

The Indian Journal of Tuberculosis

Vol. XVIII

New Delhi, October 1971

No. 4

DRUG DEFAULT

The value of anti-TB chemotherapy has been vindicated in numerous studies. That it can cure over 95% of cases, restore them quickly to normalcy and its effectiveness is the same under the home and hospital conditions—is now common knowledge. All these statements can be true only if the administration of the drugs is appropriate, adequate and acceptable.

India accepted nearly three decades ago 'Clinic-based domiciliary treatment' as one of its major programmes for tuberculosis control. Efforts are being made to implement the programme according to her limited financial and technical resources. At present the services are being extended through what is commonly known as the 'District Control Programme'. But it became apparent that the very basis of this great contribution from science is being seriously undermined by extensive drug default or failure in regular administration of drugs.

Adverse effects of drug default on an individual patient cannot be correctly assessed because of the undeterminable factors like the nature and number of the persistent bacilli and the immunological status of the body. It may, however, be right to assume generally that the more the extent of default the greater the adverse effect.

Default may be as a result of many factors—such as premature fall-outs, long and short interruptions, inappropriate and unacceptable drug regimen, non-cooperativeness, long distances and lack of conveyance to the drug collection centre as also non-availability of the drugs at the centre, etc. So far there is no extensive cooperative study on the causes, kinds of default and their adverse effects. It would make our tuberculosis control programme more effective if ICMR can organise such a study.

Irregular drug-intake not only makes the patients chronic incurables, but exposes them as potentially dangerous to the community for drug resistant infections. It denies to those who develop disease from such infections the benefits of the standard drugs. To treat the defaulters as also these new cases so-called second line drugs will have to be used which are much less effective (except Ethambutol and Rifampicin) and more expensive and toxic. These can hardly be used in unsupervised domiciliary service with absolute

safety and they are beyond the reach of most of the patients because of their prohibitive cost.

These undeniable facts not only jeopardise the present programme but will also complicate control of tuberculosis immensely in future. How to revoke the situation is our problem. To detect default, proper drug supply register is most useful and it should be uniformly enforced. Pill counting, tests to detect PAS and INH in urine, etc., do not appear to be of much use. Preventive measures will be of more value than the corrective ones. Indoctrination and motivation of the patients, specially at the start of treatment, are very important. These should not be left to the health visitors alone. The doctor-in-charge should himself explain to the patients the benefits of regularity and grave dangers of irregularity in drug-intake, preferably in the presence of a responsible member of the family who may then serve as a constant supervisor. With our limited resources, concentration of home visits, during early stages of the therapy and later follow up of defaulters only may be more paying.

Whatever may be the contribution of technical advances towards default action it is certain that success will largely depend on combating the natural resistance of the patient against long and continuous drug taking when he feels well and is working. Community must give him moral support and sympathy not only for the sake of the patient himself but also for its own sake. This will require education to improve community awareness and extensive organisation to provide voluntary aid and supervision, initially, a few 'pilot projects' may be developed adapted to different local conditions. They need not be merely replicas of 'Tumkur Project' and may be a difficult task. But the problem of drug default is so grave that it brooks no delay. Tuberculosis Association of India and its branches in cooperation with the Government and other agencies should apply themselves most earnestly to realise this end.

CASH AWARD FOR PAPER ON 'RECOVERY OF DEFAULTERS'

Shri H.B. Shah, President and Managing Trustee of the Bharatiya Arogya Nidhi, announces the award of two prizes, of Rs. 500 and Rs. 300 outstanding papers on "RECOVERY OF DEFAULTERS DURING DOMICILIARY TREATMENT IN TUBERCULOSIS". This competition is open to the Medical and Para-Medical persons working in the field of tuberculosis. The paper should be based on the personal work, should be written in English (5 copies) and should not exceed 3,000 words. The award winning papers may

be read at the 10th Maharashtra State Tuberculosis & Chest Diseases Conference to be held in March 1972 and shall be the exclusive property of the Bharatiya Arogya Nidhi. The prizes will be awarded during Conference.

The paper should reach the Honorary Secretary Maharashtra State Anti-Tuberculosis Association, Organised Home Treatment Clinic Jerbai Wadia Road, Sewree, Bombay-15 DD,

on or before the 26th January, 1972.

COLLECTION AND CONSUMPTION OF SELF ADMINISTERED ANTITUBERCULOSIS DRUGS UNDER PROGRAMME CONDITIONS

G.D. GOTHI, D. SAVIC, G.V.J. BAILY, K.P. RAO, S.S. NAIR AND R. SAMUFL
(From National Tuberculosis Institute, Bangalore)

Synopsis

Among 816 tuberculosis patients living in Bangalore city and anxious to take treatment from the Lady Willingdon TB Demonstration and Training Centre, Bangalore, 54 per cent made ten or more monthly drug collections over a period of fifteen months. Judged by urine test, on an average, at any point of time, 70 per cent of those who collected drugs in any treatment month consumed them. This by and large substantiates the prevailing impression that those who take the trouble of collecting drugs would also consume them. It therefore suggests that in the National Tuberculosis Programme it is more important to prevent default in drug collection than to supervise drug consumption.

Introduction

In self administered antituberculosis therapy under domiciliary conditions, regularity of drug collection and consumption and duration of treatment are as important as the clinical efficiency of the prescribed drug regimen and sensitivity of bacilli to those drugs. While the period of treatment and the regularity of drug collection can be ascertained from clinic records, pill count at patient's home or urine examination for excretion of drugs or their metabolites becomes necessary to confirm drug consumption.

District Tuberculosis Programme envisages diagnosis and treatment of tuberculosis patients from areas spread far and wide by general health institutions throughout the district (Piot 1962; Nagpaul 1967). Neither pill count nor urine examination is feasible under programme conditions. It is therefore assumed that those who take pains to collect drugs would also consume them. Such an assumption needs confirmation.

Object of Investigation

The purpose of this investigation was to study the drug collection and consumption among tuberculosis patients put on treatment, in terms of the proportions that make the various "levels" of drug collection and the proportion among them that consumes drugs at different points of time during the total period of treatment.

Methods and Material

The study was conducted at the Lady Willingdon TB Demonstration and Training Centre, Bangalore (hereinafter the Centre) that provides the usual antituberculosis service as outlined in the District Tuberculosis Programme. The study was conducted and supervised by a medical officer and two public health nurses of the National Tuberculosis Institute (NTI), Bangalore. Three NTI health visitors collected urine specimens during surprise home visits.

Eligibility for inclusion in the study

All tuberculosis patients newly diagnosed by the Centre, if aged 5 years and above, irrespective of sputum status were eligible for inclusion in the study. In addition, the patients had to affirm that they would be taking treatment only from the Centre. To facilitate home visits for urine collection the patients also had to be residents of Bangalore city.

Investigations

As in the programme, the routine investigations for the study patients consisted of a chest photofluorogram and smear examination of a spot sputum specimen. To meet the requirements of the study, culture examination, of sputum and drug sensitivity tests were done at the NTI. Follow-up examinations of sputum, on the same lines, were also done at the NTI.

A spot specimen of urine collected at the time of intake was tested for the presence of Isoniazid (INH) and Para-Aminosalicylic Acid (PAS). Follow-up urine examinations were planned in such a way that a patient had to provide only one specimen during his entire period of treatment lest frequent collection influences the drug consumption. Urine specimens were planned to be collected in the 1st, 2nd, 4th, 6th, 9th and 12th months of treatment in order to distribute the collections over the entire study period, each patient providing urine once during any of the months. Correspondingly, the patients were divided into six consecutive cohorts taken serially at the time of intake and each cohort was randomly allocated for urine collection. Thus

cohort one patients had to provide urine during the 1st month of treatment, cohort two in the 9th month, cohort three in the 12th month, cohort four in the 4th month, cohort five in the 2nd month and cohort six in the 6th month of treatment. Based on the expected losses of patients that occur between the time of intake and the month for urine collection, the size of each cohort was determined at intake in order to have almost equal numbers in each cohort at urine collection. Thus, while the cohort due for urine collection in the first treatment month had 100 consecutive patients, that due for urine collection in the second treatment month contained 113 patients and so on (Appendix Table II). In the sixth cohort instead of 137 patients only 113 were taken due to oversight. The day for urine collection at a patient's home within the allotted month and within the 33 days available for consumption of drugs after collection was also determined roughly at the time of intake for each patient. In case a patient was not found at home on the day fixed for his urine collection, two further efforts were made to contact him on different days. If in the meantime he happened to visit the Centre for a check up or drug collection the urine was collected at the Centre.

All urine tests were done at the NTI. Specimens collected in the forenoon were tested the same day while the rest were preserved at 4°C for testing the next day. For INH, the direct naphthaquinone-mercuric chloride test (N-M test of Short and Case, 1957); the combined N-M test (Gangadharam, 1958); the paper spot test (Cattaneo, 1960) and the acetyl-isoniazid test (Eidus, 1964) were performed. However, the acetyl-isoniazid test results were preferred, as this test is considered more sensitive and specific. A comparative study of these INH tests will be reported separately. For PAS, both the ferric chloride (Simpson, 1956) and the Case test (Case, 1961) were performed; the Case test results were preferred. For 21 patients the acetyl-isoniazid test and for 7 patients the Case test results were not available, therefore the results of N-M test and ferric chloride test respectively were taken into consideration. The tests were read independently and without reference to the results of the other tests. A positive result was considered as evidence of drug intake within 18 hours prior to the collection of urine since sensitivity of these tests beyond that time limit decreases.

Treatment—procedure and regimens

Patients were put on treatment immediately

after diagnosis. The direct smear sputum positive patients were put on the self-administered double drug regimen namely. INH 300 mg in a single daily dose with PAS 10 G daily in two divided doses. The direct smear negatives were prescribed INH 300 mg daily in a single dose; if their pre-treatment sputum culture turned out to be positive, they were switched over to the double drug regimen. All patients were advised to take INH at bed time in view of urine collections planned for the morning or afternoons of the following day.

All patients were "motivated" as per routine to take drugs regularly and uninterruptedly for a period of 12 months. They were to collect drugs from the Centre once a month in quantities sufficient to last for 33 days. If a patient failed to report for the next collection, he was first reminded through a letter on the 34th day and in the event of no response for a week, personally contacted by a health visitor. A period of 15 months was allowed to each patient to complete the 12 monthly collections. The sputum positive patients who became negative after six months of treatment were prescribed INH alone for the remaining period.

Material

Out of 34,692 registered new outpatients (during the period 23.9.1964 to 1.2.1966) 2,756 persons were diagnosed as suffering from pulmonary tuberculosis, including pleural effusions and tubercular hilar adenitis. Excluding those who were ineligible, 816 patients were admitted to the study. Initial sputum microscopy results were available for 747 patients (91 per cent) of whom 456 were positive. Sputum culture results were available for 713 patients (88 per cent) and 482 cultures were positive: 393 patients were positive both by culture and smear examinations, 89 by culture alone and 63 by direct smear alone. Drug sensitivity tests were done on 439 cultures, 98 were resistant to INH (22 per cent), eleven were resistant to Streptomycin and/or PAS but not INH while 330 were sensitive to all the three drugs (75 per cent). The age and sex distributions of the total patients and the number of direct smear positives among them did not differ between the study patients and the patients diagnosed during the calendar year 1964 (Appendix Table I), substantiating the representativeness of the study patients. Age and sex of the patients in the six consecutive cohorts were also similar (Appendix Table II), but the proportion of direct smear positives differed in the fifth cohort, perhaps on account of small numbers.

APPENDIX TABLE I

Centre and study patients by age, sex and direct microscopy results*

Age group	Sex	No. of patients		Sputum positive	
		Study	Centre	Study %	Centre %
5 — 14	M	21	54	33	16
	F	20	63	67	25
15 —24	M	90	192	73	51
	F	132	227	55	46
25—44	M	213	380	59	57
	F	206	342	63	42
45 +	M	100	237	67	43
	F	54	65	45	35
Total	M	424	863	63	50
	F	392	697	59	42
	Both Sexes	816	1560	61	46

All patients diagnosed by the centre during the Calendar year 1964

APPENDIX TABLE II

Patients in the cohorts by age, sex and direct microscopy results

Cohort	No. of patients	Per cent		Per cent in age group				Per cent sputum positive
		M	F	5 - 15	15 - 24	25 - 44	45 +	
1	100	55	45	3	28	54	15	63
2	172	57	43	6	24	55	15	62
3	196	54	46	6	27	51	16	70
4	122	52	48	2	29	47	22	68
5	113	46	54	6	32	46	16	41
6	113	43	57	6	26	54	14	56
Total	816	52	48	5	27	52	16	61

Finding*Drug collection level**

Out of 816 patients, 439 (54 per cent) made

*Drug collection level denotes the number of monthly drug Collections made during a period of 15 months irrespective of being made on due dates or of not

10 or more collections over a period of 15 months. The levels of drug collection cohort-wise (not shown) and in respect of the two drug regimens were similar (Table 1).

Analysis of drug collection by age and sex shows that fewer patients in the age group 45 years and above, in both the sexes made 10 or

TABLE I

Levels of drug collection by age, sex and drug regimens

Age group	No. of patients		Percent making drug collections			
			1 or more	4 or more	7 or more	10 or more
5 — 14	M	21	100	81.0	76.2	52.4
	F	20	100	85.0	80.0	70.0
15 — 24	M	90	100	78.9	73.3	60.0
	F	132	100	79.5	69.7	56.1
25 — 44	M	213	100	68.1	57.3	46.4
	F	206	100	80.6	71.4	63.1
45 +	M	100	100	63.0	53.0	39.0
	F	54	100	82.3	58.5	41.2
Total	Both	816	100	75.0	65.2	53.8
<i>Regimen</i>						
INH		341	100	73.9	64.2	52.8
INH+PAS		475	100	75.8	65.9	54.5

collections compared with the other age groups. Further, fewer males made 10 or more collections compared with females in all age groups (except 15-24 years). These differences are statistically significant. The initial radiological or bacteriological status including the drug sensitivity status did not influence the level of drug collection.

*Relationship between drug collection and drug consumption**

The urine collection coverage for the cohorts ranged from 62 per cent in the 4th month's cohort to 80 per cent in the 6th month's cohort. There was no significant variation in the coverage between the cohorts ($.05 < P < .10$). Of 816 patients, 540 (66 per cent) collected drugs during the months fixed for their urine examination, and from among them urine specimens were collected from 377 patients (70 per cent) within 33 days of the drug collection.

Urine specimens from 292 patients were collected at their homes and from the remain-

* Drug consumption is judged by a positive urine results.

ing 85 at the Centre. The proportion of positive results among the two groups being similar the total 377 patients have been considered together. The shortfall in urine coverage, as probably in drug collection, was mainly due to death, migration, hospitalisation or the failure of staff to locate houses. Patients whose urine was collected only after 33 days (66 patients) and hence excluded from the analysis also contributed to the shortfall in coverage.

Table 2 gives the results of urine tests for each of the six cohorts : separately for INH for all patients and for INH and PAS for those taking the double drug regimen. Urine specimens of 71 per cent were positive for INH suggesting a fairly close relationship between drug collection and consumption. With regard to the remaining 29 per cent, it may either mean that they had discontinued drugs or that drugs had not been consumed within 18 hours prior to collection of urine. If the latter presumption is correct then 71 per cent would be conservative estimate of consumption on any day. Table 2 also shows that out of the 377 who had collected drugs, 145 had collected both the drugs ; the sudden fall in their numbers during the 9th and 12th months being due to switch

TABLE 2

Urine test results in those who collected drugs by month of treatment

Month of treatment	All patients			Patients on INH PAS		
	Collected Drugs	Urine collected	% positive for INH	Urine collected	% positive for INH	% positive for PAS
1	100	76	63.2	36	66.7	27.8
2	96	63	85.7	27	88.9	81.5
4	87	54	75.9	39	76.9	66.7
6	59	47	68.1	24	54.2	50.0
9	99	63	69.8	11	81.8	54.5
12	99	74	64.9	8	50.0	50.0
Total	510	377	70.8	145	71.7	55.2

TABLE 3

Urine results by interval between drug collection and urine collection

Interval in days	No. of urine specimens tested	% positive for INH
1—5	37	81.1
6—10	59	66.1
11—15	96	70.8
16—20	102	73.5
21—25	35	60.0
26—30	29	75.9
31—33	19	63.2

over to the single drug after six months on achieving sputum conversion. While 72 per cent of the urines in this group were positive for INH, only 55 percent were positive for PAS suggesting comparatively lesser consumption of the latter.

Differences in positive results denoting drug consumption by age, sex and initial sputum status were not significant. It was, however, observed that though younger patients collected their drugs better than the older patients they did not consume them to the same extent. The positive results were the lowest in the first treatment month suggesting that a number of patients collect the drugs at the time the medical officer prescribes the treatment but actually have no intention of consuming the drugs. There is a gradual decline in the positive results from the 2nd to the 12th month, but the differences are not significant.

