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ORGANISED HOME TREATMENT

In this issue of the Journal, different aspects of domiciliary treatment are discussed.

Home treatment is nothing new. In fact, it is the most ancient form of treatment. In spite of all efforts during the past years to provide hospital beds for tuberculous patients we have only one hospital bed available for every 1500 of them in India; and there is no doubt that the number of patients who get treatment in the homes is several times more than the number treated in institutions.

Two considerations need special mention. The first is the vastness of the tuberculosis problem in India *vis-a-vis* the number of hospital beds available for treatment. After the formation of the Tuberculosis Association of India, its first Medical Commissioner, the late Dr. C. Frimodt-Moller, advocated as early as 1939 'Organised Home Treatment' as in his opinion, that was the only way the vast majority of TB patients in the country could be reached. This form of treatment was introduced in 1939 not because it was the best, but that was the only practical method to give some relief to the tubercular patient. In fact, sanatorium and hospital treatment was considered better. The advent of anti-bacterial drugs has changed this conception. Recent research have shown that treatment of patients in their homes properly carried out with these new drugs is as effective as given in hospitals. The research that is being done at the TB Chemotherapy Centre in Madras has proved this. Even so, there is reason to believe that the full significance of home treatment has not been realised by the public, Governments, general practitioners and even by specialists.

How can home treatment be organised and who is to do it? There are some essential conditions necessary to make the home treatment effective. To mention a few: there should be a centre, which should be the base from which treatment can be carried out. There should be adequate facilities for proper diagnosis. There should be doctors and ancillary personnel, specially home visitors, to supervise the treatment. The patients and their families should be educated and persuaded to take the drugs regularly for long periods. In addition, the fact that the patient is in the midst of his relatives and friends demand that the preventive, sanitary and educational aspects of the disease should be adequately attended to, while the treatment programme is being carried out.

The Centres from which a programme of organised home treatment can be carried out best are the tuberculosis clinics. This is one of the reasons why the establishment of an extensive network of clinics throughout the country is given high priority in the Government's Five Year Plans. The organisation of Home Treatment would be one of the items of orientated teaching and training programme undertaken by the new National Tuberculosis Institute at Bangalore.

Domiciliary Treatment Scheme in Practice

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The clinical efficacy of Domiciliary Chemotherapy in tuberculosis has for several years been common knowledge among workers in the field. The last remaining doubts have now been laid to rest, thanks to the controlled trials conducted at the Madras Chemotherapy Centre. Even at the risk of repetition it must be stressed that "Domiciliary Treatment Scheme" means something more than mere treatment from the Out-Patients Department. Perhaps our initial term "Organised Home Treatment" was more expressive of its dynamic content than the abbreviated but suave term "Domiciliary". The originator of the term obviously meant to emphasize the need for organized efforts for a scheme of prevention in the community, with the individual patient as the starting point of a chain of activities. The contents of such a scheme could be defined as:

1. Organised search for patients;
2. Organised scientific treatment;
3. Organised preventive measures; and
4. Organised socio-economic relief and rehabilitation.

It is proposed to present here an analysis of a group of cases attending the New Delhi Tuberculosis Centre, in respect of the above activities, to allow a critical review and evaluation of ideas, attitudes, and techniques of the Domiciliary services. The material chosen consists of a group of consecutive cases freshly registered over a given period (January—February 1958), so that the favourable as well as unfavourable results appear together, and the gap between the theory of the "Domiciliary Service Scheme" and its achievement in actual practice becomes obvious.

Organisation of the Scheme

Before presenting the material, it is well to give the background of the Domiciliary Treatment Scheme in Delhi. For purposes of anti-tuberculosis work, the cities of Delhi and New Delhi have been divided into six zones, one corresponding to each of the six Clinics, which are expected to run a Domiciliary Service within their assigned zones, and to refer any TB case from other zones to the appropriate clinic for further action. The idea, of course, is to avoid any overlapping of activities, and to give each zonal clinic the responsibility of the preventive programme in its own area. Patients in the rural areas of Delhi and from the adjoining states of Punjab, U.P. and Rajasthan are however free to seek out-patients' service from the clinic of their choice. The New Delhi Tuberculosis Clinic has been assigned the whole of New Delhi plus portions of Old Delhi contiguous to the clinic, the whole area covering a population of over 6 lakhs. Apart from the treatment and advice given at the Centre, liaison is maintained with patients' families and the community in general, through two field medical officers and nearly a dozen public health nurses and health visitors, and a social welfare organisation consisting of five voluntary Care & After-Care Committees, and a medical social worker placed at the Centre.

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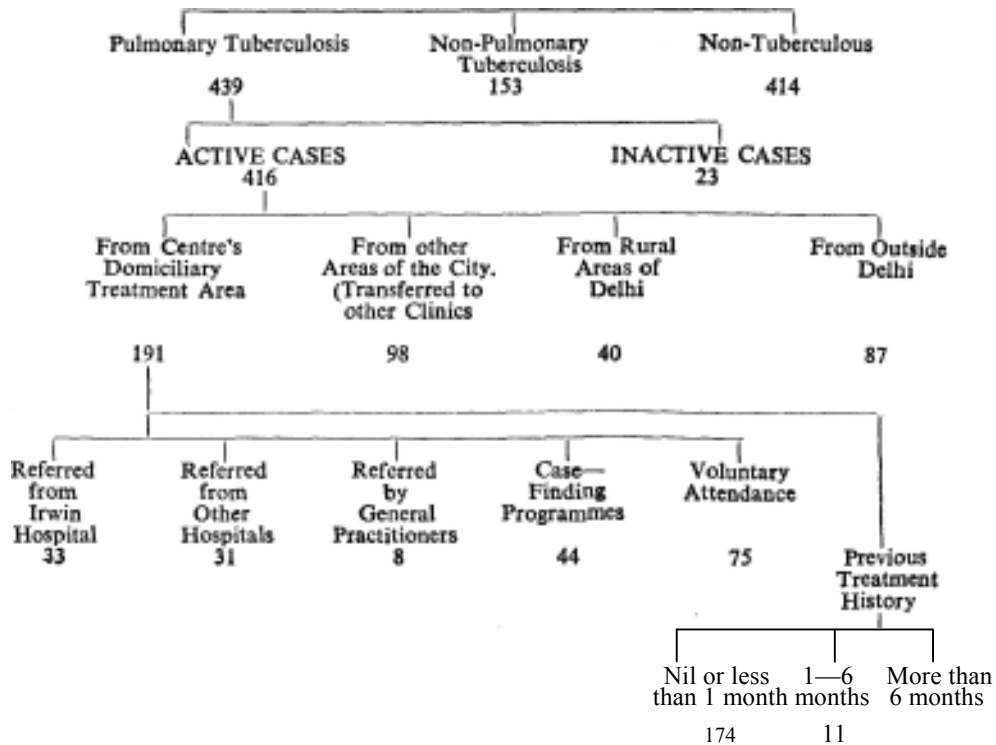
1. Organised Search for Cases

The approach in this organised effort, apart from providing free diagnosis and treatment facilities to the patients, is to create and maintain working contacts with the general hospitals, medical practitioners and others interested in the TB problem, and within our means to arrange a search for the asymptomatic and unknown cases of pulmonary tuberculosis among groups of the apparently healthy population.

During the period January—February 1958, 1,006 new patients were registered at the Clinic and their composition is shown in Diagram 1. The following points need emphasis:

DIAGRAM 1

Total New Cases Registered in Jan.—Feb. 1958.
1,006



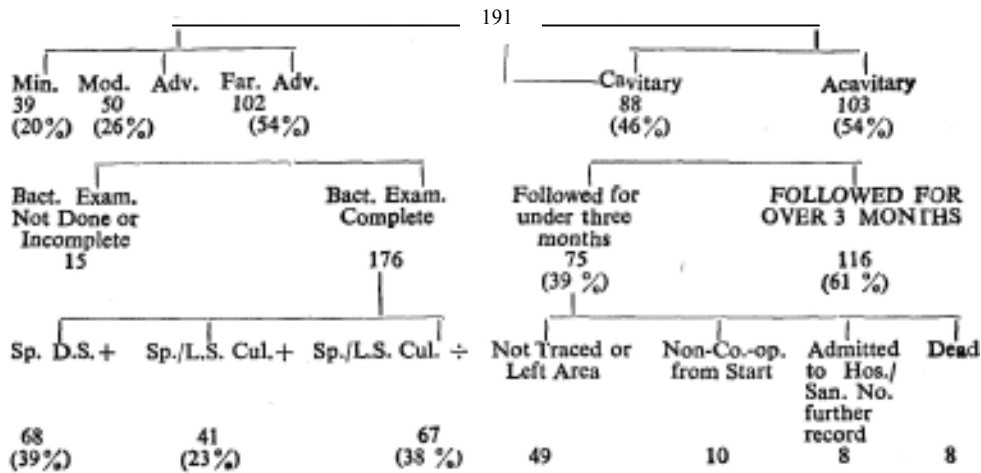
- (i) In spite of the demarcation of the area assigned to the Centre, a major portion of the diagnostic load pertained to cases which did not belong to the area under our domiciliary control. This can only be avoided by provision of equal and sufficient facilities at the local clinics. Patients from across the borders of Delhi, will similarly continue to attend till the necessary services are developed in the neighbouring States.
- (ii) Nearly 50 % of the new patients were referred by general hospitals and general practitioners which is indicative of the excellent cooperation that exists between these agencies and this Centre.
- (iii) Cases mentioned under 'Case-finding Programmes' which constitute nearly 30% of the total cases belonging to the area, include those discovered during

Contact Examination and Case-finding programmes. This represents an organised effort for search for the 'Unknown Cases'.

- (iv) Nearly 90% of the cases from the Centre's area had had practically no treatment prior to reporting at this Centre. Apart from its significance from the point of view of individual patients, this indicates that the Centre is recognized as a specialized diagnostic Centre in the area.

The radiological and bacteriological assessment of the 191 cases of active pulmonary tuberculosis from the domiciliary area is shown in Diagram 2.

DIAGRAM 2
Active Pulmonary Tuberculosis Cases from Centre's Area



This diagram also shows that 39% of the cases could not be followed even for 3 months, nearly two-thirds having been reported as Not Traced or Left Locality. Probably they were not bonafide residents of the area—having come from other areas either for diagnosis or in the hope of free treatment or hospitalisation. Such a supposition tends to be supported by the fact that loss due to 'Left Locality' of this order has been a regular feature of this Centre's working over a number of years, irrespective of the nature of the treatment in vogue at any period. Loss of 8 cases (nearly 5%) is due to late reporting for treatment. Eight patients were admitted to hospitals etc. soon after diagnosis and their follow-up has not been possible due to lack of functional integration of the clinics with the hospitals.

The real non-cooperators from the start, it would be noted, were only 10 out of 126 i.e. about 8% of the 126 available for follow-up. These patients had no use for the advice and services of the Clinic and repeated visits by the doctors and health visitors failed to convince them of the necessity for treatment. Ignorance, superstition, and several other ill-defined causes can be the basis of this phenomenon.

2. Organised Scientific Treatment

In general, the treatment policy during this period has been to give antimicrobial coverage for a minimum of 2 years. This comprises a period of combined drug therapy till the 'Target Point'* is achieved, and Maintenance Therapy with I.N.H. alone for a

*"Transaction of the 13th Conference on the Chemotherpy of Tuberculosis (U.S. Veterans' Administration), February 1954".

minimum of 1 year. How much of this policy could be enforced and what could be achieved would be judged from how regular and adequate the treatment taken was, and what result could be achieved in terms of clinical cure, and return to work.

(i) *Regularity & Adequacy of Treatment*

It is obvious that under Domiciliary conditions, regularity in self-administration of drugs as against that obtaining in hospitals (where drugs could be forced down the patients' throats) would be exceptional, and minor breaks in treatment unavoidable. The regularity of treatment in our patients has been assessed according to the following scale:

Category	1:	26 weeks' treatment in	32 weeks or less (or pro-rata)	
	2:	" "	32-40 "	(" ")
	3:	" "	40-52 "	(" ")
	4:	" "	over 52 "	(" ")
	5:	Treatment entirely	inadequate.	

It may also be pointed out that in a scheme of prolonged treatment, Regularity, as defined above, cannot be equated with 'Adequacy' of treatment. It is possible that a patient entered in regularity category No. 1, may have had only 6 months treatment, although he was regular as long as it lasted. Both these factors have been shown in Tables 3 & 4.

