iii) exercise supervision over the programme and guide the general health staff on a continuous basis and (iv) establish and maintain the district tuberculosis case-index for submitting reports to the higher levels and for programme assessment.

Under the programme, case-finding is undertaken by general health institutions amongst their daily outpatients attendance and for epidemiological reasons the stress is upon finding the infectious cases first. Those with symptoms suggestive of pulmonary tuberculosis are offered sputum examination and the sputum negatives are referred to District Tuberculosis Centre where X-ray facilities enable a chest skiagram to be taken. Treatment is free and is offered on domciliary basis from all the institutions. It is organised in a manner that patients are expected to collect drugs once a month on fixed dates. In case of default, steps are taken to retrieve the defaulters. The 0-19 years old in the population are given BCG vaccination without a pre-vaccination tuberculin test. These activities have been systematised* into a set of simple tasks such as registration, sputum collection, microscopy, arrangement of treatment cards in treatment box, etc and "manuals" have been prepared to give detailed information on the various steps of each task, and how the tasks are interlinked. In other words, the techniques and procedures underlying the programme activities are placed well within the understanding and competence of a general health worker.

* System is a conglomeration of items of activities which are so inter-linked as to constitute a single whole for achieving the given objective (s). An activity comprises one or many simple, homogenous and well defined components called *tasks* that are performed in a certain manner or order by person or persons trained to do so. Steps are the ultimate break down constituents of a task.

Training of Tuberculosis Control Teams

(a) *Place of Training*

The place of training has to be determined by the actual training needs. In India, as in many other countries, the existing training institutions for tuberculosis workers are traditional: medical officers and their supporting para-medical categories train separately in respective schools mainly in the technical (and clinical) aspects. Tuberculosis control teams actually comprise those who have had that type of specialised training previously and must now learn how to function as key programme workers. Therefore, the proper place for their training is one where programme planning, implementation, supervision and assessment are being done and can be demonstrated, and where they can have opportunity for practical field training together as a team.

Diagram I represents schematically the planning process for national tuberculosis programmes. It depicts the steps for the *ab initio* planning and how changes could be introduced into the programme on the basis of concurrent assessment. All technical initiative and guidance flow from the pilot test run area which is represented by the National Tuberculosis Institute, Bangalore (NTI) in India.

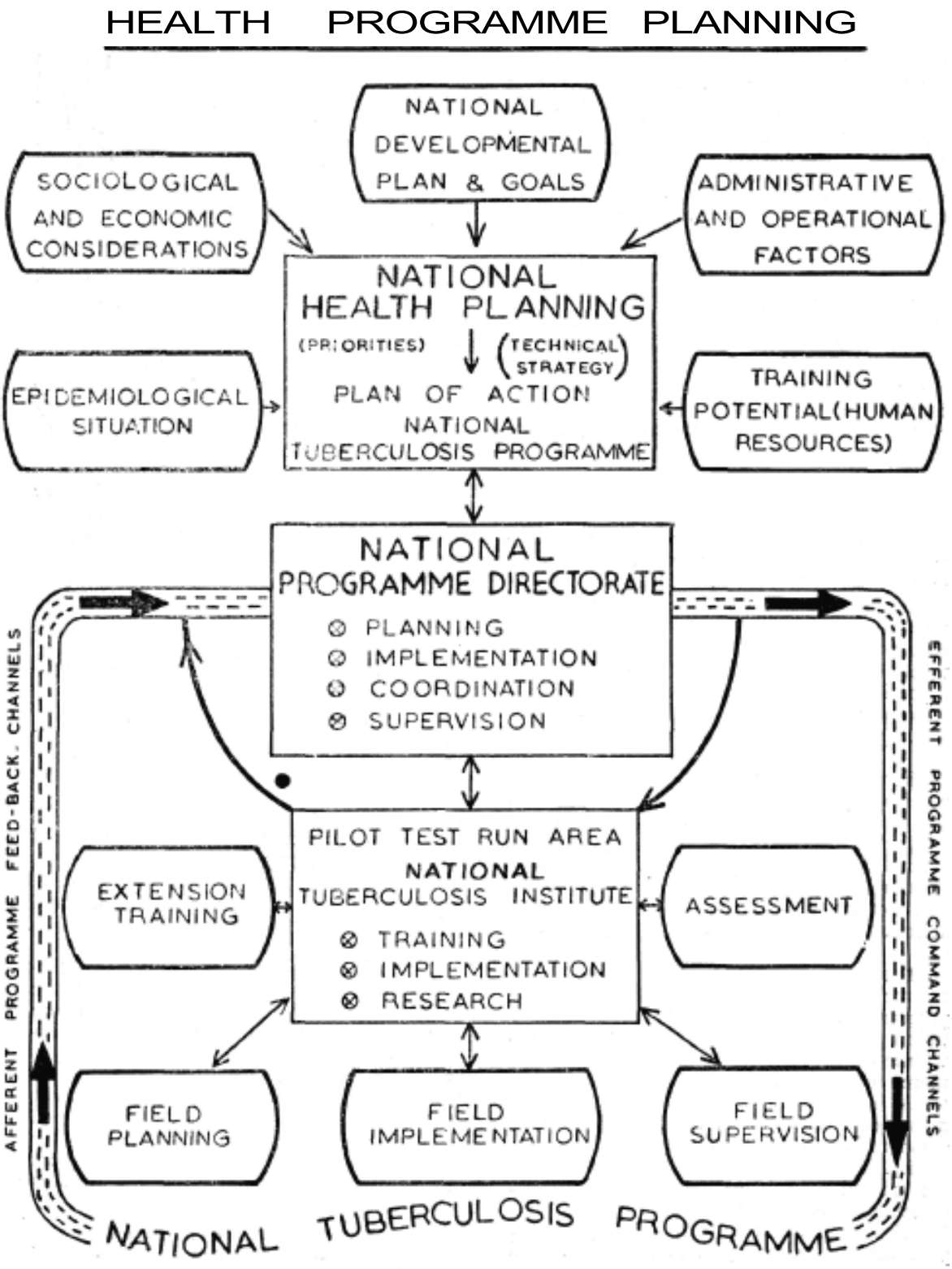
The appropriate place for managerial training of tuberculosis control teams, without the necessity of opening new training centres, is the programme pilot test run area. Besides the advantages of readily available teaching material, a well developed field practice area and good teachers, it offers possibilities for imparting a uniform training of high standard and adjusting the speed of training to the pace of development of the programme. Training of key programme workers in one institute only, even for a large country like India, has been found to be practical, but under exceptional circumstances such a training could be decentralised to the regional or state levels, and the teachers for those centres trained at the pilot test run area.

(b) Selection of Candidates

Though desirable, it is not always practical to select team members on the basis of intelligence, proficiency or aptitude tests. It must be ensured, however, that members belong to categories represented in the national career streams and possess minimum basic qualifications necessary to absorb the training.

The opportunity (see under 'Place

DIAGRAM- I


HEALTH PROGRAMME PLANNING
NATIONAL DEVELOPMENTAL PLAN & GOALS
SOCIOLOGICAL AND ECONOMIC CONSIDERATIONS
ADMINISTRATIVE AND OPERATIONAL FACTORS
NATIONAL HEALTH PLANNING
(PRIORITIES)
(TECHNICAL STRATEGY)
PLAN OF ACTION
NATIONAL TUBERCULOSIS PROGRAMME
EPIDEMIOLOGICAL SITUATION
TRAINING POTENTIAL(HUMAN RESOURCES)
NATIONAL PROGRAMME DIRECTORATE
PLANNING
IMPLEMENTATION
COORDINATION
SUPERVISION
PILOT TEST RUN AREA
NATIONAL TUBERCULOSIS INSTITUTE
TRAINING
IMPLEMENTATION
RESEARCH
EXTENSION TRAINING
ASSESSMENT
FIELD PLANNING
FIELD IMPLEMENTATION
FIELD SUPERVISION
AFFERENT PROGRAMME FEED-BACK CHANNELS
EFFERENT PROGRAMME COMMAND CHANNELS
NATIONAL TUBERCULOSIS PROGRAMME

of Training') for linking the training of tuberculosis control teams with the expansion of NTP suggests that when government accords administrative approval to the programme in a district, it simultaneously nominates a six-member team (or less if unavoidable) from the staff of the district tuberculosis clinic and deputes them to the NTI for training. The administrative stipulation should be that the team returns to the same district after training. Although NTI does not participate in the selection (beyond ensuring basic qualifications), it supports the nominations in recognition of the fact that under existing conditions in this country candidates often have to be administratively sponsored for public health oriented training courses for a variety of reasons. Better selection procedures could, therefore, wait till the "felt-need" and enthusiasm for such courses improves sufficiently among those coming out of the medical colleges and schools.

(c) *Training Needs*

Considering the role of tuberculosis control teams, it is necessary that they should know how to plan, prepare a budget, organise implementation of NTP according to the manuals, train the general health workers effectively and maintain the programme with timely and adequate supplies and regular supervision. They must also appreciate the importance of the district case-index and keep it complete, correct and up-to-date.

For the above needs, training course particularly dwells upon Epidemiology, Sociology, Public Health Administration, Statistics, operations and administration, the art of teaching, public speaking and human relationships, the maintenance of transports and equipment, supervision and pays less attention to the clinical or technical topics.

There is little attempt to train under ideal environment or to demonstrate a "model" programme. The necessity of imparting training under conditions similar to what trainees might find on return to duty is given more importance. It is thought that this would help bridge the gap that exists today in many developing countries between the comparatively artificial model conditions and reality. This might also inculcate confidence in the trained personnel that they can achieve presentable results under most situations. Conviction must come that realism and practicability are as important as idealism and perfection.

The basic training policy is to emphasise and encourage working of team members as one team* and not as separate categories. Therefore, concerted efforts are made to merge the varied educational backgrounds, experience and status consciousness of the individual team members into a common team performance (see under 'Educational method'). This is achieved by providing maximum opportunities for members to learn and for training together and not as separate categories.

(d) Educational Method

The NTI training is highly job-oriented. The length of training courses at present is three months; the period has been reduced from six months to 13 weeks through stating the objectives more clearly, streamlining and introducing better training methods. Candidates are admitted from all over the country and admission is limited to 20-25 teams in one course.

Trainees are clearly informed at the very beginning what they may expect from this course and what they would be doing after their training. They are also interviewed individually for a (subjective) pre-training assessment of their educational background, knowledge, etc.

Broadly speaking, there are three training stages or situations:

(1) During the *first few weeks* the connections between their patient-centered clinical cum technical acumen and its application to the community are taught and demonstrated. This public health orientation is considered essential. Sometimes it is liable to be painful and even generate opposition in some trainees, but this is overcome through patient reasoning and demonstration of the conditions and problems in the community.

The basic philosophy of NTP, its immediate and long term objectives and the methodology employed to achieve them are taught through didactic lectures, demonstrations and group discussions. Each category is also given separate coaching, at their own level, by teachers of those disciplines in order that they may learn doing the tasks outlined in their manuals (skills) quite thoroughly. It is common to run concurrent "tutorials", even in the regional languages of some trainees through separate individual arrangements, in

* A team is a group of workers, each having an important individual role to play in the achievement of a common goal.

order to overcome all possible doubts and fears which probably are the root cause of subsequent poor attitudes. The highly practical nature of the training and this personalised phase during which individual attention is given to different categories and persons probably helps a good deal in levelling up the the widely different educational backgrounds, training and experiences of the different members now constituting a tuberculosis control team.

(2) Next comes the *practical training situation* which occupies a major portion of the training course. Its aim is to demonstrate and teach how the programme is to be implemented and maintained.

At first all the teams gather together in a "Dummy Programme" put up at the NTI. Here the teams observe how different kinds of health institutions function for a tuberculosis programme. They perform with their own hands all the tasks as though they were running that programme. This enables members to appreciate the entire range of programme activities, get a comprehensive understanding of the task components of each activity, the steps comprising each task as well as learn all the inter-links between tasks, activities and institutions. The Appendix (Portion 'A') illustrates one out of about 25 tasks that they learn at this stage. At the same time they learn how to train general health workers under "in-service" conditions. The programme is dummy because neither there are patients to deal with nor there are real health staff to teach, but in many other respects it is realistic, even though the records and reports for students to work with do not relate to a recent date. Its main purpose is to provide a practical training situation before trainees are sent to the field to implement a programme under live conditions.

The modus operand! of dummy training is that each member is a "demonstrator" to other members ("observers") in respect of those tasks (pertaing to his own "manual") that he has learnt earlier. He demonstrates the tasks in those institutions/rooms (in the dummy programme) where those tasks normally take place. The demonstrator first explains the task in all its details and then performs as though he was teaching a general health worker. The observer then repeats what he has learnt to show that he has understood correctly. The entire training situation is supervised by NTI teachers who ensure the correctness of content and the method of teaching.

Following the dummy training the teams, accompanied by a sufficient number of NTI teachers, distribute themselves in some selected districts. At first they implement the programme—under live conditions usually with patients crowding health institutions, the staff too preoccupied in rendering service to show interest in something new, and a host of other operational and administrative problems coming in the way of implementation. After this, they redistribute themselves to supervise several programmes implemented by the others, and take corrective actions as and when required. By this stage of their training, the teams have realised that an entire district and not one specialised tuberculosis clinic is their responsibility; how general health workers are to be taught a limited programme responsibility (what they can do and what they must not do) and why the control teams must assume leadership and continuously inspire these non-specialised workers for maintaining the efficiency of the programme.

(3) In the final two weeks or so the students *consolidate* and rationalise what they have learnt. Presentation of team reports to the entire group, attending guest lectures, visits to neighbouring health institutions, group discussions, seminars, and making "public speeches" on allotted subjects to the course participants are a feature of this stage. A final assessment of their training is also made at this stage.

(e) *Assessment of Training*

Assessment of training should primarily measure changes in knowledge*, attitude* and skills* at the end of the training course. Pieferably, continuous evaluation is required — at the start, during and at the end of a training course and afterwards in the actual job en vironment—if the impact of training is to be assessed properly.

Considerable research is required on how knowledge, attitude and skill could be measured. Therefore, assessment at present has to be largely *ad hoc* and subjective. It is based upon interview of the candidate, observations made during the practical training situations

* *Knowledge* denotes the extent of overall information on a subject or task in relation to what has been taught.

Attitude is that frame of mind or mental disposition under which the imparted knowledge is accepted or rejected. It is manifested in actions or behaviour.

Skill is the dexterity with which a task is performed. It includes that part of knowledge which is necessary to perform a task correctly.

and the written tests. All these observations are pieced together and scored finally on a five-point scale.

At the end of each training course, the faculty holds a joint discussion in order to improve the curriculum and the syllabus. Even the allotment of time among the various training stages and/or subject matters to be covered are changed on a continuous basis (Appendix portion 'B')

Utilisation of trained personnel

The twin concepts of composition of tuberculosis control teams and their team training are held together by the deployment and utilisation of these teams under the NTP.

Some problems of utilisation are : (i) the speed of training (of tuberculosis control teams as well as general health workers) soon falls out of step with the actual expansion of the programme, (ii) gaps in the ranks of trained personnel occur continuously due to retirement, promotion, transfer or death and these are not filled up promptly, (iii) with the passage of time trained personnel forget, neglect or alter some important programme provisions, and (iv) trained personnel are rendered ineffective due to administrative or operational factors. All these factors may lead to lack of uniformity or lowered programme efficiency which may be attributed wrongly to faulty training. On account of the important position NTI occupies within the programme set up (Diagram I) some of these needs can be met through replacement training, re-training and refresher training.

The training system which NTI could control is shown schematically in Diagram II. On the basis of continuous assessment of training and close connection with programme assessment, it can form a reliable picture of the problems of utilisation and the changed demands for such a training, from time to time. If there is a time lag in the meeting of the newly arisen training requirements among functioning programmes, these responsibilities could be taken care of, for the time being, by the other team members to prevent damage to the Programme. It is obvious that such a stopgap arrangement should be an exception and not a normal happening.

Replacement training, which is meant to fill up gaps in the ranks of trained personnel (key programmes personnal and general health workers in each district), is the same as the initial training. It has to be arranged as soon as a vacancy in the ranks of trained persons is anticipated or soon after it occurs. Nominations for replacement training of key programme workers would not normally be as teams but as individual categories. NTI has the possibility of grouping these additional key personnel with the other regular trainees and give them the requisite team training. In the districts, tuberculosis control teams arrange replacement training as and when the need arises. *Re-training* has different scope and sphere of usefulness. It is meant for those who have already been trained. Since in-service training has its limitations and needs to be repeated over a comparatively long time, to achieve the requisite skill and attitude, re-training is mainly relevant for non-specialised tuberculosis workers. It has elements both of initial training and refresher training. The purpose of refresher training is to bring the knowledge and skills of the earlier trained key programme personnel up-to-date. This helps to introduce them to all the changes since their training and the results of new studies and enables them to maintain the efficiency of the programme on an even keel.

Since 1961, about 300 tuberculosis control teams have been trained at the NTI, Bangalore, against a minimum requirement of 338 teams (one team for each district). About 20% of the trained teams are unutilised at present and 20% have gone to provide replacements. The tempo of training had to be reduced in 1967 to fall in step with the slower expansion rate of the NTP : the number of functioning district programmes in the country is 184 now. Operational and administrative reasons are mainly responsible for this situation; limited ability to train has not posed any problem in this connection.