Timing of urine collections

The relationship between urine results and the interval in days between drug collection and urine collection is shown in Table 3. Though a majority of urine specimens were collected around the middle of the 33 days period, there was considerable spread in the timing; of the collection.

It would appear that if a patient has or is supposed to have drugs on hand, the time of urine collection does not matter in relation to drug consumption. However, among the 66 patients whose urine specimens were collected

after 33 days of drug collection—when they were presumably without drugs—17 urines (26 per cent) only were positive for INH. It means that a proportion of patients take their drugs irregularly enough to have some supplies left for consumption after 33 days. This is an indirect confirmation of the finding that having collected drugs patients will very likely consume them, and that 71 per cent represents a minimum estimate of consumption on any one day.

Relationship between consumption and response to treatment

Table 4 shows the post-treatment culture

TABLE 4

Post-treatment culture result of initial culture positives who made 10 or more collections during 15 months

Post-treatment status	Initial culture positive			Total
	Sensitive	Resistant*	Not done	
Culture positive sensitive	2	—	—	2
resistant*	26	25	—	51
Total	28	25	—	53
Culture negative	123 (81.5%)	22 (46.8%)	13	158 (74.9%)
Not done	32	13	3	48
Grand total	183	60	16	259

* Resistant to INH

positive patients who made 10 or more collections over a period of 15 months.

Out of the 482 culture positive cases in the entire group 259 (54 per cent) had made 10 or more collections in 15 months. Urine specimen of 77 per cent were positive to INH and 63 per cent to PAS. These 259 comprised 183 having bacilli sensitive to INH, 60 with resistant strains and 16 with sensitivity not determined. Their post-treatment results showed that among the sensitive cases whose post-treatment sputum culture result was available (sputum coverage 82 per cent), 81.5 per cent had become culture negative. Of the remaining 18.5 per cent, a majority were resistant to INH. Of the 32 initially sensitive cases whose post-treatment status could not be determined, a majority did not produce sputum. It was observed that 22 (47 per cent) of the initially resistant cases had also become culture negative.

Of the 223 culture positive patients who had made less than 10 collections, 158 had INH sensitive, 38 resistant organisms to start with and for 27 drug sensitivity could not be determined. Post-treatment sputum results were available for 91 out of the 158 patients with INH sensitive organisms (sputum coverage of 58 per cent) and of them 64 (70.3 per cent) became culture negative.

Discussion

In domiciliary treatment, irregularity in drug collection and consumption and or taking treatment for an insufficient period are met

with frequently. Considerable research has been devoted to understand these problems. It has been observed that administrative and organisational factors in the programme contribute considerably to such irregularities (Anderesen et al, 1963). Irregularity in daily consumption can occur particularly in self-administered unsupervised forms of chemotherapy. Attempts have been made to overcome this difficulty by evolving regimens that can be administered under supervision (TCC, 1964). Pill counts and or urine tests have also been used to confirm consumption. Pill count to check drug consumption has been considered less reliable a method as compared with urine test (TCC, 1959). Since the routine use of pill count or urine test is not practical under programme conditions, the initiative on the part of patients to collect drugs, often at a considerable personal inconvenience, is taken to be as good as consumption (Groth Petersen et al, 1960; Ireland, 1960). Fox (1958 and 1961) believes that irregularity in drug consumption has to be specially looked for, as otherwise its occurrence is hard to suspect. He considers the equation of drug collection with the consumption to be "very unreliable". The present study has demonstrated that on an average 71 per cent of those who collect drugs also consume them at any point of time. Further, that 71 per cent is perhaps a conservative estimate because confirmation of consumption based on urine test depends on the dosage of drugs, the interval between drug intake and urine collection (TCC, 1960) and sensitivity and specificity of the test (Gangadharam, et al, 1958).

Among the initial culture positives who made ten or more collections with evidence of about 77 per cent drug consumption for INH and 63 per cent to PAS the post-treatment results (Table 4) were favourable. This further substantiates the assumption that those who collect drugs consume them fairly regularly. It was reassuring to find that the estimate of actual consumption (Tables 2 and 3) did not vary with the treatment month or the day of urine collection as counted from the day of last drug collection. Further, it is to be noted that these results were obtained under unsupervised domiciliary treatment conditions.

This study has focussed attention on the fact that in programmes based on self administered oral chemotherapy, collection of drugs by patients is a far more important consideration than efforts at ensuring consumption. Only 54 per cent collected drugs 10 or more times during 15 months (Table 1). Further there was a decreasing trend in drug collections with the passage of time, among males and among those aged 45 years and over. Adequate records, their systematic maintenance and review by the programme personnel can reveal irregularity of drug collection on time, to enable prompt defaulter retrieval. As regards drugs consumption, 71 per cent had consumed INH on any one day under unsupervised chemotherapy and 82 per cent of the patients with culture positive—INH sensitive organisms achieved bacteriological quiescence.

The findings of this study pose a basic question for the programme organiser : should the available limited resources be spent on improving drug collection or drug consumption ? It is evident that basically the problem is that of improving drug collection rather than consumption. Investment of additional efforts and funds on supervision of drug consumption may not be so crucial as is often believed. A regular check on drug consumption is neither feasible nor applicable under programme conditions ; it does not also appear to be necessary as evident from this study. At the present stage of the development and the available resources, what appears justified is the prevention of defaults in drug collection by good "motivation", both at the time of initiation of treatment and during subsequent drug collections and eliciting accurate addresses of patients for the reminder and retrieval services.

ACKNOWLEDGEMENT

The authors are grateful to Dr. Susai Mary, Superintendent, Lady Willingdon Tuberculosis Demonstration and Training Centre, Bangalore, who very kindly permitted the study at the Centre. Thanks are also due to Mrs Pe, WHO Public Health Nurse, Mrs Mohan Raj, Public Health Nurse, Mr. S. Rangachari, Mr. A. Abraham and Mr. B.C. Veerabhadrapa, Health Visitors for field work, and Miss Padmalatha Krishnan for secretarial work.

REFERENCES

1. Andersen, S. and Banerji, D. *Bull. Wld. Hlth. Org.* (1963) ; 29, 695.
2. Case, E.M.; *Tubercle* (1961); 42, 531.
3. Cattaneo, C, Fantoli, U and Belasio, L. *Ann. Ist. Forlanini* (1960); 20,59.
4. Eidus, L. and Hamillon, E.J.: *Ante. Rev. Resp. Dis.* (1964); 89,587.
5. Fox, W.; *Tubercle* (1958); 39, 269.
6. Fox, W.; *Bull. Int. Union, Tub* (1962); Vol. 1 of **Reports; 32, 313.**
7. Gangadharam, P.R.J., Mitchison, D.A., Subbiah, T.V. and Short, E.I: *Tubercle* (1958); 39, 191.
8. Groth-Peterson, E., Gad, U. and Stergaard, F.; *Ame. Rev. Resp. Dis.* (1960); 81, 643.
9. Ireland, H.D.: *Ame. Rev. Resp. Dis.* (1960); 82, 378.
10. Nagpaul, D.R.: *Ind. Jour. TB* (1967); 14, 186.
11. Piot, M.A.; *Ind. Jour. TB* (1962); 9, 151.
12. Short, E.I. and Case, E.M.; *Tubercle* (1957); 38, 288.
13. Simpson, J. McD.: *Tubercle* (1957); 37, 333.
14. Tuberculosis Chemotherapy Centre, Madras; *Bull. Wld Hlth. Org.* (1959); 21, 51.
15. Tuberculosis Chemotherapy Centre, Madras; *Bull. Wld, Hlth. Org.* (1960), 23, 571.
16. Tuberculosis Chemotherapy Centre, Madras; *Bull. Wld. Hlth Org.* (1964), 31, 266.

DEFAULTS AND THEIR EFFECTS IN PULMONARY TUBERCULOSIS PATIENTS ON INTERMITTENT CHEMOTHERAPY

M.L. MEHROTRA, D.C. PANDE, C.K. CHAUBE, K.D. GAUTAM, J.P. MISRA & NASIR HUSAIN
(From T.B. Demonstration & Training Centre, Agra)

Introduction

Experimental studies in vitro and in animals with the cultures of virulent strains of tubercle bacilli, which have been exposed to isoniazid 1 ug/ml for 24 hours and to 5 ug/ml of streptomycin for 24 hours and then the drugs have been removed by washing, show that surviving bacilli do not multiply for several days (Dickinson and Mitchison 1966).

This exhibition in non-multiplication of tubercle bacilli has been instrumental in initiating clinical trials with intermittent regimens in tuberculosis patients.

There is further indication that bacilli do not multiply in the intervals between doses of isoniazid from the results of treatment in patients who metabolise isoniazid slowly or rapidly. In slow inactivators the serum concentrations of the active drug decreases gradually, whereas in rapid inactivators the drug concentrations fall quickly as a result of conversion of free isoniazid to biologically inactive compounds, Fig. 1. (Gangadharam et al. 1961(b)).

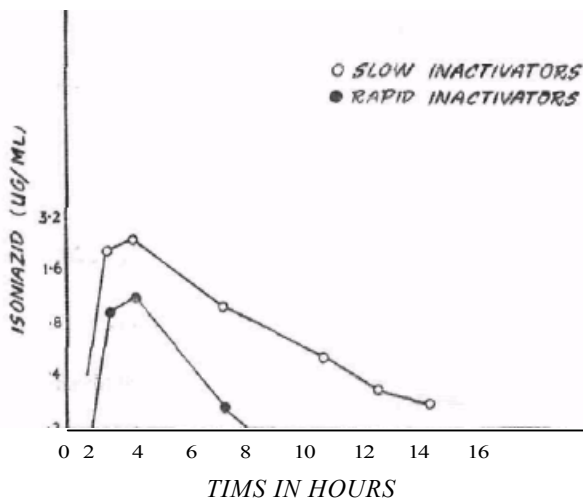


Fig. 1 Serum concentration of isoniazid in slow and rapid inactivators after an oral dose of isoniazid 100, mgm plus sodium PAS 5 gm.

Plan and conduct of the study

A study was initiated with the assistance of State Medical Research Council, U.P., to find out the effect of defaults in patients on intermittent chemotherapy.

Untreated pulmonary tuberculosis patients, 15 years or more in age and more than 30 kg. in weight, were taken into the study. All patients were smear and culture positive for mycobacterium-tuberculosis. Patients belonged to Agra district and reported voluntarily because of their symptoms or were referred by private practitioners or other agencies.

Chemotherapeutic regimens

All patients were given intensive chemotherapy for a initial period of four weeks, and then switched over to two different regimens for twenty two weeks. The details of the initial and follow up regimens are set out below.

ZHSH/ZH—initial four weeks (Daily+Twice weekly): Isoniazid 300 mgms, plus Uni-Pyrazamide (Pyrazinamide) 1.5 Gms. in a single oral dose after evening meals—daily. Additional Isoniazid 300 mgms plus streptomycin 1 Gm. intramuscular injection at the same time after evening meals—Twice Weekly.

Twenty two weeks (Daily): Isoniazid 300 mgms plus pyrazinamide 1.5 gms. in a single oral dose after evening meals.

ZHSH2/SH2—Initial four week (Daily & Twice Weekly) Isoniazid 300 mgms. plus pyrazinamide 1.5 Gms. in a single oral dose daily after evening meals.

Additional Isoniazid 300 mgms. plus streptomycin 1 Gm. intramuscular injection at the same time after evening meals—Twice Weekly.

Twenty two weeks: (Twice Weekly) Isoniazid 600 mgms. orally plus streptomycin 1 Gm. intramuscular injection at the same time after evening meals.

Allocation of chemotherapy

A total of 100 patients were admitted to the study.

Patients were randomly allocated to treatment regimens at the time of intake to the study.

Pre-treatment investigations

The pre-treatment investigation included:—

1. Assessment of the general clinical condition and weight of the patients.
2. An intracutaneous tuberculin (Mantoux) test with 1 T.U. of P.P.D. Rt. 23 with Tween '80'.
3. Examination of urine for albumin and sugar.
4. Haemoglobin.
5. Skiagram Chest.
6. One spot and the other over-night early morning sputum specimens were examined by direct microscopy and culture from the specimen giving positive smear result.
7. Sensitivity tests were carried out for streptomycin and isoniazid from positive cultures,
8. Detection of drugs in urine was carried out by S.N.P. Methods details of which are outlined below. The urine samples were collected six hours after administration of drugs.

Test for isoniazid—6 drops of urine plus 1 drop of one percent sodium nitro prusside. Shake for two minutes and then add one drop of 6 N acetic acid. Shake again. Orange brown colour indicates the presence of INH. Degree of positivity depended upon the colour.

Test for Pyrazinamide—Take three drops of urine, add one drop of 1% sodium nitroprusside, leave it for two minutes and then shake; Orange brown colour indicated the presence of pyrazinamide. Degree of positivity depended upon colour.

<i>Colour</i>	<i>Degree of Positivity</i>
Light Orange Brown	— Weakly + — slow in activator.
Orange Brown	- slow inactivator.
Dark Orange Brown	— ++ - rapid inactivator.

General management

Before the drugs were given, the patients were educated several times in self-administration of drugs. All patients were treated as out-patients and their progress assessed at one month, two months and six months after the start of chemotherapy.

During the initial four weeks chemotherapy, patients were given drugs for two weeks at a time and then called every month for collection of drugs and check up. They were requested to return the empty vials of streptomycin on their next due date of drug collection-

At each scheduled attendance, the weight of the patients was recorded. Patients were questioned at each attendance about self-administration of drugs and previous treatment. Chemotherapy was non-supervised throughout the twenty-six weeks of treatment.

Investigations during treatment

Assessments were made at one, two and six months after the start of chemotherapy.

1. *Sputum examination*—One spot and one overnight sputum specimens were examined by direct smear and culture every month.
2. Sensitivity tests were done for isoniazid and streptomycin from the positive cultures.
3. Urine Examination for albumin and sugar,
4. Requestioning about self administration of drugs and previous treatment.
5. Haemoglobin and total and differential W.B.C. Count was required.
6. Skiagram Chest at six months.
7. Detection of anti-tubercular drugs in urine by S.N.P. Method was carried out every month.

Patients in analysis

One hundred patients were admitted to the study; Subsequently nineteen patients failed to conform to the criteria for admission; six patients had isoniazid or streptomycin resistant cultures on admission and thirteen patients had their pretreatment cultures contaminated.

These nineteen patients had to be excluded from the analysis.

The remaining eightyone patients (41-ZHSH2/ZH, 40-ZHSH2/SH2) had isoniazid and streptomycin sensitive cultures and had received either nil, or not more than two weeks anti-tubercular chemotherapy,

Condition on admission to treatment

Out of eightyone patients (41-ZHSH2/ZH, 40-ZHSH2/SH2) 58 (72%) were males. Average age was 28.3 years (29 years for males and 26.5 years for females), and the mean weight was 42.2 kg. (44 kg. for males and 39.2 kg. for females).

Patients in the two regimens were similar in respect of sex, age and weight, extent of disease, cavitation and smear grading.

Cavitation and extent of disease was assessed from a, single miniature film and read by two independent readers. Cavitation was present in all the patients. Table 1.

Sputum smear grading

Bacillary counts were made on sputum smears stained with Ziehl Neelsen's stain and recorded as —, i+ + ———.

- a) Less than one bacilli per field +
- b) One to ten bacilli per field. ++
- c) More than ten bacilli per field. +++

TABLE I

Radiographic and bacteriological condition on admission to treatment

Condition on admission	ZHSH2/ZH patients		ZHSH2/SH2 patients	
	Number	Percentage	Number	Percentage
Bacterial content of Sputum—				
i. Direct smear positive				
+ Plus	10	24	15	37.5
++ Plus —	25	61	18	45
+++ Plus —	6	15	7	17.5
ii. Culture positive				
+ Plus —	14	34	12	30
++ Plus —	27	66	23	70
+++ Plus	—	—	—	—
Extent of disease				
Bilateral	30	73	33	82.5
Unilateral	11	27	7	17.5
Extent of cavitation				
Bilateral	23	56	14	35
Unilateral	18	44	26	65
INH inactivation rate				
Rapid	8	20	6	15
Slow	33	80	34	85
Total patients	41	100	40	

TABLE II

Changes in radiographic appearances at the end of six months

Regimen	Patients	Improvement	No change	Deterioration	Patient not investigated at six months
ZHSH2/ZH					
i. Regular	28	22	5	—	1
ii. Defaulter of					
1—4 weeks —	6	4	1	1	—
5—8 weeks —	1	1	—	—	—
More than 8 weeks	6	1	—	—	5
ZHSH2/SH2					
1. Regular —	27	25	—	—	2
ii. Defaulter of					
1—4 weeks —	5	4	—	—	1
5—8 weeks —	5	—	1	1	3*
More than 8 weeks	3	—	—	—	3

* including one patient who expired in 3rd month.