TABLE 3

Regularity of Treatment

1	63	60%
2	10	10%
3	13	12%
4	4	4%
5	15	14%
	105*	100%

* Excluding 9 cases not prescribed treatment and 2 cases for which information is not available.

TABLE 4

Adequacy of Treatment

Treatment completed as advised	14	13%
Treatment continuing at the Centre	49	46%
Treatment continuing in Hospitals etc.	4	4%
Treatment stopped against medical advice	40	37%
	107*	100%

* Excluding 9 cases not prescribed treatment.

Tables 3 & 4 shows the distribution of the 115 cases followed for periods longer than 3 months, both as regards Regularity and Adequacy of treatment. Of these, only 107 cases were prescribed treatment. As already stated our policy then was to give a minimum of 2 years' treatment to all patients and in many others even longer than that. The present material was analysed in April, '60. It is therefore not surprising in view of the criteria laid for the treatment and sometimes due to the comparative laxity shown by the patients in self-administration of drugs that only 14 of these 107 patients have completed full treatment so far. It must however be recorded that of the remaining, 49 are still continuing their treatment (4 others in hospitals etc.). Of these 49 patients, 36 (73%) are Fairly Regular (categories 1 & 2) in their treatment and therefore can reasonably be expected to continue their treatment till advised. Of the 40 cases who stopped their treatment against medical advice, 16 had already had more than one year's treatment (Table 5), and might by some standards, be regarded as having had adequate treatment. It is also significant that patients who stopped earlier than a year were, for the most part, recorded as Fairly Regular as long as they took treatment, and therefore it was probably the length of treatment coupled with the amelioration of symptoms that put them off. Apparently, the highest achievement of modern treatment operates against itself, when it has to be continued by the patient on his own over long periods. To the ignorant, the disease and symptoms are synonymous, 'No symptoms' means 'no disease' to them. The solution to this lies in continued health education at different levels for a long time to come.

TABLE 5

Analysis of Patients Stopping Treatment against medical advice after more than 3 months

Length of Treatment before stopping a. m. a.	}	3—6 months	12	30%
		6 months to 1 year	15	38%
		More than 1 year	13	32%
			40	100%

TABLE 6

Reasons for Stopping Treatment a. m. a. after more than 3 months

Left area Non-	25	62%
Cooperation	15	38%
	40	100%

(ii) Hospitalisation

Admission to hospital as and when necessary, or as available, would be an essential component of a good scientific treatment. Delhi has nearly 1250 beds in its two main TB Hospitals i.e. 1 bed for 2,000 of the population. Table 7 shows the length of the waiting period before hospitalisation. The lucky 10% who get admission within 3 months are the Government of India employees under the Contributory Health Service Scheme who have beds reserved for them in various hospitals including some in institutions outside Delhi.

TABLE 7

Waiting Period before Hospitalisation

Less than 3 months	10	10%
3 to 6 months	12	13%
6 months to 1 year	71	75%
More than 1 year	2	2%
	95	100%

Out of 116 patients who had treatment for over 3 months, 105 were put on the waiting list for hospitalisation. Of these, 8 left Delhi and 2 died before their turn for admission came. In 75 % of the remaining 95 cases the waiting period before their turn for admission came was anything from 6 months to 1 year. The significance of this must be judged in the context of the existing bed-strength and the present policy of limiting admissions only to infectious cases, and for surgery and emergencies.

TABLE 8

Condition of Patients when their turn for Admission came

Did not need admission	47	49%
Refused admission	18	19%
Admitted	30	32%
	95	100%

What Domiciliary Treatment achieves during the long waiting period is shown in Table 8. By the time their turn comes, nearly 50 % of the cases are rendered non-infectious and quiescent and do not need admission, and only 32% of the patients actually availed of the admission. The remaining 19 % refused hospitalisation although hospitalisation was considered necessary. This is partly due to a sense of well-being brought about by the antimicrobials, and the socio-economic difficulties of the patient. What use the patients make of the hospital beds when offered is shown in Table 9.

TABLE 9

Period of Hospitalisation

Less than 3 months	2	7%
3 to 6 months	7	23%
6 months to 1 year	16	53%
More than 1 year	5	17%
	30	100%

The following conclusions can be drawn from Tables 10 and 11:

- (a) The average length of stay in the hospital was from 6 months to 1 year.
- (b) Nearly 37% of the patients left hospital against medical advice or were discharged as a disciplinary measure. Both these situations really come to the same thing.
- (c) Surgery was considered indicated in 12 of the admitted cases. Of these only 2 patients accept the advice.

TABLE 10
Last Report from Hospitals

Still Admitted	2	7%
Discharged with advice	16	53%
Discharged a. m. a.	11	37%
Died in Hospital	1	3%
	30	100%

TABLE 11
Surgery

Advised in 12 patients	
Carried out in 2 patients	
	Minor Collapse
AP-----1	PP-----2

(iii) *Clinical Results of Treatment*

Tables 12 and 13 refer to the working status of Male patients. Table 14 shows in brief the last known clinical status of patients who took more than 3 months' treatment,

TABLE 12
Working Status of 63 Male Patients

Not Prescribed Treatment	2	
Prescribed Treatment, Not Advise Stoppage of work	12	
Advise Stoppage of work	49	
	63	
Of the 49 advised stoppage of work:	8	17%
Continued working a.m.a	38	83%
Stoppage working as advised	46	100%
Information not available	3	
	49	

TABLE 13

Present Status of 38 Male Patients Stopping Work as advised

Now Working with advice	30	78%
Not yet fit for work, not working	7	19%
Dead	1	3%
	<u>38</u>	<u>100%</u>

TABLE 14

Last known Clinical Status of Cases followed for more than 3 months (irrespective of length of Treatment and Cooperation)

I Sputum Conversion :	51(75%)	out of 68
II Cavity Closure :	36(72%)	out of 50
III Present Activity Status		
Quiescent	72	(63%)
Active	37	(33%)
Dead	4	(4%)
	<u>113</u>	<u>(100%)</u>
No information	3	

irrespective of the length of treatment and the degree of cooperation. It is worth pointing out that these results would represent the impact of the Domiciliary Service Scheme, as it actually obtains in the community at large, and not the results of treatment of individual patients with chemotherapy. It is really a sum total of the unfavourable and the favourable results. Some of the cases still deemed to be active belong to those who gave up treatment against advice or had grossly inadequate or irregular treatment (Table 3). It could be safely assumed that if they had taken treatment as advised, a large number of these also would have become quiescent and behaved as well as those who continued treatment regularly.

Results have been analysed with regard to bacillary status, cavitary changes, and overall clinical assessment. The most favourable results are shown only as "quiescent" because the period of follow up is not long enough to allow 2 years of quiescence, to be labelled "arrested".

(iv) *Working Status*

From the patient's point of view the most important aspect of his treatment is his ability to return to normal working life. As it is very difficult to ascertain when a housewife stops working or re-starts working, female patients have been excluded from Table 12 which shows the working status of the 63 male patients. Of these 63, only 49 were

advised to stop work in the initial stages of treatment. However, 9 did not accept the advice and continued working all through and no information is available about 3. Of the remaining 38, 30(78%) have been allowed to resume normal working, 1 is dead and 7 are still not fit for work and are not working. It is believed that the main reason for the 8 patients continuing work against advice was economic. From the physical and economic point of view of the return to work percentage was nearly 80%.

(3) Organised Preventive Measures

An organised effort is made to keep up a live contact between the Centre and the patient's family through regular and frequent visits by doctors, health visitors and social workers.

(i) Home Conditions

Home conditions of the 116 patients followed for more than three months with regard to facilities for isolation are given in Table 15. It is well-known that one of the biggest difficulties found by the domiciliary service is the lack of isolation facilities in the

TABLE 15

Home Conditions from the point of view of Isolation

Isolation Not Needed Isolation Possible	10	10%
and Done Isolation Not Possible but	10	10%
Improvised Isolation Not Possible, Not	10	10%
Improvised Isolation Possible but Not	66	68%
Done	<u>1</u>	<u>1%</u>
	97	100%
Information not available	<u>19</u>	
	116	

large majority of the patient's homes. Till this situation lasts, quick conversion of sputum in the largest percentage of cases (with the use of the antimicrobials) and sputum hygiene, during the period of infectiousness constitute the basis of organised preventive measures.

(ii) Sputum Hygiene

Adequate number of health visitors is a *sine qua non* of an effective domiciliary service. This Centre has 12 health visitors, each looking after a population of nearly 50 000 visiting infectious cases at approximately 2-4 weeks interval, the recalcitrant patients being visited more frequently. It is, however, extremely disappointing to note that inspite of the repeated advice, only 33 % i.e. 19 out of the 57 infectious cases collected and disposed of their sputum in the manner suggested, for the duration of their infectivity (Table 16). Patients were deemed infectious till two consecutive laryngeal swab cultures were negative. It may however be pointed out as an extenuating factor, that with antimicrobial therapy, a large majority of the patients expectorate sputum only for a short period and in the later phases only laryngeal swabs are cultured. Further, as nearly 25% of the total cases were diagnosed infectious on L.S. cultures (sputum not

being available) such patients will not be conscientious and conscious enough to use the sputum disposal outfit for a minimal or an occasional expectoration. The total effect of these measures could only be judged from the rate of fresh disease among Contacts.

TABLE 16

Sputum Disposal

Needed, Satisfactory	19	33%
Needed, Not Satisfactory	38	67%
	<u>57</u>	<u>100%</u>
Not Needed Date	31	
not available	28	
	<u>116</u>	

(iii) *Contact Examination & BCG Vaccination*

There were in all 511 household contact of the 116 patients analysed. Of these 442 or 86.5% were examined at least once. Initial contact examination yielded 35 cases, 16 (3.6%) pulmonary and 19 (4.3%) extra-pulmonary. (Besides these cases, 15 more cases were already present in some of the families when cases under report were diagnosed.) There were 270 children below 15 years among the above contacts and 92 out of these were found Mantoux Negative and BCG Vaccinated. Re-examination of 202 contacts only was possible, the average interval between the two examinations being 16 months. Four new cases—all non-pulmonary, were found at the second examination.

4. Organised Socio-Economic Relief & Rehabilitation

There is no gainsaying the fact that a large majority of these patients were poor by any standard. This is shown by the fact that nearly 75 % of the families had a per capita income of less than Rs. 20/- per month. It has to be remarked that family finances were further depleted in the case of 62 families where the patient was one of the earning members, and in 40 of these families, the patient was the only bread-winner. Domiciliary treatment for these patients is an empty slogan unless and until the more pressing need of bread, butter and shelter is fulfilled, apart from free facilities for treatment. However, if with the limited resources, one is forced to fix priorities among these essential requirements, free supply of antibiotics must take precedence over everything else.

(i) *Supply of antimicrobials*

The sources from which the patients obtain their antimicrobials are shown in Table 17. It shows that practically all patients could be provided with antibiotics from one source or the other, except for 14 cases to whom the supply of free antimicrobials was withdrawn due to gross non-cooperation at some stage or other of the treatment. Nearly 40% of the patients were given free antibiotics by the Centre or its affiliated Care & After-Care Committees.

Within their limited means, the Centre and its Care & After-Care Committees could give maintenance allowance only to 3 families during treatment. All patients and their families throughout the course of treatment got 2 lbs. of dry milk per head per month

from supplies made available by the CARE Organisation. In addition, the miscellaneous help e.g. woollen clothes, dry milk, conveyance charges, house rent etc. were given to a few others. It has been estimated that an allowance of Rs. 30/- per month for six months for an average bread-winner would come to nearly Rs. 25,000/- per lakh of the population.

TABLE 17

Supply of Antimicrobial Drugs

Entitled from some source e.g., employers, D.G.H.S., etc.	45	44%
Provided by Centre/C & AC-C's	41	41%
Partly Provided by Centre/C & AC-C's partly bought by Patient	14	14%
Bought entirely by Patient	1	1%
	<hr/>	<hr/>
	101	100%
Not Prescribed Antimicrobials	—	9
Information not available	6	
	<hr/>	<hr/>
	116	
	<hr/>	<hr/>

(ii) *Rehabilitation*

Except in those who seek treatment very late, quick restoration of physical capacity is a marked feature of present-day chemotherapy. A large majority of these patients go back to their original jobs when declared fit, which is perhaps the best form of rehabilitation. The unemployed, the under-employed and the badly employed constitute the core of the rehabilitation problem at present. In the series under study there were 4 (3 %) patients who were either casual labourers or were badly employed before their illness. Three of these were given a rehabilitation grant for starting some small business, which would give them adequate income, comparable to their initial income. The fourth could not be helped for want of proper facilities.