Discussion

One of the basic requirements for implementing a community wide tuberculosis control programme is a comparatively large number of trained personnel. The existing training institutions and facilities are often not adequate and this may stand in the way of a timely achievement of the programme objectives. For developing countries, to meet this requirement by setting up new training institutions (for each programme separately) would not appear to be advisable because the scarce resources should be put to a better use.

After giving up some traditional approaches and values, a satisfactory solution of this problem has become possible. The basis of the new approach is that even for a large

APPENDIX

A. *List of tasks to be covered during dummy training*

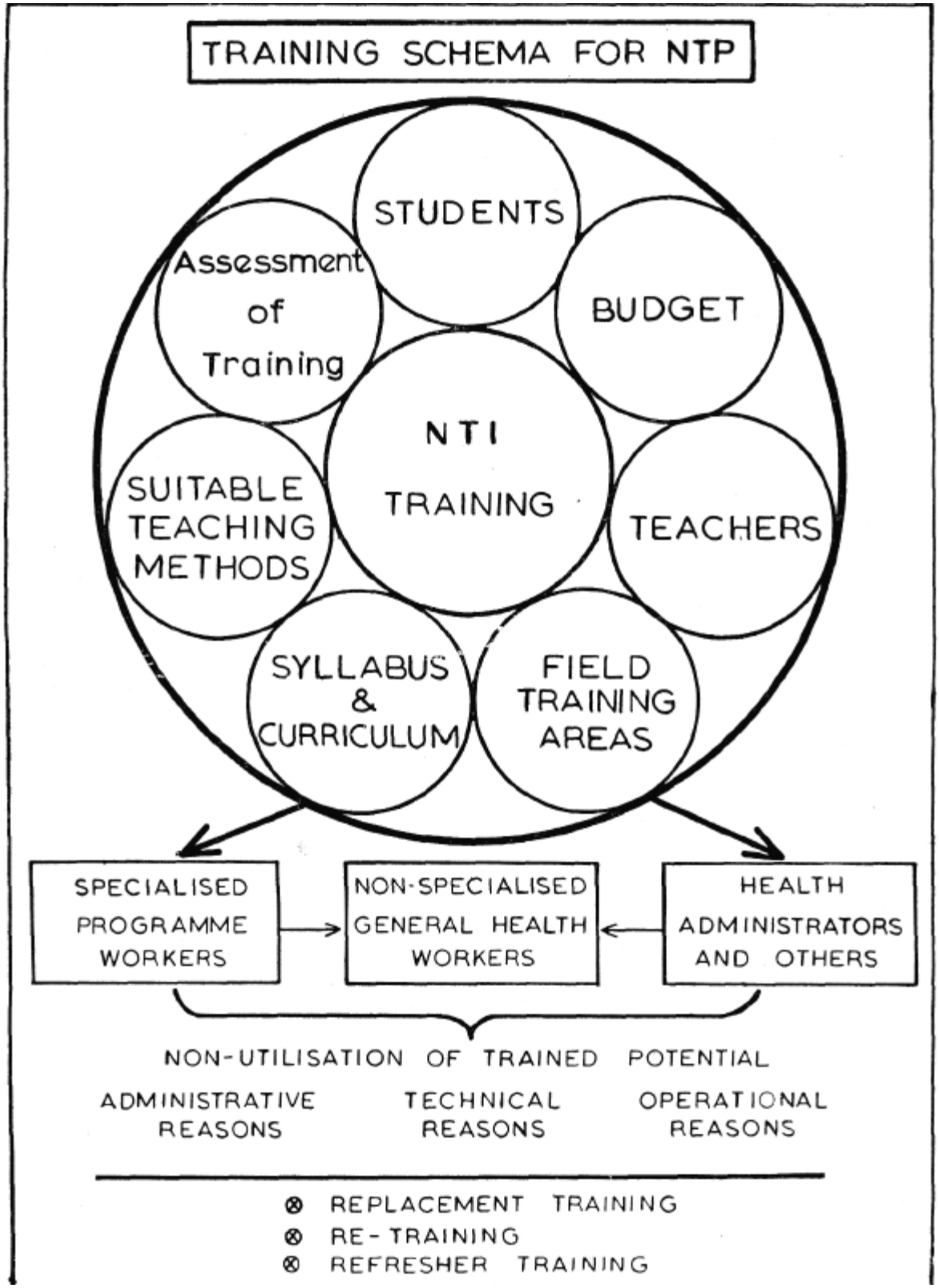
Task No,	Task Description	Task steps
1.	Registration of outpatients	1. Opening of MF/48 form for X-ray roll for that day
		2. Entry of particulars of each new outpatient, 'referrals' from PHIs and BCG team (if any)
		3. Tuberculin test (if applicable)
		4. Issue of X-ray token number to patient
		5. Issue of outpatient ticket to patient
		6. Advice to patient coming for result on third day (previous MF/48 forms)
		(a) reading of tuberculin test and BCG vaccination (if applicable)
		(b) advice to "X-ray normal"
		(c) refer X-ray abnormal for sputum examination.
2.	Routing of patients in DTC (trainees act as outpatients and start from Registration Room)	1. Registration in MF/48 form of that day
		2. Receive tuberculin test (if applicable)
		3. Get outpatient ticket (for identification)
		4. Enter X-ray room, surrender X-ray token number
		5. Have X-ray chest taken
		6. After X-ray, receive advise to return on third day for result,
----------		(list is interrupted here) ----------

B. *Allotment of training time and subjects*
(Medical Officers)

Duration of training		91 days
Holidays and closed days		20 days
Working days for training		71 days
1. Days to be spent in the field (programme implementation, supervision and visits to other institutions)		26 days (36%)
2. Days to be spent on Dummy training		6 days (9%)
3. Time spent on rest of the training (194 hours)		39 days (55%)
Lectures*	78 hours	40 per cent
Practicals	34 hours	17 per cent
Field reports and technical papers	35 hours	18 per cent
Library	18 hours	9 per cent
Seminars	15 hours	8 per cent
Group discussions	14 hours	8 per cent
	194 hours	100 per cent

* The didactic lectures are : Epidemiology (5), Bacteriology (5), Statistics (7) Sociology (3), all aspects of Tuberculosis Control (37) and General including administration and human relations (21).

D. R. NAGPAUL DIAGRAM-H



population, living in a sizable area, just one multi-disciplinary team of specialised workers is adequate, provided they are utilised more for organising the service (Programme) instead of themselves rendering it. For this they are assigned a managerial role like programme planning, its implementation from about 40 to 50 general health institutions according to standard manuals, maintenance of the programme with regular supplies and efficient supervision, etc. These managerial key programme workers constitute the tuberculosis control team.

Tuberculosis control teams could succeed only if given proper managerial training followed by adequate administrative and organisational support, when on the job. Another requirement is that programme activities should be adequately simplified and standardized to enable general health workers to render the service to the people, as part of their routine work, under regular supervision. It appears useful, therefore, to recognise three categories of tuberculosis programme workers : the specialised personnel who constitute the tuberculosis control team, the non-specialised general health workers who render the service and programme supporters who make all that possible. It would appear as if the general term "tuberculosis worker" has outlived its use.

The training needs of these three groups are different, yet it is not necessary that new training institutions be established to implement the NTP. In all countries where a planned national tuberculosis programme is being implemented, a pilot test run area is likely to be there (where NTP was tested before adoption); that institution becomes the centre of tuberculosis programme training. And, it becomes its ultimate duty to arrange the training of the general health workers and the orientation of the programme supporters. The pilot test run area staff decide if the key programme workers (control teams) trained by them should orient programme supporters or not.

The success achieved so far by the concept of tuberculosis control team suggests how the problems of training and supervision connected with other health programmes might be tackled since some accepted managerial principles for rendering medical care as well the continued training, during the entire working career, of those made responsible for providing the services are met satisfactorily. A distinction is drawn between specialised workers and general health workers, for their respective managerial and operational roles. In managerial training the stress is less upon say failures of treatment or well known disputed technical points (like the problem of drug resistance) and more upon the problems connected with the organisation of case-finding, treatment, administrative control, supervision etc., because technical knowledge alone no longer suffices and the ability to define priorities and apply knowledge as a programme is more important. If this approach is accepted for other health problems as well, then there need be only a single health control team based upon the district health office and not separate specialised control teams.

Summary

A tuberculosis control team can become the pivot of a tuberculosis programme, after proper training. Replacement training, retraining and refresher training are vital for the tuberculosis control team to plan, implement and maintain the programme. Under the programme setting changes are inevitable and the training method and content have to be kept flexible to be in consonance with the results of ongoing assessments of training and utilisation of trained personnel. It is felt that these concepts represent an advance in the implementation of national tuberculosis programmes.

REFERENCES

1. Banerji, D. : Tuberculosis : a problem of social planning in developing countries; *Medical Care,* 3 : 151, 1965.

2. Nagpaul, D.R. : District Tuberculosis Control Programme in Concept and Outline; *Ind. J. Tub.* XIV : 186, 1967.

3. Piot, M. : Outline of a District Tuberculosis Programme, *Ind. J. Tub.* IX : 151,1962.

4. World Health Organisation : *WHO Technical Report Series;* 350, 1967.

EXPERIMENTAL STUDY ON THE EFFECT OF ALLERGY IN THE PROGRESS AND TREATMENT OF TUBERCULOSIS

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Abstract

Young guineapigs weighing 225±20 gms were subcutaneously injected with 1 mg killed *M. tuberculosis* H 37 Rv in suspension and after 14 days tested with 1 Tuberculin unit of PPD. Tuberculin positive animals were grouped in 10s and different groups received different treatments.

50% of the guineapigs receiving Streptomycin and Antistine lived 394 days as against 280 days in case of guineapigs treated with Streptomycin alone. Both groups had 180% increase in body weights over the initial weights. 50% of the animals which received INH and Antistine lived 342 days and had 290% increase in body weights as against 292 days life and 207% increase in body weights with INH alone.

Tuberculous animals have grossly atrophied testes and seminal vesicles but when treated with Streptomycin the volumes increased from 0.8 ml and 0.34 ml to 3.4 ml and 0.47 ml respectively without corresponding increase in their weights. Animals treated with Antistine and Streptomycin/INH had definite increase in weights, longevity and improved histological pictures with increased cellular/fibrotic response in certain cases.

In bacterial infection, protection is afforded locally through inflammation. Hypersensitive state accelerates this inflammatory reaction which renders the tissues more susceptible to injury and destruction by bacteria. Von Pirquet (1907) had divided allergy into three classes viz. 1) Hypersensitivity, 2) Hyposensitivity and 3) No. sensitivity or Immunity. Inspite of the fact, it has not yet been shown that processes operative in ordinary infections are also operative in tubercular infections, the view that immunity in tuberculosis is dependent upon allergy has gained ground.

Heimbeck (1936) observed in persons reacting positively to tuberculin whether after natural infection or after induction by BGG vaccination that the negative group had 7-8 times higher incidence of tuberculosis than the positive group. But Plunkett et al (1940), Levine (1941) and Badger et al (1949) found no significant difference in incidence between the two groups. On the other hand Report of 1932 in respect of workers of Witwatersrand, as also Myers et al (1934) showed that there was less incidence of tuberculosis amongst tuberculin negative cases.

In recent years Kwate et al (1964) have presented data which lends some weight to the concept that tuberculin hypersensitivity is not the mediator of accelerated pulmonary (macrophagic) granulomatous response in rabbits. Shepard et al (1967) have reported that sensitivity to tuberculin had little influence on the size of the lepromin reaction that may be evoked in leprosy an allied mycobacterial infection. Kirchheimer et al (1964) have found Benadryl does not modify the solid natural resistance in guineapigs to infection with *M. lerzpe* even when this organism is introduced into macrophages of the animals. Treatment with Benadryl and pyrilamin maleate did not change the infectivity of *M. lepraemurian* in guineapig macrophages. In this context present work has been undertaken to see how far suppression or abolition of tuberculin sensitivity by antihistaminics or by other means, influences the progress and treatment in experimental tuberculosis, in guineapigs.

Materials and Methods

The experiments were started on 14.2.68 and repeated on 23.4.69. Young guineapigs weighing 225 gms±20 gms were taken. They were subcutaneously infected with 1 mg heat killed *M. tuberculosis H 37 Rv* suspended in physiological saline with the help of minimum amount of polysorbate (about 0.01%). The guineapigs were tested both before and 14 days after the infection with 1 unit of PPD and those found positive were used in these experiments. Each of the guineapigs was then injected subcutaneously with 1 mg living *M. tuberculosis H 37 Rv* in aqueous suspension. After another 14 days the guineapigs were divided in groups of 10. The different groups received separately a daily dose of 10 mg Streptomycin; 10 mg Streptomycin and 5 mg Antistine; 10 mg INH; 10 mg INH and 5 mg Antistine; 10 mg Streptomycin and 50 mg Calcium hypophosphite; 5 mg Antistine; No drugs. There was also a group of normal controls. Antistine and Calcium hypophosphite

were administered orally through a rubber tube fitted to a syringe. The tube and the syringe were filled with the drug in aqueons suspension/ solution and the desired amount pushed down the oesophagus. Animals were weighed weekly in groups. Post mortem examinations were carried out soon after natural death on each animal and different organs were weighed. A portion of each organ was fixed in Zenker's fluid and processed for histological studies. The tissue sections were stained with Haematoxylin and Eosin and also with Mallory's Anilline Blue stain for connective tissues.

Results and Discussion

It will be seen from Table 1 that the longevity of the 50% animals increased from 280 days in the case of Streptomycin treated animals to 394 days in case of Streptomycin and Antistine treated animals while in each case the animals increased by about 180% of the initial weights. This means that in Streptomycin treated animals Antistine prolongs the lives of the animals but decreased the rate of increase in body weights. Figs 1 to VII will

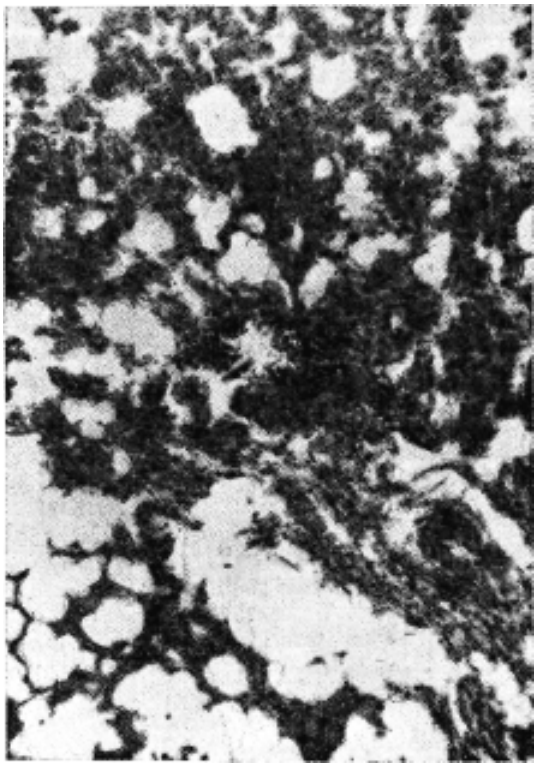

Fig. I

Tuberculous guineapig treated with Streptomycin-Lungs H.E.x140

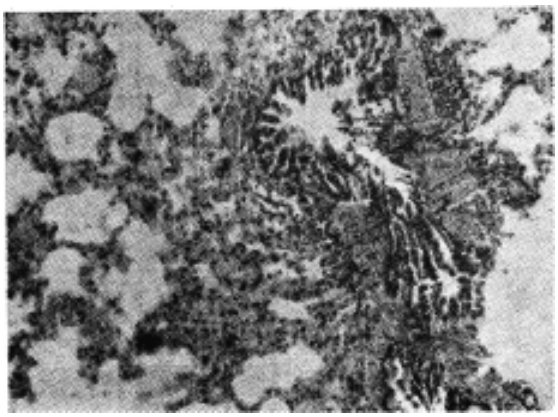

Fig. II

Tuberculous guineapig treated with Streptomycin and Antistine—Lungs H.E. X 140

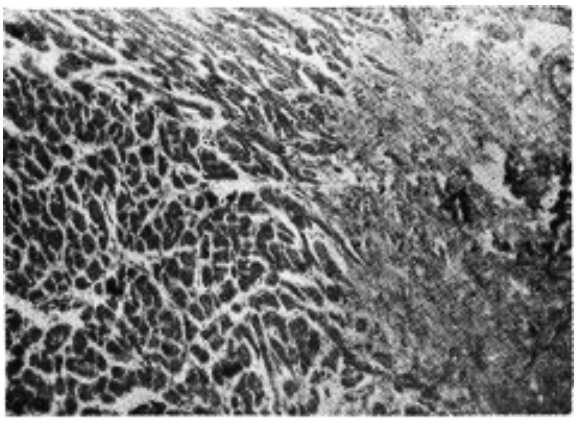

Fig. Ill

Tuberculous guineapig treated with no drug—Heart H.E x140

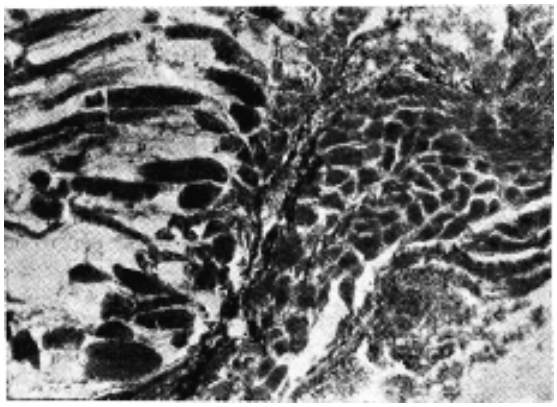

Fig. IV

Tuberculous guineapig treated with Streptomycin—Heart H.E. x 149

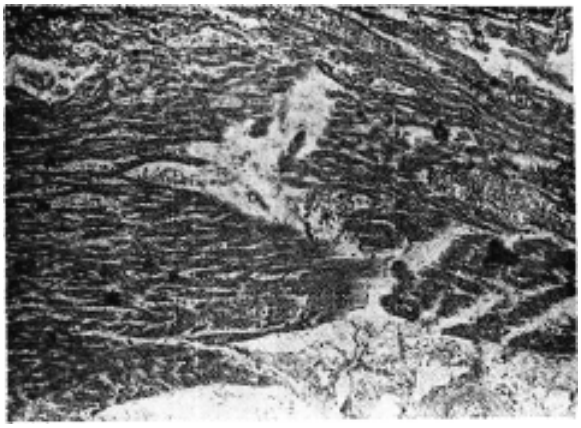

Fig. V

Tuberculous guineapig treated with Streptomycin and Antistine—Heart H.E.X140

Fig. VI

Tuberculous guineapig treated with Streptomycin—Testes H.E. x140

show that Antistine has increased the benefecial effects of Streptomycin] in lungs, heart and testes with increased presence of epithelioid cells. Infection with *M. tuberculosis H 37 Rv* brings about atrophy of the testes while treatment with Streptomycin enormously increased the size of the testes without increase in weight. In normal guineapigs weighing about 700 gms the testes measures about 2 cm, 1 cm, 0.4 cm or 0.8 ml and the seminal vesicles are 5 cm long with an average diameter of 0.3 cm or 0.34 ml. In tuberculous animals the testes atrophies to an extent that these can't be measured. But when treated with Streptomycin with or without Antistine each testes measures about 3 cm x 1.5 cm X 0.75 cm