Results

Initial four weeks

There were eightyone patients (41-ZHSH/2 ZH, 41-ZHSH2/SH2) in the main analysis. Culture results for one patient who defaulted for two months after two weeks from the start of treatment, were not available. Another four patients had their sputum culture contaminated at four weeks. Thus, at four weeks, culture results were available for seventysix patients. Out of these seventysix patients, fiftytwo patients (68%) had their sputum cultures negative at four weeks.

Regimen ZHSH2/ZH

Out of fortyone patients, twenty-eight patients were regular i.e. collected all the allotted medicaments, six patients were defaulters of one to four weeks, one patient defaulted for six weeks, three patients after eight weeks' treatment and three patients after 12 weeks treatment defaulted continuously and only one patient from the latter turned up after eighteen weeks' default.

Radiological progress

Results of 27 patients, out of 28 regular

patients were available at six months, 22 patients (81.5%) showed moderate to marked radiological improvement.

Among 6 defaulters of one to four weeks, four patients improved radiologically, one patient showed marked improvement, one deteriorated and one showed no radiological change at six months.

One out of six defaulters of twelve weeks or more, could be investigated at seventh month and showed moderate improvement inspite of continuous default of eighteen weeks (Table II),

Sputum conversion

Culture result of 27 out of 28 regular patients at the end of six months showed that 22 patients (81.5%) were culture negative.

Out of 6 defaulters of one to four weeks, five patients were available at six months; three had positive cultures and two had negative cultures. One patient who was not available at six months, converted at one month and maintained the sputum conversion upto the period of default.

The single defaulter of six weeks, was culture negative at six months.

Out of six defaulters of eight weeks or more, one could be examined at six months and was culture negative. Of the remaining five defaulters 3 were culture negative at the time of default.

Favourable response

Twenty-four patients (89%) from 27 regular patients showed favourable response to treatment.

Of the defaulters from one to four weeks, five out of six patients had favourable response to treatment. One defaulter of six weeks also had favourable response to treatment. One out of six defaulters of twelve weeks or more had favourable response to treatment.

Toxicity

Treatment was not stopped due to toxicity in any case. Out of thirty-six patients (28 regular, 8 defaulters available at six months) only six patients complained of pain in joints, and one patient complained of loss of appetite. Five patients who did not turn up after default, had no complaint before the default. Thus in all seven patients (17%) out of 41 patients had minor complaints, mostly pain in joints.

Emergence of resistance

(a) *Amongst regular patients*—Out of 28 regular patients three developed resistance (INH—2, INH+SM—1). These were slow inactivators of isoniazid.

(b) *Amongst defaulters*—Out of eight defaulters who could be investigated at six months, 2 showed emergence of resistance : One against INH (rapid inactivator) and one against INH+SM (slow inactivator).

Regimen ZHSH2/SH 2

Out of forty patients twenty-seven were regular i.e. they collected all the allocated medicines ; five patients were defaulters of one to four weeks, five patients did not collect drugs for five to eight weeks and three patients missed the allocated drugs for three months or more.

Radiological progress

Twenty-five out of twenty-seven patients

showed moderate to marked radiological improvement.

Results of four patients out of five defaulters of one to four weeks, were available at six months. All four patients improved radiologically.

Two defaulters of five to eight weeks, were available at six months, and none improved radiologically. One patient in this group expired at third month after a continuous default of two months. None of the defaulters of twelve weeks or more were available at six months (Table II).

Sputum conversion

Sputum culture results of 25 regular patients were available at six months ; 22 patients (88%) were culture negative.

Out of five defaulters of one to four weeks four who could be examined at six months, were found to be culture negative. One patient who was not available at six months, was sputum negative at the time of default.

From five defaulters of five to eight weeks two patients who could be examined at six months had positive cultures. None of the three defaulters of three months or more, was available at six months. The patients were sputum negative at the time of default.

Favourable response

Out of twenty seven regular patients, twenty-five could be investigated and showed favourable response to treatment at six months.

In five defaulters of one to four weeks, four patients were examined at six months and showed favourable response to treatment.

Out of five defaulters of five to eight weeks, three could be assessed at six months and showed unfavourable response (Table IV).

Toxicity

None of the twenty-seven regular and thirteen defaulters made any complaint of adverse reactions during the six months treatment period.

Emergence of resistance

One regular patient who developed resistance against streptomycin was a rapid inactivator of isoniazid.

TABLE III

Bacteriological status at six months

Regimen	Patients	Sputum culture		Patients not investigated at six months
		Positive	Negative	
ZHSH2/ZH				
i. Regular	28	5	22	1
ii. Defaulter of				
1—4 weeks	— 6	3	2	1
5—8 weeks	— 1	—	1	—
More than 8 weeks	6	—	1	5
ZHSH2/SH2				
i. Regular	— 27	—	25	2
ii. Defaulter of				
1—4 weeks	— 5	—	4	1
5—8 weeks	— 5	2	—	3*
More than 8 weeks	3	—	—	3

TABLE IV

Response to treatment at the end of six months

Regimen	Patients	Patients assessed		Favourable response		Total
		Rapid	Slow	Rapid	Slow	
ZHSH2/ZH						
i. Regular	28	5	22	5	19	24
ii. Defaulter of						
1—4 weeks	— 6	1	5	1	4	5
5—8 weeks	— 1	—	1	—	1	1
More than 8 weeks	6	—	1	—	1	1
ZHSH2/SH2						
i. Regular	— 27	2	23	2	23	25
ii. Defaulters of						
1—4 weeks	— 5	—	4	—	4	4
5—8 weeks	— 5	—	3	—	—	—
More than 8 weeks	3	—	—	—	—	—

TABLE V
Detection of INH in urine

Regimen	++ (Rapid)	+ or Weak (Slow)	Total
ZHSH2/ZH	8	33	41
ZHSH2/SH2	6	34	40
Total :	14	67	81

Note : Urine samples were collected after 8 hours of drug intake.

Discussion

Hundred patients were admitted to the study. Nineteen patients failed to conform to the criteria for admission and had to be excluded. Thus there remained eightyone patients (41 ZHSH2/ZH, 40 ZHSH2/SH2).

Results of these patients after six months follow-up, have been presented. Fifty-five patients were regular, eleven patients were defaulters of one to four weeks ; six patients did not collect drugs for five to eight weeks, and nine patients were defaulters of three months or more. At six months, results in respect of fifty-two regular patients (27-ZHSH2/ZH, 25-ZHSH2/SH2), 10 defaulters (6-ZHSH2/ZH, 4-ZHSH2/SH2) of one to four weeks, 3 defaulters (1-ZHSH2/ZH, 2-ZHSH2/SH2) of five to eight weeks and 1 defaulter (1-ZHSH2/ZH) of three months, were available.

Regular patients

Amongst eighty-one patients, 12 patients were INH rapid inactivators and 69 patients were INH slow inactivators (Table V). Further analysis showed that the efficacy of treatment was not related to the rate of inactivation as the difference in the response to treatment between these two groups (rapid and slow) was not statistically significant (Table IV).

Twenty-two patients (81.5%) out of twenty-seven patients in regimen ZHSH2/ZH and all 25 patients in ZHSH2/SH2 regimen improved radiologically. The difference is not statistically significant but quite substantial.

At six months twenty-two patients out of twenty-seven patients in ZHSH2/ZH regimen and twenty-five out of twenty-five patients in ZHSH2/SH2 regimen were culture negative, indicating thereby that sputum conversion rate at six months in ZHSH2/SH2 regimen was not as good as in regimen ZHSH2/SH2. ($P > .05$).

Twenty-four patients (89%) out of twenty-seven patients in ZHSH2/ZH regimen, twenty-five patients out of twenty-five (100%) in ZHSH2/SH2 regimen had overall favourable response to treatment. The results in ZHSH2/ZH regimen are good but do not match the results of ZHSH2/SH2 regimen ($P > .05$).

Three patients (slow inactivators) out of twenty seven in ZHSH2/ZH regimen developed resistance (2-INH, 1-INH + SM) ; One patient (rapid inactivator) out of 25 in ZHSH2/SH2 developed resistance against SM.

Defaulters of one to four weeks

Almost all the defaulters of one to four weeks were investigated at six months. Four patients out of six in ZHSH2/ZH regimen and four patients out of available four in ZHSH2/SH2 regimen improved radiologically.

Two patients in ZHSH2/SH2 regimen, who did not improve radiologically, had chronic disease at the time of admission and might have taken treatment elsewhere, before they came to us, but they did not give the history of previous anti-tubercular treatment of more than two weeks. Radiological progress in these patients was as good as in regular patients. Results showed that even if a patient missed his drugs for four weeks continuously or intermittently radiological progress with the given regimens may not be effected at the end of treatment.

At six months two patients out of five in ZHSH2/ZH regimen and four patients out of four in ZHSH2/SH2 regimen were culture negative. Bacteriological results in defaulters upto four weeks corroborate the radiological response.

Results in the short duration defaulter

patients were as good as in regular patients in both the respective regimens. Five patients out of six in ZHSH2/ZH regimen and four patients out of four in ZHSH2/SH2 regimen had favourable response to treatment. Out of six defaulters in ZHSH2/2H regimen, two (slow inactivators) developed resistance against isoniazid and streptomycin.

None of the defaulters in ZHSH2/SH2 developed resistance.

In conclusion defaulters in ZHSH2/ZH regimen were at a disadvantage in comparison to defaulters in ZHSH2/SH2 regimen but results in these defaulters were as good as in regulars with the respective regimens (Mehrotra and others 1968).

Defaulters of five to eight weeks

The only available defaulter patient under regimen ZHSH2/ZH had favourable response to treatment ; at six months he was culture negative and improved radiologically.

Out of five defaulters in ZHSH2/SH2, three could be assessed at six months ; one was stationary, one deteriorated radiologically (both were culture positive at six months and had unfavourable response to treatment); one patient who defaulted for two months after two weeks treatment, again resumed treatment, but expired next two weeks.

Defaulters of more than eight weeks

Of the nine defaulters of three months or more (6-ZHSH2/ZH, 3-ZHSH2/SH2) only one in ZHSH2/ZH was available at six months. He was culture negative and improved radiologically and had overall favourable response at six months.

From these observations it can be concluded that defaulters of more than four weeks during a six month treatment period do not respond well to the treatment and default may be a cause for emergence of drug resistance.

Summary

Results of eighty-one sputum positive untreated pulmonary tuberculosis patients who fulfilled the criterion of admission were analysed

at the end of six months' treatment. Twenty-eight patients out of 41 in ZHSH2/ZH and twenty-seven patients out of 40 in ZHSH2/SH2 regimens were regular. Defaults of one week or more in drug collections were of the order of 32% in ZHSH2/ZH regimens and 33.5% in ZHSH2/SH2 regimen.

Amongst the regular patients whether the therapy was daily or intermittent the INH inactivation did not affect the ultimate outcome of treatment.

The investigation 'showed that patients missing drugs for four weeks in six months may be considered as regular as results of treatment of these patients were as good as of regular patients.

Defaults of more than four weeks affected the efficacy of the regimens and the retrieval of patients was difficult as majority of these did not turn up even after best efforts ; in such defaulters the anti-tubercular treatment taken before admission and the chronicity of the disease may be the deciding factors in permitting the optimal period of default.

There was more development of resistance in patients on daily chemotherapy than in patients on twice weekly intermittent chemotherapy.

Pyrazinamide in a daily single dose of 1.5 gm. with isoniazid as a standard drug in follow up daily chemotherapy, is less effective in comparison to other drugs like streptomycin plus isoniazid twice weekly.

There is an indication that slow inactivation of INH have more chance of development of INH resistance (P. 9).

REFERENCES

1. Dickinson, L.M. and Mitchison, D.A., (1966a), *Tubercle, Lond.* 1, 370.
 2. Gangadhardtn, P.R.J., Devadatta, S., Fox, W., Nair, C.N., and Setkon, J.B., (1961 b) *Bull. Wttt.HealiliOrg.*, 25, 793.
- Mehrotra, M.L., and others (1968)-XXIII National Conference on Tuberculosis and Chest Diseases, Bombay.

FACTORS RESPONSIBLE FOR THE SHORT FALLS IN THE NOTIFICATION OF SPUTUM RESULTS BY A T.B. CLINIC

R.P. BHAGI AND GAMBHIR SINGH
(From TB Section, Municipal Corporation, Delhi)

Introduction

Tuberculosis is a notifiable disease in the Union Territory of Delhi. All the health agencies—whether private, aided, semi-government or government and also the private medical practitioners—are required to notify all freshly diagnosed TB cases to the Central Registration Agency, i.e., TB Control Office of the Municipal Corporation of Delhi, on a self-addressed notification card containing information regarding name, sex, age and address of TB patient alongwith the diagnosis (whether pulmonary or non-pulmonary TB) and sputum results. The notification system of TB cases is an essential requirement of TB Control Programme in Delhi.

In the year 1970, the various TB institutions of Delhi notified 19,017 tuberculosis cases of which 17,266 (or 90.8%) were pulmonary TB and the rest 1,751 (or 9.2%) non-pulmonary TB. Of the pulmonary TB cases 4,088 (or 23.7%) were sputum positive, 10,459 (or 60.6%) sputum negative and in the remaining 2,719 (or 15.7%) cases sputum results were not recorded. The percentage of non-recording of sputum results of pulmonary TB cases varied from clinic to clinic (Table I).

The percentage of pulmonary TB cases notified 'without sputum results' varies from 0.7% to 45.1.

Since sputum status is such an important and sensitive index of the Tuberculosis situation in any country or community, absence of sputum results in such a large number of notified cases is a matter of great concern to the planners and those entrusted with control of tuberculosis.

The aim of this analysis is to go into details and to find out the reasons—technical or administrative—responsible for sputum results not being recorded in such a high percentage of notification cards. It is pertinent to find out whether such cases were diagnosed without examination of sputum and if so why? Or if the sputum was examined, why could the result not be entered on the notification card?

Material and Method

Out of the nine TB Clinics, then functioning in the Union Territory of Delhi, Motinagar TB Clinic was selected at random for this analysis. All the 2,455 pulmonary TB cases notified by the Motinagar TB Clinic during the

TABLE I

Name of the Institution	Pul. TB cases notified in 1970	Sputum results not recorded	Percentage to pul. TB cases
<i>Total all TB Clinics</i>	17,266	2,719	15.7
1. S.P.M. Marg, TB Clinic	3,084	599	19.4
2. Shahdara, TB Clinic	322	66	20.5
3. Moti Nagar, TB Clinic	2,455	551	22.4
4. Jhandewalan, TB Clinic	1,712	242	13.6
5. Narela, TB Clinic	368	67	18.2
6. Kingsway Chest Centre	1,536	693	45.1
7. R.K. Mission, TB Clinic	558	204	36.6
8. New Delhi, TB Centre	3,210	269	8.4
9. Mehrauli, TB Hospital	3,951	28	0.7

year 1970, were scrutinised. It was found that out of these 2,455,277 (11.3%) were sputum positive, and K627 (or 66.3%) were sputum negative. In the remaining 551 cases (i.e. 22.4%) sputum results were not entered in the notification cards.

A list of all these 551 cases was prepared by the Statistical Unit of TB Control Office and sent to Motinagar TB Clinic, for investigation and check-up from the clinic's records. The results of this re-check are shown in Table II.

It is note-worthy that out of 551 cases, 399 or 72.4% (or 16.2% of total pulmonary TB cases notified by the clinic) had given their sputum for examination but their results were not entered on the notification cards sent to the TB Control Office. In 44 (or 8.0%) cases sputum was not available. Thus only 108 (or 19.6) had not given the specimen of their sputum for examination.

The area Health Visitors of tuberculosis

were directed to visit and contact all these 108 cases physically and ascertain the reasons of default from each patient individually, i.e. whether the patient deliberately ignored the clinic's instructions or he/she had not been guided properly by the clinic's staff in this regard. Table III shows the results of this enquiry.

It is clear from Table III that in fact only 13 patients out of 108 (or 12.0%) did not give the specimen of their sputum inspite of instructions and motivation by the staff, and 80 (or 74.1%) were not properly guided by the clinic's staff and hence were not aware of the importance of sputum examinations.

Out of the 15 cases where the reasons of sputum default could not be ascertained, 5 patients were untraceable, 3 had left the locality when they were visited by the TB Health Visitors, 2 had died, 3 were admitted in the hospital and the rest 2 were reported to be outsiders though they had given the local address.

TABLE II

Particulars	Number of Pul. TB cases notified 'without sputum results'	Percentage to Pul. TB cases notified without Spt. results (i.e., 551)
Total number of Pul. TB cases notified without sputum results	551	100.0
A—Sputum given by the patients and tested but the results not entered on notification cards	399	72.4
(i) Sputum results available (Positive/Negative)	386	70.0
(ii) Sputum specimen—unsatisfactory	13	2.4
B—Non-productive cough	44	8.0
C—Sputum not given by the patients	108	19.6

TABLE III

Particulars	Number	Percentage
Number of Pul. TB patients who had not given their sputum for examination		100.0
	13	12.0
by the clinic's staff		74.1
(C) Reasons unknown	15	13.9

As has already been mentioned (see Table II) 44 cases out of 551 (i.e., 8.0%) were such where the cough was non-productive. The age-wise distribution of such cases is given in Table IV.