DISCUSSION

The material presented attempts to show what cooperation and what results can be achieved in an average groups of patients through a 'Domiciliary Treatment Scheme' operated from an Urban Clinic with limited resources of staff and finances. In a big city like Delhi, a large majority have no fixed roots in the soil. They are likely to gravitate to their towns and villages, when faced with difficulties, whether physical, social or psychological.

How can we visualise the gaps between the ideal results and the actual facts? Like any other plan, the ideal would have been to follow and maintain contact with all the persons registered from the Domiciliary Treatment Area over the planned period of a minimum of 2 years and irrespective of the costs, to ensure regular and adequate treatment for all of them throughout this period. Any shortfall from this would be a measure of the gap that exists between the ideals and the realities. But since an important aim of all the measures is to eliminate the source of infection, therefore another criterion for judgement would be the difference between the actual results achieved in this regard (after combining the results of cooperators as well as non-cooperators) and similar results obtained under ideal conditions.

As indicated earlier, only 142 cases would be considered to be really belonging to the area. Present lack of functional integration between the TB Clinic and the TB Hospitals accounts for a "loss" of 8 cases (5 %); 8 early deaths are responsible for another loss of the same magnitude. From amongst the remaining 126, 10 non-cooperated practically from the beginning, and another 40 left off treatment at varying periods during this follow-up. As shown in Table 6, 25 were lost because the patients left the area, and therefore the actual non-cooperators from amongst those who continued to live in the area, is reduced to 25. If, however, only one year's treatment was taken as the standard treatment, as is done by some, the non-cooperators over this period would be reduced to 13.

How much regularity and adequacy could be enforced is important. Table 3 shows that 70% could be classified as Regular and Fairly Regular, and in respect of Adequacy nearly 60% would be considered as continuing or having finished treatment for the stipulated period of 2 years. Taking these two items together, we find that among those who continued treatment as advised, 73% could be classified 'Fairly Regular', and among those who stopped treatment earlier than advised, a large percentage left treatment only after 1 year, 62% being regular while continuing treatment. This tends to show in a majority of cases the patients stopped treatment or left the locality only when their symptoms had been overcome. The final outcome of the interaction of all these factors will be evident in the sputum conversion rates or patients becoming quiescent or being restored to full working capacity. The overall sputum conversion rate in this material is 75%; 63% reached a stage of quiescence and 73% of the males advised stoppage of work have so far been restored to full working capacity. The first of these figures may be compared with 89% sputum conversion after 9 months' treatment under near-ideal conditions at Madras Chemotherapy Centre. If, however, these who continued working against advice, because they considered themselves physically fit and were forced to work for a basic existence are also included the percentage of those restored to working capacity would go even beyond 80%.

If ignorance and socio-economic distress are responsible for the non-cooperation, bigger investment in staff for more frequent personal contacts, and finances to meet the economic distress would obviously reduce this gap between the ideals and the realities. It is also obvious that after a certain level of achievement, the cost per unit will go on rising as one gets nearer and nearer to the ideal.

Hospital treatment may be ideal, if it were available for all; but in Delhi city which has probably the largest number of beds per head of the population and where admission is restricted to infectious cases, surgical cases and for emergencies, nearly 74% had to wait for a year before their turn came. That 50% not only got their sputum converted, but were also considered as not needing hospitalisation before their turn for admission, is a positive contribution by the Domiciliary Service.

A more important point however is, what use the patients make of the hospital facilities when provided. Refusal to go to hospitals, discharge against medical advice, like the irregularity in treatment in the Domiciliary Service, probably all arise from the same causes i.e. an early return of a sense of well-being, ignorance, and economic distress. This is a challenge to modern treatment. The exact role of these factors would need detailed and prolonged sociological studies.

Apart from 8 deaths within the first three months, there were only 4 deaths in this group over a period of just over 2 years. The early deaths can only be avoided by early diagnosis. Low subsequent mortality is a big achievement of the modern drugs.

Modern treatment curtails drastically the need for surgery—only about 5 % to 8 % could be considered as needing this treatment. But the quick relief of symptoms under

treatment takes away the fear of the disease and therefore if the present appeal of this form of treatment is any criteria, provision for surgical beds need not be high. Five beds for a lakh of population would adequately meet these needs.

Looking at the material in respect of preventive, hygiene, it appears that inspite of repeated advice only 33 % disposed of the sputum as advised, and in the remaining it was only irregular and occasional. These deficiencies are rooted partly in the social habits, partly too in modern treatment itself, since it quickly reduces the cough and sputum to such an extent that the patient tends to ignore them. A legitimate question would be whether in view of such low results it is essential or even of any advantage to continue such a service? Faith and hope are the best arguments for continuing the Domiciliary Service, which should be continually improved by means of Health Education programmes.

The material also brings out clearly that with the paucity of TB Clinics in the country, there would be a tendency of overcrowding at the better-equipped clinics, so that the actual load would be much more than can be expected from the allotted population. Development of clinics in all areas, apart from correcting the overload in some clinics, will do away with the losses due to patients leaving locality, because the treatment could then be continued in any clinic near the patients' new residence.

In this small material, it was pointed out that 4 persons were either initially unemployed or badly employed; in 3 of these a comparatively small grant could put them on their feet. With modern antibiotics the disability at the end of treatment has been drastically cut down both in numbers and in severity. In this material 3 or 4 percent needed this help. The major problem will be that of patients who take treatment irregularly and hence become crippled and are rendered incurable.

The socio-economic data shows that 40% of the patients had to fall back on charity for the supply of antibiotics, 45% got the drugs free from their employers, 14% purchased the drugs from some source or the other and only 1 person could meet the entire cost of treatment. A large majority of patients are extremely poor (in 75 % of the families the monthly income per head was less than Rs. 20/-) and this is one of the major factors leading to non-cooperation and irregularity in treatment. Economic help for such obvious hardships, besides free supply of antimicrobials, should be an integral part of the Domiciliary Service programme.

Two points which might be useful indications of the ultimate effect of domiciliary treatment on the family and the community in general are:

- (a) Incidence of fresh disease among household contacts as judged by re-examinations;
- (b) Proportion of Unknown cases of Tuberculosis in the community as found by Mass Radiographic Surveys.

As regards (a) the amount of fresh disease amongst contacts would give an idea of the impact of domiciliary treatment on the control of TB in the family and the community. Although rigorous comparisons are not possible in this matter it is worth nothing (Table 18) that the incidence of fresh disease among contacts at least over a short period of 2-3 years was not particularly high. These figures are based on data collected at the New Delhi TB Centre for a study in 1955, since the contacts of the 1958 series now under study form too small a group for drawing any conclusion in this respect.

TABLE 18

A. Contacts given BCG Vaccination at First Examination.

			Age of Contacts at First				Total
			Below 5 yrs	5-14 yrs	15-34 yrs	Over 34 yrs.	
No. of Contacts Re-examined			214	183	48	16	461
Total Person-years of Risk			418	356	91	29	894
New Tuberculosis Cases found	Pulmonary Tuberculosis	Needing Treatment	—	—	—	—	—
		Needing Observation	—	—	—	1	1(0.1%py)
	Non-Pulmonary Tuberculosis	Needing Treatment	3 (0.7%py)	1 (0.3%py)	—	—	4(0.5%py)
		Needing Treatment	1 (0.2%py)	—	—	—	1(0.1%py)

B. Contacts Mantoux Positive at First Examination

			Age of Contacts at First Examination				Total
			Below 5 yrs	5-14 yrs	15-34 yrs	Over 34 yrs	
No. of Contacts Re-examined			738		906	438	2,387
Total Person-years of Risk			699	1,655	1,858	903	5,115
New tuberculosis Cases Found	Pulmonary Tuberculosis	Needing Treatment	—	4 (0.2%py)	16 (0.9%py)	5 (0.6%py)	25 (0.5%py)
		Needing Observation	—	—	18 (1.0%py)	21 (2.3%py)	39 (0.8%py)
	Non-Pulmonary Tuberculosis	Needing Treatment	16 (2.3%py)	13 (0.8%py)	3 (0.2%py)	2 (0.2%py)	34 (0.7%py)
		Needing Observation	2 (0.3%py)	4 (0.2%py)	—	—	6 (0.1%py)

The proportion of unknown to the known cases can be an index of the TB situation in the community—a lower percentage of the 'unknowns' will represent a favourable situation, some credit for which must go to the TB control programmes in the community covered. In a survey conducted in 1956-57, in some areas of our Domiciliary Treatment Scheme, we found that only 31(21 %) of the 146 'Treatment Cases' were known, whereas amongst the bacillary cases only 42% were known. Some recent surveys conducted

in another area which has been under our Public Health Control for some years, give the following figures.

	<i>Total</i>	<i>Known</i>
Active Cases	131	56 (43%)
Infectious Cases	23	11 (48%)

These figures compare well with some western countries. We have also noted that in some areas which have only recently come under our Domiciliary Treatment Scheme, these figures are much lower, pointing to the effect of the scheme. Domiciliary Chemotherapy works to raise this proportion of 'known' cases in two ways: firstly, by encouraging attendance through health education in patients* homes and secondly, through antimicrobial treatment which prolongs life so that a larger percentage survive as 'known' cases.

ACKNOWLEDGEMENT

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“Routine for the Conduct of Clinic Based Domiciliary Treatment for Pulmonary Tuberculosis”.

By

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A clinic routine not only includes reception, registration, investigation, diagnosis, treatment, follow-up and rehabilitation of cases but it must aim at influencing the family and the community. It should also work for case finding.

So far as the treatment is concerned, there could be no difference between the hospital and the home. Whatever treatment is good for a patient should be advised. Real difference between domiciliary and hospital treatment exists in the control of treatment and in the environment in which the patient is treated. At the hospital, therapy can be well controlled and the environment and nutrition can be made uniform. At the home this control is much more difficult and the environment and nutrition differs widely from one patient to the other. The main stress in the domiciliary treatment is, therefore, not only on the patient but also his home and the design of this treatment should be such as to fulfil this requirement. This treatment is, therefore, not really a treatment in the usual sense. This is a service where the family or the home is the unit for care. This is the central concept which everybody engaged in this service must possess. It seems necessary also that the community should be psychologically involved in carrying out this service, specially in countries where such patients are generally regarded as outcasts and are subjected to many difficulties of housing, social contacts, etc.

The scope and requirements of this service, therefore, should be quite different from the hospital treatment. A hospital routine can be easily developed but it is not so with the domiciliary treatment. The ways and manner of working this service will not only be different in different countries in the light of their resources and the attainments of medical and public-health standards but also for communities and homes. It must, therefore, depend on constant assessment of the field. It should interpret the changes in community basis and design and re-design the service in the light of such findings. It is, therefore, obvious that there cannot be and should be not any fixed design of this service. There could, however, be some requirements which seem to be essential now for successful conduct of this service. The following, to my mind, are such requirements:

I. Proper Registration & Keeping of Records

This is one of the most important part of proper conduct of this service. Different clinics are generally using different types of schedules for this purpose. It is likely that consideration of some local conditions may cause some alterations in a schedule, but, personally, I think it will be better that an Expert Committee should suggest a basic common schedule which can be used for all the clinics in India. For local conditions, if need be, additions and alterations can then be made. This will help co-operative studies and also allow comparative study of findings in different parts of the country.

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This schedule will take into account important epidemiological, clinical, radiological and laboratory findings under classified headings. On initial assessment the cases may be classified with clear cut definitions of the character and extent of the lesions, of cavitations, of the results of treatment, etc.

The sensitivity of the bacilli to the common drugs (wherever possible), the nature of the ease (index or contact) and the source of referral of the case should also be included. All these informations recorded properly, will help the conduct of the service greatly.

It will also be very profitable to maintain a Master Register and/or a proper card index system.

As has been said before that a family is the Unit—a “family folder” with a house number will contain all these informations along with informations on the housing, crowding, financial status, contact examination results, etc.

2. Investigation, Diagnosis & Classification of Cases

The investigations should be thorough to arrive at as firm a diagnosis as possible. Routine investigations in this regard should be: tuberculin testing, physical and x-ray examinations. Sputum should be tested on the detection of any lung pathology or on any other suspicious finding. This test should include smear and culture. On bacillary growth, sensitivity test against the common drugs should be made. If facilities for smear test is only available, then, in negative cases the test should be repeated on 3 consecutive days. Smear test by concentration method is slightly superior to usual smear. Facilities for examination of blood, urine and stool should be provided, for differential diagnosis. More elaborate examinations should be entrusted to the Pathology and Bacteriology departments of a college.