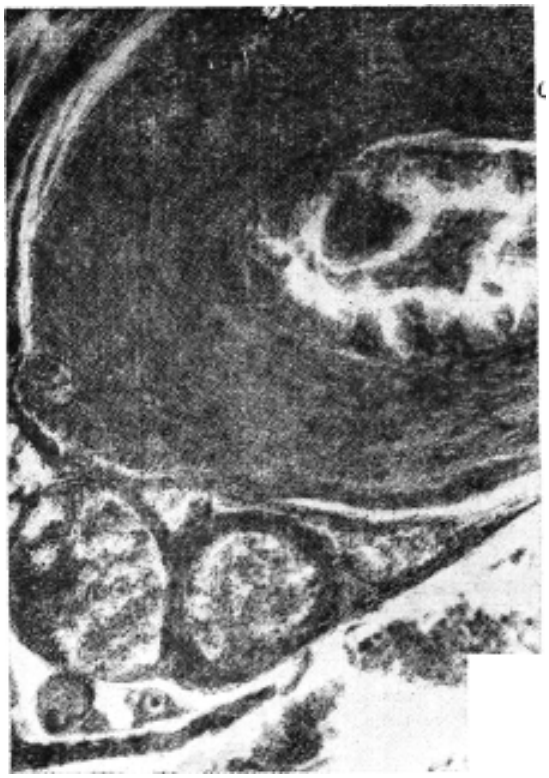

Fig. VII

Tuberculous guineapig treated with Streptomycin and Antistine—Testes H.E. x 140

or 3.4 ml and each seminal vesicle measures about 3 cmx0.5 cm diameter or 0.47 ml (figs. VIII & IX). The two testes weigh about 0.718% in normal animals and in Streptomycin treated animals 0.93% of the body weights. These findings have not been reported before and it will be interesting to investigate the process or processes involved in the change.

With INH the longevity of the 50% guineapigs infected with *M. tuberculosis* had been 292 days while with added Antistine it rose to 342 days. Percentage increase in body weight increased from 207% with INH treatment to 232% with combined INH & Antistine treatment. Figs X-XI11 will show that Antistine augmented the beneficial effects of INH in lungs and Supra-renals with increased epithelioid cells in lungs and with fibrosis in Supra-renals.

In normal animals liver weighed 3.8% of the body weight and in infected animals as also in guineapigs treated with streptomycin

Fig. VIII

Normal guineapig—Testes and seminal vesicles X 0.66

Fig. IX

Tuberculous guineapig treated with Streptomycin-Testes and Seminal vesiclesxO.66

with or without Antistine about 5% of the body weight. In animals treated with INH with or without Antistine liver weighed 4.8% of the body weight. Spleen in normal animals formed 01.26% of the body weight and in infected animals 1.13%. Treated with Streptomycin alone the spleen weighed 0.32% and with added Antistine 0.18% of the body weight. Supra-renals formed 0.083% of the body weight in normal animals and 0.16% in infected animals. Treatment with Streptomycin or INH with or without Antistine brought down the weights of the Supra-renals to the normal level of 0.08% of the body weight. Lungs formed 0.47% of the body weight in normal and 1.7 of the body weights in infected animals. Treatment with Streptomycin or INH with or without Antistine kept the weights at the normal levels. In all different organs whenever Streptomycin or INH was supplemented with Antistine the therapeutic effect was more marked and there were increased epithelioid cells and or fibrous tissue. Tuberculin reaction was lost in all the animals receiving Antistine and Calcium

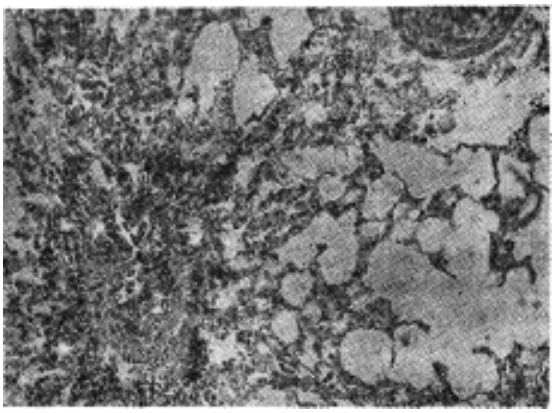

Fig. X

Tuberculous guineapig treated with INH
Lungs H.E.x 140

hypophosphite, without any loss of resistance to infection.

Chakravartty (1963) and Stuck (1963) have

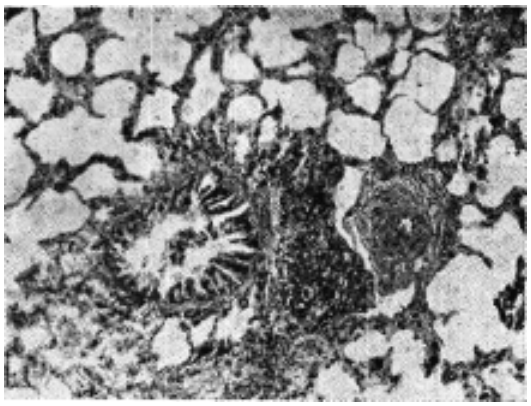

Fig. XI

Tuberculous guineapig treated with INH & Antistine—Lungs H.E.X 140

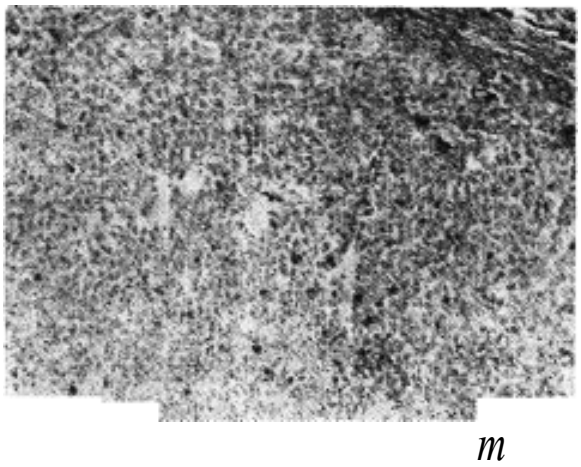

Fig. XII

Tuberculous guineapig treated with INH Suprarenal H.E.X140

reported suppression of Tuberculin reaction with Cortisone. Gray et al (1964) have reported that Detergent WR 1339 suppressed tuberculin allergy and enhanced resistance to infection with *M. tuberculosis*. Gray (1958) had earlier reported that when guineapigs after infection with *M. tuberculosis* were desensitized with Old Tuberculin there was less spreading of the disease. Kwata et al. (1964) have found that rabbits sensitized with killed BCG do not develop typical granulomatous response unless desensitized by Old Tuberculin. Almeida (1964) has also found that incidence of tuberculosis was also low among persons with reactions below 6 mm.

It will be seen from Table 1 and from the

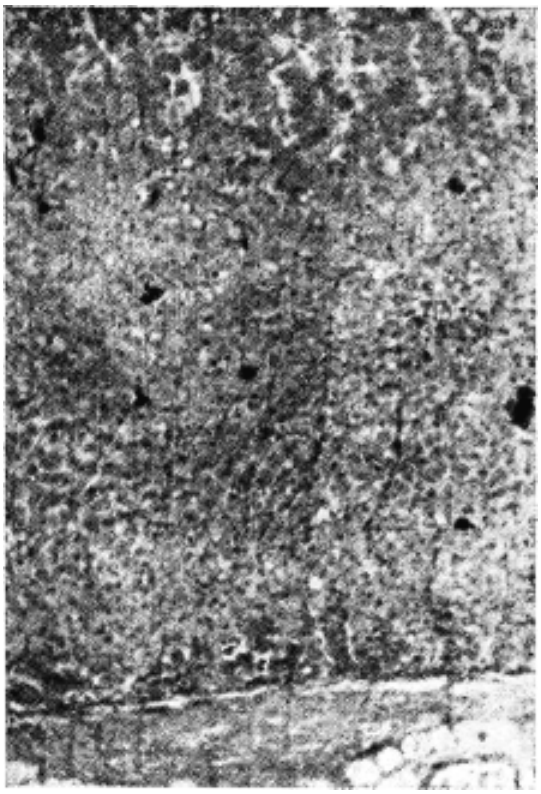

Fig. XIII

Tuberculous guineapig treated with INH & Antistine—Suprarenal H.E.X140

Figs (I-XIII) that Antistine, an anti-histaminic which suppressed the Tuberculin reaction exerted a very significant beneficial effect in the treatment of tuberculosis when used in conjunction with Streptomycin or INH, brought about by increased cellular response and/or fibrosis. Calcium hypohposphite at the 50 mg per day dose had similar reaction but to a lesser degree. Rich (1951) had submitted guineapigs to mild degree of tuberculous infection and desensitized them by repeated massive doses of Tuberculin. Guineapigs which were not desensitized were equally resistant to superinfection with *M. tuberculosis.* These experiments do not support the theory that allergy is necessary for bringing in immunity in tuberculous infection. On the other hand antihistaminics augment the therapeutic actions of Streptomycin and INH presumably by suppressing the allergy which brings in tissue destruction in its wake.

TABLE 1

Effect of antihistamics in tuberculosis

Group	Initial weight	Final weight	Percentage increase	Liver	Spleen	Kidneys	Supra renals	Heart	Lung	Testes	L D 50
Normal	218.6	856.3	291	32.6 (3.8%)	1.05 (0.12%)	6.79 (0.79%)	0.714 (0.083%)	3.63 (0.42%)	3.99 (0.46)	6.15 (0.718%)	Not determined
No drug	237	201	—36.3	10.02 (4.99%)	2.26 (1.128%)	3.01 (1.5%)	0.315 (0.156%)	1.55 (0.77%)	3.31 (1.65)	0.72 (0.353%)	35 days
Antistine	238	211	—27.4	10.88 (5.16%)	2.44 (1.16%)	3.19 (1.51%)	0.37 (0.18%)	1.53 (0.73%)	3.69 (1.75%)	1.1 (0.52%)	49 days
Streptomycin	242	700	188.6	35.15 (5.02%)	2.29 (0.33%)	6.46 (0.92%)	0.627 (0.09%)	3 (0.43%)	3.52 (0.5%)	6.47 (0.92%)	280 days
Strepto & Antistine	222	618	171.4	33.4 (5.4%)	1.11 (0.18%)	6.27 (1.01%)	0.651 (0.11%)	3.43 (0.56%)	3.33 (0.54%)	5.76 (0.93)	394 days
Strepto & Cahypo	235	632	169	27.6 (4.37%)	1.01 (0.16%)	5.56 (0.85%)	0.53 (0.08%)	2.65 (0.42%)	7.2 (1.14%)	5.85 (0.93%)	375 days
INH	237	730	207	36 (4.9%)	1.19 (0.16%)	5.94 (0.81%)	0.65 (0.09%)	2.97 (0.4%)	2.74 (0.38%)	4.94 (0.6%)	292 days
INH & Antistine	204	679	232	32.7 (4.82%)	1.14 (0.17%)	4.37 (0.64%)	0.51 (0.074%)	2.97 (0.44)	2.81 (0.41%)	4 (0.6%)	342 days

N.B. All the figures are in grammes. Figures in brackets denote percentage to the final body weight.

REFERENCES

1. Almeida, P. ; N. Das.; J.M. Almeida ; and N. Das (1964). Relation between degree of tuberculin sensitivity and prevalence of tuberculosis. *Bull. World Hlth. Org,* Geneva, 50, Pp 519, 28.
2. Badger, T.L. and L.F. Ayvizian (1949). Tuberculosis in nurses : Clinical observation on its pathogenesis as seen in a 15 year follow up of 745 nurses. *Amer. Rev. Tuberc.* 60, Pp 305-331.
3. Bloch, R. ; Vennegland, K. and C. Gurney (1951). The effect of cortisone on tuberculosis in guineapigs, *J. Lab.* and *Clin Med.* 38, P 133.
4. Chakravartty, S.C. (1963). The role of corticosteriods in the treatment of tuber culosis, *Acta. Tuberc. Scand.* 43, Pp 147-58.
5. Gray, D.F. and R. Poole (1964). The specificity of cellular immunity, *J. Hygiene,* 62, Pp 353-62.
6. Gray, D.F. (1958), Immunity, naturalanergy and artificial allergy demonstration in experimental tuberculosis, *Amer. Rev. Tuberc.* 78, Pp 235-50.
7. Heimbeck, J. (1928) Immunity to tuberculosis, *Arch. Internal. Med.* 41, Pp 336-42.
8. Kwata, H; N. Myrvik and E. Leake (1964). Dissociation of tuberculin hypersensitivity as mediator for an accelerated pulmonary granulomatous response in rabbits, *J. Immuno* 93, Pp 433-38.
9. Levine, M.I. (1941). Exposure of tuberculin sensitive children to exogenous infective human tubercle bacilli, *Amer. J. Dis. Child,* Pp 61, 1238-45.
10. Myers, J.A. ; H.S. Diehl and H.D. Leese (1934), *J. Amer. Med. Asson.* 102, P 2086 from Topley and Wilsons Principles of Bacteriology and Immunity Vol. II, 1964 by C.S. Wilson and A.A. Miles ; Edward Arnold (Publishers) Ltd. London.
11. Plunkett, R.E. ; G.E. Weber ; W. Seigal and R.R. Donk. Development of tuberculosis in controlled environment, *Amer. J. Publi. Health,* 50, Pp 229-236.
12. Pirquet, C, Voh (1907) Klinische Studium uber Vakzination and Vakzinale Allergie Deutike, Leipzig.
13. Shepard, C.C. and E.H. Saitz (1967) Tuberculin Reactivity in adults not exposed to leprosy, *J. Immunol,* 99, Pp 637-42.
14. Shick, Bela and J. Dolgin, (1963) The influence of Prednisone on the Mantoux reaction in children, *Paediatrics,* Springfield, III, 31, Pp 850-59.
15. Rich, W.R. (1951). The pathogenesis of tuberculosis. Publishers Charles C Thomas, Springfield, illonois, USA.
16. Kirchheimer, W. (1964) Resistance of antihistamine treated guineapigs against infection with *Mycobacterium leprae* and *Mycobacterium lepraemuriam, Int, J. Lep* 32, Pp 1-8.

BACTERIUM ANITRATUM INFECTION OF THE RESPIRATORY TRACT

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Bacterium anitratum has been found to be associated with diverse clinical conditions. The actual pathogenic role played by this micro-organism is not very clear. It is a gram negative bacillus of extremely plemorphic character found in diplococoid, rod or filamentous forms. It may be mistaken for gonococcus and other members of the pathogenic neisseria which it resembles morphologically. The species belongs to the tribe Mimeac which was originally described and classified by DeBord. The name Mimeac was given because it mimicked gonococcus. Shaub and Hauber described an organism of similar nature and named it Bacterium anitratum because it failed to reduce nitrate to nitrite. It was Ewing who showed that Herellea species of the tribe Mimeae was identical with Bacterium anitratum. It has also been named as BSW (Stuart et al), Diplococcus mucosus (Von lingelsheim) Moraxella (Pichaud), Acinobactor anitratum (Brisou & Prevot) Achromobactor anitratum (Gardner et al).