It is obvious that sputum could not be examined in 43 out of 44 cases because they were children below 15 years of age and the cough was said to be dry. There was only 1 (or 2.3%) case above the age of 15 years who denied the presence of sputum. The corresponding age-wise distribution of such cases who did not give their sputum for examination (i.e., 108) was 11 (or 10.1%) and 97 (or 89.9%) respectively. It clearly shows that it is generally in the age-group of 15 years and over that sputum is not produced for examination and the reason for default in this age-group is other than the non-productivity of cough.

Table V shows distribution of 551 pulmonary TB cases notified 'without sputum results' among local and outsider patients.

It was observed that only 18 patients (or 3.3%) were outsiders and the rest 533 (or 96.7%) had given local addresses as per clinic's record. The corresponding percentage for the outsiders and local patients in the total pulmonary TB cases notified by the Motinagar TB Clinic during the same period i.e., in 1970 was 1.3% and 98.7% respectively. It was also observed that out of 18 outsider patients, 15 had given their sputum of which 13 were negative, 1 was positive and in 1 case the specimen was unsatisfactory. The remaining 3 (or 16.7%) patients were not bringing out any sputum. There was not a single outsider patient who had not given his/her sputum for examination.

TABLE IV

Age-group	Number	Percentage
Total all ages (Cough non-Productive)	44	100.0
Under 1 year	3	6.8
1—4 year	22	50.0
5—9 year	15	34.1
10—14 year	3	6.8
15 year and over	1	2.3

TABLE V

Particulars	Total	Local	Outsiders
Total number of Pul. TB cases notified 'without Spt. results'	551	533	18
A— Spt. given by the patients and tested by clinic's laboratory	399	384	15
(a) Positive	45	44	1
(b) Negative	341	328	13
(c) Results Unsatisfactory	13	12	1
B— Sputum Non-productive	44	41	3
C— Sputum not given by the patients	108	108	—
(a) Not given inspite of motivation	13	13	—
(b) Not given because of improper guidance	80	80	—
(c) Reasons not known	15	15	—

The hypothesis that outsiders generally default during investigation, therefore, does not hold good in this case.

Discussion

Sputum examination by direct smear is an important tool to diagnose a case of TB especially in the hands of such clinics where culture examination facilities do not exist. Pulmonary TB proved bacteriologically by microscopy is the best index to measure the size of 'Infector Pool' in a community or locality. It makes it possible to identify the majority of patients who are not only dangerous to themselves but to the community as well. Moreover, it is another helpful index of changing trends. So if the sputum is examined and notified correctly, it is a very important epidemiological index in tuberculosis.

When sputum of a larger number of patients is not examined, or the results are not entered on notification forms, determination of the 'Infector Pool' and assessment of the efficiency of a clinic becomes difficult. The analysis has shown clearly that if the motivation and guidance of the patient is proper then only few are left without sputum examination (i.e., 13 out of 2,455 or 0.5%). These patients are hard-core which in spite of all the efforts will not heed the instructions of staff of the TB clinics. The percentage of such cases is so small that if these people do not give sputum for examination, there will be hardly any effect on the measurement of TB 'Pool of Infection'. 80 cases, i.e., 3.3% who failed to bring sputum could have been persuaded to do so with a little more effort. They escaped due to lack of proper check by the health visitors and the notifying authority. In other words the short-fall here was operational.

The most alarming aspect of the analysis, however, is that although the sputum was examined but the results were not entered in notification cards even on patients' clinic record sheets in 399 cases.

It means that apart from the negligence of clerical and laboratory staff, even medical officers did not bother about sputum results and prescribed treatment for these cases on the basis of radiological examination only. It is, therefore, essential that at all the 'Check

points the persons concerned should be alert and careful to avoid the default in the recording of sputum results.

Conclusion

1. The patient should be properly motivated by the clinic staff, so that he is convinced to give his/her sputum for examination.
2. There should be proper supervision over the reporting and laboratory personnels.
3. Medical officers may be careful enough while prescribing anti-TB drugs. The patient may not be taken on treatment unless all the essential tests and investigations are completed.
4. Patients without sputum result should not be notified unless it is confirmed that he/she does not produce cough.

ACKNOWLEDGEMENTS

We are thankful to Dr. S. P. Pamra, Director, New Delhi TB Centre, for his encouragement and valuable suggestion in preparing this paper.

We are also thankful to Lt. Col. O.N. Tyagi, Municipal Health Officer, for permitting to use the records from TB Clinic, Motinagar and TB Control Office, S.P. Mukherji Marg.

Our thanks are due to Shri T.R. Bhasin, Treatment Organiser, and other staff of Motinagar TB Clinic for help in personally contacting the patients.

For typing the manuscript (Text and Tables), we are thankful to Shri Prem Pal Sharma.

REFERENCES

1. Pamra, S.P.; *Ind. Journ. Tuberc.*; 1970, **XVII**, 3.
2. W.H.O, Expert Committee on Tuberculosis, 8th Report; *W.H.O. Tech Resp. Ser.*; 1964, 290.
3. Sikand, B.K. and Pamra, S.P.; *Proceedings 18th Tuberculosis and Chest Disease Workers Conference, India, 1962.*
4. Leading Article on "Microscopy in Diagnosis of Tuberculosis"; *Ind. Journ. Tuberc.*; 1968, **XV**, 127.

A STUDY OF PNEUMOCONIOSIS—RESPIRATORY SYMPTOMS & PHYSICAL DISABILITY AMONG THOSE EXPOSED TO DUSTS IN THE OCCUPATION

V. SUNDARAM

(From the Hospital for the Diseases of Chest & TB, Hyderabad)

Introduction

The diagnosis of Chronic Bronchitis offered by many for a prolonged cough is a “waste basket diagnosis.” The employees at dusty occupations usually suffer from prolonged cough and such are considered by many as simple ailments. The bronchitis caused by the irritable dusts is a major cause of sickness, absence from occupation resulting into misery in the family. Though the modern chemotherapeutic drugs have brought down the incidence of respiratory bacterial infection, increased industrial activities especially in dusty occupations are the major causes for the production of bronchitis and disability.

We, at the hospital for the diseases of chest and TB, Hyderabad have conducted a survey on a sample of 10% of the workers in the age groups 21 to 60 years spread out in 3 dusty occupations i.e. Asbestos cements—quartz grinding and at rock masonry where dust exposure was maximum.

Objects of the present study

- (1) To find out the prevalence of pneumoconiosis and respiratory symptoms in terms of age among those exposed to dusts.
- (2) To find out the relationship between respiratory symptoms and physical fitness in terms of age.
- (3) To find out any other associated factors responsible for disability—the part played by tubercle bacilli.
- (4) To arrive at methods to prevent disease and to preserve the maximum physical fitness.

Methodology

Each case was interviewed and a relevant history taken. The exercise tolerance capacity in terms of physical fitness index was estimated during which a Questionary on respiratory symptoms was filled in.

Pneumoconiosis Respiratory Symptoms Questionary

A. Name B, Age

- C. Residential address.....
D. Factory..... E. Section.....
F. Occupational History

Cough

Do you cough when you get up first thing in the morning ? YES/NO. 1.

Do you cough during the rest of the day ? (I don't mean at the end of the shift)..... YES/NO. 2

(If the answer to 1 or 2 is YES go on to 3. If both are NO go on to 4).

Do you cough like this on most days for as much as 3 months in the year? YES/NO. 3

Phlegm

Do you bring out phlegm when you get up or first thing in the morning..... YES/NO. 4.

Do you bring up the phlegm during the rest of the day ?..... YES/NO. 5

(If the answer to 4 or 5 is yes go on to 6. If both are NO go on to 7)

Do you bring out the phlegm like this on most days for as much as 3 months in the year? YES/NO. 6.

Breathlessness

Do you have to walk slower than other people on the level ? YES/NO. 7

Wheezing

Do you ever have wheezing or whistling, in your chest. I don't mean when you have cold ...YES/NO. 8.

Arbitrarily the diagnosis of respiratory symptoms was given when the positive answers to questions 3 or 6 and 7 or 8.

Routine investigations—sputum for AFB ; Complete Blood Picture etc. were done. Each case had a MMR and these were read as per the instructions and descriptive terminology and Classification given by I.L.O.

Physical Fitness Index was measured by adopting a simple procedure in order to find out the cardio respiratory reserve. It was calculated by counting the pulse rate. The procedure was : The patient was put on basal resting conditions. The exercise was given only after 24 hrs of physical and mental rest, and when his pulse rate was normal (i) the patient was given exercise i.e. 5 steps up and 5 steps down for 5 minutes. (2) half minute pulse was counted at the end of 1st, and 4th minute after the exercise.

PFI was calculated in every case by applying the formula.

$$PFI = \frac{\text{Exercise in seconds} \times 100}{2 \times 1 \text{ minute pulse rate after 1st, 2nd and 4th minute after exercise.}}$$

The result is expressed as follows :—

PFI of 100 and above indicates : Respiratory efficiency — VERY GOOD.

PFI of 70 and above indicates : Respiratory efficiency — GOOD.

PFI of 40 and above indicates : Respiratory efficiency — FAIR

PFI below 40 indicates...Respiratory efficiency. — POOR.

(Tests like FEV Forced expiratory Volume or PEF peak expiratory flow measured by the wright peak flow meter or tests of gas distribution and exchange and of pulmonary circulation though desirable could not be performed because of their complexity. However PFI correlates well with the disability assessed clinically as despnœa etc. and this comparatively simple test of ventilatory function was practicable) For the criterion of Physical Fitness Index normal figures among the healthy individuals of the corresponding age groups were not taken in this study because I had adopted an already worked out PFI procedures of Dr. Erickson of Oslo. His scale was taken in this study. The respiratory efficiency was expressed as *Very Good—Good—Fair—and poor* in the adult age groups.

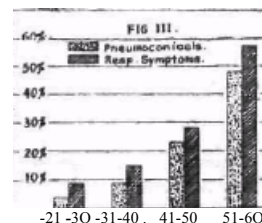
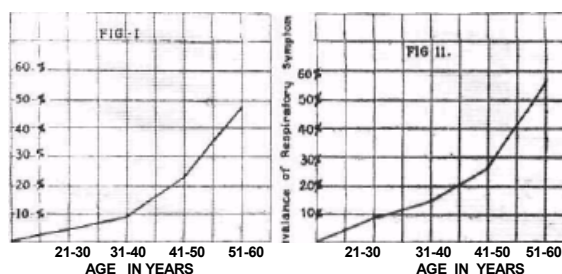
Results

The prevalence of categorized pneumoconiosis and respiratory symptoms varies with advancing age. (Vide Table No. 1)

TABLE I

Age group	No. of cases examined	X-ray positive	%	Respiratory symptoms	%
21—30	150	6	4	14	9.3
31—40	108	10	9.26	16	15
41—50	52	12	23.08	14	26.9
51—60	42	20	47.6	24	56.9

Fig. I Fig. II and Fig. III.

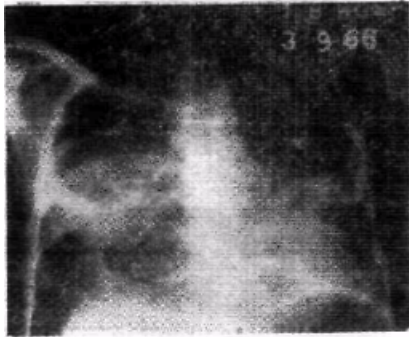


The prevalence of 4% pneumoconiosis and 9.30% respiratory symptoms found even at the age group of 21—30 infers that in such dusty industries the labour are recruited during the adolescent period. The physical fitness index in all was above 100 and therefore there was no physical disability at present. But it is frightfully important to realize that these young energetics are those liable to be disabled before they reach 40th year as revealed in the Fig I and Fig II.

A steep rise in the heights of the bars (Fig III) at age groups 41-50 and 51-60 with a difference of 24.52% in pneumoconiosis and 30% in the respiratory symptoms go to say that the accumulation of pathogenic dust is inversely proportional to the period of service. Out of 32 cases with radiological evidence 21 were physically disabled. The PFI was below 70. An interesting observation in this age group was 6 women victims, 2 of them with progressive massive fibrosis having PF index of 30.

Illustrative cases

Case. No. I.G.P. A woman aged about 50 years, remarkably breathless. The respiratory symptoms questionnaire answers revealed it to be a case with respiratory distress and she did not see any medical man previously.



X-ray ; progressive massive fibrosis, showing a localized spontaneous pneumothorax at the Rt. upper lung. Multisized nodules, a circular shadow with radiating line shadows—a band like adhesion pulling the Rt. Diaphragm and localized emphysema at Lt. lower lobe.

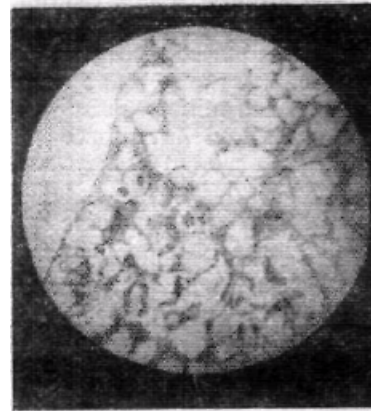
Needle biopsy of the lung was histologically diagnosed as Pneumoconiosis due to silica.

Occupational history : Labour at Quartz grinding mill since 30 years.

Case No. 2. A.H.: A male aged 52 years, masonry worker. He was exposed to rock dust for more than 35 years. The x-ray Bilateral pulm disease, with the background history of dust exposure and the presence of nodules in the lung it was read as Silico-tuberculosis. Tubercle bacilli were found in the sputum. Open biopsy of lung histologically proved as



Silico TB. Special bacteriological study culture TB and Virulence test revealed that the Tubercle bacilli was sensitive to SM-INH-PAS and it was Niacin +



The Virulence test done at Madanapalle TB research unit was as follows :—

Result of the Virulence test.

A culture of tubercle bacilli for virulence test was inoculated into 10 guinea-pigs on 7-6-68.

TABLE II

Guinea-pigs No.	Survival in days	Root Index
1	D 180	0.41
2	D 154	0.45
3	D 164	0.17
4	K 182	0.41
5	K 182	0.37
6	K 182	0.36
7	D 162	0.56
3	D 136	0.48
9	K 182	0.32
10	K 182	0.41
Mean root index of Virulence=		0.39

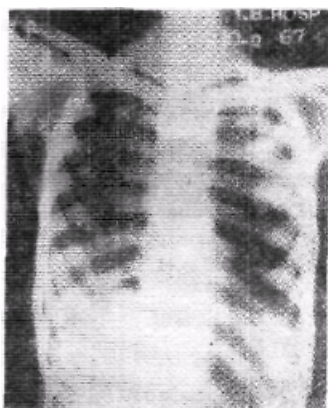
D=died, K=killed.

The tubercle bacilli from this silicotic patient is found to be of low virulence.

The post-mortem specimen of the guinea-

pig No. 6, killed after 182 days revealed that there were some inflammatory changes in the lung, (ref: Microphotograph). There was no evidence of tuberculosis.

Case No. 3. U.R. aged 51 years worker at Asbestos Cements factory is a banjara, Nomadical tribal group. He changed several of his professions and in the end joined at this factory 15 years ago. Before this he was a labour at Nalagonda District an edemic area for fluorosis.



His chest X-ray shows Bilateral Silicotic Nodules in the lungs. The ribs and the vertebral column is thick and is characteristic of Fluorosis. Due to the change of several professions and also due to auto-transfers from place to place he was submitted to hardships in life, change of climate, water and environment. It was found that this patient is suffering from both Fluorosis and silicosis. He acquired fluorosis at Nalagonda from drinking water and Silicosis from, his 15 years of dust exposure at the Asbestos Cement Factory.

Discussion

Pneumoconiosis varies from one country to another, from one dust to another and from one occupation to another. Therefore each case has to be dealt with individually. In a simple asymptomatic form with focal fibrosis, education of patient with sanctioning of long leave and a change of section will do good. In its more advanced forms especially when it is complicated with Emphysema or spontaneous pneumothorax as in Case No. 1 or that which is complicated with Tuberculosis as in Case No. 2 or that with co-existing disease as Fluorosis and Silicosis as in Case No. 3, there is a need for symptomatic and specific treatment. Though these advanced cases are incurable, to certain extent relief to patient could be given by the symptomatic therapy.

It is of interest to note that the women in this study have considerably more disability than men and the suffering was more. The case No. 1 woman with progressive massive fibrosis complicated with pneumothorax had more dyspnoea and suffering. It thus appears that the women in the population studied are subject to more severe respiratory disease as judged by the fact that they have a higher prevalence of combined chest symptoms.