The important problem in the routine diagnosis is: whether a case can or should be diagnosed as a case of tuberculosis without bacillary finding? My own stand on this problem is: a diagnosis of tuberculosis should be resisted till a positive sputum finding is obtained. But, at the same time, this diagnosis should not also be denied if no other chest disease, after thorough investigations, seems probable. In many doubtful cases it should be a routine to wait and observe without anti-tuberculous therapy for a few weeks and then reassess the case again. Such observation and reassessment is immensely helpful for protection against misdiagnosis.

Another important problem in clinic routine is: when should we use miniature radiography and when a large film? The question is important in relation to cost. It is now generally accepted that for miniature radiography 70 m.m. film should be used. Opinion differs widely with regard to the extent of its use for diagnosis and treatment. In the light of our financial resources, after discussing this question with many authorities of different nations in that line, I have come to this conclusion, that miniature radiography (when available) should be in general use both for diagnosis and treatment. Only in doubtful cases for diagnosis, at times when important interventions like major surgery is necessary, at the end of chemotherapy for certification, and for differential diagnosis where other positional pictures are necessary etc. large films will be required. If finance permits, then an initial large film on diagnosis will also be very helpful.

After the investigations and assessment the cases may broadly be divided into 3 groups: (a) No finding—normal. Some of these cases, specially those with history of haemoptysis should be followed by re-examination after 2 to 3 months, (b) Chest disease, non-tuberculous. They should be treated according to the diagnosis, (c) Pulmonary tuberculosis. The case cards of these 3 groups should be kept separately.

Handling of the first two groups will be omitted from discussion here except to say that BCG vaccination should be done to those who are negative to tuberculin test.

For proper management, it may be profitable to classify the pulmonary tuberculosis cases again into 3 groups. They are: (a) domiciliary recumbent: those who need bed rest and should not visit the clinic except on special purposes like a fresh "check", etc., (b) domiciliary ambulatory: those who can carry on their work without appreciable risk, (c) and an intermediate group: domiciliary intermediate. It may be difficult to divide the cases this way, but an attempt should be made. Besides these groups, the cases should also be divided into (1) sputum positive and (2) sputum negative cases and kept separately. The purpose of such classifications is to arrange home visits according to such notations. It is, however, obvious that in the course of treatment cases will shift from one group to the other. Such changes should also be noted and home visits re-arranged accordingly.

Acceptance for Domiciliary Treatment: Suitables and Unsuitables

At the initial examination and during subsequent assessments it is necessary to determine whether a case should be retained in the domiciliary service. As a general rule, it is probably most profitable to hospitalise all patients for a short period at the start of treatment. This has many advantages. But, by and large, the vast majority of the cases can also be well treated at home. One should, however, realise that patients under emergency conditions like spontaneous pneumothorax, massive effusions with respiratory distress, acute miliary tuberculosis with or without meningitis, very large haemoptysis etc., should be immediately hospitalised and should not be retained in the domiciliary clinic service unless there is no way to hospitalise them. A few beds attached to the clinic to deal with such cases is most useful. All attempts should also be made to hospitalise those who need major surgical intervention—specially the "good risk" cases.

In this connection, though not exactly a routine, domiciliary service should have some policy for recommending for hospitalisation. Generally this treatment will have all kinds of cases from minimal to extensive disease, refractory and relapsed cases, rich to poor social groups with all grades of environmental and nutritional conditions. If a very limited number of beds are available, whom to hospitalise will be the problem, leaving aside the question of emergency cases who must be hospitalised. Those who make home visits see terrible conditions in some families where grossly infectious cases live in the same room with many others and naturally the first thought will be to hospitalise them as serious sources of infection. For sometime I am thinking over this matter. My feeling today is this: the available beds are so few compared to the number of such cases that by segregating them we cannot make any appreciable dent on the potential of infection in the community. On the other hand we would block the beds for a long period, in many cases till the death of the patients. We, therefore, do not gain much if we approach the problem from the community point of view. If, instead, we try to hospitalise those whose disease is likely to be amenable to simpler forms of treatment and quick recovery is expected, then we can have quick turn-over of patients for the beds and may also prevent many going to the extensive stage of the disease. If we concentrate admitting these cases now, along with good domiciliary treatment for the others, the load of infectious cases is bound to diminish gradually by deaths of extensive, incurable cases and chemotherapy eliminating a large number of sources of infection. When the number of beds are nearly equal to the number of sputum positive cases, then this policy should change. The policy then should be to hospitalise as many infectious cases as possible. By such a policy maximum utilisation of beds, quicker elimination of sources of infection and a definite effect on the control of the disease may be produced. I would, therefore, suggest that domiciliary service should recommend hospitalisation of cases where quick recovery is expected, specially from the group where domiciliary

control is difficult or impossible. An expectation of quick recovery by chemotherapy alone should supersede the question of infectiousness at present. Later, with the diminishing number of infectious cases and increase of beds this policy should change.

3. The Treatment & Follow-up

For all practical purposes the treatment is chemotherapy. Rest, followed by graduated movement, adequate nutrition, etc., are, of course, useful adjuncts and are included in this treatment. In rare instances, minor collapse therapy like A.P., and P.P., and aspiration of pleural fluid have to be undertaken.

Chemotherapy

No other drug has yet replaced any of the three common drugs: Streptomycin, Para-amino-salicylic Acid and Isonicotinic Acid Hydrazide. For initial treatment these are the drugs to be used. INH is the main drug and it should be retained in all combinations unless this drug is not tolerated or sensitivity study shows that the bacilli are resistant to this drug.

During the initial period, specially for the cases with predominantly exudative lesions with high toxæmic reactions of the disease, combination with streptomycin is preferable. The injections should be given at the home as the exercise involved in visiting the clinic may harm the patient. Such a service is generally not possible with the usual strength of home visitors and, therefore, this combination is not recommended for general use. Further, domiciliary use of streptomycin is associated with greater danger in older age-groups.

INH & PAS regimen is recommended as the more convenient and for many reasons a superior combination. In the long-term regimen this combination is almost as good as daily streptomycin and INH regimen.

The main problem, however, is unacceptability of PAS because of its gastrointestinal symptoms, massive dose, bad taste, besides the cost. Because of these reasons patients tend to abandon taking PAS and continue with INH only.

It is common knowledge that a very large number of domiciliary patients in the country are taking INH alone because of the above reasons and in many clinics some doctors are even advocating this single drug therapy. Nothing can be more preferable if administration of INH alone proves harmless, specially with regard to emergence of resistant strains, as INH is not only the most potent drug but it is most acceptable, cheap and least toxic to the tissues. It is likely that the immediate response to this treatment will prove almost as beneficial as a combined therapy. But, as long as it is not proved to a reasonable extent that emergence of the resistant strains are not frequent and/or the resistant strains are non-pathogenic and/or immediate stabilisation of the lesions are not followed by higher relapse rates or reactivation, single drug therapy cannot be justifiably recommended for mass use where community is also exposed to all the hazards of resistant bacillary infection in addition to the danger to the patients. Control measures for such a happening are the following:

1. At the start of chemotherapy the doctor must take time to explain chemo therapy to the patient, impressing on him its great value and also its great dangers if the regimen is not followed with care and regularity.
2. A responsible member of the family, preferably the guardian, should not only be told about good points of chemotherapy but also of the dangers to the family members from resistant strain infection and disease, if the patient becomes irregular or takes only one drug. From my experience, I believe,

these measures are the strongest deterrent to irregularities in the self-administration of the drugs. Regular group talks by the Health Visitors and/or by the doctors are also very useful.

3. Pill counting during home visits: This should be made a routine in the home visits but should be tactfully done so that the patient may not so much realise that one is suspecting him. There are many ways of doing so.
4. Ferric chloride tests of urine for PAS: Occasionally samples of urine of patients, specially those who seem to be irregular, should be tested this way. The samples to be collected on spot without previous notice.
5. For prevention of single drug taking both INH & PAS should be given in the same cachet. This should be the general rule but for various reasons the drugs should also be made available separately in small quantities.
It is also preferable that the patient does not know what drugs are given. It seems that the complaints are less if the patients do not know the contents.
6. Supply of drugs should be regular and preferably be free to indigent patients. After recovery (quiescence) and stoppage of chemotherapy, the cases should be followed by 3 monthly check for the first 2 years, 6 monthly check for next 3 years and an yearly check for the next 5 years.

4. Home Visiting

A clinic must be provided with this facility and there should be a routine for this. On diagnosis, all sputum positive cases in the allotted area should be visited in 2 or 3 days time, sputum negatives in about 7 days. Re-visits should be arranged every month for the open and every two to three months for the closed cases. This is about the minimum requirement. Cases having a tendency to irregularities in attendance to the clinic and to chemotherapy should be visited more frequently than this routine.

After the attainment of "quiescence" and the end of chemotherapy, those cases not reporting on time for proper "check", should be specially home visited.

It would be right to have arrangements for doctors to visit the homes on all emergencies and at times for other purposes. Routine may also include "check" by the doctor for about 2 % of all home visits.

For convenience and more visits per day, each Health Visitor should be allotted a circumscribed area. The number of visits per day per Health Visitor will vary—specially in relation to the density of population and number of cases in an area. Generally this should not be less than 5 cases a day even though a T.H.V. spends sometime at the clinic daily.

5. Contact Examination

It has been said before that the unit for domiciliary treatment is the family. Herein lies the great advantage of this service. It should, therefore, be the rule that all members of the home be brought to the clinic for examination and not the children only as there is more disease in the older age groups than in the younger.

This examination should consist of tuberculin test and skiagraphy. If any lung pathology is detected and/or any important relevant symptom or sign is present, then, the case should be further investigated by sputum test, etc., to establish or eliminate a diagnosis of tuberculosis.

Tuberculosis cases, detected this way, should be recorded as "Contact Cases" in relation to the "Index Case" and records to be placed in the "Family folder". New clinic case cards should also be made for such "Contact Cases".

Besides the contact examination, case-finding programme should include others also, specially, the susceptible groups e.g. those with chest symptoms, diabetes, employees of hazardous industries, etc.

6. Care & Rehabilitation

As we stand now, rehabilitation may not be a direct responsibility of the clinic but this, certainly, is one of the important functions. Every large clinic in the cities should, therefore, try to develop "work centres" in association with such clinics. Details of working of such centres will depend on many factors and, therefore, will not be considered in this paper.

Among the daily routine, the doctor has to certify often on 'leave', fitness for resumption of work, fitness for new employments etc. I feel it will be good if some guiding principles are laid down by the Tuberculosis Association. My own principles are: a case will be regarded fit for work (not involving heavy manual labour) when—(a) there is no toxic manifestation with exercise tolerance of one-mile-walk, (b) sputum test to be negative—at least by smear test, on 3 successive occasions over a period of 3 months, (c) skiagram shows no cavitary lesion.

On rehabilitation, the 'check' should be exactly so arranged as mentioned earlier for follow-up of a quiescent case.

It should also be the duty of the social workers attached to the department including also the chief of the clinic to exert their influences in many ways to find employment or to rehabilitate in previous job when such help is necessary.

For various kinds of this type of help and for various other necessities, development of a "Care-Committee" attached to the clinic is very useful and whenever possible, should be established.

It may be realised from what has been said that a "clinic" today occupies the most important position or is the "hub" of a Tuberculosis Control Programme. As such, a clinic's function and routine could incorporate a very wide and variable range of work. The author will feel grateful if only it is realised that the clinic is not only for individual patients but more so for the community.

For this, the clinic service should be designed properly and must meet some minimum requirements.

7. Minimum Requirements

- (1) Adequate staff—medical and para-medical with a chief, specially trained, directing the plan of operation and supervising the service: facilities for X-rays for full-sized chest films and for bigger clinics, for miniature 70 mm films with the help of mobile mass miniature radiography X-ray service: facilities in the laboratory of the clinic for a good smear test of sputum and for bigger clinics for culture and resistance-tests, besides the drug control tests in urine for PAS & INH and usual examinations of blood, urine, etc.: a store for drugs, which should always have an adequate supply of anti-tuberculous drugs: an office for registration, records and analysis of data and proper transport service.