Bacterium anitratum has been reported to be associated with or cause of 1. Meningitis (DeBord, Torregrose and Ortiz, Olaffson), 2. Fulminating septicaemia (Fauster and Hood, Daly, Wasserman), 3. Penicillin resistant urethritis (Svihus), 4. Conjunctivitis (Moor and Burns), 5. Abcess (Waage), 6. Endocarditis, (Pike), 7. Cardiovascular lesions (King Copeland and Berton), 8. Acute and Chronic conditions of eye ball, (Burns & Florey), 9. Post burn infection (Graber), 10. Vaginitis (DeBord), 11. Gastroenteritis (Formol) and 12. Post-intravenous infection (Daly).

The role of this organism in respiratory diseases is obscure. Only a few cases have been documented so far. The present study is an attempt in that direction.

Materials and Methods

The present report is based on the study of cases whose sputum culture showed growth of Bacterium anitratum.

The sputum of the patients admitted in the Hospital of this Institute with respiratory complaints were routinely examined for Bacterium anitratum also. Sputum collected in a sterile container was inoculated on blood agar and MacConkey's agar plate and incubated at 37°C. Suspected colonies were further identified by smear and biochemical reactions. The organism was labelled as Bacterium anitratum if the following criteria were fulfilled:— Luxuriant growth on MaConkey's agar; gram negative coccobacilli in smear; nonmotile; fermenting glucose, 10% lactose and Xylose with the production of acid and no gas, not fermenting 1% lactose sucrose and manitol, Methyl red test, voges Proskauer test, Indole production and oxidase test negative; citrate was utilised and nitrate was not reduced to nitrite. Strains were tested for sensitivity against penicillin, streptomycin, Chloramphenicol and tetracycline by the disc technique of Bauer et al. The clinical diagnosis in these cases was established with the help of history, skiagram of chest, bronchoscopic examination, bronchography, biopsies of the tissues and other relevant laboratory investigations.

Results

Bacterium anitratum was isolated from 27 patients suffering from various bronchopulmonary diseases. Age and Sex distributions of the patients are shown in Table I. Age ranged from 9 years to 65 years, maximum number of cases were found in the age group 20—30 years (7 cases). There were 22 males and 5 females.

TABLE I

Age and sex distributions

Age in Years	Male	Female	Total
Less than 10	1	Nil	1
10—20	4	2	6
20—30	5	2	7
30—40	5	1	6
40—50	1	Nil	1
50—60	2	Nil	2
60—65	4	Nil	4
	22	5	27

Duration of the symptoms at the time of

isolation of the organism varied from 4 days to 12 years. In the majority of the cases the duration was within one year (19 cases) and it was of recent onset (up to 3 months)in 10 cases. (Table II)

TABLE II

Duration of illness

Duration in months	No. of cases
Less than 1 month	3
1 - 2	5
2—3	2
3— 6	3
6— 9	2
9-12	4
12—18	Nil
18—24	1
24-30	3
30-36	2
'Above 36	2
	27

The symptomatology is enumerated below. The disease was of acute in 6 cases, and insidious in the rest.

Symptoms	*Number of patients*
Fever	12
Cough	22
Expectoration	20
Hemoptysis	10
Pain chest	5
Dyspnoea	2
Digital clubbing	5
Jaundice	2
Anaemia	2

One case of neurodermatitis and one case of Lymphoma had no respiratory symptoms, but had radiological finding in the chest. Liver was palpable in 3 cases and spleen in one. One patient was epileptic. Leukocytosis was present in 6 cases.

Radiological Localisation:- is shown in Table III

TABLE III

Radiological localisation

Right		Left		Bilateral
Upper lobe	5	Upper lobe	1	8
Upper lobe & middle lobe	1	Lower lobe lingula & lower lobe	3 1	
Lower lobe	7			
Upper & middle & lower lobe	1			
	14		5	8

Clinical Diagnosis

The Diagnosis covered a wide range consisting of bronchiectasis, lung abcess, pneumonia, intrathoracic malignant conditions, suppurative pneumonia bronchogenic cyst, chronic bronchitis and pulmonary tuberculosis. (Table IV) Most of the cases belonged to the bronchopulmonary suppurative disorders. Three patients had diabetes mellitus in addition to pulmonary disease.

TABLE IV

Clinical diagnosis

Diagnosis	No. of cases
Bronchiaectasis	11
Pneumonia and Pneuomonitis	5
Intrathoracic Malignant disease	4
Lung abcess	3
Bronchogenic cyst	1
Chronic bronchitis	1
Aplastic anaemia with pulmonary tuberculosis	1
Suppurative pneumonia	1

Bacteriological Findings

A total of 94 samples of sputum obtained from these patients were put on culture, out of which 47 samples showed growth of Bacterium anitratum. In most of the cases more than one sample was cultured. Samples from 17 patients did not show growth of any

other microorganism except Bacterium anitratum. In 9 patients repeated isolations were obtained ranging from two to nine. The Table V and VI show the distribution of the

TABLE V

Nature of growth in culture medium

	Nature of growth	No. of samples
(a)	Pure growth of bacterium anitratum	41
(b)	Mixed growth (bacterium anitratum & other Pyogenic organism)	6
(c)	Pyogenic organisms only	23
(d)	Normal throat flora	24
		94

TABLE VI

Frequency of growth patientwise

	Nature of growth No.	of patients
(a)	Pure growth, single isolation	17
(b)	Pure growth, multiple isolations	7
(c)	Pure and mixed growth in multiple isolations	1
(d)	Mixed growth only, single isolation	1
(e)	Mixed growth only multiple isolations	1
	Total	27

growth. In addition, skin swabs from 11 patients were also cultured, out of which two were positive for Bacterium anitratum. Pure growth of Bacterium anitratum was repeatedly obtained from 7 patients indicating the definite pathogenic role of the organism. In 5 of these cases who had prexisting lung disease, the organism possibly acted as a superinfecting agent but in 2 it acted as primary pathogen. The particulars of these 7 cases are shown in Table X.

Invitro Bactrial sensitivity test

The sensitivity pattern was not uniform. Variations were observed not only between the strains isolated from different patients, but also between strains isolated from the same patient on different occasions. Out of 9 patients from whom Bacterium anitratum was isolated on more than one occasion, only 3 yielded strains of uniform sensitivity pattern.

Out of the total of 47 strains 24 were sensitive to streptomycin, 17 to chloramphenicol, 11 to tetracycline, and 6 to penicillin (Table VII).

TABLE VII

Invitro sensitivity pattern of the 47 cases of bacterium anitratum

Drugs	Sensitive		Resistant	
	No.	(%)	No.	(%)
Penicillin	61	13	41	87
Streptomycin	24	51	23	41
Chloramphenicol	17	36	30	64
Tetracyclin	11	23	36	77

Response to treatment

Fourteen cases responded to chemotherapy which consisted of penicillin, streptomycin, chloromycetin and tetracycline either singly or in combinations. (Table VIII) One patient responded to sulfadimidine and erythromycin given simultaneously. All the 5 cases of pneumonia and 2 of the lung abscess cases completely recovered while the other improved. The drug response was not in strict accordance with the drug sensitivity result.

TABLE VIII

Response to treatment

Result	No. of cases
Complete recovery	7
Improvement	7
Uncharged	12
Expired	1 (Cardiac arrest following mycardial infarction)

Some of the cases deserve special mention :

Case No. 12. 31 year male. The onset of the illness was acute with high fever, cough and expectoration. Serial radiological pictures were suggestive of spreading suppurative pneumonia. Bacterium anitratum was grown 9 times in pure culture from different samples of sputum. The strains varied in drug sensitivity pattern. There was no response with streptomycin, penicillin and chloromycetin, though organism were found sensitive to streptomycin and chloromycetin in most of the cultures. He showed marked response to combination of sulfadimidine and erythromycin. Antibodies against Bacterium anitratum in significant titre was found in the serum at the peak of the disease which disappeared later on. He had not been suffering from any pre-existing debilating condition or any chronic respiratory disease. Skin swab culture was negative Bacterium anitratum was primarily responsible in this case for the suppurative pneumonia in an otherwise healthy person.

Case No. 2. A case of Bronchiectasis of long duration. Bacterium anitratum was isolated 3 times in pure culture at long intervals. Skin swab culture was negative. He was also suffering from leprosy.

Case No. 18. Bronchogenic carcinoma, first isolation of the organism was from sputum in mixed growth, second isolation was from pus in pleural cavity in pure growth 4 months after. Shin swab culture was negative.

Case No. 24. A case of lung abscess. There was 4 isolation in pure growth within a period of 18 days. Responded to Achromycin. Skin Swab culture was positive. He was in prefect health before the illness. Bacterium anitratum was the etiological agent for the lung abscess. Source of infection was possibly endogenous from the skin of the patient.

Discussion

Bacterium anitratum has been incriminated as an etiological agent in various diseases. The literature on the subject has been reviewed by Daly et al, Reynolds et al, Robinson et al, and Olaffson. It has been considered as an organism of low virulence. If the host resistance becomes low due to any disease or drug therapy, this opportunist organism may cause severe and some time fatal disease. However, in some cases, like meningitis, the organism has been reported to produce disease in healthy persons.

The natural habitat of the organism is not definitely known. An unbiquitious existence has been suggested by Reynold and Cluff. It has been isolated as harmless commensal from various human sources. Taplin found 35% of 225 persons examined as carriers of the organism in the skin. Venkatramani et al isolated it from the skin of 13 persons out of 105 examined. In the present series the organism was isolated from the skin of 2 patients out of 11 patients examined. The organism has also been isolated from gastro intestinal tract (Stuart), Naso pharynx (Donald); genital tract (DeBord) and conjunctiva (DeBord). It has been found to be present also in the environment.

Portals of entry into body may be through inhalation, ingestion, or body surface. A Nosocomial mode of infection in hospital environment has been suggested (Reinarz et al). Male patients predominated over females in this study and this has also been observed by others.

The role of this bacteria in respiratory disease is obscure. Only a few cases have been reported so far, most of which occurred in persons of low host resistance resulting from varions debilating conditions. Gardner et al reported a case of fatal bronchopneumonia with septicaemia due to Achromobactor anitratum in a case of chronic bronchitis with polycystic kidney. It showed convincingly for the first time the highly pathogenic potentiality of the organism. Glick also reported a case of lobar pneumonia with septicaemia. Reynold reported 8 cases consisting of bronchitis, bronchiectasis and pneumonia. Robinson et al also reported 17 cases of bronchopneumonia, lung abscess, pneumonia and other bronchopulmonary diseases from which Bacterium anitratum was isolated. Torregrose mentions of a case of lobar pneumonia with positive blood culture. Madhavan isolated Mimeae from two cases of bronchitis. Shaub and Hauber, Ferguson and Roberts Simson and Crossley have also linked this organism with pulmonary infections.

As the Bacteria is ubiquitious it is difficult to evaluate the actual role played by this organism in pulmonary infections. Positive sputum culture indicate the following possibilities : 1. Contamination from the environment 2. Presence of the organism in pulmonary secretion either as a harmless commensal or as a pathogen. Garrison has established that this bacteria is rarely encountered in sputum as a member of normal resident flora and only in small transcient number. He considers those patients whose sputum reveal growth of Herellea in pure culture on more than one occasion as examples of pulmonary

Herelleosis. In our series the organism seems to be pathogenic in atleast 7 cases where repeated growths in pure culture were obtained from multiple samples of sputum. Additional proof was furnished in Case No. 12 in which antibodies were demonstrated in the serum at the peak of the disease. In one of cases of this group (No. 24) infection might be endogenous as the skin swab culture was positive. In 6 cases the Isolation was not of clinical significance. In rest of the 14 cases the role played by the bacteria is not clear.

In vitro drug sensitivity patterns have been reported by Moore, Brook, Waage, Gardner, Green, Torregosa & Oritz, Ashely & Kwantes, Lund, Daly. The sensitivity patterns have been found variable. Robinson et al after review of the work of others summarise that Bacterium anitratum is sensitive to Neomycin, Colistin and Tetracyclin in almost all the cases, frequently sensitive to streptomycin, occasionally sensitive to sulfathiasole, chloramphenicol and erythromycin and completely resistant to bacitracin and penicillin. Comparable patterns were observed in his own cases except that tetracycline was not as effective as reported by others. Sensitivity pattern of the individual strains isolated from the same patient did not change during the therapy. Om Prakash and Balkrishnan found that the strains were on the whole sensitive to erythromycin, streptomycin, neomycin and polimixin B, 15 out of 17 strains were also sensitive to sulfadiazine. Results with other drugs varied with the strains, only one strain was sensitive to chlorotetracycline. In the present series 13% of the strains were penicillin sensitive. This figure is somewhat higher compared with other (Table IX).

TABLE IX

Invitro sensitivity test, comparative figures, percent of sensitivity

	Robinson et al	Other workers (summerised by Robinson)	Present study
Penicillin	0%	0%	13%
Streptomycin	21%	59%	51%
Chloramphenical	15%	10%	30%
Tetracycline	47%	Nil	36%

In this study variable sensitivity pattern was observed even amongest the strains isolated from the same patient on different occasions. Burns also observed this phenomenon in a case of conjunctivitis. The variation was possibly not due to the emergence of drug resistant bacilli, but due to the presence of different variants of the same organism with dissimilar sensitivity pattern. This could be actually demonstrated in one of the cases. This phenomenon can also partly explain the disparity between drug sensitivity result and therapeutic response.

Bacterium anitratum has been found to be pathogenic in this study. The diagnosis of broncho pulmonary infections caused by this organism depends upon the awareness of the physician and bacteriologist. The organism may be ignored as a contaminant or a harmless commensal or may be mistaken for Neisseria and Alkalegens faecalis. Repeated culture of sputum or bronchial aspirates and repeated sensitivity test performed will give a clear picture. Failure to identify the organism and assign their proper role will lead to a therapeutic error.

Summary

47 strains of Bacterium anitratum were isolated from the sputum of 27 patients suffering from various bronchopulmonary disorders. Multiple isolations in pure form were obtained in 7 cases. Significance of the isolations has been discussed. The drug sensitivity patterns were variable. The clinical response was not in strict conformity with the sensitivity pattern. Simultaneous presence of different varients with dissimilar sensitivity pattern, has been postulated. The literature on the subject has been reviewed.

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REFERENCES

1. Ashley, D.J.B. and Kwantes, W. (1961) *Jour Clin. Path., 14 :* 670.
2. Burns, R.P., & Florey, M.J. (1963) *Am. Jour. Oph,* 56:386.
3. Bauer, A.W., Kurby W.M.N., Sherris, J.C. and Turk, M. (1966) *Amer. Jour. Clin. Path.*. 45 : 493.
4. Brooke, M.S. (1951) *Denmark. Acta. Path, Microbiol. Scan.* 28 : 338.