In case No. 2. Mason aged 52 years has maximum disability to work. He is suffering from both Silicosis and pulmonary tuberculosis. It was also found in this case that the tubercle bacilli cultured and studied revealed to be of low virulent ones. The mean root index of virulence was only 0.39 and the post-mortem specimen of the guinea-pig that was inoculated with the strain did not show any tuberculosis except some inflammatory changes. Even a low virulent tubercle bacilli in a silicotic patient can produce maximum destruction of lung tissue and thus giving rise to maximum disability.

In this study we found an entity called "silico fluorosis", a double disabling disease. This is existing among the tribal labourers in the dusty industries at Hyderabad. If we explore further may be we will find the triple disabling disease called "silico-fluoro-tuberculosis".

The methods to prevent these diseases and the disability are mostly prophylaxis.

Dust suppression and control of fibrogenic dust is important. The efficiency of dust control in a factory depends both on the factory inspectors who design methods of dust control and the workmen in conformity with the regulations designed to protect them. A hygiene engineer is a very important person who detects the dust counts of sampled air, its toxic size, frequent dust sampling and the chemical analysis of the dust is of paramount importance.

Pre-employment medical examination is not insisted in most of the factories. This is very important a test to recruit healthy and suitable candidates to various professions. The objective of this initial examination are to ascertain fully the personal health, occupation history and to determine whether any physical lesion exist which would disqualify him to be employed in a dusty trade.

The expansion and modernisation of Indian industry has created a large demand for trained manpower at all levels. The health of these is of

prime importance to improve the industry or to achieve the goal. The International Labour Organization with the generous assistance of the United Nations Development Programme has been collaborating with the Government of India in starting and developing the institutions and the technical services needed in this context to assist the developing economy.

The country can grow into economic and social maturity only if its assets are put to use by the skill of the worker, if only he is healthy. In an industry where there is dust exposure, an individual health organization and medical care of the skilled worker are the necessities by which both the country and the individual can move to a richer life.

ACKNOWLEDGEMENTS

I am thankful to the Superintendent, Hospital for the diseases of Chest and TB Hyderabad for all the help given to prepare this paper. I am also thankful to the Research Director, Madanapalle TB research unit, for undertaking the bacteriologic study.

This paper was presented at the 4th Andhra Pradesh TB and chest diseases worker Conference in October 1969 held at Niloufer hospital, Hyderabad.

REFERENCES

1. Cancelli et al: Panel discussion presented at the 4th International Congress on diseases of chest. *Am. college of Chest Physician*, August 19-23, 1956.
2. James. W.R.L.: The relationship of tuberculosis to the development of massive Pneumococcosis. *B.J. of TB & Disease of Chest*; Vol. XLVIII—April 54.
3. King E.T. et al: Symposium on Industrial pulmonary diseases. 1960. Lond.
4. Mark W. Lischner : Prevalence of Respiratory Symptoms in an industrial population : *Dis. of chest*. Vol. 50, No. 5 Nov. 66.
5. Dr. Erickson Oslo : Physical fitness Index or Erickson Index.

ASSESSMENT AND MONITORING OF NATIONAL TUBERCULOSIS PROGRAMME (NTP)

S. S. NAIR

(From National Tuberculosis Institute, Bangalore)

The Approach

Assessment of a programme is the measurement of the extent to which its objectives have been fulfilled. Assessment may also include a study of factors that may influence the achievement. It is clear that the objectives have to be defined in quantifiable terms so that the extent of achievement can be measured.

In the past, control of tuberculosis defined as a systematic reduction of the problem of tuberculosis to an extent that it ceases to be a major public health problem had been accepted as the goal of the National Tuberculosis Programme. The difficulties arising from such a definition of the goal are:

1. What is a major public health problem?
2. In what quantifiable terms—social and epidemiological—should the tuberculosis problem be defined?
3. To what extent should the problem thus defined be reduced for it to be a major public health problem no longer? and
4. What should be a reasonable period of time required for achieving this reduction?

A number of attempts have already been made to quantify the problem. But, more thinking and research has to be done before these and related considerations can form the basis of assessment. A clear definition of the goal in quantifiable terms has yet to be adopted.

Another serious difficulty for assessment arises from a lack of precise information on the period between infection and disease. If, as is commonly believed, most of the cases* occur among the already infected, then prevention, case-finding and treatment can have only a marginal effect, during the initial period of the programme. Thus, a sizeable reduction in the number of cases may not occur within a period of 10-15 years, or even more, unless the disease is already on the decline. Any early

* Cases are these patients confirmed bacteriologically; the rest are Suspects.

assessment of reduction in the number of cases will only be a very costly attempt at proving the obvious and will possibly lead to frustration. Nevertheless, it is necessary to know the gains from tuberculosis control measures involving sizeable amount of public funds. For this, a different methodology of assessment has to be adopted since it is almost impossible to provide a direct answer in terms of reduction of the problem.

It is true that based on the trend of the disease, before introduction of the programme, epidemic models can be used to predict the size of the tuberculosis problem at future points of time. Comparing this with the actual size of the problem after the programme has been working for sometime, can provide a measure of the problem reduction due to the programme. But, even for this, the programme has to be on for a sufficiently long period so that a demonstrable reduction could be expected.

Assessment of efficiency

Measurement of the extent to which the objectives of the programme as a whole have been achieved may be called *assessment of efficacy*. Measurement of the extent to which the expectations for various activities under the programme are being fulfilled is referred to as *assessment of efficiency*. It is generally true that improving the efficiency of each activity under a programme will result in improvement in its efficacy, provided the improvements in one activity do not place restrictions on other activities. On the basis of this rationale, assessment of efficiency seems to be a practicable solution to the problem of assessment of a tuberculosis control programme.

Realistic expectations for outputs and coverages under different activities can be set up on the basis of potentiality studies on the one hand and programmes working with reasonable efficiency on the other. The former provides information on what could be achieved with a given staffing pattern and method of work. The latter on what normally is achieved in the environment in which the activity is performed. Achievements of the programme could then be matched against these expectations.

Need to define stages

One important consideration is that the programme can only be implemented in a few districts at a time and administrative and operational conditions may vary among those districts. Thus, different districts will have the programmes developed to different levels. Any overall assessment of such a heterogeneous programme situation may give a confusing picture. One way to avoid this is to define some stages of development of the programme, with graded expectations, and to assess each district at suitable intervals to judge whether it qualifies to cross from one stage to the other. The number of districts which qualify to go from one stage to another at a specified time will itself indicate the progress achieved. One advantage of this method is that after assessment, attention can be concentrated on the corrective actions required for fulfilling the expectations for that stage.

Monitoring

A detailed stage-by-stage assessment could be supplemented by monitoring i.e., a continuous watch on some key indices of the programme calculated from periodic reports. This requires a reasonably efficient reporting machinery. At present about 30% of the district programmes do not report on time. Within the reporting programmes more than 50% of the peripheral health institutions doing tuberculosis work do not report on time. Under these circumstances, monitoring or any assessment based on reports will underestimate the achievements and cannot be considered reliable. It would be better for assessment based on reports to be separate for programmes under different stages, as the expectations against which achievements are to be matched differ with the stages.

Comparison of performance against expectation

Some results of monitoring are given below mainly for illustrating the methodology and the type of conclusions that can be drawn. An average peripheral health institution in which tuberculosis programme is implemented could be expected to examine sputa from 75 "symptomatics" per quarter and diagnose about 7.5 cases. The achievements of the programme in the Southern Region generally are of the order of 30% of the expectation for examinations and 40% for cases diagnosed. On the average 60% of the cases and suspects who are expected to collect their drugs do so i.e., about 63% of a fairly high target of 95% of patients on hand taking treatment at any time. For BCG vaccination, the all India average monthly performance per team is about 55% of the expectation of 8,000 vaccinations. Thus, comparatively, case-finding activity needs greater attention and improvement at present. Then comes BCG and lastly treatment.

Contribution from peripheral health Institutions

Three indices help in assessing the contribution made by PHIs in the programme.

- (1) Only about 28% of the total cases diagnosed by an average DTP are found by peripheral institutions (about 50% in the Southern Region).
- (2) Only about 23% of the total cases and suspects in an average DTP are diagnosed by peripheral health institutions, suspect cases diagnosed at DTC on referral being credited to the referring institutions.
- (3) Only about 26% of the patients on

TABLE I

Indices showing contribution of peripheral health institutions (PHIs) (January 1967—March 1970)

	Percentage of total	
	Range	Mean
Diagnosed by PHIs		
a. Cases	23.8—34.1	28.1
b. Cases and suspects	18.4—27.9	22.9
c. Treated by PHIs	9.1—34.9	26.2

N.B. Figures are under-estimates because of non-receipt of reports from peripheral health institutions.

treatment are treated by peripheral institutions (about 50% in the Southern Region).

After making allowances for non-receipt of some reports, it is likely that the combined performance of a large number of peripheral health institutions fall much short of that of the district tuberculosis centre. This can be improved if the case finding efficiency of the peripheral health institutions can be increased, so that more and more cases who seek relief from these institutions could be diagnosed, and treated there itself

Comparison with case load in the community

An average district is expected to have about 5,000 cases at any point of time and an annual incidence of about 1,500 cases. The present rate of diagnosis in an average district programme is about 158 per quarter or 632 per year and is only about 40% of the rate at which new cases occur. This figure again may be an underestimate and is an average for districts under different stages of development. It is likely that this percentage will be quite high in some districts and a more correct picture could only be obtained by separately considering districts under different levels of development. However, it is significant that the diagnosis of only one more case per peripheral health institution per month will increase the number diagnosed by an average district with 30 peripheral institutions by 360 per year. And, this will result in more than 1,000 cases being diagnosed every year in an average district i.e., about 70% of the rate at which new cases occur.

Range in performance of an average DTP

The quarterly reports prepared by the Directorate General of Health Services show

an interesting feature. The average performance of a district tuberculosis programme has been fairly stable over the last four years with respect to the number of X-rays and sputum examinations, new cases diagnosed and cases under treatment (Table 2). It could be that these programmes have reached a particular level of performance within such a short time and that further improvements are not easily achieved. One possible reason for this may be that the situation is a true reflection of the overall efficiency of the general health services. In other words, the efficiency of participation of peripheral health institutions in tuberculosis control may not be much different from the achievements for other activities of these institutions and the problem cannot be considered to be peculiar to the tuberculosis programme alone. If so, concerted efforts will be necessary to increase the all round efficiency of the general health services. This is all the more important firstly because the available resources do not permit many parallel vertical health programmes and secondly because the performance under such special programmes viz., BCG, N.S.E.P., Family Planning etc., have not so far shown a much higher efficiency than the general health services.

Comparison of DTPs with tuberculosis clinics

Monitoring could also be used to compare (the contributions from different components of NTP vis-a-vis the resources which have been spent on them. For instance, the case-finding output of an average DTP is about 260% that of District TB Clinics where the integrated programme has not yet been introduced (Table 3). This comparative performance may even be better (may be more than 3 times) if allowance is made for non-receipt of reports from some peripheral health institutions. This would indicate that establishment of district

TABLE 2

Average quarterly out put per district programme (April 1966-March 1970)

	Range	Mean
X-ray examinations	1,559—2,353	2,085
Sputum examinations	1,162—1,512	1,356
Cases diagnosed	143— 190	158
Cases and suspects diagnosed	458— 627	532
Cases and suspects under treatment	2,092—2,641	2,366

N.B. Figures are under estimate because of non-receipt of reports from peripheral health institutions.

TABLE 3

Average cases & suspects found by district programmes & district clinics (April 1966—March 1970)*

	Cases and suspects found per quarter per district	
	Range	Mean
District programmes District clinics (without integrated programme)	458**— 627** 149 —305	532** 203

* Based on the quarterly reports of the Directorate General of Health Services.

**These figures may be under estimates because of non-receipt of reports from peripheral health institutions.

tuberculosis programmes could probably give better results than district clinics. On the other hand, the expenditure on a district programme will be more than that of a TB clinic and it has to be studied whether even this three fold increase in case-finding is commensurate with the additional expenditure involved. Similarly, data on treatment for these two components of the programme could also be compared.

Need for a proper climate for assessment

Assessment becomes a mere exercise if the indicated corrective actions are not taken. Assessment should be objective enough to inspire confidence and its findings should be accepted or at least appreciated by the persons in charge of the actual functioning of the programmes. Assessment findings are generally acceptable when the assessment team has been authorised by the administrative authority concerned and has the necessary technical capacity and status. When assessment of a district programme is done without a favourable attitude on the part of the persons responsible for the actual working of the programme and/or that of the State Government concerned, the findings may not always be acceptable and may not be followed by effective corrective action. Developing a proper climate for assessment and authorising suitable and competent agency to carry out assessment are extremely important if resources spent on assessment should not be wasted. This aspect has not so far been given the attention it deserves and may be one of the reasons for assessment being equated with fault finding and thereby inhibiting the progress of assessment activities which are essential for the healthy development of programmes and better utilization of resources.

In conclusion, the following points may be re-emphasised:

- (1) Attempts should be made to define the goal of the programme in quantifiable terms—both epidemiological and social.
- (2) It is almost impossible at present to calculate the extent of reduction of the tuberculosis problem. Assessment of efficiency is a practicable solution to this problem of assessment.
- (3) Certain stages of the programme with quantifiable objectives should be formulated and assessment of programmes in different stages should be considered separately.
- (4) Monitoring or assessment based on reports could give useful information about the working of the programme provided (1) the efficiency of reporting from peripheral health institutions to the district level and from districts to state and central levels is improved and (ii) such assessment is done separately for districts under different stages of development.
- (5) A proper climate for assessment should be created so that assessment is welcomed by programme organisers at state, district and peripheral levels and corrective actions are taken soon after completion of assessment. This very important aspect is not given the attention it deserves.

TUBERCULOSIS OF THE THYROID GLAND REPORT OF A CASE

D. BHASKARA RBDY, P. HARINARAYANA, C. HARIDAS AND A. G. NIRMALA
(From Kurnool Medical College, Kurnool)

Struma tuberculosis was described by Bruns in 1893 and later by Poncet and Leriche in 1912. Collier and Huggins in 1926 described 5 cases which were seen in 1200 operations for Goitre. Rankin and Graham in 1932 reported 21 cases in 20,758 cases operated surgically at Mayo Clinic. Stubbins and Guthrie have reviewed all the cases on tuberculosis of thyroid in 1948 and have recorded only 250 cases till 1948.

Since the tuberculosis of thyroid gland is extremely rare, even a single case is worth recording. The following is the only case recorded in the Department of Pathology, Kurnool Medical College, Kurnool (A.P.) in 189 cases of thyroid glands removed and hence the case is recorded below for its rarity.

Case Report

A Hindu male aged about 50 years was admitted in the Surgical Ward under the care of one of the (P.M.), for a swelling in front of the neck of 20 days duration. The patient took some indigenous treatment at his place as a result of which the swelling reduced in size partly for a few days, but was again growing rapidly. There was no history of fever or cough. He did not complain of dysphagia or dyspnoea or change in the voice. He had no pain over the swelling.

Local Examination

A swelling of 6"x2" was seen over the region of the thyroid gland affecting both the lobes and the isthmus, the right lobe being enlarged considerably more than the left lobe. The swelling was moving up with deglutition. There were no engorged veins over the swelling. The swelling was smooth, hard in consistency, throughout and not tender. Slight amount of restriction was observed over the region of the thyroid gland. The swelling can be moved side to side and up and down with difficulty. On contraction of the sternomastoid muscles the swelling become less prominent. There were no pulsations over the swelling.

Another small swelling about the size of cherry was present just above the right upper lobe of the above mentioned one, which did not move with deglutition. Carotid pulses were felt normally on both the sides. Trachea

was in middle. There were no bruits over the swelling.

General examination and systemic examination revealed nil significant.

Investigations

Urine	:Albumin	Nil
	Suger	
Hb	:10 gm %	
Blood urea	:20 mgs %	
Blood group	: 'A'	
ES.R.	:56 mm/hr.	
B.M.R.	: + 34	
Serum cholesterol	:338 mgs%	
Serum creatinine	: 1.2 mgs%	
Serum creatine	: 0.32 mgs %	
X-ray chest and neck	: Nil abnormal.	

A pre-operative diagnosis of carcinoma thyroid was made and the patient was operated on 24.11.1970 and hemithyroidectomy was done. Patient had an uneventful post-operative course and was discharged on 12.12.1970.

Follow-up

The patient is being followed up periodically and is coming up for a check up. The general condition is good and there is no evidence of recurrence or generalised infection.

Pathology-macroscopic appearance

Shows a well capsulated, oval mass of 2"x3" which on cut section showed areas of caseation (Fig. I.).