- (2) The diagnosis of pulmonary tuberculosis should be firm enough. A definite diagnosis should be made on sputum positiveness. A possible diagnosis should be made on the collective evidence from history, clinical and radiological findings suggesting strongly a diagnosis of pulmonary tuberculosis. If, however, at any time it is deemed necessary to alter the diagnosis that should be made boldly without any hesitation.
- (3) The treatment should ordinarily mean anti-tuberculous chemotherapy. The most suitable drug regimen, for general domiciliary service, is Isoniazid and PAS. The minimum average duration of chemotherapy should be 12 months.
- (4) There should be adequate control of domiciliary chemotherapy, by (a) proper home visiting system to control irregularities in drug taking and to prevent fall-outs, (b) surprise checks by pill counting, (c) urine tests for presence of drugs specially the ferric chloride test, (d) proper education of the family and the patient, (e) timely supply of drugs, (f) laboratory control of the drug treatment, (g) asking the patients not to take acetylsalicylic acid and salicylates, if possible, during the treatment period.
- (5) Segregation and isolation of infectious cases in particular should be done as effectively as possible.
- (6) Education and propaganda should be made with special stress on the "family unit" and the community as it is necessary that the family and the community has a responsibility in the proper care of the patient and should be well aware of the dangers of infection and the means to avoid them. In this educative campaign, the 'family' is taken as the unit. Education to patients regarding disposal of sputum, use of handkerchief, dangers of irregularities in drug taking, etc., should continue.
- (7) Social service—aiming at care and rehabilitation. For this a proper social record of each case is necessary.
- (8) It would be necessary to investigate and follow-up the known contacts and to sieve out the unknown cases from the community through case-finding methods applied to specially hazardous groups e.g., workers in industries, doctors' referrals, etc.
- (9) To increase host-resistance, B.C.G. service should be extended to the tuberculin negative persons.
- (10) Associated with this service there should be some hospital facilities for the cases who need surgery; 'emergency cases,' those needing investigation for firm diagnosis, etc.

Tuberculin Sensitivity in Young Children (0-4 Years Old) As An Index Of Tuberculosis in the Community

By

N.L. BORDU, ANTON GESER, Miss J. MCLARY, Miss I. MUNDT AND. KUL BHUSHAN

Background:

The purpose of the present study is to find out whether the prevalence of infection in young children might be used as an index of the tuberculosis problem in a population group.

The possibility of using the low age group for this purpose is of particular interest in countries like India where extensive BGG vaccination has made tuberculin testing unreliable for epidemiological purposes in higher age groups.

The fact that non-specific tuberculin sensitivity is thought (WHO 1957) to be widespread in India, makes it still further desirable to restrict tuberculin surveys to the youngest age groups which are usually less affected by this disturbing phenomenon.

Another advantage of using the young children is that tuberculin testing among them reflects something about recent conditions, since any infection must have been acquired during the relative short period of the children's existence.

Objectives :

The specific objective of the present study was to investigate how sensitive the index would be to judge the epidemiology of tuberculosis in study area. If the prevalence of infection among the 0-4 year old children is comparatively high in an area, the index is evidently fairly sensitive, in the sense that it would be sufficient to examine relatively few children in order to detect differences between two or more groups in the area.

One way of investigating the sensitivity of an index is to see whether it varies systematically with variations in other factors. In this study, variations in the tuberculin index were compared to variations in socio-economic conditions in the communities which were surveyed.

Methods and Techniques:

The investigation was carried out in a random sample of the population in Bangalore City and in villages within a distance of 100 miles from the City. 35 blocks of houses were surveyed in the City and the rural sample was made up of 59 villages.

The investigation consisted, in all cases, in tuberculin testing of the children aged 0-4 years in the selected groups. Emphasis was placed on obtaining high cover-

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ages. The teams walked from house to house and made a complete registration of the child population (0-4 years old) in the selected houses.

For the purpose of identification, the teams numbered the selected houses and prepared a map of the locality showing the exact location of all houses.

A record card was made out for each child giving information regarding name, age, sex and household number. The age of the tested children had to be estimated by the team as the exact age was often not known.

The tuberculin test consisted in the intradermal injection of 1/10 ml. Tuberculin containing 1 TU of PPD (RT 23 with 0.05% Tween 80) prepared at the Statens Serum Institute in Copenhagen. The reactions were read, by measuring the size of induration, 3-4 days after giving the injection. No attempt was made by the reader to classify the reactions as positive or negative: the size of induration was simply measured and recorded.

In fact, only after the full size distributions of the tuberculin reactions had been studied was it decided what was a "positive" and what a "negative" reaction.

The prevalence of infection among the 0-4 years old children in each group was correlated to the socio-economic indices used to characterise the group. Road communications, area of cultivated land, and quality of houses were used as indicators of relative prosperity in the villages. In the urban area, degree of overcrowding, number of water taps and quality of houses were used to express the economic status of the group.

Study Population:

In each selected group, the studied population was defined as all children 0-4 years old who had slept in the selected houses the night prior to testing, even if they were only temporarily present in the locality.

1. Urban Sample:

100 blocks of houses, each estimated to have a population of approx. 500 persons, were randomly selected in Bangalore City and the first 35 blocks actually surveyed.

2. Rural Sample :

The sampling was confined to three districts (Bangalore, Mandya, Kolar) around Bangalore because these districts were the only ones, within a distance of a hundred miles, where the BCG campaign had not been extensively carried out during the last five years.

FINDINGS AND ANALYSIS

A. Urban Part :

Details regarding the urban study population, number of children registered and tested are given in Appendix Tables 1 & 2.

A total of 2,883 children (0-4 years old) were registered in the 35 urban blocks and 2,589 (89.8%) of these actually completed testing (including six children with BCG lesions).

The initial screening of the material clearly indicated that the proportion of children with large reactions to tuberculin was greater in the "City" area of Bangalore than in the Cantonment area. Since the Cantonment and the "City" form two different socio-economic strata the findings in the two areas were kept separate throughout this analysis.

The various socio-economic indices compiled during the present survey reflect a higher standard of living in the Cantonment.

	Persons per 100 M ²	Person per block	Persons per household	children 0-4 years per h. hold	Taps & wells per h. hold	persons per room
"City" Area	1.0	633	5.4	0.9	0.5	2.8
Cantonment	0.6	475	6.4	0.8	1.1	2.3
Total Urban	0.8	565	5.7	0.8	0.7	2.6

It is seen that in respect of area or inhabitant and in respect of water supply the cantonment area is better off than the "City" it may appear surprising that there are more people per household in the cantonment than in the city but in this group of people who prepare and take their meal together. In the "City" the number of household (family) living in one house, was higher than in the cantonment and the crowding per house (taken to mean a building) was actually greater in the "city" as can be seen by the fact that there were 2.8% living per room in the "city" versus 2.3 persons in the cantonment.

Figure .1 shows the size distribution of the 39 blocks, covered in the urban survey separate for cantonment and "city".

In the cantonment, the blocks varied in size from 7 inhabitants to approx. 1200 ; in the "city" the variation was from 47 to 2500. The population was thus grossly underestimated in some blocks and highly over-estimated in others. By testing all children ; actually found in the included blocks, the principle of valid random selection was nevertheless, upheld.

The age distributions of the children who were tested in the cantonment and the "city" are shown in Fig. 2 below, excluding 6 children with BCG lesions (2 in cantonment and 4 in the "city").

The distribution observed in Fig. is somewhat surprising since with increasing age a slight fall in the number of children per age group was to be expected in a stable population ; this should especially be the case from ; the year one to year two, due to infant mortality. This decline was not, seen but on the contrary the number increased with increase in age from year 3 to 4. This finding could mean that the registration in the youngest age groups was less complete than among the older children. However, this is not likely since the teams went from house to house and actually saw all the children present. Another possible explanation is that the teams,

TUBERCULIN SENSITIVITY IN YOUNG CHILDREN

Fig. 1
Distribution of 35 Sample Blocks by size of Population Separately
For City and Cantonment Areas

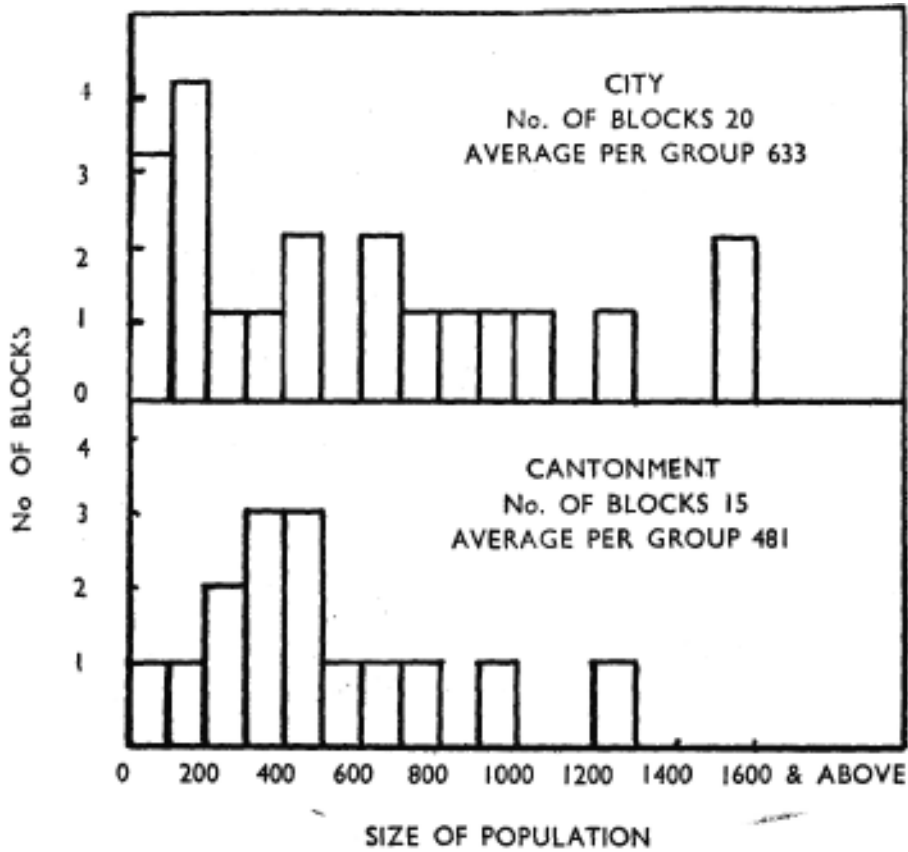
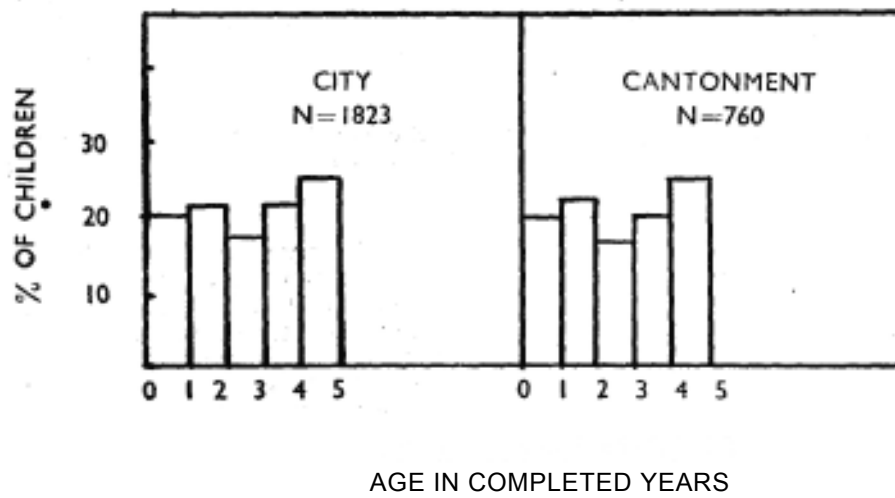


Fig. 2
Age Distribution of Children Completing the I TU Test in the Urban
Survey Separately for City and Cantonment Areas

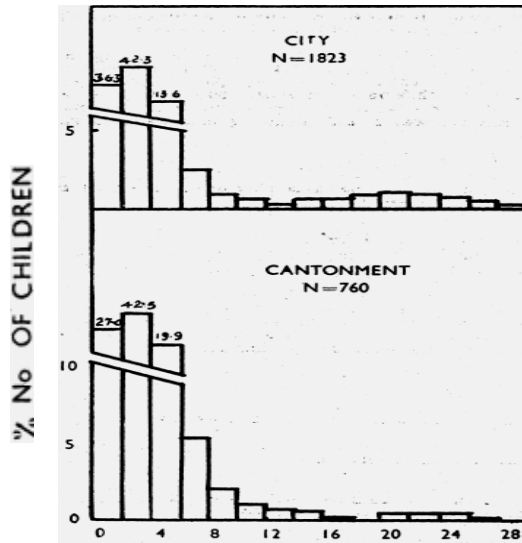


in order to make children eligible for testing, tend to underestimate the age of those who were just 5 years old, and should have been excluded. In both cases, the results of the survey tend to give an over-estimate of the actual prevalence of infection.