TABLE X

Particulars about the patients from whom bacterium anitratum was isolated repeatedly in pure culture

Case No.	Age	Sex	Duration of illness	Diagnosis	Number of isolations	Drug sensitivity pattern of the isolates	Drug response
11	2	M	4 Years	Bronchiactasis	3	Variable	Nil
12	31	M	1½ Months	Suppurative pneumonia	9	Variable	Responded to Erythromycin & sulfadimidine
14	64	M	2 Years	Chronic bronchites with bronchiactasis	2	Variable	Nil
24	40	M	1 Month	Lung abcess	4	Variable	Responded to Penicillin & Tetracycline
29	21	F	1 Year	Bronchiactasis	2	Uniform	Short observation period
34	58	M	2 Years	Hodgkin's disease with diabetes mellitus	2	Variable	Nil
43	43	M	15 days	Pneumonitis following mycardial infraction	2	Variable	Nil (Expired of cardiac arrest)

5. Brooke, B.E. & Sanders, A.C., (1954) *Armed. Forces, Med. Jour.* 5 : 667.

6. Brisou J. and Morichau Beachaut, Quoted by Daly.

7. Brison J. and Prevot, A. Quoted by Daly.

8. DeBord, G.G. (1939) *J. Bact.,* 38 :119.

9. DeBord, G.G. (1942) Quoted by Robinson et al.

10. DeBord, G.G. (1948) *J. Lab. Clin. Med.,* 28 : 710.

11. DeBord, G.G. (1953) *J. Bact.,* 55 : 764.

12. Daly, A.K., Postic, B. and Kass, E.H. (1962) *Arch, of Inter. Med.* (Chicago) 110 : 580.

13. Donald, D.W. (1966) *Paediatrics* 37 , 760.

14. Ewing, W.H. (1949) *J. Bact. 59 :* 659.

15. Ferguson, W.W. & Robert, L.F. (1950) *J. Bact.* 59: 171.

16. Faust, J., and Hood, M. (1949) *Amer. J. Clin. Path.,* 19 :1143.

17. Gardner, D.L., Pines, A., & Stewart, S.M. (1960) *Brit. Med. J.,* 5179 : 1108.

18. Graber, C.D., Rabin, E.R., Mason. A.D., J.R. Vogel, E.H. Jr. (1939) *Surg. Gynae. Obst.* 114 : 109.

19. Click, L.M.,Moran, G.P. Coleman, J.M. and O. Brien, G.F. (1959) *Amer. J. Med.* 27 : 183.

20. Garrison, R.G. (1963) *Amer. J. Clin. Path.* 40 : 260.

21. Green, J.D., (1960) *Arch. Intern. Med.,* (Chicago) 106: 870.

22. King, J.Jr., Copeland, G.D. & Berton, W.M., (1963) *Amer. J. Med.* 35 : 241.

23. Lund, E. (1954) *Acta. Path. Microbiol. Scand.* 34 : 329.

24. Madhavan H.N. & Murthi, R. (1968) *Ind. J. Med. Res,* 56 : 391.

25. Moor, W.A. (1949) *Amer. J. Opthal.* 32 :1593.

26. Olafson, M., Lee, Y.C. and Abernethy, TJ. (1958) *New Eng. J. Med.* 258 : 465.

27. Om Prakash & Balkrishann, P. (1963) *Ind. J. Med. Res.,* 54 : 648.

28. Om Prakash, Balkrishnan, P. Sivarajan, K., and Sethi, R. (1963) *Ind. J. Microbiol* 3 : 23.

29. Pichaud, D., Pichaud, M., and Secuod, L. Quoted by Daly.

30. Pike, R.M., Schulze, M., and McCullough, M.A. (1951) *Amer. J. Clin. Path.,* 2.1 : 1094.

31. Reynolds, R.C., & Cluff, L.F. (1963) *Ann. Intern. Med.,* 58 : 759.

32. Robinson R.G., Garrison, R.G. and Brown, R.W. (1964) *Ann. Intern. Med.,* 60 : No. 1.

33. Reinarz, J.A., Pierce A.K., Mays, B.B., and Sanford, J.B. (1965) /. *Clin. Invest* 44 : 831.

34. Schaub, I.G. and Hauber, F.D. (1948) *J. Bact.* 56 : 379.

35. Stuart, G.C., Formal, S., & McGann, V. (1949) *J. Infect. Dis.,* 84 : 235.

36. Svihus, R.H. Lucero, E.M. Mikolajcyk, R.J., Carter, E.F. (1961) *J.A.M.A.* 177 : 121.

37. Simpson, M., and Grossley, V M. (1954) *Canad. J. Pub. Health.* 45 : 259.

38. Torregrose, M.V.de, & Ortiz, A (1961) *J. Paediat.* 59 : 35.

39. Taplin, D.. Rebell, G. & Zais Nardo (1968) *J. Am. Med. Asso.* 186 : 952.

41. Wassermen, E., (1958) *Ann. Intern. Med., 49 :* 451.

42. Waage, R. and Watson (1953) *Acta. Path. Microbiol, Scand. 33 :* 268.

43. Von Lingelsleim, W. Quoted by Daly.

44. Venkatramani, T.K., Sundarraj, T., Madhavan, H.N. and Sharma, K.B. *Personal communicg-tion.*

PULMONARY TUBERCULOSIS AND CHRONIC (GENERALIZED) AIRWAYS OBSTRUCTION

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Introduction

The association between pulmonary tuberculosis and chronic (generalised) airways obstruction is well established (1, 2, 3, 4). Between thirty and forty percent of the patients with active pulmonary tuberculosis may reveal evidence of airways obstruction*, the incidence and severity of which has been shown to be closely related to the extent and duration of the activity of tuberculosis disease (2, 5). It has been further suggested that chronic cavitary and endobronchial tuberculosis (1, 3, 7) are the predominant factors in the pathogenesis of chronic airways obstruction in such patients. The etiplogic relationship between the two conditions, however, is not very explicit (a) because, functionally the airways obstruction seen in patients with pulmonary tuberculosis is indistinguishable from that observed in patients of chronic bronchitis, emphysema, etc. and (b) other auxiliary factors like history of cigarette smoking, chronic bronchial irritation due to different kinds of inhalants in the immediate and general environment is common to either kind of patients.

Earlier studies by Martin et al., (6) showed that clinical morbidity was increased and incidence of treatment failures was higher in patients of pulmonary tuberculosis who had accompanying airways obstruction. Vargha et al., (7) reported poor healing of tuberculous cavities in similar patients. The present study was carried out to review the degree of physiological impairment when tuberculosis and chronic airways obstruction are co-existent as well as define the role played by the latter upon the clinical course of pulmonary tuberculosis.

Material and Methods

Ninety-eight patients with the diagnosis of active pulmonary were studied. The patients were classified as having far advanced (P3) or moderately advanced (P2) disease based upon the radiographic criteria recommended by the National Tuberculosis and Respiratory Disease Association. (8) The extent of disease on the chest roentgenogram was further evaluated by giving a score of 5% for each segment involvement, the minimal score being 5% and the maximum 50%. There were no patients with minimal disease in this study.

Before chemotherapy was started baseline measurements of vital capacity (VC), maximal voluntary ventilation (MVV), maximal expiratory flow rate (MEF) measured with a puffmeter (9), concentration of alveolar nitrogen at the end of seven minutes 100% oxygen breathing (10), and membrane permeance for carbon monoxide were obtained. Evaluations were also made for the walking-ventilation index (11) and arterial blood was analysed for partial pressures of O_2 and CO_2 with standard Clarke and Severinghaus electrodes. In those patients where pre-treatment function studies could not be performed because of acuteness of the disease, such values were obtained within a period of three to four weeks after initiation of chemotherapy and as soon as the patients were considered to be in physical condition to cooperate with the pulmonary function testing.

The functional diagnosis of airways obstruction was based upon reduction in maximal voluntary ventilation below 80% of the predicted values and a reduced maximal expiratory flow rate (below 260 litres per minute in males and 210 litres per minute in females). The whole group of patients with tuberculosis was then sub-divided into those without (Group A) and those with evidence of airways obstruction (Group B). All patients received standard antitubercular drugs. Radiological clearance, cavity closure and sputum conversion was evaluated at 12, 24 and 48 week intervals. The results were examined for statistical significance by the standard methods, S.E. of the mean, Chi square and paired sample analysis (12)

Results

Data was available for 52 patients in Group A (mean age 47.0±10.0 years) and for 46 patients in Gronp B (mean age 60.0± 11.0 years). The age difference between the two groups was significant (P<.01.) Patients in Group B had significantly greater

* Martin et al prefer to use the term diffuse obstructive pulmonary syndrome which is synonymous to clinical emphysema, clinical chronic bronchitis and chronie (generalised) airways obstruction,

extent of tuberculosis compared to those in Group A. The mean values of various pulmonary functions are detailed in Table 1. Vital capacity was significantly reduced in patients of Group B as compared to those in Group A. The functional airways obstruction was proportionately severe (Table 1) in all patients of Group B, both with far and moderately advanced disease. Similarly, impairment in intrapulmonary gas distribution as indicated by the seven minute nitrogen washout, reduction in membrane permeability for carbon monoxide, hypoxemia and functional disability as assessed by the walk ventilation index were more pronounced in patients of Group B. (Table 1). The patients in Group A (P_a and P 3) showed only slight hypoxemia and mild reduction in membrane permeance.

In both the groups of patients a progressive radiological improvement and cavity closure took place with chemotherapy. (Table 2). Patients in Group B, however, cleared the radiological disease at a slower rate and were left with significantly more disease at the end of 24 and 48 weeks of follow-up. The trend was similar when individual groups with moderate or far advanced disease were compared. Similarly, sputum conversion was equal in both the groups up to 12 and 24 weeks of follow-up, but, at the end of 48 weeks 21% of the patients in Group B in contrast to 3.4% of the patients in Group A still remained bacteriologically positive. (Table 2).

Comments

Destruction of pulmonary tissue due to tuberculous disease results in varying degrees of functional impairment. (13) Typically, proportionate to the extent of involvement the physiological impairment is restrictive in nature. When a combination of restrictive and obstructive ventilatory impairment is present in the same patient, the lung function may be seriously compromised. As has been shown in the present study, the functional impairment was significantly worse in patients of group B. In addition, these patients (Group B) also demonstrated slow resolution of radiological disease and delayed bacteriological conversion despite adequate antimicrobial treatment. Such patients are likely to run an increased risk of development of respiratory insufficiency, both in the early and in the late course of follow-up. Long term follow-up studies were not completed in all these cases reported presently, but there were five patients in Group B who showed significant blood gas abnormalities (hypoxemia, carbon dioxide retention) at 48 weeks interval after the initial evaluation.

Previous studies (14) have shown that once permanent tissue destruction has taken place, chemotherapy is generally ineffective in restoring the lung function to normal. In order to reduce the clinical morbidity and minimize the severity of functional impairment, it is therefore essential to detect active tuberculous infection during its early stages so that specific anti-microbial therapy is initiated promptly. When airways obstruction is recognised, administration of treatment and education in the techniques to improve bronchopulmonary hygiene such as avoidance of bronchial irritants, topical aerosol therapy, postural drainage, etc. will prove useful. These general measures of bronchopulmonary hygiene may also be found helpful in cases with far advanced tuberculosis even if there is no associated airways obstruction. It is only through a dual approach that the late sequella of chronic pulmonary tuberculosis might be prevented.

Summary

Clinical course of active pulmonary tuberculosis was compared in 52 patients with another group of 46 patients who also had active tuberculosis but additional evidence of chronic airways obstruction. The respiratory dysfunction was more marked in the second group of patients and both radiological improvement and bacteriological conversion were delayed in the same patients.

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REFERENCES

1. Gaensler, E.A., and Lindgren, I.: Chronic bronchitis as an etiolcgic factor in obstructive emphysema. *Ame. Rev. Resp. Dis.,* (19. 9), 80, (Supplement, p. 185).
2. Martin, C.J., and Hallett, W.Y.: The diffuse obstructive pulmonary syndrome in a tuberculosis sanatorium: I. Incidence and symptoms. *Intern. Med,* (1961), 54, 1156.
3. Lancaster, J.F., and Tomashefski, J.F.: Tuberculosis—a cause of emphysema. *Amer. Rev. Resp. Dis.,* (1962), 87, 435.
4. Birath, G., Caro, J., Malmberg, R. and Simonsson, B.C.: Airways obstruction in pulmonary tuberculosis. *Swand. J. Resp. Dis ,* (1966), 47, 27.

TABLE 1

Lung function alterations were more pronounced in group B patients.

		Group A			Group B		
		Pulmonary tuberculosis without airwaysobstruction (Mean extent of disease, 27.5±12.7%)			Pulmonary tuberculosis with airwaysstruction (Mean extent of disease, 38.5±13.5%)		
Parameter (mean values—S.D.)		P_2	P_3	Combined group	P_2	P_3	Combined Group
Vital Capacity L.		4.1±1.2	3.5±1.0	3.94±0.94	3.0±0.90	2.8±0.84	2.93±0.70
MVV L/min		130.7±31.0	127.7±28.3	122.5±31.6	75.0±23.5	64.0±23.5	68.5±24.0
Maximal Expiratory Flow rate L/min.		310.5±59.0	290.0±53.0	310.8±66.0	158.5±42.0	142.0±47.0	150.0±30.5
7 Min. Alv. N_2%		1.3±0.87	1.7±0.95	1.5±0.94	3.2±2.0	3.8±3.0	4.0±2.7
Membrane Permeance (DCO) L/min/760 mmHg**		11·24±3.6	10.5±3.4	10.2±3.9	6.0±1.9	5.6±2.2	6.0±2.2
Walk Vent. Index (Normal<0.35)		0.20±0.12	0.21±0.10	0.16±0.10	0.32±0.10	0.42±0.14	0.38±0.18
Pao_2 mmHg.	Rest	78.5±8.8	76.5±7.5	77.5±7.5	72.0±10.4	67.0±9.8	71.0±9.0
	Exercise	80.5±7.8	77.0±16.5	79.4±9.0	73.5±11.0	68.5±10.0	71.0±10.5
$PaCO_2$	Rest	37.0±3.3	40.0±3.5	36.6±4.0	39.0±4.3	39.0±4.7	39.0±4.7
	Exercise	38.0±3.5	37.5±4.5	38.0±4.0	40.0±4.6	39.5±4.7	40.2±5.2

* Values<0.1

** Normal values for males are 14.±3.0 and 11.0±2.0 for females. Steady state method.

TABLE 2

Radiological and bacteriological course of pulmonary tuberculosis in group A and group B patients.

Intervals	Extent of radiological disease (%)		Cavity size cms.		% with positive sputum	
Initial 12	Group A	Group B	Group A	Group B	Group A	Group B
weeks 24	27.5±.27	38.5±13.5	2.4±1.8	3.4±1.8	100%	100%
weeks 48	15.4±6.4	27.5±13.8	0.70—1.0	1.2-1.1	50%	55%
weeks	12.0-6.8	21.2±11.4	0.43—0.74	0.80—1.1	20%	29%
	12,0—8.6	22.8±10.2	0.13-0.44	0.58-0.48	3.4%	21%

5. Pardee, N., Dominik, J., and Martin, C.J.: The diffuse obstructive pulmonary syndrome: II. Factors associated with its progress, *Amer. Rev. Resp. Dis.,* (1966),**93**, 390.

6. Martin, C.J., and Hallett, W.Y., The diffuse obstructive pulmonary syndrome—a factor in tuberculosis treatment failures. *Amer. Rev. Resp. Dis.,* (1962), **86,** 898.

7. Vargha, G. and Bruckner, P: Study of relation ship between cavity and obstructive ventilatory syndrome in tuberculosis. *Amer. Rev. Resp. Dis ,* (1964),**89**, 830.

8. Diagnostic standards and classification of Tuberculosis. *NTRDA,* New York, (1969), 69.

9. Goldsmith, J.R.: A simple test of maximal expiratory flow for detecting ventilatory obstruction. *Amer. Rev. Tuberc.,* (1958), 78, 180.

10. Cournand, A., Baldwin, E. deF., Darling R.C., and Richards, D.W., Jr.: Studies on intrapulmonary mixture of gases: IV. The significance of the pulmonary emptying rate and a simplified open circuit measurement of residual air. *J. Clin. Invest ,* (1941), 20, 681.

11. Waring, F.C., Jr.: Ventilatory function: Expe riences with a simple practical procedure for its evaluation in patients with pulmonary tuberculosis. *Ame. Rev. Tuberc.,* (1945) 51, 432.

12. Hill, B., Principles in Medical Statistics. *Lancet Ltd.,* London; 1949.

13. Birath, G.: Forms of Chronic cardio-pulmonary insufficiency in pulmonary tuberculosis and their diagnosis. Acta. *Tub. Scand. Supple.,* (1959), 47, 32.

14. Malik, S.K., and Martin, C.J.: Tuberculosis, Corticosteroid Therapy and Pulmonary Function. *Amer. Rev. Resp, Dis.,* (1969), 100,

FREQUENCY DISTRIBUTION OF ABO BLOOD GROUPS AMONG GENERAL POPULATION OF NORTHERN RAJASTHAN AND AMONG SPUTUM POSITIVE PULMONARY TUBERCULOSIS CASES WITH PARTICULAR REFERENCE TO RATE OF IN-ACTIVATION OF ISONIAZID

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Among the various factors that contribute to a person's individuality are antigens that are attached to surface of red blood cells and naturally occurring antibodies that circulate in the serum. The various combinations of their antigens and antibodies determine various blood groups.

The frequency of blood groups varies in different races of the world (McCombs 1965). Such variations have been observed in different states of Indian Union (Talwar et al, 1958; Sen et al, 1959 and Anand et al, 1963). There may be variation in frequency distribution of ABO group, in different parts of a state, e.g. Rajasthan. Jain (1968) has reported such frequency distribution among the population of Southern Rajasthan and while data for Northern Rajasthan is not available and hence this work was taken up.

One of the earliest attempts to find out an association between blood groups and disease was that of Buchanan and Hursley (1921-22) in a series of 2446 subjects wherein they concluded that there was no relationship between blood groups and any disease.

Observations reported subsequently by various workers (Mitra, 1933 ; String & Rytias—quoted by Allan, 1955 ; Shenoy, 1962 and Jain, 1970), on the association of pulmonary tuberculosis and blood groups were contradictory. Therefore, it was decided to study this association again, particularly with reference to the rate of inactivation of isoniazid, as both, rate of inactivation of INH and blood group of an individual are genetically controlled, a correlation between them may exist.

Aims of the Study

(1) To determine frequency distribution of ABO blood group among general population of Northern Rajasthan.

(2) To determine frequency distribution of ABO blood group among sputum positive pulmonary tuberculosis com pared to general population.

(3) To study correlation between rate of inactivation of isoniazid and blood groups among tuberculosis patients and vice versa.

Material and Methods

On one hand, this study deals with freshly diagnosed sputum positive pulmonary tuberculosis cases admitted in T.B. Hospital, Bikaner, during months of June and July, 1970, and on the other hand it deals with blood donors and non-tubercular patients registered and examined for blood groups in blood bank of Associated Group of Hospitals, Bikaner, since its inception (1966) upto December, (1970) as representatives of general population of Northern Rajasthan (where Bikaner is situated).