Histopathology

Several sections were studied on the entire mass and were stained with H&E, Reticulum and A.F.B. stains. All the sections showed caseous type of necrosis with epithelioid cells, giant cells and round cell infiltration (Fig. 2). The histological picture was typical of tuberculosis infection. There was complete lack of reticulum in the area in caseation. No acid fast bacilli could be demonstrated in the sections. Morbid anatomical diagnosis—Tuberculosis of the thyroid gland.

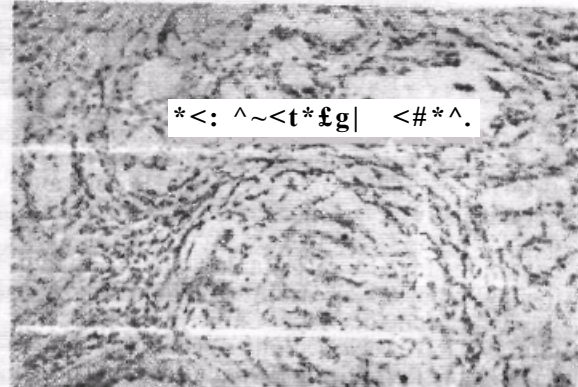
Comment

On reviewing the autopsy and biopsy re-



Fig. 1

Photograph shows the cut section of the thyroid with areas of caseation.



(Fig- 2)

Photomicrograph illustrates the typical tubercle follicle consisting of epithelioid and giant cells (H &E+ 100).

cords of Department of Pathology, Kurnool Medical College, Kurnool for the last 12 years, 189 thyroidectomies were done for various etiological purposes and are recorded in Table I.

TABLE I

Sl. no.	Cases	Total No. of thyroid cases
1.	Benign epithelial tumours	118
2.	Colloid goiters	24
3.	Malignant tumours	23
4.	Thyrotoxicosis	9
5.	Hashimatos	8
6.	Multinodular goiters	4
7.	Non-specific infections	2
8.	Tuberculous infection	1
Total		189

Of these only one (case under report) is the case of tuberculosis of the thyroid gland which indicates that the tuberculosis of thyroid gland is very rare. The rarity of this infection is due to relative lack of reticuloendothelial cells and hence the gland is not readily attacked by tubercle bacilli. The abundant blood supply of thyroid gland may be another contributing factor for the rarity of this condition.

The youngest age recorded is by Clairmon- (1902) in a child aged 2 years whereas majority of the cases are recorded in the age period of 30 and 40 years. In our case the age of the patient is 50 years.

The clinical picture may depend upon the type of lesion. If it is a miliary type, there may be very few signs and symptoms. If it is a secondary type of tuberculous infection with caseation and necrosis, it may give rise to variety of clinical manifestations from abscess formation, to pressure symptom such as dyspnea, dysphagia, dysphnoea of varying severity. There have been '33' well authenticated cases of this type recorded in the literature. This form of infection is never primary. Sometimes the infection may directly extend from the cervical lymphnodes, trachea or larynx. Pain may be present but never a prominent symptom. Alteration of functional status is very rare.

Pre-operative diagnosis is rarely made and these cases are mostly mistaken for adenomas or Riedel's straua.

The treatment of choice may be incision and drainage and sub total thyroidectomy. In Klassen⁴ and Curtis series of cases, 14 patients recovered and 2 died of military tuberculosis. In the case recorded hemithyroidectomy was done and the case is being folio wed-up periodically and there has been no recurrence of disease or any evidence of primary focus where.

Summary

1. Literature on tuberculosis of the thyroid gland is briefly reviewed.

2. A rare case of tuberculosis of the thyroid gland is recorded.

ACKNOWLEDGEMENT

We are very thankful to the Photographer Mr. P. Haricharanapathi for the photographs.

REFERENCES

- J. Brims, P. : "*Brims*" *Beitrage* 10, 1, 1893.
2. Clavimopt, P.: *Ueber Tuberculose der Schilddruse, Wien Klin Wchnsfhr*, 15,1267, 1902.
 3. Coller, F.A., and Huggins, C.B. : *Tuberculosis of the thyroid gland. Ann. Snrg.* 84, 804, 1926.
 4. Klassen, K.P., and Curtis, G.M.: *Tuberculosis abscess of the thyroid gland. Surgery*, 17, 552-559, 1945.
 5. Poncet, A., Leriche, R. : *Bull. Acad. Med. Paris*, 55, 502, 1912.
 6. Rankin, F.W., and Graham, A.S. : *Tuberculous of thyriod gland, Ann. Surg.* 96, 625, 1932.
 7. Stubbins, W.M., and Guthrie. : *Tuberculous abscess of thyroid gland. South Surgeon.* 14, **351**, 1948.

**NOTES ON VISITS TO MOSCOW, LONDON & LUSAKA (ZAMBIA)
FROM JULY 10 TO AUGUST 2, 1971**

B. M. CARIAPPA

Secretary-General, Tuberculosis Association of India

I had the privilege to visit Moscow and attend the 21st International Conference and other meetings from the 11th to 16th of July, 1971. The Conference was inaugurated in the Palace of the International Congress in the Kremlin by Academician B.W. Patrovsky, Minister for Health, U.S.S.R., before a gathering of about 4000 of whom about 3000 were said to be delegates. He gave a review of the Public Health Services in the U.S.S.R. The Deputy Mayor of Moscow and Academician Serenko also addressed the session. Prof. Chebanov was President of the Conference. Social and cultural functions including dance performances on 12th and 14th and a Reception on the 12th evening were held in the same Palace.

2. The meeting of the Executive Directors/Secretary-Generals of National Associations was held on 11th July. The main subjects related to the Role of the Union and National Associations in the global fight against tuberculosis, priorities in the activities of newly created Associations and relationship between the Union and its regional bodies.

3. The meeting of the Council of the Union was held in the afternoon. Drs. S.P. Pamra, H.B. Dingley, M.L. Mehrotra. Mrs. M. Paul and I from India attended this meeting. After the proceedings of the previous meeting were confirmed the Secretary-General (Prof. Etinnie Bernard) presented his report on the work of the Union during the past year. The Treasurer (Mr. J.P. Mallet) presented the accounts for 1970 and the budget for 1971-72. Dr. J.E. Perkins moved for adoption of the revised Constitution of the Union. Representatives from Australia and Malaysia pointed out that some amendments suggested by them were not circulated by the Union and therefore opposed the adoption of the revised constitution. Dr. Perkins slated that these amendments were not received in time. It was agreed that the *ad hoc* Committee for amendment of the Constitution may consider this matter. The revised Constitution was adopted. Dr. Harley Williams presented his report on new Constituent members of the Union. Report of the Co-ordinator of the Scientific Committees, Dr. Bignal and reports of the Regional Committees of the Union by their Executives were presented. *The decision of the Executive Com-*

mittee to hold the 22nd International Conference in Tokyo was approved and Dr. M. Yamaguchi of Japan announced that the Japan Association would arrange to host this Conference towards the end of October, 1973.

4. The meeting of the Council of the Eastern Region was held in the afternoon of the 15th July. Dr. Dingley attended as a Councillor Member as he did in previous meetings and Drs. Menon, Pamra, P.K. Sen, Mehrotra, T. Mirza and Mrs. Paul attended as Observers. The revised Constitution of this organisation was approved and recommended for adoption by the International Union. *It was decided that the invitation extended by the Australian TB Association to hold the 1972 meeting of this body be accepted.* Dr. Yamaguchi, the temporary President, announced that he would yield the place to the President to be elected by the Australian Association in deference to the convention that the President should be from the country in which the Conference is held. This was agreed to, and Dr. Howells, on behalf of the Australian Association, announced that he would place the matter before his Committee. *I mentioned that our Executive Committee had agreed to host the 1974 meeting if circumstances were favourable.* The question of forming a Technical Committee on Bacteriology for the Region was brought up. I reminded the meeting that our Technical Committee had asked for full information about the real functions of this Technical Committee before they could consider the proposal.

5. The scientific sessions of the International Conference were held in the massive University building from the 13th to the 16th. The sessions were held simultaneously in three different rooms. About 150 papers were presented from different countries. The session on Epidemiology was chaired by Dr. Pamra. Dr. Pamra also presented the paper prepared by Dr. Deshmukh on 'Shibirs' organised by the Maharashtra Association and the excellent way this was presented was appreciated especially by the Chairman of the session, Dr. Harley Williams. I could gather that some of the papers presented in the various scientific sessions were really outstanding e.g. papers from Dr. Canetti, Mr. Sutherland, Dr. Svandova, Dr. Frimodt-Moller, Dr. Allan,

Dr. Mitchison and Dr. Fox. Many of the other papers had, it appears, already been published while some papers appeared to be not of that standard required in an International Conference. In the selection of papers geographical distribution and personality considerations probably weighed more than the importance of the subjects or merits of the papers. In the session on Community Participation, for example, Dr. Alexander, an Indian (Kerala) domiciled in Baltimore, presented his findings of a study sponsored by Rockefeller Foundation in South India. Some of the delegates felt that this paper should not have found a place on the international forum. Whether the findings enumerated by Dr. Alexander were submitted in India to the Government or to other appropriate authorities is not known.

LONDON

6. In London I had talks with officials of the Chest and Heart Association. I discussed matters with the Secretary, Miss Walsh, who is also Editor of their Journal 'Health' and who is in charge of the other publications of that Association. She felt that the pamphlet prepared for the benefit of Indian Immigrants by Dr. Harley Williams and which was translated here may be printed and sent to them. I spent some time with Mr. Elwyn Jones, who is in charge of the publicity campaign under 'Bronchitis'. Mrs. Sceats and Mrs. Ferguson gave me in general their way of approaching the public for funds. Mostly they make personal appeals. I had useful discussions with Mr. Young, the Accounts Officer of the Association.

7. The C.H.A. arranged for my visiting the Ham Chest Clinic in East End. I spent a day in that Clinic. Dr. Audrey Hauson took me round. She was dealing mostly with Indian population and was assisted by Dr. Bhakshi, a young doctor from Calcutta. They were appreciative of the cooperation they were getting from the Indian settlers in East End and had no problem with them at all. They did not have a welfare section in the Hospital, but the Health Visitor (Sister Roberts) was attending to the social needs of TB patients wherever these came up.

8. I spent two days in the Overseas and Commonwealth Department of the C.H.A. Miss Elizabeth Harrison, Secretary, and Miss K. Hambly, Assistant Secretary, covered a wide range of subjects including the Overseas Fellowship Programme of the Chest and Heart Association. In addition to the Fellowship

offered to the T.A.I, the C.H.A. also assists some Indian doctors who undergo training in the United Kingdom under other schemes and who may have to be assisted for short periods to complete their studies.

9. We discussed in some detail as to how the Fellows selected by us in the past have been making use in India of their experience gained in the U.K. Of the nine Fellowships given from 1955, the first, Dr. Dip Singh, did not return to India and Dr. Ghai, Medical Officer in the Kasauli Sanatorium, passed away in 1962. The others have been working in the TB field and making use of their experience gained in the U.K. The question whether personnel other than medical doctors may benefit from these fellowships was discussed in view of the fact that those in the Nursing field and Administration have important roles to play in the anti-TB movement.

10. I spent a day in the Social Services Society at the Camden Down London. This organisation has a workshop to help various kinds of disabled persons and acts as a liaison organisation for some Institutions doing similar service. Mr. Baker, who is in charge of the Camden Society and Mrs. Brill, Head of Day Care Management Group, were kind enough to take me round. Another of their staff members, Mr. W. Delstanche took me to the Filzroy Industrial Centre and to St. Francis Workshop, both in Camden and maintained by the Social Services Section and Health Department of the London Brough of Camden.

11. Dr. Harley Williams and I reviewed mailers already discussed with his departmental heads including the question of fellowships. He agreed to continue the Fellowships and if any departure needs to be made to assist non-medical personnel he would be happy to do so. He indicated that in 1971 he may be able to give two Fellowships for doctors sponsored by the Tuberculosis Association of India.

ZAMBIA

12. During the week I was in Zambia I had a good deal of discussion with Government officials and those connected with the Z.A.P.T. The Republic of Zambia is spread over an area of about 3,00,000 sq. miles. Its population is about four million. The Republic has eight Provinces, each of which is divided into districts for administrative purposes. On a general estimate Zambia may be having between 15,000 to 20,000 TB cases of whom about one-third may be infectious. There are 1,086

beds for the treatment of tuberculosis distributed in 54 hospitals. Domiciliary treatment is becoming popular. They have no dearth of drugs I was told. The sheet-anchor of their anti-TB programme is BCG vaccination and chemotherapy. They adopted BCG programme for those under 14 years in 1966, and this is carried out widely along with small-pox vaccination. Anti-TB drugs are given free to all diagnosed cases under a standard regimen (Streptomycin daily for two months *plus* Thiacetazone *plus* INH combines "in a simple tablet" daily) for 12 to 18 months. Second line drugs are given to proved failures. New cases are hospitalised initially for about two months mainly to ensure that they have their daily injections and to discipline them for taking regular treatment in their homes. Thereafter patients continue to collect the drugs from the nearest hospital or dispensary and the Government is appointing non-medical personnel for taking defaulter action. There appears to be no case-finding programme at present, but attempts are under way to mobilise existing out-patients' departments in hospitals, health centres and dispensaries to participate in case-finding and treatment on a permanent basis, so that the programme becomes a fully integrated part of the general health services. This programme will be assisted by eight mobile mass X-ray units which they hope to obtain by 1971-72. Laboratory services are available in the national laboratory attached to the Pneumoconiosis Bureau, Kitwe, Zambia. They have plans to establish a National Laboratory in Lusaka proper and to have provincial units also.

The Zambia Association for Prevention of Tuberculosis was established in September 1967. It has good constitution. It has not worked out a programme yet, nor does it have funds of its own. The Government have given them a grant of 4,000 Mcaba with which the Association has purchased some vehicles. The routine work is being carried on by the Chief TB Officer, Dr. Dissouki and his assistant Mr. Millapo, who is Chief Medical Assistant in the Ministry of Health, Zambia. In the course of the discussions I mentioned to Dr. Dissouki and Mr. Millapo the various activities which the Tuberculosis Association of India and its affiliates are carrying out and left it for them to consider which of these they could adopt in Zambia. They agreed that they should organise Provincial Associations and in course of time District Organisations also. They agreed that health education was important. It was agreed that the National Association

should organise a fund-raising campaign similar to the X-mass Seals Campaign or the TB Seal Campaign as in India. I gave them details of the organisation of our Seal Sale Campaign. This I explained gives opportunities to collect funds for the Association and to institute definite programmes for the benefit of the people. The organisation of conferences on national and provincial levels, as also the idea of holding Seminars and 'camps', appealed to them. As their constitution is more or less a standard one they should get their Association affiliated to the International Union.

14. I had opportunities to put across these ideas to the Chairman of the Z.A.P.T., Mr. M.S. Sakala and to the Permanent Health Secretary of the Government of Zambia, Dr. M. Nammango whom I met on various occasions. They showed deep interest in the work of our Association and said that they would try their best to do likewise in Zambia. The Health Secretary further agreed to invite an International Conference to Zambia and was confident that they could organise one in a fitting manner.

15. The annual meeting of the Z.A.P.T. was held on the 28th of July. This was their first general meeting. I addressed the gathering for about 40 minutes on various matters relating to tuberculosis control and gave a general review of our own activities in India.

16. I spent a day in Livingston, about 300 miles from Lusaka, where I visited the TB Hospital of 50 beds. In Lusaka and also in Livingston I met some members of the Indian community. They showed interest in the activities of the Tuberculosis Association of India and wanted to know in what way they could help. I mentioned to them our Seal Sale Campaign and pointed out Indian nationals in Zambia contributed about Rs. 250 or so through our High Commission. They agreed that this was a very small amount and they should contribute more. I have mentioned this to Mr. A.M. Thomas, our High Commissioner-designate to Zambia whom I met in Delhi on 18.8.1971. Mr. Thomas is a good friend of the T.A.I, and will be doing whatever he can in this regard subject to his limitations as our High Commissioner in Zambia.

17. I am deeply grateful to Chairman, Vice-Chairman, Honorary Treasurer and members of the Executive Committee of the Association for deputing me to the Moscow Conference and allowing me to visit London and Zambia after the International Conference.

THE XXI INTERNATIONAL TUBERCULOSIS CONFERENCE HELD IN MOSCOW (USSR) FROM 12TH-16TH JULY, 1971

Inaugural Session

The XXI International Tuberculosis Conference was inaugurated in the Palaces of Congress in Kremlin on Monday, the July 12, 1971. Nearly 3000 delegates from 80 countries attended the Conference.

The inaugural Session opened with the presentation of the report of the President of the International Union, Prof. Ph. V. Chebanov, followed by an address of welcome by the Minister for Public Health, B.W. Petrovsky and by the President of the Executive Committee of the Soviet of Workers Deputies of the City of Moscow. This was followed by the presentation of Report by the Secretary-General of the International Union Against Tuberculosis, Prof. Etienne Bernard and address by Dr. K. Hitze of behalf of the World Health Organisation. The Minister of Public Health of the USSR, Academician B.W. Patrovsky presented his report on the organisation of health services in the USSR.