Definition of a “positive” reaction

In order to find out the size of reaction to the 1 TU dose in the group of children infected with tubercle bacilli, the full size distributions of the reactions are given in Fig. 3 separately for “City” and Cantonment (also see Appendix Table IV and V).

Fig. 3
Size Distribution of 1 TU Reactions in 0-4 Year Old Children Tested in the Urban Area (Separately for City and Cantonment)



It is not easy to say which reactions in Fig. 3 correspond to infection and which do not; experience from other studies must be resorted to.

Tuberculin testing among tuberculous patients in different parts of the world (WHO 1955) have shown that tuberculosis patients as a group react with large size reactions to even a weak dosage of tuberculin. A dose of 1 TU of RT 23 (with Tween) corresponds closely to 5 TU of RT of 19-20-21 without Tween (Guld et al 1958 and it was found (WHO 1957) that such a dosage elicits reactions averaging approx. 18-20 mm. and ranging from 10-30 mm. when injected in tuberculosis patients. It is therefore presumed that infected persons in general have large reactions. Therefore, in this study the children infected with *Mycobact. Tubercul* must be searched for among those having reactions above 10 mm. (Fig. 3). It is, however, also known (WHO 1955) that medium-sized (approx. 6-12 mm.) reactions to weak tuberculin doses, not caused by infection with *Mycobact. Tubercul.*, are prevalent in South India. It may therefore be wrong to consider all reactions larger than 10 mm. as indicating presence of tuberculous infection.

Fig. 3 shows that there are more large reactions among the children in the "City" than in the Cantonment area. For the "City", it is possible to discern a group of large-size reactions which form a normal distribution around a mean of 20-22mm., and range from approx. 12-30 mm. In view of the aforementioned findings from tuberculin studies in other countries, it is reasonable to conclude that this group of "large reactions corresponds to the group of children infected with *Mycobact. Tubercul*.

In defining the lower limit of a "positive", reaction in this study it was thought important to fix it as high as could be considered reasonable in order to avoid including children with "non-specific" sensitivity only. The limit was consequently fixed at 14mm.

Using 14mm. as the lower limit of a "positive" reaction, the prevalence of infection in the 0-4 year old children is found to be 4.1% for the "City" and only 1.6% for the Cantonment. This difference indicates that the risk of infection is higher in the "City" than in the Cantonment.

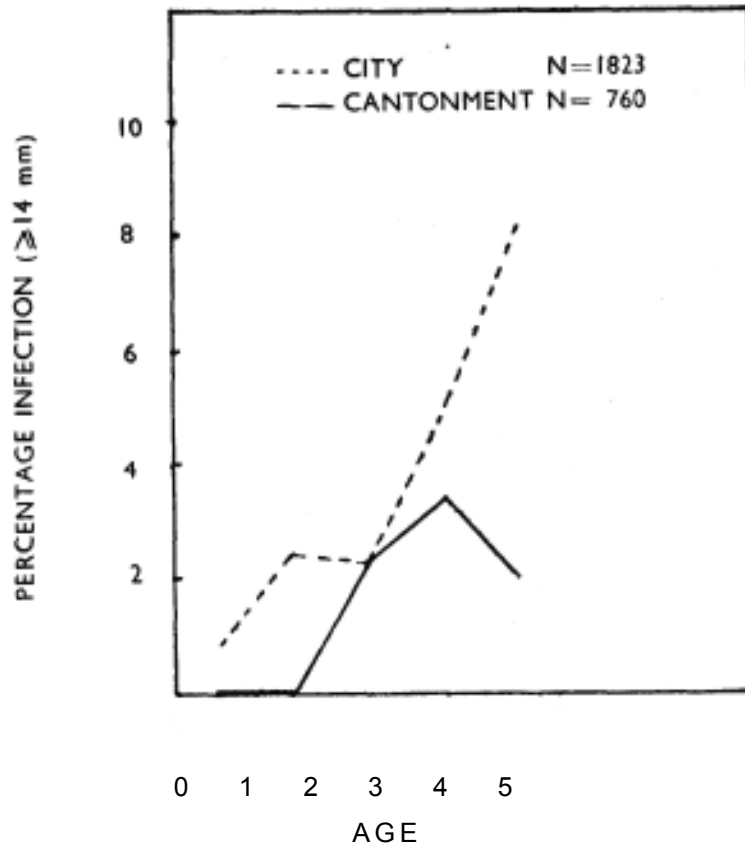
The age development of infection is presented in terms of age infection curves in Fig. 4. It can be seen that both curves begin low at age 0 and climb with increasing age. At age 4 years, 8.6 of the children in the "City" are infected versus 2.1 % in the Cantonment. The number of children tested in the Cantonment is smaller and the course of the curve is irregular here.

Inter block variation in prevalence of infection

The prevalence of infection in a given group is influenced by several factors which can conveniently be divided into three categories :-

1. The prevalence is primarily determined by the general level of prevalence in the population to which the group belongs.
2. In addition, it might be influenced by the particular dominating properties of this group, for instance, by various socio-economic patterns. These may be called the systematic variations.
3. Thirdly, come the numerous other factors at work, factors which cannot be separately accounted for. They work in both directions and provided the groups

Fig. 4
Age - Infection Curves For 0-4 Year Old Children in Urban Area
(Separately for City and Cantonment)



have been selected at random, tend to even each other out. These factors are referred to as the random variations.

The systematic and the random element of the variations are of different nature and are examined separately.

The random element is solely a function of the prevalence i.e. if the prevalence is known, the random variations may be estimated. If, therefore, the total variation between groups is bigger than could be expected from theoretical considerations, one may infer that systematic variations probable exist between the groups.

The question of whether the varied from group to group, more than could be due to random elements was examined (by a X^2 test), separately for the two strata in the urban area. Then X^2 -tests indicated that only random factors are acting within the Cantonment as well as with the "City" area.

Correlation between prevalence of infection and socio-economic indices

Correlation of the various socio-economic indices established for each group and the prevalence of infection in the group was examined separately for the "City" and the Cantonment (tested at 5% significance level)

Ind. J. Tub., VIII, No. 1.

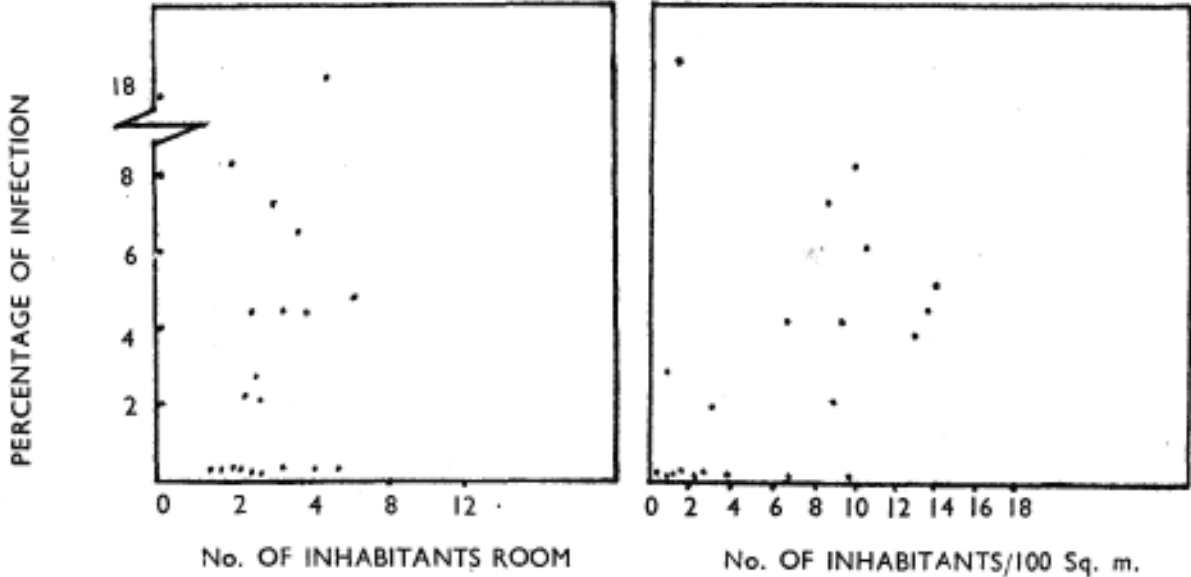
1. Prevalence of infection and persons per 100 sq. m. block area are perceptibly (fig. 5) correlated though the correlation proved not significant at the level chosen.

Fig. 5

Scatter Diagrams of Prevalence of Infection and Socio-Economic Factors in 20 Population Groups in City Area

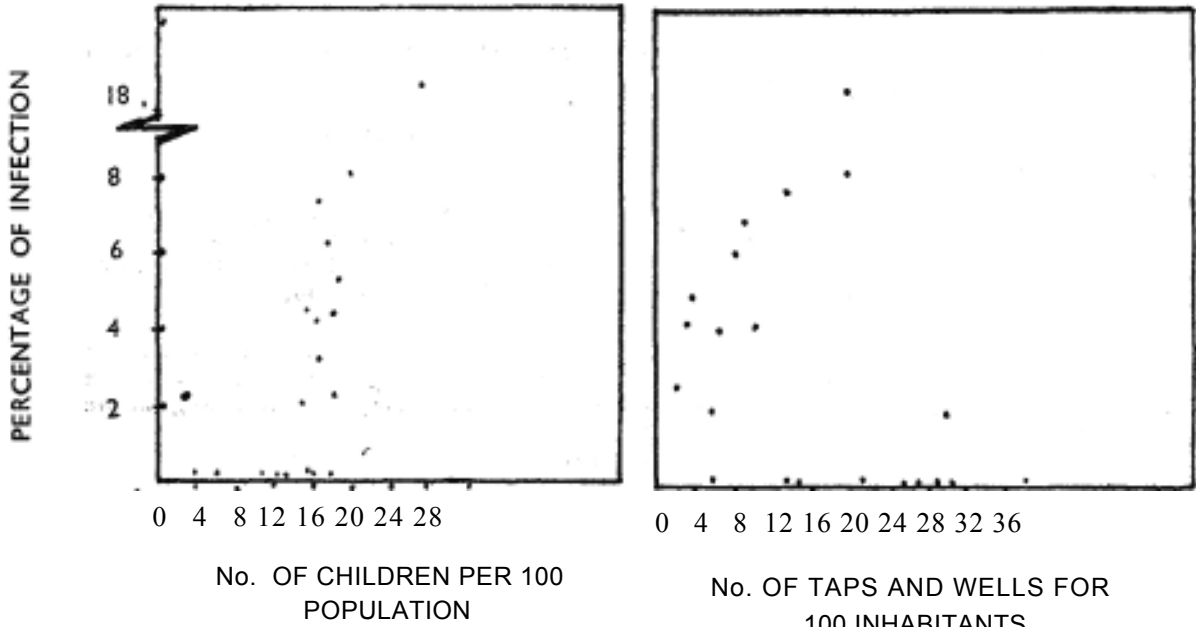
Percentage Infection and No. of Persons per Room

Percentage Infection and No. of Inhabitants per 100 Sq. Meters



Percentage Infection and No. of Children per 100 Population

Percentage Infection and No. of Taps and Wells



2. Prevalence of infection and average (per block) number of persons per room: correlation not significant.
3. Prevalence of infection and number of children per 100 inhabitants in the block: correlation not significant.
4. Prevalence of infection and number of taps and wells per 100 population are negatively correlated: correlation significant.