Blood groups of all the above persons were determined by testing the individual's red blood cells with various antisera and by identifying antibodies in his own serum by testing against cells containing known antigens.

Rate of inactivation of isoniazid was assessed in terms of concentration of active isoniazid present in the serum of sputum positive pulmonary tuberculosis cases, four and half hours after intramuscular administration of isoniazid in doses of 3 mg/kg body weight by biochemical method (Kelly & Poet, 1952). Patient with 6/ug or less of isoniazid per ml of their serum in this study were taken as rapid inactivators and patients with more than .6/ug of INH/ml were labelled as slow inactivators.

Observations and Results

Total number of sputum positive pulmonary tuberculosis cases studied was 118 and total number of blood donors and non-tubercular patients tested for blood group as representatives of general population in this study was 17104.

The above table I deals with frequency distribution of blood groups among general population and sputum positive pulmonary tuberculosis patients. This table reveals that proportions of general population belonging to A, B, AB & O blood groups were 22.67%,

TABLE I

Assoaiation of blood group of contra land bacillary pulmonary tuberculosis cases

Blood group	Bacillary tuberculosis patients		Control groups		Difference in percentage	
	No.	Percentage	No.	Percentage	No.	Percentage
A	25	21.1	3878	22.67	—	1.57
B	32	27.1	6242	36.50	—	9.40
AB	2	1.8	1463	8.55	—	6.75
O	59	50.0	5521	32.28	+	17.72
All	118	100	17104	100		

TABLE II

Distribution of slow and rapid inactivation of isoniazid in relation to blood group of bacillary pulmonary tuberculosis patients

Blood group	Total		Rapid of inactivation of isoniazid			
	No.	%	Rapid		Slow	
			No.	%	No.	%
A	25	100	7	28.0	18	72.0
B	32	100	7	21.9	25	78.1
AB	2	100	_	_	2	100
O	59	100	18	30.5	41	69.5
All	118	100	32		86	

36.50%, 8.55% and 32.28% respectively. Thus there was preponderance of group B, followed closely by group O among general population of Northern Rajasthan.

This table further reveals that proportion of sputums positive pulmonary tuberculosis cases with blood group 0 was significantly higher than that proportion among general population viz. 50.00% and 32.28% respectively.

Table II deals with distribution of slow and rapid inactivators among sputum positive pulmonary tuberculosis cases belonging to various blood groups. Proportions of rapid inactivators are almost the same among the patients belonging to different blood groups viz. 28.0%, 21.9% and 30.5% among patients of A, B, O blood groups. Both the patients of A B group were slow inactivators.

Discussion

This study deals with frequency distribution of A, B, O blood groups among general population of Northern Rajasthan as well as among, freshly diagnosed sputum positive pulmonary tuberculosis cases with particular reference to rate of inactivation of isoniazid among them.

It was observed in the present study that there was preponderance of group O, closely followed by group B among the general population of Northern Rajasthan. Exactly similar was the observation of Jain (1968) among general population of Southern Rajasthan. Thus there seems to be no variation in

frequency distribution of blood groups in different parts of Rajasthan. Such variations have been reported among different states of Indian Union. Preponderance of blood group B was reported also among Punjab (Talwar et al, 1958) and Bengalis (Sen et al, 1959). But group O was more frequently observed among Kashmiris (Anand et al, 1963) and group A was in preponderance among Sikkimis (Verma, 1970). Shenoy et al (1962) from Bombay found in series I, B group more and in series II, O group more frequently occurring in general' population. Frequency of blood group varies in different races of the world. In Negroes there is much higher percentage of group B, while in American Indians Group B is rare and group O is common.

In the present study group O was significantly more common among sputum positive pulmonary tuberculosis cases than among general population. Regarding association of blood group and pulmonary tuberculosis contradictory reports are available. No influence of blood group was observed by Mitra (1933) on diseases including tuberculosis except in helmenthiasis and malignancy. String & Ryti (as quoted by Allan, 1955) reported shortage of tuberculosis among persons of O group. Shenoy (1962) concluded that there was no relation between blood group and pulmonary tuberculosis. Jain (1970) observed higher incidence of AB group among pulmonary tuberculosis cases. The authors agree with the views of Jain (1970) that there is some association between blood group and pulmonary tuberculosis and propose that more extensive and intensive study should be undertaken to reach definite conclusions on - this subject. After having reached such conclusion it may be possible to predict which infected (with mycobacterium tuberculosis) persons will be more liable to develop disease in due course of time. Among other factors blood group may be one for such prediction.

In the present study an attempt has been made to find out, if there is any correlation between the rate of inactivation of isoniazid and frequency distribution of A, B, O blood groups among pulmonary tuberculosis cases. It was observed in this study that proportions of slow and rapid inactivators of isoniazid were almost uniform among patients belonging to different blood groups. It may therefore be concluded that in the present study there is no evidence in favour of any correlation between frequency distribution of blood group and rate of inactivation of isoniazid among sputum positive pulmonary tuberculosis cases. Available literature is completely silent on this subject. It may be pointed out that results of this study are based on small number of patients and therefore need further confirmation in a large series.

Conclusions

Among general population of Northern part of Rajasthan there is a preponderance of blood group B, closely followed by O group.

O group was found significantly more frequent among sputum positive pulmonary tuberculosis cases than among general population.

There seems to be no association between frequency distribution of blood groups and rate of inactivation of isoniazid among pulmonary tuberculosis cases. It is proposed that then observation may be confirmed in large series of patients.

Summary

Blood groups wese determined among 118 sputum positive pulmonary tuberculosis cases. 17,104 blood donors and non-tubercular patients were taken as representatives of general population of Northern part of Rajasthan, as regards frequency distribution of A, B, O group is concerned. Rate of inactivation of isoniazid was assessed in above mentioned patients. It was observed that there was preponderance of blood group B, closely followed by group O among general population. Group O was found to occur significantly in higher proportion of sputum positive general population. This study also .revealed that there was no association or correlation between rate of inactivation of isoniazid and frequency distribution of blood groups. Since the number of tubercular patients studied is small the above results therefore need confirmation in large series of patients.

ACKNOWLEDGEMENTS

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REFERENCES

1. Anand, B.R. and Chander Kanta (1963) *Curr. Med. Pract.,* 7 : 507.
2. Buchannan, J.A. and Hingley, E.T. (1921-22) *Brit. J. Exper, Path.,* 2:247
3. Jain, R.C. (1968) *Curr. Med. Pract.,* 12 : 498.
4. Jain, R.C. (1970) *Tubercle,* 51 : 322.
5. Kelly, J.M., and Poet, R.B., (1952) *Amer. Rev. Tub.* 65,484.
6. Mitra, P.N. (1933) *Ind. J. Med. Res.,* 20 : 995.
7. Sen, N.N., Mukerjee, C.L. and Aikat BK. (1959) *J. Ind. Med. Assoc*., 33:210
8. Shenoy, M.A. and Daftary, V.G., (1962) *Ind. J. Med. Sc.,* 16 : 493
9. String, C. and Ryti , E, (1927)Quoted by Allen , T.M. (1955), *Brit . M ed. Journal,* 2:1206
10. Talwar C.L. and Sawney, C.P.(1958), *Ind. J. Med . Science.* 12:942
10. Verma, N.K. (1970) *Curr. Med. Pract.,* 14 : 363

PSYCHO-SOCIAL SURVEY OF TUBERCULOSIS PATIENTS OF A SANATORIUM

AVINASH C. MOUDGIL AND DWARKA PERSHAD
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Introduction

The very high incidence of Tuberculosis in India has aroused grave concern but very little effort has been made to study the psycho-social factors contributing to the disease and its therapeutic aspects. The present investigators have not come across even a single study on this problem, especially on Indian patient population.

The near-certain fatality attributed to this disease has now been replaced by a sure control and cure. The present trend of ambulatory treatment demands a cautious study of the psycho-social factors affecting both the pathological process of the disease and the concerned therapeutic procedures.

Review of literature

The present investigators have not come across any study on the subject in the Indian setting. However, some studies of psycho-social nature have been reported in the western literature.

Davis (2) and Davis et al (3) reported that patient compliance depends on many psychologic and spciologic factors, including the age and educational level of the patient, the interaction between patient and doctor, and patient's own attitudes and ideas about his disease. Pratt, Seligman and Reader (5) reported that patients who receive adequate explanations from their physicians may accept more fully the physician's plan. Seeman and Evans (7) have reported that the traumatic experience of diagnosis and hospitalisation may inhibit the TB patient's learning about his disease. Riley (6), on the other hand, reported that the best time for establishing a constructive attitude is when the patient is first told he has Tuberculosis.

Another set of studies which are more focussed towards the treatment aspect of TB have suggested that group therapy (1 and 11 and psychotherapy (9) are useful along with drugs.

Vendiviere et al (8) have reported that patients below the age of 50 years were more knowledgeable about the contagiousness of the disease and the criteria of discharge from the sanatorium. The duration of stay in the sanatorium was significantly less in this group as compared to those who were less knowledgeable.

Aims

The review of literature indicates that no effort has been made to study the psycho-social variates of the hospitalised patient. Nor we find any personality evaluation of such patients through objective psychological tests. Therefore the present study was planned to study the above-mentioned factors.

Methodology

The present investigation was conducted at Hermitage (TB Sanatorium) of Sangrur District in Punjab. The sample of the study was 50 % of the total patient population of the Sanatorium, during the days of the study. (Oct. 1.4.1970). Selection of the patients was based on alternative number. Only 8 patients were not included in the study because of their poor physical condition. The patients were seen in separate rooms by both the investigators separately. A nurse helped the investigator to communicate with the patient, where it was necessary. The investigators made efforts to build up rapport with the patients before proceeding as per plan. The following techniques were used to collect the data :

(a) Structured Interview, (b) Physicians's Rating, (c) Psychological Test.

Structured Interview

The Structured Interview aimed at eliciting the following information ;

1. Identification data
2. Patient's knowledge of and attitude toward his illness
3. Habits
4. Relationship with family.

Physician's Rating

The Medical Officer of the Sanatorium rated the severity of the patient's illness on a 3-point scale.

Psychological Tests

The following Psychological Tests were used to evaluate the personality of the patient :

1. Maudsley Personality Inventory (Modi fied)
2. Cornell Medical Index (Health Ques tionnaire).

Results and Discussion

There were 88 patients in the Sanatorium, put of which 8 patients were not amenable for investigations. The distribution of the remaining patients was as follows : Male=50, and Female=30. Fifty per cent of this population was taken for investigation. All these patients were cases of pulmonary Tuberculosis. Table I shows the identification data of the sample. The patients were normally distributed in the age range of 10 to 59 years and 50% patients were between 25 to 39 years. 25 patients were illiterate and only 10 patients were educated from middle to matric plus. The profession of 12 patients was agriculture; 4 were unskilled labourers; 4 were skilled labourers and 13 female patients were housewives. It is interesting to note that none of the patients was holding any prestige job. This may be due to the socio-economic factors and the ambulatory treatment in vogue. 24 patients (60%) belonged to the group earning less than Rs. 200 p.m. and there were only 40% patients who earned above Rs. 200 p.m. 82.5% of the patient population came from rural area, and only 17.5% came from urban area. 77.5% patients were married and 22.5% were single. Among the married patients, 16% had no child; 35.5% were having 1 to 3 children; and 48% had crossed the family planning limit and had children from 4 to 7. 65% population was suffering from the disease for 2 years, and 35% patients were having illness for the last 2 to 5 years. No female patient reported habit of smoking or drinking; whereas about 50% male patients were in the habit of smoking and 56% male patients reported habit of drinking.

Patient's knowledge of and attitude toward illness

The investigators asked 10 questions to each patient, to elicit his knowledge of and attitude towards his illness. The answers were scored on "Yes—No" basis. The attitude was quantified as follows :

TABLE I

Showing identification data

Age	10-14 Yrs.	1
	15-19 „	5
	20-24 „	3
	25-29 „	7
	30-34 „	7
	35-39 „	7
	40-44 „	4
	45-49 „	2
	50-54 „	3
	55-59 „	1
Education	Illiterate	25
	Primary	5
	Middle	3
	Matric	6
	Matric	1
Occupation	Agriculture	12
	Unskilled Labour	4
	Skilled Labour	4
	Business	3
	Student	4
	House-wife	13
Duration of illness	Up to 1 year	15
	1 to 2 years	11
	2 to 5 years	14
Habits	Smoking	12
	Drinking	14
(*A11 female patients were free from the above mentiond habits)		
Relationship with Family	Congenial	35
	Disturbed	5

(a) Unhealthy Attitude where a patient obtained 7 or more points.
(b) Borderline where a patient obtained 4 to 6 points.
(c) Healthy Attitude where a patient obtained 3 or less points.

The scoring resulted into the following picture :

(a) Unhealthy Attitude = 5 patients.

(b) Borderline = 16 patients.

(c) Healthy Attitude = 19 patients.

Physician's rating

The attending physician was requested to rate the severity of illness and physical condition of each patient on a 3-point scale, as given below :

(a) Severe illness;
(b) Moderate illness;
(c) Mild illness.

The patient's attitude towards his illness and the physician's rating about severity of illness were compared to find whether there was any correlation. Table II shows the results.

Table II shows that there is no correlation between the patient's attitude towards his illness and the physician's rating of the severity of his illness. There were only 5 patients who had unhealthy attitude towards their illness, and only one out of these five was rated as "Severe" by the physician.

A similar picture had emerged in the "Structured Interview" where direct questions were asked concerning Treatment, Outcome, and Rehabilitation, and the responses were scored on a 3-point scale. Interestingly, none of the patients was dissatisfied with the Treatment adopted at the Sanatorium. There was one patient who was doubtful concerning the outcome of the treatment, and only one patient was not hopeful about his rehabilitation.

Inspite of the poor socio-economic status and low educational level of the patient population, all reported very healthy views regarding the treatment, its outcome, and rehabilitation. This can be due to not only well-planned medical regimen, but also masterly psychological handling of the patients. It was learnt that the physicians and the nursing personnel devoted much attention towards both medical and psychological factors influencing the patients.

Personality testing

The investigators gave two objective-type psychological tests, i.e. Maudsley Personality Inventory (MPI) and Cornell Medical Index (CMI). The mean scores of TB patients were compared with the mean scores of patients suffering from (a) Cardiac illness where surgery was indicated (4); (b) Chest-disease where surgery was indicated (4); and (c) Vasectomy cases (10). Table III gives the results.

It is interesting to find that the neurotic scores on MPI of Cardiac patients awaiting surgery was the highest, followed by Chest-diseases patients awaiting surgery, TB patients, and Vasectomy cases (which is of course a normal population). This indicates the level of stress and the anxiety aroused by the type of illness. In the light of this fact, the psychological handling of patients of different disease categories, demands varied psychological approaches.

The "Extraversion Dimension" of MPI reveals that the Vasectomy cases were most

TABLE II

Showing correlation between patient's attitude towards his illness and physician's rating of the severity of Illness.

	Rating	Severe	Moderate	Mild	Total
	Unhealthy	1	1	3	5
Patient's attitude	Borderline	0	1	IS	16
	Healthy	1	1	17	19
	Total	2	3	35	40

Phir = .06

TABLE III

Snowing mean and S.D. values on MPI and CMI tests of TB, Cardiac, Chest and Vasectomy patients.

		TB N=40		Cardiac N=180		Chest N=88		Vasectomy N=121	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
MPI	N	15.15	10.60	19.82*	12.88	14.6	11.26	8.25**	9.39
	E	27.50	5.25	25.61	1026	26.94	8.02	31.50**	8.75
CMI	AL	13.00	6.70	23.85**	13.25	16.63*	13.07	8.35**	9.86
	ML	6.25	4.25	11.47**	9.02	7.72	8.30	4.28*	5.75

*P= .05 or less
**P= .01 or less

MPI= Maudsley Personality Inventory (Modified) N= Neurotic Dimension E= Extraversion Dimension.

CMI= Cornell Medical Index (Health Questionnaire) AL= Physical Distress Section. MR= Emotional Distress Section

extraverted as compared to patients of other categories mentioned in Table III. Patients of Cardiac illness, Chest diseases and Tuberculosis scored almost similarly on the Extraversion Dimension of the test.

The finding on "Emotional Distress" section of CMI test are in agreement with the findings obtained on the "Neurotic Dimension" of MPI. The "Physical Distress" section of CMI reveals that a patient of Cardiac illness awaiting surgery, scores highest followed by patients of Chest Diseases, Tuberculosis and Vasectomy cases. The higher score of Cardiac and Chest diseases patients is due to the gravity of illness, that is why surgical intervention was indicated.

Although scores on the "Neurotic Dimension" of MPI of Chest diseases patients and TB patients are similar, there is a significant difference in scores on the "Physical Distress" section of CML It may be concluded from this fact that the difference in physical distress will not have a corresponding difference in neuroticism level.