Mr. B.W. Petrovsky in his speech on "Basic Principles and the System of Organisation of Public Health Services in USSR" outlined the growth of Public Health measures from all aspects. On the problem of tuberculosis, he stressed the general preventive measures, improving and bettering the living conditions, medical measures and preventing the spread of infection among the population.

Efforts to control tuberculosis in the USSR rests on a State basis. All anti-tuberculosis establishments—hospitals, sanatoria, anti-tuberculosis dispensaries prophylactoria, forest schools, boarding schools, children's tuberculosis sanatorium establishments and others are financed from the State budget. Treatment of tuberculosis patients at in-patient and out-patient establishments is free. During the period of treatment, patients receive grants for temporary disability for a period of 10 months or more. During this period, the job is reserved for the patient. The plan for controlling tuberculosis includes formidable tasks and the implementation of comprehensive health building and special measures, with the participation of the organs of Government, industrial enterprises, state farms and collective farms, public health establishments and public circles.

The preventive measures are combined with curative and sanitary preventive work. The anti-tuberculosis establishment make use of the dispensary method on a broad scale. Both the healthy and the ill are objects of surveillance and care of the public health authorities and the establishments.

There are about 2000 anti-tuberculosis dispensaries and more than 4,500 anti-tuberculosis departments in the general poly-clinical net work for treating adults and children. The patients receive in-patient treatment in tuberculosis hospitals and sanatorium which have approximately 4,50,000 beds. The anti-tuberculosis establishments are staffed by more than 23,000 skilled phthisiatrists engaged in preventive measures, treatment and follow up of tuberculosis patients.

Research work in tuberculosis is being investigated by 18 scientific research institutes.

Vaccination and chernoprophylaxis are being employed on a broad scale to prevent tuberculosis. In 1969, about 1.15 million people were vaccinated and revaccinated against tuberculosis. For case finding and early detection, more than 138 million people had the mass flouorography.

All the newly diagnosed cases have their initial treatment in hospitals or sanatorium and subsequently as out-patients in the dispensary. Children are treated entirely in the sanatorinm till they are totally cured. From the year 1950 to 1969, the mortality rate has come down by 7 per cent and morbidity rate by 5 per cent. In the morbidity rate there is a sharp decline of the rapidly progressing forms of tuberculosis.

Plenary Session

July 13, 1971

The Plenary Sessions were held in the University of Moscow. The subject of discussion was on 'The application of Modern knowledge to the control of tuberculosis' under the Chairmanship of Dr. H. Jentgens—Koein, Federal Republic of Germany, who while introducing the discussion stressed on the fact that the

problem of tuberculosis was still the greatest problem in the developing countries and it needed a more coordinated effort of both the developed and under-developed countries to combat it.

Dr. K.L. Hitze—W.H.O., Geneva, Switzerland, pointed out that the measures to control tuberculosis were still meagre and for fighting tuberculosis, BCG vaccination was needed in the community as the only control measure in the developing countries, where the prevalence of tuberculosis was still high. For a successful BCG programme, both organisational and operational researches were required. He stressed the need for treatment with the standard chemotherapeutic drugs. There is need for National Tuberculosis Control Programmes which should be countrywide and cover sociological aspects. He suggested the need of TB services to be integrated with General Health Services. The Social and economic aspects of health are to be looked after properly and to be developed accordingly. There is need for mobile case finding units and there is less need for setting up the hospital beds.

Dr. H. Acan—Ankara, Turkey, outlined the success of TB Control Programme in his country having an area of 70,000 sq. miles with a population of 36 million, where BCG vaccination is successful and there is effective health education of patients, their families and training programmes for the para-medical and social workers. There is effective case finding programme and chemoprophylaxis of those above the age of 5 years and with Tuberculin positive reaction. 95 per cent of the eligible population has been vaccinated without the tuberculin test. The case finding programme is both by the M.M.R. and sputum test both by direct smear and sensitivity studies. The treatment is mostly ambulatory in the city by the city clinics and in villages by the primary health centres by using 3 major drugs. Hospitalisation is mostly for acute cases and bacillary positive chronic and resistant cases. There is effective social assistance by giving monetary aid to the patient and his family.

Dr. F. Blanco—Madrid, Spain, said that in his country TB services are integrated with the General Health Services. BCG examination and M.M.R. are being used as preventive measures and the number of hospital beds have been reduced. Emphasis is also being laid on sputum testing.

Prof. M. Millet—Brussels, Belgium, said that more emphasis is being laid on preventive measures and most of the budget is being

spent on preventive measures such as BCG vaccination. Tuberculin test and X-rays of those who are highly tuberculin positive.

Prof. AM. Raboukhine—Moscow, USSR, said that BCG vaccination is being done in children, chemoprophylaxis of those who are highly positive and treatment of those who are diagnosed as cases of tuberculosis is by three drugs combination. Mass Miniature Radiography of workers is being done and surgical intervention for those who are bacillary positive and resistant cases.

Dr. H. Radenac—Paris, France, emphasised the need for Research and planning of scientific studies, where important decisions are to be taken and action taken on the decisions arrived. For such a programme required the coordination of Mathematicians, Jurisists, Sociologists, medical personnel, Statisticians, and administrators.

July 14th, 1971

The Session on 'Problems in organising effective ambulatory treatment of tuberculosis patients' was presided over by Dr. B. Kreis, Paris, France. While introducing the subject, he highlighted the multifacets of the problem in organising effective ambulatory treatment of tuberculosis patients. Such an organisation is different in developing countries than in the developed countries,

Dr. A. Roullion, IUAT, Paris (France), said that economics of the TB Control programme are very important for it we have to depend upon the availability of consumer goods and stressed on the need of good oral and regular therapy. The organisation of services play an important part and voluntary services are vital. The latter services should help in motivation of the patients to take the prescribed treatment and the voluntary agencies should cooperate with the Government bodies by having regular meetings for the effective working of the National TB Control Programme. Maintenance of proper records and statistics is very vital and the services are to be provided at a minimum cost.

Prof. Ph. V. Chebanov, Moscow, USSR, said that efforts are to be made to simplify treatment and for introducing an effective chemotherapy. The out-patient treatment should be for minimal cases and recommended oral therapy while acute and open cases should be hospitalised which is also recommended for those who are with complications and for diagnosis. According to him hospital treatment is better than the OPD treatment as it

provided better facilities. The success of OPD treatment depends on discipline of the patient, and proper control by the dispensary and by home visits. In the OPD treatment the use of INH plus PAS is recommended, while in the hospital the use of tripple drug therapy consisting of Streptomycin, INH and PAS is recommended. The toxic effects to either of the regimen both in the OPD and hospital are similar and it is about 8%. The side effects with the second line drugs are relatively more.

Dr. Chew Chin Hin—Singapore, while speaking on 'methodology and results of National Survey in Singapore' gave an outline on the results of smear and culture examination and Niacin test which was done in 3422, 3399 and 1713 patients respectively. The frequency of culture positive were 85/100,000 of the population. Of 1713 patients with Niacin test positive, it was in 1256 males and 457 females. More population with sputum negative were lost while on treatment as compared with sputum positive. Apparently there was more disease in sputum positive cases as compared to sputum negative cases.

Dr. J. Fridodt-Moller, Madanapalle, India, stressed on the fact that due to high morbidity and mortality home treatment is the treatment of choice and for its success regularity of drug taking is very essential. Factors inflencing regularity of drug treatment or for discontinuing treatment early are very many. Interestingly enough loss was in all types of disease, and irrespective of the extent of disease, presence or absence of cavitary pathology and the size of the cavity.

2. Sputum direct smear positive cases cooperated better than sputum positive culture cases.

3. Those with INH resistance, cooperated better than INAH sensitive strains.

4. Those with previous treatment co operated better and as many as 70% continued treatment, whereas only 30% continued with out treatment.

5. Those having two drugs cooperated better than those who were given single drug.

6. Results of treatment were better with culture positive than with culture negative.

7. Factors such as extent and type of disease, previous history of treatment, length of previous treatment influence the ultimate results.

8. Results are better with longer treatment and the minimum duration of treatment should be one year.

Dr. P. Ithrbe, Maracaibo, Venezuela, in his series the frequency of defection was 1.69% in those with controlled disease and it was 21.79% in those with uncontrolled disease. The frequency of acquired resistance was 59.67%.

Dr. J. Valente Pereira Cabrat, Porto, Portugal, gave an outline of organisational set-up in Portugal with special emphasis on psychological and social aspects of tuberculosis patients and also stressed the need of cooperation between para-medical and medical personnel and their proper training. Patients are properly motivated about the regularity in treatment. Voluntry organisation, psychologists and Journalists play an important part in organisational aspects of anti-tuberculosis programme.

July 15th, 1971

Session on 'Community Participation in the Tuberculosis programme' under the Chairmanship of Dr. B. O. Akinosho, Legas, Nigeria, who while introducing the subject stressed on the need for people's efforts being mobilised for active participation in the tuberculosis programme and the ways by which this active participation is organised.

Dr. N.C. Sen-Gupta, Singapore, expressed that inspite of the effective anti-biotics available and the public health measures, there has not been much dent in the TB control programme and this has been mostly due to failure to apply proper and realistic priorities.

According to lime three fundamentals of TB Control are

1. BCG coverage
2. Case finding by providing basic health facilities such as direct microscopy.
3. Treatment by providing adequate chemotherapy.

Another big factor responsible for it has been the failure on the part of the policy makers to provide facilities particularly to the rural community. By community participation we mean active and direct participation of community in any National TB Control programme e.g. mothers bringing child for BCG vaccination, volunteers can enhance case

finding by bringing symptomatics for examination and socially motivated people should be mobilised to help in bringing down the defaulter rate.

Dr. C.A. Alexander, Baltimore, USA, emphasised on encouraging the indigenous medical practitioners to take part in the National TB Control Programme because according to him a large proportion of the poor population go for consultation to these indigenous medical practitioners.

Dr. P. Iturbe, Maracaibo, Venezuela, The three associates for the successful working of the National TB Control Programme are the States, employees and the community who should mutually cooperate with each other for case-finding, chemotherapy, BCG vaccination and contact examination. For successful community motivation there should be careful selection of the staff for community participation and both the community and staff should be motivated by mutual discussions, Press, Radio talks, etc.

Prof. C.A. Mitrev, Moscow, USSR, highlighted the working of the Red Crescent Society of the USSR, the Red Cross and the Ministry of Health of the USSR. For educating the children, social workers and paramedicals was by the supply of Text-Books, visual aids, etc. "Regular propaganda for examination of symptomatics, chemoprophylaxis and on regular treatment with chemotherapeutic drugs is by distribution of pamphlets, placards, slides, radio talks etc.

Mr. W.N. Thevakadacham, Jaffna, Ceylon, emphasised the importance of fund raising and on the ways and methods by which these are being utilised by the Ceylon Anti-TB Association.

July 16th, 1971

Session on 'Results of Controlled Chemotherapy Trials' under the Chairmanship of Dr. W. Fox, London.

Dr. W.G. Allan, Hong Kong said, that provision of facilities for sensitivity testing of bacilli are not essential for successful chemotherapy.

2. Default rate is higher in self-medication irrespective of the drugs used.

3. Pre-treatment drug sensitivity does not play an important part in the ultimate results of treatment.

Ind, J. Tub., Vol XVIII, No. 4

Prof. D.A. Mitchison, London laid emphasis on the fact that initial resistance to PAS and INH is of not much prognostic value.

2. Slide culture sensitivity tests is as good as standard tests.

3. Efficacy of standard and proportion test is same, but proportion test is more expensive.

4. Rapid pre-treatment sensitivity tests are of no value.

5. Treatment without sensitivity tests show slightly more clinical failures. It is about 0.5% in developed countries and 5% in developing countries.

Dr. S. Devi, Singapore, while presenting her observations on self administration vs. supervised treatment remarked that both policies achieve high degree of success. S.P.H. in the initial treatment followed by P.H. vs. S.P.H. in the initial phase followed S₂H₂ (bi-weekly).

Dr. Z.S. Ozoen, Istanbul, Turkey, while giving the results of controlled trials remarked that the combination of thiacetazone plus Isoniazid was an effective combination in his country.

Prof. N.A. Schmelev, Moscow, USSR recommended the use of 2-phase treatment for the newly diagnosed cases, initially with Streptomycin, PAS and INH followed by PAS and INH orally. He also indicated the obvious advantages of ambulatory treatment.

Dr. S.P. Tripathy, Madras, India, presented his observations on daily administration of PAS plus Isoniazid (unsupervised) in standard doses vs. PAS plus Isoniazid twice weekly (supervised) in higher dose along with 6 mgm pyridoxin both the therapeutic regimens were equally effective, with obvious advantages of the later regimen, that there is less cost and relatively low toxicity.

Prof. F.A. Dubra, Buenos Aires, Argentina, presented his observation on a controlled trial with Rifampicin plus Isoniazid and Ethambutol daily. After daily administration of Rifampicin plus Isoniazid for six months followed by Rifampicin plus isoniazid intermittently gave better results than isoniazid plus Rifampicin and Ethambutol.

Dr. R. Corpe, Rome, Italy, presented his observations after a controlled trial with Rifampicin plus isoniazid, 2) Rifampicin plus

Isoniazid and 3) Streptomycin plus Isoniazid and Ethambutol.

In regimen No. 1 and 2 sputum conversion was achieved after two weeks of administration, development of resistance was not seen in any case and toxic effects were in about 6%.

While summing up the optimum drug regimens and their toxic effects in

1953			with Streptomycin + Isoniazid	+PAS =22%
1958	”	”		+PZA =13%
1968	”	”		+EMB=11%
1971	”		+Rifampicin+ Isoniazid	=2%

Dr. W. Fox, the Chairman while concluding the sessions highlighted the causes of

failure of chemotherapy which are due to 1) Inadequate drug regimen, 2) irregularity in taking drugs, 3) stopping the drugs earlier, 4) toxic effects and 5) Development of resistance. He emphasised on the methods of inaccurate sensitivity tests and unnecessary change of drug regimen and use of reserve drugs haphazardly and injudiciously. According to him for the success of good chemotherapy the various factors were

Vital	Good chemotherapeutic regimens – Daily Intermittant
Very Subsidiary	Efficient organization for drug administration
Largely irrelevant	Reserve chemotherapy of failure patients
	1. Sensitivity testing
	2. Sanatorium regimens

NEWS AND NOTES

NATIONAL CONFERENCE

The Twenty-seventh National Conference on TB & Chest Diseases will be held in Patna in the first week of January 1972. Dr. K.N. De of Calcutta is the President of the Conference. The Bihar State TB Association will play the host.

The main subjects proposed to be presented are : 'Population Dynamics and Tuberculosis', 'Changing Trends in the Prevalence and Incidence', 'Surgery', 'Chemotherapy including Management of Resistant Cases', 'Tuberculosis in Children', 'District Tuberculosis Control Programme', 'Sensitivity Testing', 'Non-Pulmonary Tuberculosis' and 'Non-Tuberculosis Chest conditions'.

CASH AWARDS

The Tuberculosis Association of India will award a cash prize of Rs. 500/- to a Tuberculosis worker, preferably below 45 years of age, for an original article not exceeding 30 full-scape double-spaced typed pages (approximately 6,000 words) excluding charts and diagrams, on a subject relating to Tuberculosis in which he or she is specializing or has worked, and adjudged best by a committee. Paper may be sent in quadruplicate to reach the TB Association of India, 3, Red Cross Road, New Delhi-1, on or before the 10th November, 1971.

ESSAY COMPETITION

The Tuberculosis Association of India has decided to give a cash prize of Rs. 300/- to a final year medical student for an original essay on Tuberculosis adjudged best by a Committee of this Association. The competition will commence from 1972 and the subject selected for the first competition is 'Chemotherapy of Tuberculosis. Manuscript should be typed in double-space and should not exceed 15 fullscape size pages (approximately 3,000 words). Four copies of the manuscript should reach the Tuberculosis Association of India, 3, Red Cross Road, New Delhi before 16th October, 1971 through the Dean/Principal of the College.

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

The Chest & Heart Association, London has offered two fellowships for the year 1971-72 to be awarded to Indian Doctors selected by the

Tuberculosis Association of India. The travel expenses have to be borne either by the selected candidates or by the sponsoring authorities. The selected candidates will be given a programme by the Chest & Heart Association for visiting various Institutions in U.K. for eight weeks and in the continent for two weeks.

TB ASSOCIATION OF GOA, DAMAN AND DIU

Dr. R.V. Rajadhakshya has been appointed Honorary Secretary of the TB Association of Goa, Daman and Dm in place of Dr. M.R. de Menezes Mesquita with effect from August, 1971.

TB ASSOCIATION OF ORISSA

Dr. B.N. Palit has been appointed Honorary Secretary and Treasurer of the TB Association of Orissa in place of Dr. S.K. Mitra.