Cantonment

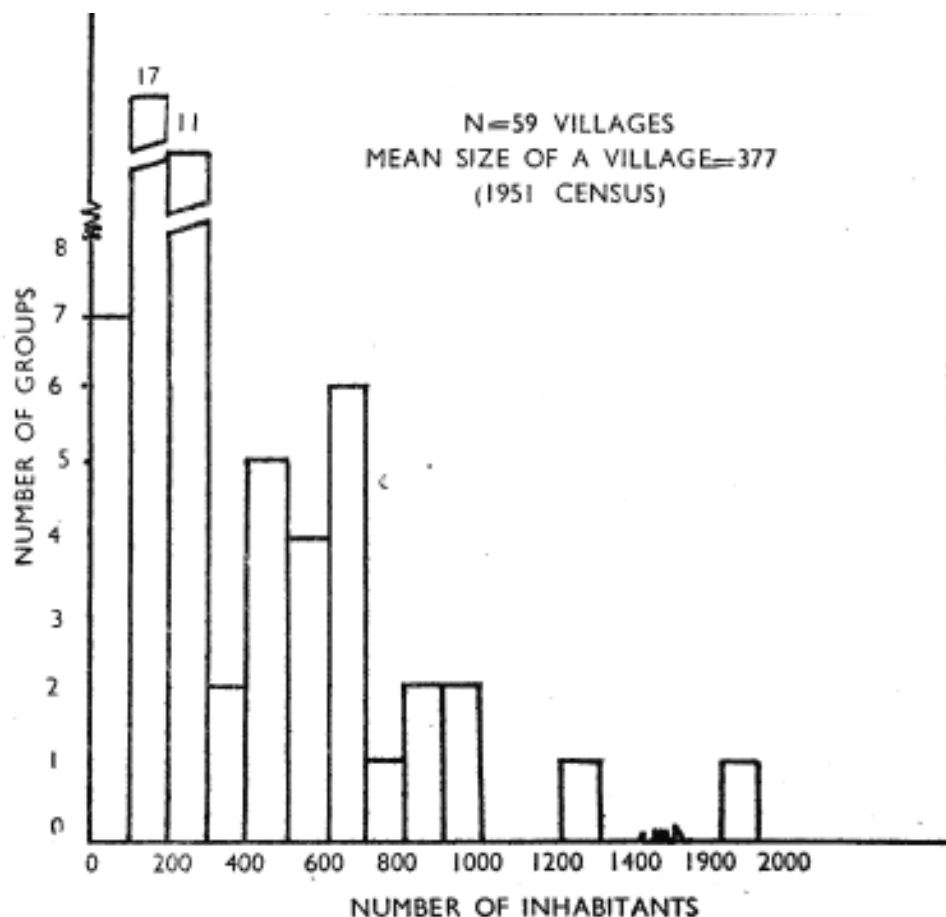
None of the observed socio-economic indices were significantly correlated with the prevalence of infection.

B. Rural Part

Study Population : Appendix Table 3 gives information about the size of the 59 surveyed villages and the number of children registered and tested in each village.

The distribution of the 59 villages by size of population, is shown in Fig. 6.

Fig. 6
Distribution of Villages According to Number of Inhabitants (1951 Census)

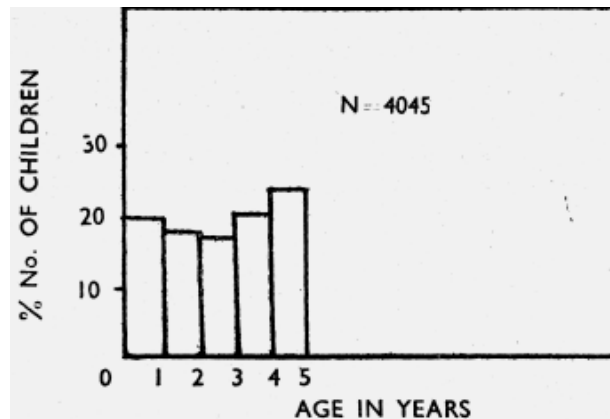


From Fig. 6 it may be seen that most of the villages were small, having populations ranging from under a hundred up to 300; only 2 villages had populations over a thousand.

A total of 4340 children 0-4 years old were registered in the 59 villages and 4090 of these (94.2%) actually completed testing (including 45 children with BCG lesions).

The age distribution of the 4045 children who completed testing is shown in Fig. 7.

Fig. 7
Age Distribution of Children Completing 1 Test Rural Area



It appears that there is here as in the urban group, an overweight of children 3—4 years of age. This may be due to the factors mentioned in connection with the urban survey and would also here tend to over-estimate the prevalence of infection.

Definition of a "Positive" reaction

In the rural as the urban survey, the full size distributions of the 1 TU reaction (Fig. 8 and Appendix Table VI) were studied in order to decide the reaction size in infected children.

Large size reactions are so few that no distinct group of "positive" reactions can be seen. Medium-sized reactions (8-12 mm. are also few whereas small reactions are in the majority. Such reactions may be caused by intradermal injections of mere buffer solution (Nyboe 1960); they are therefore not necessarily taken as evidence of any increased level of tuberculin sensitivity in the tested children.

Using the arguments set forth under part (A) of this analysis, it appears logical to apply the 14 mm. limit to the village material also and to consider all children with reactions bigger than 13 mm. as having been infected with *Mycobact. Tubercul.*

Using this criterion, the proportion of infected children at the various ages is as shown in Fig. 9.

Fig. 8
 Size Distribution of 1 Tu Reactions Among 0—4 Year Old Children in Rural Area

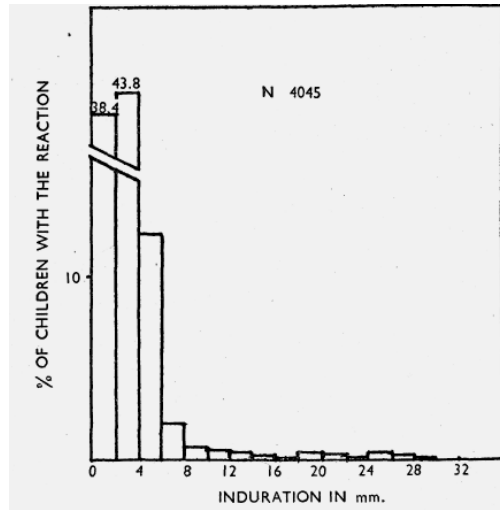
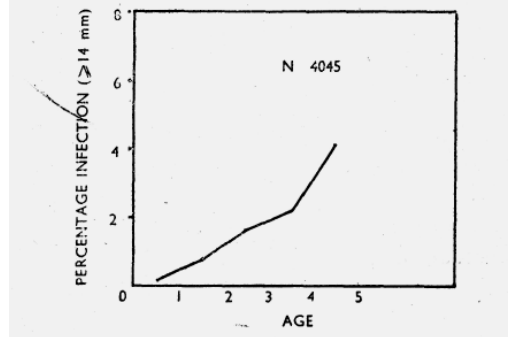


Fig. 9
 Proportion of Infected (Induration ≥ 14 mm to the 1 Tu test)
 Children by Age; 59 Villages Around Bangalore



It can be seen that the prevalence of infection was less than 1 % for the children under 1 year of age and rose up to 4% for the 4 year old children. Of the total of 4045 tested children, 2 % were infected.

AX² test showed that the inter-village variation in prevalence of infection is not larger than could be expected from random variations.

Correlation between tuberculosis infection among children 0-4 years old and certain indices of relative prosperity

The indices which were used to express the socio-economic level of a village were as follows:—

- Area of cultivated land per inhabitant;
- Proportion of pucca (stone) house in the village;
- Size of the village;
- Distance to nearest highway and other motorable roads.

These indices of socio-economic levels were plotted for each village in scatter diagrams against the prevalence of infection in the village in order to study the inter-dependence between prevalence of infection and economic status. The result was that correlation between prevalence of infection and the various socio-economic indices could not be demonstrated in any case.

The prevalence of tuberculous infection in the A. K. (Harijans) Colonies and the rest of the population were contrasted, but no significant difference could be demonstrated between these two population strata.

DISCUSSION AND CONCLUSIONS

It is evident that the most direct way of assessing the tuberculosis problem in a community is to go out and find how many people suffer from the disease. Short of this any index used to indicate the magnitude of the problem must be sensitive enough to bring out significant variations and must be relevant in the sense that variations in the index are correlated to variations in the prevalence of tuberculous disease.

The present study was designed to assess the *sensitivity* of the index, whereas its relevance must be evaluated in other investigations.

The sensitivity of an index may be evaluated by investigating whether the index shows any *systematic* variations or merely varies randomly. If the prevalence of infection among the 0-4 year old children shows variations from group to group which are correlated to variations in other factors, then it has been shown that the index varies systematically and must therefore be sensitive to some degree.

Results of the present study showed that the index for the "City" was correlated to certain indices in socio-economic conditions (crowdedness of population, shortage of water supply). This finding indicates that it may be possible to use the index to show differences in the magnitude of the tuberculous problem, at least in some areas.

On the other hand, in the Cantonment and the rural areas, no such systematic variations could be demonstrated. The sensitivity of the index was thus not demonstrated in these areas.

It could be postulated that it might be more profitable to use tuberculin sensitivity in age groups higher than the 0-4 years old in areas where only very few of the young children are infected. This is undoubtedly true in so far as the index would be more sensitive in the higher age groups; put against this fact stands the argument that in the higher age groups the level of tuberculin sensitivity is more influenced by non-specific tuberculin sensitivity and any previous BCG campaign. Such influence would complicate the interpretation of the results and might in the end make the older age groups less useful.

Recent investigations (Unpublished NTI Surveys) have, however, indicated that these complications may not be serious in South India and that higher age groups should be included in further studies of the index. Against this it could be argued that it is less interesting to know what happened some years ago than what happened more recently. Such pros and cons will have to be considered when deciding on the best age groups for the index.

In conclusion it may be stated that the proportion of tuberculin reactors among the children for some groups did show variations beyond mere random variation thus indicating that the index may be sensitive enough to be used as a yardstick under certain conditions.

Whether or not the variations in the index reflect similar variations in the tuberculosis morbidity and mortality is not known, but will be studied in further investigations relating results of tuberculin testing in community groups to results of simultaneous X-ray and laboratory examinations in the same groups.

In considering the sensitivity of an index for assessing a problem, it is useful to compare it to the sensitivity of other methods which may be used to assess the same problem. The relative sensitivity of two indices may, for instance, be expressed in terms of how many persons must be examined by each method, in order to demonstrate a significant difference (of a given magnitude) between two groups. Let us as an example consider how many persons should be examined by the present method (tuberculin testing of 0-4 year old children) and by chest X-ray examination respectively in order to find out whether there is any significant difference in the occurrence of tuberculosis in two areas. Let us assume that the prevalence of infection is about 2 % (best available estimate) and that the prevalence of persons with tuberculous X-ray lesions is also about 2% (Indian National Survey).

Fig. 10 below shows the number of observations needed in to different populations to show significant differences in prevalence of a phenomenon. The number of observations needed is given for various levels of prevalence (1 %, 3 % and 6%) of the quality being investigated. The prevalence level is the average according to the best available estimate of the prevalences obtaining in the two populations.

Fig. 10 shows that with the prevalence of infected children around the 2% level as found in the villages around Bangalore, it would be necessary to test at least 3300 children in order to detect differences amounting to 50% between two groups.

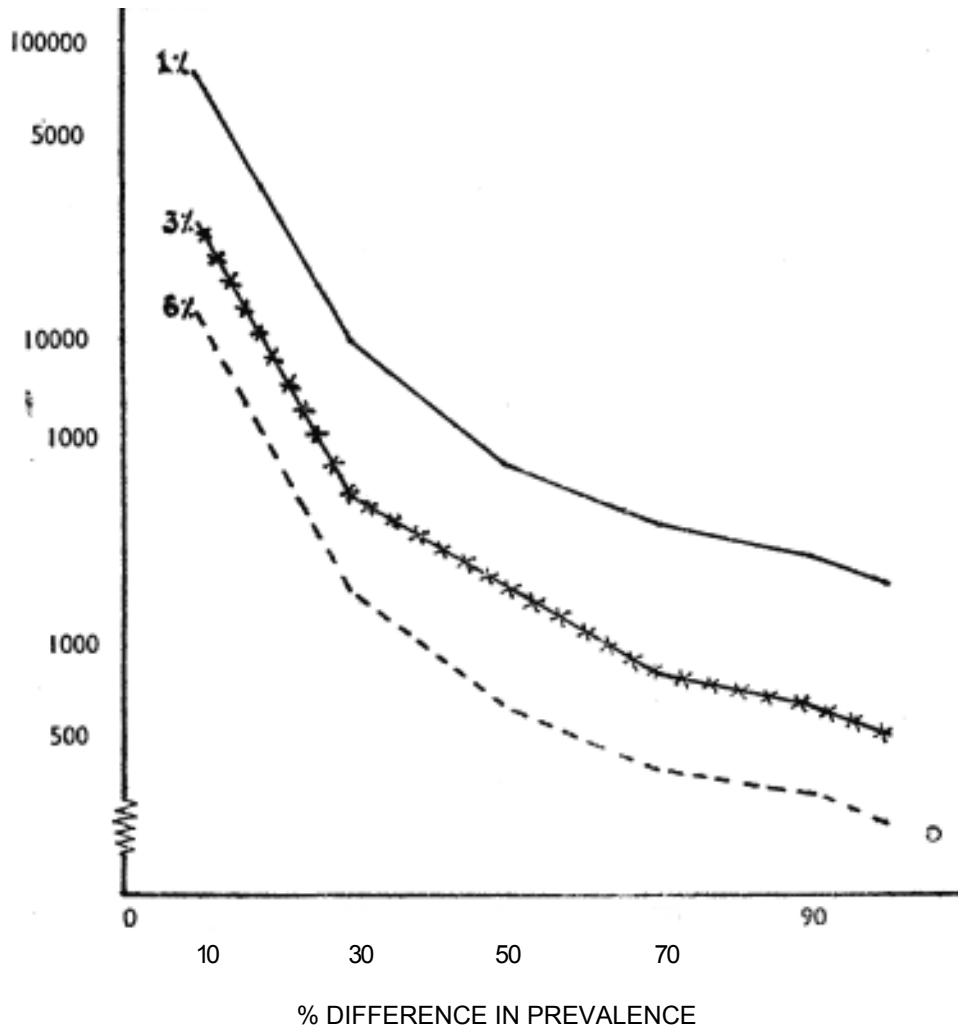
In the "City" (all over prevalence approx. 4.0%) on the other hand, the method is more sensitive and it would be sufficient to test a total of approx. 1000 children in two groups to detect a difference of 50 %.