Summary

Fifty per cent patient population of the TB Sanatorium named Hermitage of Sangrur District in Punjab was studied through Structured Interview Schedule, Physician's Rating and objective-type psychological Tests. The findings reveal that the peak age of the patients was in the range of 25 to 45 years; that most of the population of that Sanatorium was illiterate, and their socio-economic status was poor. 82% of the patients came from the countryside; 77.5% were married and 84% among them had children from 1 to 7. 65% of the patients had been ill for less than 2 years. About 56% of the male patients had a habit of drinking. Only 12% of the patients had disturbed family relations. No correlation was found between the patients' attitude toward their illness and the physician's rating about the severity of their illness. The Psychological Tests indicated that TB patients were not having different neurotic scores when compared with other chest diseases patients.

REFERENCES

1. Barnes, G. : 1957. *Bull. Nat. Tuberc. Assn.* 43. PP61.

2. Davis, M.D.: 1967. *J. Health Soc. Behav.* 8. PP 265.

3. Davis, M.D. and von der Lippe, R.P. 1967. *Soc. Sci Med.* 1. PP 336.

4. Pershad, D., Verma, S.K., and Wahi, P.L. : "Measuress of Neuroticism and Prediction of Psychiatric Disturbances in Patients awaiting Cardiac Surgery". Read at the Conference of Clinical Psychologists, Lucknow in Dec. 1970.

5. Pratt, L., Seligman, A., and Reader, G. : 1957. *Amer. J. Public Health.* 47. PP 1277.

6. Riley, J.D. : 1946. *Amer. Rev. Tuberc.* 54. PP 340.

7. Seeman, M. and Evans, J.W. : 1962. *Amer. Social Rev.* 27. PP 6.

8. Vandiviere, H.M., Kane, R.L. and Kavasch, Paula I. : 1970. *Amer. Rev. Resp. Dis.* 101. PP 314.

9. Weber, F.J. : 1953. *Dis. Chest.* 24. PP 1.

10. Wig, N.N. and Singh, S. : "A Psychological Study of Symptoms Following Vasectomy". *I.C.M.R. Project* (1968—1970) Report.

11. Wilmer, H.A. : 1953. *Dis. Chest.* 24. PP 19.

A SCHEME FOR COMMUNITY PROGRAMME

It is common knowledge that for various reasons the National Control Programme is not making a satisfactory headway, even though it is a scientifically sound and feasible programme. It is, therefore, the duty of the voluntary organizations viz., the Tuberculosis Association of India and its affiliates to supplement the efforts of the official agencies in the working of the national control programme. It is also the function of the official agencies to bring about fuller participation of the community in the programme.

2. Our Advisory Committee suggested that 'operational research' in association with voluntary organisations in the working of the District Tuberculosis Control Programme on the lines of Tumkur Project in India, Jaffna and Kinta projects in Ceylon and Malaysia respectively may be taken in hand. This project should be taken up simultaneously in 4 or 5 districts in different parts of the country under the joint sponsorship of the Central Association and the State/District branches. The Standing Technical Committee accepted the suggestion.

3. In principle, the project consists of having a number of voluntary workers to help in the implementation of the Tuberculosis control programme as operating from the District TB Centre. The main activities of the volunteers would be:

1. To motivate people with suspicious symptoms to attend health facilities for diagnosis, thus helping in finding as many unknown cases as possible.

2. To see that all freshly discovered cases take treatment regularly and as long as advised with a view to make them safe for the community. Checking drug default by patient will be the main responsibility of the volunteers.

3. To disseminate health education particularly regarding preventive measures in tuberculosis; to improve health consciousness of the population and to make them avail of the existing facilities under the tuberculosis control programme.

4. To assist in BCG vaccination programme.

5. To help in collecting funds for subsidizing this project and also to provide socio-economic assistance to patients in case of necessity.

4. The following set up is suggested for the working of this programme:

(a) The project will work under the joint responsibility of the State and District Tuberculosis Associations with the active Association of the District Tuberculosis Officer and the District Health Officer. It would be preferable if the DTO of the district also serves as the Secretary of the District Association.

(b) The implementation of the programme will be incharge of a whole time paid organiser, who preferably should be a quali fied medical social worker of health educator. A graduate in sociology with good under standing of the community in which he is to work and its problems will also meet the needs. The organizer however must belong to the district or the area near the district. He should be given a scooter/motor cycle to visit all parts of the district. His main function will be to organise the project in the district and to recruit suitable persons as Group Leaders, to motivate and guide them, and supervise their work in general.

(c) There should be one Group Leader for each- Treatment Centre in the district. The Group Leaders will be honorary and will work under the guidance and supervision of the whole time organizer. They may be paid a small honorarium to cover their out of pocket expenses in connection with travelling, postage etc. Their main work will be to recruit volunteers, to motivate, guide and supervise their work. In addition they will provide liaison between the volunteers and the organizer and maintain good contacts with the village panchayats working in their area, which will ordinarily be the area of that particular Treatment Centre. He must be a resident of the village where the Treatment Centre is located.

(d) The number of volunteers will depend upon the number of cases under treatment from each Treatment Centre. Volunteers will work only in one village i.e. the village where they live. The number of volunteers in each village will depend upon the number of cases in that village. Since the interest of volunteers may not abide for a long time, frequent changes of volunteers will be permissible. The main duties of the volunteers will be to see

that the patients take the drugs regularly, attend the Treatment Centres for fresh supply of drugs as advised and to motivate persons with suspected symptoms to get themselves examined and treated properly.

(e) The programme should not cover 2 or 3 taluqas in the district. These taluqas where defaulter action will be in accordance with the routine D.T.P. procedure will serve as controls for the remaining taluqas where voluntary effort will be in addition to the routine D.T.P. procedures. Two different procedures will help in final assessment of the additional contribution of voluntary effort in regularity of treatment obtained.

(d) The first assessment of the programme should be two years after its implementation.

(g) Before the project starts, the organizer and the Group leaders will have to be given a short orientation training and a good briefing. This can be done in the district headquarters for about a week or so. Briefing of the volunteers would be when they are actually on the job.

(h) All volunteers working in the area of the Treatment Centre should be called to a meeting at the Treatment Centre atleast once but preferably twice a year. The meeting should also be attended by the DTO and the staff of the Treatment Centre. Similarly, all Group Leaders should attend a meeting atleast once in 3 months at the DTC. This meeting should be attended also by the organizer, the DTO and as far as possible by the DHO and as many members of the district Association, Executive Committee as possible. These meetings would be essential to maintain liaison and sustain the interest of workers at all levels.

5. It is expected that a scheme like this will not cost more than Rs. 15,000 recurring expenses per year. Non-recurring expenses specially the cost of a scooter/motor cycle for the organizer will cost another Rs. 5,000/- though this would be refundable by the organizer in easy instalments. It is expected that the recurring expenses will be shared by the State and the District Associations though the Central Association in Delhi may also contribute a small amount towards the expenses in each of the district working the scheme, as a token of their Association with and involvement in the project.

BOOK REVIEWS

MANAGEMENT OF THE FUNGUS DISEASES OF THE LUNGS by Howard A. Buechner, Publishers Charles C. Thomas, Springfield, Illinois. Price $16. Pp. 229.

Disease pattern in any country or community is not constant. Many respiratory diseases, commonly seen 50 years ago are rarely encountered today. Many others, rare then, are being increasingly seen now-a-days. To the latter category belong fungus diseases of the respiratory system. Many cases, even in our country, which radiologically appear to be tuberculous but do not show tubercle bacilli in the sputum may turn out to be due to fungus infection, if investigated properly. With better understanding of hyper-sensitivity reaction to fungus and its organic dust e.g. spores etc. many cases grouped under 'Asthma' or Eosinophilic infiltration of the lungs are being proved to be caused by fungus. This book presents in a lucid yet comprehensive manner the pathogenesis, diagnostic features and management of fungus diseases.

The role of immunological reactivity of the individual as the prime determinant of the clinical and histo-pathological picture and the role of precipitating and non-precipitating antibodies which mediate type I and type III hypersensitivity reactions respectively have been clearly brought out. That mere demonstration of fungus in the sputum is not enough to clinch the diagnosis is rightly emphasised.

In a book written by American authors, the bulk of space has naturally been devoted to blastomycosis, Coccidioidomycosis, histoplasmosis etc. which are met with most in the American continent. Diseases usually found in India viz. Aspergillosis and Candidiasis are also covered fairly adequately. These commensal fungi become opportunist pathogens under adverse ecological conditions such as wide spread use of antibiotics and corticosteroids because of their immuno-suppresive property. Why Aspergillosis manifests as Aspergilloma in one case, Fibrosing Alveolitis in another and Allergic Broncho-Pulmonary Pneumonitis in still another is clearly explained to depend mainly on whether the host is atopic or non-atopic and whether the antigen is a fungus or organic dust and spores.

A short chapter on Actinomycosis and Nocardiosis is also included even though Actinomyces and Nocardia are now believed to be mycobacteria rather than fungi. On the whole it is a very readable yet concise treatise. The general get up of the book is excellent and reproduction of skiagrams and tissue section micrographs is of a high order. It will be found to be very useful by all those dealing with diseases of the chest.

* * *

"COMING TO TERMS WITH CHRONIC BRONCHITIS" by The Chest and Heart Association, London.

This is another booklet in the series being brought out by Chest & Heart Association for laymen. It covers in simple, easily understandable and non-technical language the causes, course and prevention of chronic bronchitis. The Do's and Dont's will help an intelligent sufferer to understand his illness and ameliorate the disability as far as possible.

Although Chronic Bronchitis is not so common in India as in U.K. at present, there is still a real need for this book and it will be of use and help to all those who are interested in health and health education.

* * *

"THE CHEST IN HEALTH AND DISEASE" by Kenneth P. Goldman, Published by Chest & Heart Association, London. Pp. 132, 18s. or $3.50.

This booklet is another in the series of similar books which are being brought out by the Chest & Heart Association for education of the community in diseases of the chest. The book, like its predecessors, deals lucidly with the causes, management and prevention of all important diseases of the respiratory system and would interest both lay and para-medical readers. Highly technical phraseology has been scrupulously avoided. In a presentation like this, over simplification becomes unavoidable. However, simplification has not been achieved at the cost of accuracy. The author has covered practically all important chest diseases from common cold to cancer of the lung. Since chest diseases still continue to take a heavy toll of life and even larger toll in terms of man days lost, the book would be of immense value not only to sufferers but also to those who want to protect themselves from these diseases. On the whole the book constitutes a very significant addition to the available literature on the subject and would fulfil a real need. It is highly commended.

PLANNING INDIA'S HEALTH by K.S. Sanjivi, published by Orient Longman Ltd., New Delhi, 1971. Price Rs. 8/-.

Health services available in the rural areas of our country are grossly inadequate. On the other hand the available medical and para-medical man-power is not properly utilized. Opening new medical colleges and increase in the number of doctors qualifying each year since independence has not brought about the desired improvement in the quality and quantum of health services in the rural areas. The author, after a thorough study of the pattern of health services in several countries like USA, UK, USSR and available financial and man-power resources in our country has recommended a pattern which can provide a break-through.

It is common knowledge that the concept of primary health centre with its integrated approach to meet all curative and preventive health needs of the rural population is feasible and scientifically sound but it has failed to deliver the goods so far. One of the main reasons appears to be the large population spread over a vast area which a primary health centre is required to look after. To that extent, the scheme of mini-PHC recommended by the author will certainly go a long way to meet the urgent requirements of the rural population. Each of these mini-PHCs will be required to look after 2000 families i.e. a population of 10,000 only. Referral system, upgrading of facilities in Taluqa hospitals and strengthening out of administrative bottle-necks will also bring the specialists' advice within the easy reach of rural population.

The author is not a mere theoretician but has been associated with a similar scheme already operating successfully in Madras. One may however not agree fully with the author regarding the financial aspects of the scheme. According to the author each mini-PHC is likely to cost about Rs. 30,000/- per year which amount, according to him, can easily be met by compulsory subscription of 0.5% of the annual income of the 2000 families that each such centre will be looking after. The expenditure of such a mini centre will probably be much more ; but there is no reason why the balance should not be met out of the state exchequer. After all no health service can be expected to be self-supporting. Even if a part of the huge amount spent on the family planning programme is diverted towards running of the mini-PHCs, the latter can work successfully and effectively, looking after all health needs of the community, including family planning.

The author has done a real service to the country by bringing out this volume which deals with practically all aspects of planning and manning of health services in all parts of the country. This book should be read by all doctors, adminstrators, planners and those interested in the community's health and welfare.

S.P. PAMRA

NEWS AND NOTES

27TH NATIONAL CONFERENCE ON TB & CHEST DISEASES

Due to National Emergency, it has been decided that the 27th National Conference on Tuberculosis & Chest Diseases to be held in Patna from 2nd to 5th January, 1972 be postponed to a date to be announced later.

TB SEAL CAMPAIGN

The Twentysecond TB Seal Sale Campaign which has been in progress since October 2, 1971 will officially terminate on 26th January, 1972.

CHEST & HEART ASSOCIATION FELLOWSHIP : LONDON (1971-72)

The Chest & Heart Association, London, offered two Fellowships for the years 1971-72 and 1972-73 to be awarded to two Indian Doctors selected by the Tuberculosis Association of India. The Association selected Dr. M.M. Singh, Medical Superintendent, Rajen Babu TB Hospital, Delhi, for the first Fellowship. Dr. E.V.V. Gupta, Superintendent-in-charge, Lady Willingdon TB Demonstration & Training Centre, Bangalore, has been selected for the second Fellowship.

With these two, the number of Fellowships offered by the Chest & Heart Association, London from 1955 comes to ten. The fellowships is of £500 and the travel expenses are to be borne either by the candidates or by the sponsoring authority. The selected candidates are given the programme by the Chest & Heart Association for visiting various institutions in U.K. for eight weeks and in the Continent for two weeks.

ESSAY COMPETITION

Eight Medical students entered the competition for the cash prize of Rs. 300 instituted by the Association for an original essay on Tuberculosis. The paper prepared by Shri Bhaskar Mukherjee of the Medical College, Calcutta on "Chemotherapy of Tuberculosis" has been selected for this award. The prize will be made at the time of the 27th National Conference in Patna, the dates for which will be announced in due course.

REFRESHER COURSES FOR GENERAL PRACTITIONERS

The New Delhi TB Centre held three Refresher Courses, each of one week's duration in the month of October, 1971. One of these was for general practitioners working in the northern states and was attended by 11 doctors. This was organised in collaboration with the IMA College of General Practitioners. The second course was for TB Health Visitors and was attended by eleven health visitors. The third course, was for X-ray Technicians, and was attended by four X-ray technicians.

While several courses have been held previously for general practitioners, Refresher Courses for TB Health Visitors and X-ray technicians is a recent innovation. The Centre proposes to hold in future one Refresher Course every year for general practitioners, nurses, health visitors, X-ray technicians, etc. Those desirous of participating in these courses may write to the Director, New Delhi TB Centre, Jawaharlal Nehru Marg, New Delhi-1.

TUBERCULOSIS CAMP (SHIBIR)

The Andhra Pradesh TB Association organised a Camp in Achampet, Hyderabad in cooperation with the Mobile Hospital of the Union Ministry of Health on 23rd October, 1971.

MYSORE ASSOCIATION

His Excellency the Governor of Mysore, while inaugurating the 22nd TB Seal Sale Campaign at Raj Bhavan called for intensive measures against malnutrition among the children to check the incidence of tuberculosis.

Dr. T. Manickam, former Special Officer for E.N.T. department and a member of the Executive & Technical Committee of the State TB Association, has been visiting some of the districts in connection with the development of various anti-TB activities. The District TB Association, Mysore has agreed to implement the nutrition programme at an early date in Mysore District TB Centre.

TB SEMINAR

The Tamil Nadu TB Association will organise a seminar on Tuberculosis in the month of December, 1971. A large number of TB specialists from the State are expected to participate in the Seminar.

DR. M.D. DESHMUKH

Dr. M.D. Deshmukh, Hony. Secretary, Maharashtra State Anti-TB Association, has been elected a Fellow of the Indian Academy of Medical Sciences, New Delhi.

DR. R. VISWANATHAN

Dr. R. Viswanathan, Emeritus Scientist, Vallabhbhai Patel Chest Institute, Delhi University, has been selected for the award of Gold Medal instituted by T.A.I, for the year 1972.

DR. JIVRAJ N. MEHTA

Dr. Jivraj N. Mehta, M.P. has been awarded the Dr. B.C. Roy National award (1969) in the category of "Medical man-cum-Statesman" by the Medical Council of India. The award is of the value of Rs. 50,000 in cash and will be presented at a special function to be held early next year.

SYDNEY CONFERENCE

The 8th Eastern Regional TB Conference of the International Union Against Tuberculosis will be held in Sydney (Australia) from the 30th October to 3rd November, 1972. The Australian TB & Chest Association Inc. will play host to this Conference. Those who wish to attend this Conference may contact the Secretary-General, Tuberculosis Association of India, 3, Red Cross Road, New Delhi-1.