MYSORE TB ASSOCIATION

Shri Y. Ramakrishna, former Minister for Health, Government of Mysore, has been elected as the Vice-President of the Mysore State TB Association with effect from July, 1971. Shri Ramakrishna as Minister for Health was President of the State TB Association until the ministry resigned.

ANDHRA PRADESH TB ASSOCIATION

The TB Association of Andhra Pradesh will be organising a Refresher Course in Tuberculosis for General Medical Practitioners and Medical Officers on 3rd and 4th October, 1971 at the State TB Centre, Irramnuma, Hyderabad.

DR. R. VISWANATHAN HONOURED

Dr. R. Viswanathan, former Director of the Vallabhbai Patel Chest Institute, Delhi, has been awarded the Dhanwantri Prize (1971) by the Indian National Science Academy, for his outstanding contributions in the field of Medical Sciences. Dr. Viswanathan has done outstanding work on Pulmonary Diseases. He discovered a new type of Candida, named after him "Candida Viswanathi" which produces acute meningitis in children. The award consists of a prize of Rs. 5,000/- and a brozne medal.

DR B.C. ROY NATIONAL AWARD FOR 1971

On the demise of Dr. B.C. Roy, one of the founder members of the Medical Council of India and first elected Indian President, a person of great political foresight and outstanding merit, the Medical Council of India created an Award known as 'Dr. B.C. Roy National Award Fund', to perpetuate the memory of this great son of India in a befitting manner. Subsequently, the fund has been registered under the Societies Registration Act XXVI of 1860 and is being managed by a Managing Committee.

The Managing Committee has decided that the following 3 awards may be given during the year November, 1971.

1. To recognise The merit of a good and capable teacher in the following branches of Medicine : (a) Pathology, (b) Microbiology and (c) Social & Preventive Medicine.
2. To recognise best talents in encouraging the development of specialities in different branches of Medicine.
3. To recognise the best services in the field of socio-medical relief and in the establishment of medical organisations and medical institutions.

The Management Committee fixed an award of Rs. 2,000/- (in cash/Medal) each for the above 3 categories. The above awards will be made by the Committee of Management on the advice of an Expert Committee constituted by the Management Committee.

In addition to the above Awards, the Management committee decided to give awards in the following categories also :-

1. To aid two deserving research projects in the Medical Colleges conducting research in (a) Paediatrics with special reference to Nutrition and (b) Cardiovascular Diseases with special reference to Hypertension of the value of Rs. 7,500/- each for two years.
2. To grant one fellowship for post-graduate studies in M.D. (Social & Preventive Medicine) with special emphasis on Community Health—Rs. 300/- per month for two years.

The Management Committee also selected Major-Genl. Inder Singh, Sr. Consultant in Medicine, Directorate of Armed Forces Medical Services, New Delhi, for the 2nd

B.C. Roy Oral ion to be held in November, 1970. Further particulars may be had from the Secretary of Dr. B.C. Roy National Award Fund, Office of the Medical Council of India, Temple Lane, Kotla Road, New Delhi-1, and completed nomination forms should reach him not later than 5th October, 1971 through Registered A.D.

INDIAN ACADEMY OF MEDICAL SCIENCES

The Indian Academy of Medical Sciences has been conducting post-graduate examinations in different disciplines of medical sciences on All India basis with a view to admit candidates to the Membership of the academy. The examinations are held twice a year in January and July. The next examinations will be held in January, 1972. Details about the examinations and application forms can be obtained from the Executive Director, Indian Academy of Medical Sciences, C 11/2, Medical Institute Campus, Ansari Nagar, New Delhi-16, on payment of Rs. 3/-.

NATIONAL CONGRESS ON DIABETES

The Second National Congress on Diabetes will be held in Poona from 3rd to 5th December, 1971 under the auspices of the Poona Branch of the Diabetes Association of India. The Congress which is once held every three years is open to all workers in the field of Diabetes. For details please write to Dr. V.S. Prayag, Organising Secretary, IInd National Congress on Diabetes, B.J. Medical College, Poona.

CONFERENCE ON MEDICAL JOURNALISM

The Indian Journal of Medical Sciences which will be celebrating its Silver Jubilee Year of Publication this year has organised a Conference with a view to bring together Editors of Medical Journals in India. The main purpose is to improve the educational value of the journal to the Medical Profession in India. The Conference will be held in Bombay from 15th to 17th November, 1971. For details please write to the Managing Trustee, Indian Journal of Medical Sciences, Backbay View, opposite Charni Road Garden, Mama Parmanand Marg, Bombay-4.

ANDHRA PRADESH DONATION

The Andhra Pradesh TB Association has decided to donate Rs. 500/- for the Bangla Desh Refugees.

The Indian Journal of Tuberculosis

ABSTRACTS

Vol. XVIII

October 1971

Abst. No. 4

Penicillin, Ampicillin and Cephaloridine in Severe Exacerbations of Purulent Chronic Bronchitis in Elderly Patients.

A. Paris, H. Raafat, J.S.V. Greenfield, M. J. Marshall and M. Solari. Brit. J. Dis. Chest (1971) 65, 91.

Three antimicrobial regimens consisting of Cephaloridine in dosage of 4.5 and 6 g daily, benzyl penicillin nine million and then six million units daily and ampicillin 4 g daily by mouth with an initial supplement of 3 g daily intramuscularly, each for 14 days showed that benzyl penicillin regimen was inferior, cephaloridine 6 g daily was marginally superior to ampicillin regimen but not cephaloridine 4.5 g daily.

Toxic effects were few though cast in the urine with cephaloridine 6 g daily were common.

Cephaloridine 6 g daily seemed to be an effective antimicrobial agent in elderly subjects with troublesome purulent chronic bronchitis.

H.B.D.

Provoking Factors in Asthma

Margaret Turner Warwick. Brit. J. Dis. Chest (1971) 65,1.

For the asthmatic reaction of an individual patient, the mechanism of trigger stimuli, boost reactivity and bronchial wall response plays an important role.

H.B.D.

Selectivity of Broncho Dilator Action of Salbutamol in Asthmatic Patients:

J. W. Patterson, JR. J. Courtenay Evans and F. J. Prime. Brit. J. Dis. Chest (1971) 65, 21.

In fifteen patients, effects of intravenous isoprenaline and salbutamol were compared and found to be equipotent as bronchodilators. Salbutamol was seven times less potent than isoprenaline in raising the heart rate. Both

drugs increased alveolar ventilation to the same extent and mean arterial oxygen tension rose by a few m. m. Hg with both drugs;

H.B.D.

The Circumstances preceding Death from Asthma in Young People in 1968 to 1969.

P.M. Fraser, F.E. Speizer, S.D.M. Waters, R.Doll and N.M. Mann. Brit. J. Dis. Chest (1971) 65, 71.

In 52 young persons aged 5 to 34 years, the circumstances preceding death from asthma were investigated. All the patients were sick severely, most had required medication to control their asthma, many had been in Hospital for an acute attack and many were deteriorating before death. In 79% the death was regarded as sudden and unexpected.

In 11 of 30 cases (37%) excessive inhalation of bronchodilator was considered as contributory to death.

In less than half the deaths studied (46%) were due to epidemic factor.

H. B. D.

Progress of Asthma and Adreno Cortical Function

A. R. Nathoo, Brit. J. Dis. Chest (1971)65, 85.

In two groups of asthmatic patients treated with normal and subnormal doses of corticosteroids showed, that adrenal suppression occurs as a result of corticosteroid treatment, but the clinical course of disease is not influenced by the functional state of adrenal cortex.

H. B. D.

Simultaneous Immunization with B.C.G. Diphtheria Tetanus and oral Poliomyelitis vaccines in Children aged 13—14.

N.S. Galbraith; C. Groshy, Joan M. Barnes, Rayna Fernandes. Brit M. Jour. 24th April, 1971.

The simultaneous administration of B.C.G.

vaccine, diphtheria tetanus toxoid aluminium hydroxide adsorbed vaccine and oral poli-vaccine was studied in 628 children aged 13-14 years between 1966 and 1969 in New Ham, London.

The efficacy of these vaccines was uneffected by administrating them at the same time; routine simultaneous administration is considered justified when organizational difficulties prevent the attainment of high immunization rates with the vaccines given separately.

No adverse reaction to B.C.G. or oral poliomyelitis vaccine took place, but 8% of children had moderately severe local reactions after diphtheria-tetanus aluminium hydroxide adsorbed vaccine, which is attributed to diphtheria toxoid.

H. B. D.

Oral Preparation of Isoetharine Compared with Oreiprenaline and Choline Theophyllinate.

W. Linehen. And J.P. Guffin. Brit. J. Dis. Chest (1971) 65, 44

In patients with reversible air way obstruction isoetharine in plastic matrix tablets were as effective a bronchodilator as an equal dose of 20mgs. of oreiprenaline and both the sympathomimetic amines were more effective than 200 mgs. of choline theophyllinate.

H. B. D.

The Nature of the Increased Lung Volume in Asthma.

Melvin N. Zelefsky and Bajra K. Swarin. Brit J. Dis. Chest (1971) 65, 39

Thirty-two asthmatic patients, who were studied during an acute exacerbation and subsequently during remission showed increase of their total lung capacity during acute exacerbation when measured by a closed Circuit helium dilution technique.

Concomitant use of radiologic method for estimating total lung capacity showed no increase of T.L.C.

H.B.D.

Rifampicin in initial treatment of Pulmonary Tuberculosis

Rae Newman, Bernice Doster, Francis J. Murray and Shirley Ferebee, Amer. Rev. of Resp. Dis.; 1971, 103, 461.

The paper deals with the interim results of

treatment of 234 patients admitted to a US PHS co-operative therapy trial to test rifampicin in the initial treatment of pulmonary tuberculosis. Patients were randomly assigned to one of the 3 treatment regimen: rifampicin + INH; rifampicin + INH+ethambutol; streptomycin+INH+ ethambutol. The daily dose of drugs used was rifampicin 600 mg; INH 300 mg; ethambutol 15 mg per kg. and streptomycin 1 gram daily for first 8 weeks and twice weekly for the remaining 12 weeks.

The two regimens containing rifampicin were equally effective in eliminating tubercle bacilli from the sputum and both were slightly superior to the control regimen without rifampicin. By 16 weeks, the cultures of approximately 90% of the patients treated with rifampicin still yielded tubercle bacilli as compared with 13% of those treated with control regimen.

Rifampicin was well tolerated by the patients and had to be discontinued because of intolerance in only 3 patients. Renal and hepatic functions were monitored at 4 weeks' intervals. The only abnormalities observed during treatment with rifampicin were values for SGPT exceeding 100 units in 9 out of 127 patients receiving rifampicin. SGPT value decreased in 3 patients while treatment was continued and in 6 after the regimen was discontinued. Low WBC counts occurred sporadically with all regimens but were persistent only in 5 patients receiving ethambutol.

The authors conclude that the combination of rifampicin/INH given orally was as effective and considerably less toxic than the best regimen available so far.

S.P.P.

Rifampicin association with Isoniazid, Streptomycin and Ethambutol respectively in the initial treatment of Pulmonary Tuberculosis

K. Nitti E. Catena, F. Delhi Veneri, G. De Michele and A. Marra. Amer. Rev. Resp. Dis.; 1971, 103, 329,

A clinical trial of Rifampicin in association with INH, Streptomycin or Ethambutol was carried out in 220 patients of pulmonary tuberculosis who had never received any anti-tuberculosis drugs earlier. A control group of patients was treated with INH and Streptomycin. The treatment lasted four months. The results in respect of sputum conversion and its speed were comparable in patients treated with Rifampicin with INH and Rifampicin with Ethambutol. However, the results were

significantly better than in the other two schedules consisting of Rifampicin with Streptomycin and INH with Streptomycin. Safety of treatment with Rifampicin was good and no specific side effects were observed. The incidence of ototoxicity was the same whether Streptomycin was combined with INH or Rifampicin. No abnormality in vision was noticed in the Ethambutol group.

S.P.P.

The Australian Rifampicin Trial

A.J. Proust. Med. J. Aust.; 1971, 2, 85.

An assessment of hepatic toxicity of Rifampicin was made as part of the Australian trial. About 3% of patients developed evidence of toxic hepatitis and an additional 11% evidence of an abnormal liver function some time or other during the trial. Whereas Jaundice induced by some drugs e.g. INH, ethionamide, pyrazinamide etc. is the result of hepatitis-like reaction with hepatocellular injury, Jaundice in Rifampicin cases is probably due to cholestasis following disturbances of bile metabolism, transport or excretion. The incidence of Jaundice in patients on Rifampicin can be considerably reduced if patients with history of impaired liver function and alcoholism are excluded. The value of symptoms of gastric intolerance such as anorexia, nausea, vomiting in heralding the onset of toxic hepatitis is stressed. Gastro-intestinal symptoms may some times be due to an irritable gastro-intestinal tract, in which case the symptoms will disappear if Rifampicin is administered after breakfast rather than before breakfast as is usually done. If the symptoms persist when drug is given after breakfast, liver toxicity must be suspected.

S.P.P.

Community-wide chest x-ray surveys in Australia

T.C. Boag. Med. J. Aust.; 1971, 2, 74.

Community-wide chest x-ray surveys for case-finding were introduced in Australia in 1948. The measure, voluntary to begin with, was finally made compulsory in all the state by 1963. In 1969, the death rate had been reduced to 1.7 per 100,000 from 27.8 in 1948. During the same period notification rates declined from 46.3 to 14.6 per 100,000. Whereas in 1948 the percentage of tuberculin reactors was high, the position to-day in some states is very near to the accepted 'control' stage of less than 1% reactors among children up to the

age of 14 years. It is believed that this improvement is due mostly, if not solely, to compulsory x-ray surveys and systematic and continuous case-finding.

Mass surveys have enabled to detect 30% to 40% of annual notifications. Further, whereas only 18.3% of the freshly detected cases from the surveys were in an advanced stage, 28.5% of the others who attended voluntarily were advanced. Another significant finding has been that whereas hardly 40% of the population got themselves x-rayed when the programme was voluntary, the coverage increased to over 98% when the programme was made compulsory. Superiority of compulsory surveys over voluntary surveys is further brought out by the fact that the yield of new active cases per 1,000 persons x-rayed in the former was almost double of the yield in the latter type of surveys. Although the cost per case discovered in compulsory survey is exorbitant, the Australian authorities believe that it is a worthwhile investment.

S.P.P.

Decreased Glucose Concentration in Malignant Pleural Effusions

Herbert W. Berger and Grace Maker. Amer. Rev. Resp. Dis.; 1971, 103, 427.

Decreased Glucose Concentration in the pleural effusion has been reported in Tuberculosis and Rheumatoid disease. Its frequency in effusions due to malignancy has not been stressed. Thirteen out of 88 patients (15%) with pleural effusions due to malignant tumour had pleural fluid glucose concentration ranging from 5 to 59 mg %. In 7 patients the values were less than 20 mg %. A pleural fluid glucose concentration of less than 60 mg %, and particularly less than 20 mg%, suggests a diagnosis of malignancy in the absence of hypoglycaemia, rheumatoid arthritis and tuberculous pleurisy.

S.P.P.

BCG Vaccination and Leukaemia Mortality

Lise Davignon, P. Lemonde, P. Robillard A. Frappier. The Lancet; 1970, II, 638.

It has been observed that BCG exerted counter-acting influence on various types of experimental neoplasms, including spontaneous lymphoid leukaemia in mice. BCG vaccination record in children below 15 years in each of the years 1960—1963 was scrutinized to find out if this observation was true in human

beings also. Death from leukaemia was found to be half as common among BCG vaccinated as among non-vaccinated children. Whether the mechanism is similar to that in mice or whether the lower incidence of the leukaemia in vaccinated children is due to non-specific stimulation of immunity, remains to be seen.

S.P.P.

Nature of Hodgkin's Disease Agent

N.J. Vianna, P. Greenwald, J.N.P. Davies. The Lancet; 1971, I, 733,

A concept has been put forward that the causative agent of Hodgkin's disease is a virus of low virulence and low infectivity that possibly resides in the female birth-canal and that exposure to it is at the time of birth and entry is via the oral respiratory portal.

There it is normally held over a long period and may in many individuals be lost but in others, perhaps especially susceptible, it usually manifests its effects only when the tonsillar barrier is diminished by involution or surgery. In other words, the disease is not congenital but is acquired.

The causative agent is barrier-held and barrier decrease permits access to the lymph-nodes only of immune-complex material which evokes the eosinophil and later cell responses typical of Hodgkin's disease. The agent not being present in the nodes, will not be identified there. The authors conclude that although there are deficiencies in evidence in favour of this concept, it does permit understanding of many of the known features and aspects of disease and should lead to more experimental work.

S.P.P.

J
.
T
u
b
.
,
V
o
l
.
X
V
I
I
I
,
N
o
.
4

I
n
d
.