OBITUARY

The Tuberculosis Association of India deeply regrets the death of Dr. R.B. Billimoria and Dr. B.B. Yodh, the two oldest specialists in the TB field, on 30th September and 31st October respectively. The Executive Committee of the Association mourned the passing away of these two stalwarts and recorded the following resolutions :—

DR. R.B. BILLIMORIA

"The Executive Committee of the Tuberculosis Association of India learnt with great sorrow that Dr. R.B. Billimoria who was one of the oldest specialists in the tuberculosis field passed away on 30th September last. Dr. Billimoria was the first President of the TB Workers Conference held in Calcutta in 1948 and also the President of the 6th National TB Conference. He was the first Chairman of the Technical Committee of this Association in 1949. He was an early pioneer in anti-tuberculosis work and highly respected by his colleagues, patients and the medical profession. Dr. Billimoria was the founder-Director of the Bel Air Sanatorium for TB in Panchgani which is today one of the finest Sanatoria in Maharashtra. He was awarded Padmabhusan on recognition of his services in the tuberculosis field. The Executive Committee mourns this loss and offers its condolences to Mrs. Billimoria and other members of the bereaved family."

DR. B.B. YODH

"The Executive Committee of the Tuberculosis Association of India learnt with deep sorrow that Dr. B.B. Yodh passed away on the 31st of October last. Inspite of his preoccupations in the medical profession, Dr. Yodh was intimately connected with the Maharashtra State TB Association as one of its founders and Organising Secretary for several years and as its Vice-President during the past few years. He was President of the twelfth National Tuberculosis Conference and Chairman of our Technical Committee. In his passing away, the medical profession, the anti-TB movement in general and the Tuberculosis Association of India in particular have lost a highly respected worker. The Executive Committee mourns this loss and oifers its condolences to Mrs. Yodh and other members of the bereaved family."

The Indian Journal of Tuberculosis

ABSTRACTS

Vol. XIX January 1972 Abst. No. 1

A Controlled Clinical Trial of the Role of Thiacetazone containing Regimens in the treatment of Pulmonary Tuberculosis in Singapore.

Singapore Tuberculosis Service/ Bromptom Hospital I British Medical Research Council Investigation. Tubercle, (1971), 52, 88.

The results of the role of thiacetazone containing regimens allocated at random to newly diagnosed patients with smear positive disease were analyzed.

In all 114 SH/11, 94 STH/TH and 78 TH patients were assessed after one year treatment.

The drug schedule was a) SH/H Streptomycin I gm, daily for six months followed by Isoniazid 300 mgm. b) STH/TH Streptomycin 1 gm. daily plus Thiacetazone 150 mgm. plus Isoniazid 300 mgm. daily for six months followed by Thiacetazone 150 mgm. plus Isoniazid 300 mg. daily, c) Th:-Thiacetazone 150 mgm. plus Isoniazid 300 mgm daily.

At six months 100% SH/H, 98% STH/TH and 76% TH patients were culture negative as were 97%, 99% and 69% respectively at 12 months.

The proportion of patients with Isoniazid-resistant strains at 12 months were 3% of the SH/H, 5% of the STH/TH, and 27% of the TH regimen. None of the patients developed resistance to Streptomycin in the SH/H or STH/TH regimen. Lowered susceptibility to Thiacetazone was seen in some in the TH regimen.

Side effects were reported in 64% of 131 SH/H, 91% of the 128 STH/TH and 72% of the 100 TH patients. It is concluded that neither of the Thiacetazone containing regimen has a role in the routine treatment of ne wly diagnosed patients with Pulmonary Tuberculosis. The STH/TH regimen is more toxic. TH regimen is ineffective and toxic.

H.B.D.

Ethambutol Compared to Streptomycin in Original Treatment of Advanced Pulmonary Tuberculosis.

I.D. Bobrowitz. Chest: Vol. 60, No. I, July 71.

Results of hundred and eighty days of SM and EMB with each drug a part of a three drug regimen including INH and PAS and a regimen of EMB-INH were compared.

The findings indicated no significant superiority of SM to EMB combined with INH and PAS.

EMB-INH regimen appeared as effective as the three drug combination,

H.B.D.

Ten Year Results during the Introduction of Chemotherapy for Tuberculosis.

V.H. Springett. Tub. (1971), 5,273

Results of the chemotherapy alone in an unselected complete population treated under routine conditions do not differ from those obtained in Controlled Clinical trials.

Mortality for sputum positive tuberculosis patients has declined 14 times to 3 times than to be expected in general population.

H.B.D.

A Survey of Tuberculosis Mortality in England and Wales in 1968.

Tuberc. (1971), 52, 1.

An enquiry was done into the death of 1201 death certificates due to tuberculosis between February 1st and April 30th, 1968. Of these 884 cases were investigated and of these 40 were excluded because in these there was no evidence of tuberculosis.

In 844 included in the analysis, 263 deaths were due to active tuberculosis, 52 of these

were diagnosed only after death thus these were failures of diagnosis, 140 died more than three months after diagnosis, these were failures of management and treatment and 71 died within three months of diagnosis.

In 244 deaths were due to inactive tuberculosis leading to respiratory failure in 226, haemorrage associated with an aspergilloma in 3, and failure of other organs in 15.

Of the 263 cases in which death was due to active tuberculosis, avoidable factors responsible for or contributing to death were identified in 211 of the 263 cases in which death was due to active tuberculosis.

More than one factor was identified in 50. 106 patients were responsible for delay in diagnosis or failure of treatment, mostly due to old age, mental disorder and alcoholism. In 27 welfare service to community was inadequate. In 149, medical care was unsatisfactory.

H.B.D.

Isoniazid overdose: Report of 40 patients, with a critical analysis of treatment and suggestions for prevention.

C.L. Whitefield et al. Amer. Rev. Resp. Dis. 1971, 103,'887.

INH overdose can take place through negligence giving rise to severe and serious sequelae. Overdose is manifested by seizures, obtundation, respiratory distress and metabolic acidosis. 50% of the patients may become comatose. Treatment consists of supportive care of the respiratory and cardie-vascular systems as well as intravenous sodium bicarborate to counteract acidosis. Gastric lavage, diuresis, anticonvulsants, pareternal pyridoxine and dialysis are also of help frequently.

S.P.P.

Ethambutol in the treatment of Tuberculous Meningitis: Preliminary Report of a Prospective, Controlled Therapy Trial.

K. Sorensen et al. Amer. Rev. Resp. Dis.; 1971, 103, 887.

Fifty six cases of tuberculous meningitis were studied during the period March, 1969 to May, 1970. The diagnosis was confirmed bacteriologically in 55% of the cases. In the remaining the diagnosis was based on biochemical findings of C.S.F. and clinical course. Nearly half the patients, randomly selected, were treated with streptomycin, INH and PAS and the other half with streptomycin, INH and Ethambutol. The two groups of patients were compareable as to age, sex and duration of symptoms. The response to therapy was also found to be comparable in the two treatment groups as measured by time required before improvement in clinical status and return towards normality of C.S.F. There were 12 deaths in the PAS group and 9 in the ethambutol group but the difference was not statistically significant. No evidence of ocular toxicity was met with.

S.P.P.

Efficacy of BCG and Isoniazid-Resistant BCG with and without Isoniazid Chemcprophylaxis.

N. Dworski et al. Amer. Rev, Resp, Dis.: 1971, 103, 888.

A Haitian population with a tuberculous prevalence of 2.8% and infection rate of 6.3% per year was selected for a field trial to compare the efficacy of ordinary BCG and INH-resistant BCG with and without INH chemoprophylaxis. A third group was given a placebo vaccine. The new case rate difference between conventional BCG and INH-resistant BCG with or without INH chemoprophylaxis was not significant. Separate analysis in terms of non-reactors or weak reactors to PPD before vaccination did not influence the results. It is therefore, concluded that BCG and INH chemoprophylaxis can be given concomitantly when conditions warrant, and the protection conferred by BCG in this study was not decreased sufficiently to justify the use of INH resistant vaccine.

S.P.P.

Microscopy positive and microscopy negative cases of pulmonary tuberculosis.

Raj Narain et al. Amer. Rev. Resp. Dis.; 1971, 103, 761.

Data from 3 successive prevalence surveys in 133 villages in Bangalore district have shown that patients whose sputum was positive by direct microscopy constituted 39% of the total patients whose sputum was positive by culture. Direct microscopy positive patients had more extensive disease and were more infectious to household contacts than patients whose sputum was negative by direct microscopy but positive by culture. The effect of excluding 61 % direct smear negative culture positive cases from national control programme (which

aims at detecting only direct smear positives) could be significant.

Examination of only one specimen of sputum whether by microscopy or by culture failed to reveal a substantial number of cases. Patients with Acid Fast Bacilli in the sputum by microscopy but negative by culture were mostly errors in diagnosis by microscopy. The Ziehl-Neelsen technique led to such errors significantly more often than fluorescence microscopy.

S.P.P.

Tuberculosis risk and marital status.

Ole Horwitz Amer. Rev. Resp. Dis.; 1971, 104. 22.

From 1960 to 1968, a total of 3,596 adult men and 2,274 adult women were reported to have developed pulmonary tuberculosis in Denmark. Amongst men, those married had the lowest incidence for all age groups. The rates were twice as high amongst single men and widowers, and 4 times higher amongst divorced men. Among women, the same pattern was observed but the differences were smaller. In the capital city of Copenhagen where the prevalence of tuberculosis is the highest in the country, the differences amongst various groups from marital point of view were also more marked than in rural areas. This applied specially to men. In the rural districts the differences between various groups were smaller especially amongst women. Further, the cases of tuberculosis were more severe among unmarried than married persons.

A group's eligibility for case-finding programme depends on its size, its yield of cases and its risk of disease. Judged by these criteria, unmarried men especially in big cities deserve close surveillance as a group.

S.P.P.

Tuberculosis—diagnosed and undiagnosed—as a cause of death.—Autopsy observations.

Veikko Makela, Kari Ala-Kidju, Juhani Hoist & Tuomo Siljander Scand. J. Resp. Dis.: 1971, 52, 13.

During the year 1959-1968, 8,479 autopsies were carried out in Helsinki. In 129 of these tuberculosis was the principal cause of death. In more than half of these 129, active tubergulosis was also the immediate cause of death. In 49 cases (nearly 33%), the diagnosis of tuberculosis was not made before autopsy. Miliary type of disease was seen in 41 of the total tuberculous cases, 25 out of which were diagnosed as tuberculous at autopsy. Cor-pulmonale was the most important immediate cause of death in those with inactive tuberculous lesions in the lung. The average length of clinical history in such cases was 18.5 years. The authors conclude that in elderly patients in particular, in that country, tuberculosis may run an atypical course with practically no symptoms. Further, the disease may simulate pneumonia, pulmonary or mediastinal tumour or cardiac failure, or may manifest as fever of unknown origin.

S.P.P.

Familial Sarcoidosis

O.P. Sharma, C.S. Johnson & O.J. Balchum Amer. Rev. Resp. Dis.: 1971, 104, 255.

Familial sarcoidosis is rare. The total number of such cases involving more than one member of the family is so small that it can be considered to occur no more often than would be expected by chance. The report deals with a family of 9 siblings, 4 of whom developed sarcoidosis. They were all in the age group 20 to 25 years, 3 of them males and one female. It is suggested that a complex constitutional factor (? heredity) might be operating in the pathogenesis of sarcoidosis.

S.P.P.

Tuberculin tests during the course of Srcoidosis in 350 patients.

E. Leslie Chusid et al Amer. Rev. Resp. Dis. 1971, 104, 13.

Tuberculin sensitivity was determined in 350 patients of Sarcoidosis diagnosed during the preceding 22 years. In all patients the diagnosis was established by biopsy of an organ, Kveim test or both. At first presentation 54% were non-reactors to 100 TU to 250 TU, 32% reacted only to 100 TU to 250 TU and 14% reacted to 1 TU to 10 TU. Thus 86% of the patients were either non-reactors or weak reactors. The ratio of non-reactors and weak reactors to strong reactors remained unchanged all through this period. In 91 of the patients in whom serial tests were done, reaction to tuberculin did not change in more than two-thirds. The differences among patients with subacute and chronic forms of sarcoidosis were not significant. When sar-

coidosis stabilized or became clinically inactive tuberculin reaction showed little change from that present during the active phase amongst 69 patients who were tested serially. In the presence of active tuberculosis, either before or concurrently with Sarcoidosis the tuberculin reaction was not suppressed and all but 4 of the 20 such patients were strong reactors. Superimposed tuberculosis in patients with Sarcoidosis is thus manifested by change of tuberculin reaction from negative or weak reaction to strongly positive reaction.

S.P.P.

Respiratory function in Sarcoidosis and other interstitial lung diseases with similar radiological appearance.

J.R, Va'e. Scand. J. Resp. Dis.; 1971, 52, 1.

Lung function at rest and during exercise was studied in non-fibrotic pulmonary sarcoidosis confirmed by lymph node biopsy, and in patients with corresponding bilateral lung densities where intrathoracic lymph node biopsies had not revealed signs of sarcoidosis. Cases of tuberculosis and pneumoconiosis had been excluded and comparable groups were arranged by matching 8 pairs with regard to sex, age and duration of disease. Fibrosing alveolitis and allied conditions dominated the non-sarcoidotic group. Whereas spirometrical data were normal in the group of sarcoidosis, a restrictive ventilatory impairment was evident in the other. Alveolar-arterial O_2 tension difference and dead space for CO_2 exceeded slightly normal levels in patients with sarcoidosis. Their matched partners showed significantly higher values of both parameters, particularly during exercise. A close association between the alveolar-arterial O_2 difference and the dead space indicates that maldistribution of the ventilation-perfusion relationship is mainly responsible for the hypoxemia on exercise in diffuse, restrictive lung disease. The severity of functional impairment was unrelated to the radiological appearance.

S.P.P.

Intrathoracic Splenosis

Martin L, Dalian Jr. et al. Amer. Rev. Resp. Dis.; 1971, 103, 827.

Autotransplantation of splenic tissue after trauma has been reported. Intrathoracic transplantation is also possible, though rare, in cases where trauma involves diaphragm as well as the spleen. It has been theorized that pleura! autotransplant probably arose from the migration of splenic tissue through a small rent in the diaphragm. The possibility of blood stream spread however, cannot be excluded. Intrathoracic splenosis is usually asymptomatic and manifests as a single or multiple 'coin' shadows and has to be distinguished from several other conditions giving rise to such shadows.

S.P.P.

Death from rupture of the aorta on the basis of tuberculous lesions.

Maria Cesarz-Frongzyk Lech Zimnoch. Materia Medica Polona; 1970, 2 : No, 2J3(4), 61.

Tuberculous lesions of the great blood vessels are rare. Tuberculosis of the ascending Aorta is one of the rarest. The case of a male 56 years old argricultural worker suffering from pulmonary tuberculosis for 5 years (and treated more or less irregularly during this period) is reported. He died suddenly with symptoms suspected of myocardial infarction. Autopsy revealed an extensive transverse rupture of the Aorta with evidence of tuberculous lesions in its walls. The lesion in the Aorta was probably caused by spread of the process from neighbouring caseous lymphnodes to the walls of the Aorta. Death was the result of perforation and massive hemorrhage into the pericardial sac.

S.P.P.

Pleural Effusion complicating intensive media -stina' radiation therapy.

Michael E. Whitcomb and Marvin I. Schwarz. Amer. Rev. Resp. Dis.: 1971, 103, 100,

Three patients who had previously received intensive radiation to the mediastinum for malignant disease presented with pleural effusion. Two of these patients died and another underwent exploratory thoracotomy. Malignant cells were absent in repeated pleural aspirates in all these patients. Histological examination of the pleura was possible in each case. Although pleural fibrosis was present in each case, no other pleural abnormality that could explain the presence of pleural effusion was observed. No evidence of radiation pneumonitis was present in the two autopsied cases. The development of effusion cannot, therefore, be ascribed to direct radiation injury to large areas of pleural surface. Pericardial restriction, superior vana caval obstruction and

mediastinal lymphatic obstruction could all be the possible causes of pleural fluid collection.

S.P.P.

Peripheral Measurable Bronchogenic Carcinoma

William Weiss, Afner. Rev. Resp. Dis ; 1971, 103, 198.

Because therapy is often not curative in primary lung cancer, prognosis is determined to a large extent by the biological character of the tumour viz. its growth rate and tendency to metastasize. Three studies were carried out in Philadelphia and London on a total of 103,259 old men with an observation period ranging from 3 to 10 years. Serial films taken at approximately 6 months interval were the basis of observation. Histologically confirmed lung cancer developed in 286 of these men. Estimates of speed of growth were confined to only those cases where the peripheral growth was at least 2 cm in diameter and serial x-rays for at least 5 years were available. Squamous cell and undifFerentiated carcinomas tend to grow more rapidly as compared to adenocarcinoma. Therefore, if growth rate were the only factor determining the length of survival, then patients with adenocarcinoma should have the best prognosis and those with the other two types of tumour should fare equally badly. However, tendency and speed of metastasis is also a modifying factor in survival. Undifierentiated carcinoma and adenocarcinoma show a high metastatic potential whereas squamous cell carcinoma has only a moderate metastatic tendency. Combining both factors, undifferentiated carcinomas have a very poor prognosis. Patients with spuamous cell carcinoma are more amenable to treatment because despite rapid growth, some of them do not metastasize. Patients with adenocarcinoma can survive longer periods despite high metastatic potential, because they grow slowly.

S.P.P.