In the case of X-ray examination, assuming that the prevalence of tuberculous X-ray shadows is of the order of 2 %, we find that the required number of persons to be X-rayed in order to detect a difference of 50 % between two groups, would

again be about 3300, With an over-all prevalence of 4 % of X-ray shadows in the population and of infected children in the 0-4 years age group, approx. 1000 children (see Fig. 10) would have to be tested in order to investigate for a 50% difference between two population groups, and the same number of persons would have to be examined by X-ray in order to show a similar difference by X-ray examination.

Fig. 10

Number of Persons Required in each of two Populations in order to Significant Difference for Various Differences of the Prevalence (Given for 1%, 3% and 6% Prevalence)



In evaluating the practicability of the two methods it should be kept in mind that whereas 1000 persons for X-ray examination (general population over, for instance, 5 years of age) may be found in a few communities, it may be necessary to survey 10 times as many communities in order to get a similar number of children in 0-4 years age group if only approx. 10% of the total population is in this age group.

It may well be that it is cheaper to make a complete X-ray examination of a few community groups than it is to tuberculin test the 0-4 years old children in 10 times that number of groups. This will depend on how scattered and accessible the groups are and how easy it actually is to get the various age groups examined. Such considerations will have to be weighed against the sensitivity of the various survey methods when a choice is to be made.

The final evaluation of how useful the prevalence of infected children is as an index of the extent of tuberculosis in a community will depend on how this index correlates with the "real" size of the problem. The "real" size of the problem may be measured by the prevalence of persons having X-ray lesions or symptoms due to tuberculosis or by number of persons dying from the disease.

SUMMARY

The purpose of the present study was to investigate whether tuberculin testing of random samples of young children (0-4 years old) might be used as a method of assessing the extent of the tuberculosis problem in an area.

A random sample was selected in the City of Bangalore and in unvaccinated villages within a distance of 100 miles from the City. The random sample in the City comprised of 35 blocks of houses having a total population of 19,870 persons; the random sample in the rural area consisted of 59 villages with a total population of 22,266. The child population (0-4 years) totalled 2,884 in the urban sample of which 2,590 completed testing. In the rural sample 4,090 children out of a total of 4,340 were examined.

An intradermal dose of 1 TU PPD RT 23 (with Tween 80) was used as the sole test. The reactions were read 72-96 hours after injection; all reactions measuring less than 14 mm. of induration were considered negative.

Information regarding socio-economic status of the examined house-blocks and villages were collected during field work in order to establish certain indices of relative prosperity which might be correlated to the index of tuberculosis infection. Crowdedness and density of water taps were used as prosperity indices in the City whereas remoteness and size of village were used in the rural area.

The usefulness of the tuberculin sensitivity in the children as an index of tuberculosis was evaluated in terms of the sensitivity of the index. The results showed that the prevalence was significantly different for the Cantonment (1.6%) and the City area (4.1 %) of Bangalore, whereas only random variation in prevalence was observed in the villages, where the all-over prevalence was 2% among the 0-4 year old children.

Only in the City proper could any correlation between prevalence of infection and socio-economic indices be established. These findings indicate that the sensitivity of the index may be so low in the villages that differences are difficult to demonstrate. In the urban area, on the other hand, strata with different prevalence of infection could be defined by the method.

The present study does not give information on how relevant this index of tuberculosis infection may be as an indicator of how much tuberculous diseases there is in a given population. Comparisons of the index to X-ray and laboratory findings are needed for this purpose, and will be carried out in future surveys undertaken by the NTI.

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TUBERCULIN SENSITIVITY IN YOUNG CHILDREN

APPENDIX TABLE I

Details of the Study Population in the Selected Blocks of Bangalore City Area where 1 T.U. Test was given to the Children of 0-4 years of age

Name of the Block	Population of 1959	No. of children registered	No. of Tested	children Read	* % Tested	children Read	Actual no. of children infected 14 mm
1	2	3	4	5	6	7	8
South of V Cross RD.							
Malleswaram	47	6	5	5	83.3	83.3	0
Chamarajpet	623	113	102	102	90.3	90.3	2
Visveswarapuram	219	37	32	32	86.5	86.5	0
Gudumiahpet	983	158	143	143	90.5	90.5	6
North of V Cross Rd.							
Malleswaram	183	26	24	24	92.3	92.3	0
Chickpet	138	5	5	5	100.0	100.0	0
Gudumiahpet	775	146	131	127	89.7	87.0	10
Minto Hospital	52	14	11	11	78.6	78.6	2
Chamarajpet	158	20	17	17	85.0	85.0	0
Ranasinghpet	1052	198	179	175	90.4	88.4	9
Chamarajpet	51	0	0	0	—	—	0
Srirampuram (Cluster)	2514	437	380	377	87.0	86.3	16
Labour Colony	1675	277	261	261	94.2	94.2	7
Railway Station	635	39	35	35	89.7	89.7	0
Ballapurpet	452	74	72	71	97.3	95.9	5
Gamgarpet	1264	223	211	211	94.6	94.6	13
Basavanagudi	811	124	109	109	87.9	87.9	2
Aralepet	352	50	46	46	92.0	92.0	2
Race Course	485	54	48	48	88.9	88.9	0
Visveswarapuram	197	31	28	28	90.3	90.3	0
TOTAL	12666	2032	1839	1827	90.5	89.9	74

* Columns (4) and (5) include children with lesions from previous BCG vaccination

® Columns (6) and (7) are calculated on the basis of total number of children registered (column 3)

APPENDIX TABLE II

Details of the Study Population in 15 Blocks of Cantonment Area of Bangalore where 1 T.U. Test was given to the Children of 0-4 years of age

Name of the Block registered	Population	Number of children registered	No. of children tested	* No. of children read	†Percentage of children tested read	No. of children tested	Actual number of children infected 14 mm
1	2	3	4	5	6	7	8
Queens Road	218	29	20	20	69.0	69.0	1
Elegondanapalya	281	63	55	54	87.3	85.7	0
Mosque (Eraser town)	11	3	1	1	33.3	33.3	0
Commercial street	328	48	46	46	95.8	95.8	1
Cavalry Road-Drain	581	86	80	79	93.0	91.9	0
Langford Town	683	30	29	29	96.7	96.7	1
Goodsheppards' Convent	911	23	20	20	87.0	87.0	0
Sonenhally	470	89	87	86	97.8	96.6	3
Behind Commercial Street	716	72	58	57	80.6	97.2	2
Murphy Town	1223	177	170	170	96.0	96.0	3
Clive Lines	375	80	70	70	87.5	87.5	1
Shule	148	16	12	12	75.0	75.0	0
Jayamahall extension	422	49	41	41	83.7	83.7	0
Central Street, Hospital Road	334	21	13	13	61.9	61.9	0
Dukkanahally	431	65	64	64	98.5	98.5	0
TOTAL	7132	851	766	762	90.2	89.7	12

Columns (4) and (5) include children with lesions from previous BCG vaccination Columns (6) and (7) are calculated on the basis of total no. of children registered (column 3)

APPENDIX TABLE III *Details of the Study Population in 59 Villages Around Bangalore where 1 T.U. Test was given to Children of 0-4 years of age*

District	Taluk	Name of the village	Popula- tion (1951 Census)	No. of chil- dren Regis- tered	No. of children		% No. of children		Actual number of children infected 14mm	
					Tested	Read	Tested	Read		
1	2	3	4	5	6A	6B	7A	7B	8	
Bangalore	Channarayana	A. Hosahally	643	130	125	123	96.2	94.6	4	
		Dabbangurdudoddi	200	39	33	33	84.6	84.6		
	Magadi	Aralapur	441	96	92	92	95.8	95.8		2
		Hemapura	421	66	62	62	93.9	93.9		3
		Dublagottige	565	135	130	129	96.3	95.6		2
		Mylenahally	268	43	42	42	97.7	97.7		2
	Nelamangala	Kallur	521	107	100	100	93.5	93.5		1
		Hadi Hosahally	210	41	39	39	95.1	95.1		1
		Honnahally	634	128	121	121	94.5	94.5		5
		Mallasandra	397	72	71	71	98.6	98.6		1
		Avalakuppe	209	57	56	56	98.2	98.2		—
		Hosahudva	519	81	77	77	95.1	93.8		—
Kolar	Bagepally	Chaldiganahally	266	68	66	66	97.1	97.1	1	
		Audarlahally	633	127	116	116	91.3	91.3	1	
	Chikballapur	Singadakadirenahally	137	35	31	31	88.6	88.6	—	
		Kaddibbur	150	23	20	20	87.0	87.0	—	
		Yarasigehally	62	13	13	13	100.0	100.0	—	
		Chowdanahally	197	42	42	42	100.0	100.0	—	
		Vempally	192	42	33	33	78.6	78.6	2	
		Kappalli	140	34	34	34	100.0	100.0	1	
		Billandapally	685	117	104	103	88.9	88.0	3	
		Chintamahalahally	187	39	38	38	97.4	97.4	1	
		Deshmarihall	62	14	13	12	92.9	85.7	—	
		Doddakondnahally	479	83	69	68	83.1	81.9	1	
Ulavadi	922	209	196	196	93.8	93.8	2			
Kolar	Kutharsanahally	67	17	15	15	88.2	88.2	—		
		Settigenehally	265	56	53	53	94.6	94.6	—	
	Kallahally	856	149	143	143	96.0	96.0	1		
		Urata Agrahara	244	45	44	44	97.8	97.8	—	
		Thoradevandahally	419	79	74	74	93.7	93.7	2	
		Vanarasi	545	89	87	87	88.8	88.8	1	
		Yadahally	130	23	18	18	78.3	78.3	—	
		Kanamapally	80	19	19	19	100.0	100.0	—	
		Sri Rangapuram	104	19	18	18	94.7	94.7	1	
		Kapabikanahally	188	37	37	37	100.0	100.0	—	
		Madaghatta	227	49	44	44	89.8	89.8	7	
		Doddathihally	231	39	36	36	92.3	92.3	1	
Kolar	Devarayasamudra	1,250	179	171	171	95.5	95.5	1		
		Pavastahally	113	16	15	15	93.8	93.8	—	
	Sidlaghatta	Doddatekahally	739	132	130	129	98.5	97.7	13	
		Timmasandra	869	164	152	152	92.7	92.7	4	
	Maddenahally	154	20	18	18	90.0	90.0	1		
	Chowkappanahally	118	25	24	24	96.0	96.0	—		
	Mandya	Chicknaikanahally	212	29	25	25	86.2	86.2	1	
			Honnenahally	358	81	81	80	100.0	98.8	—
		Bidarahally	91	16	16	16	100.0	100.0	—	
		Pandavapura	Mollenahally	62	11	11	11	100.0	100.0	—
			Honganahally	265	67	62	62	92.5	92.5	—
		Mandya	Basaralu	1,935	318	312	311	98.1	97.8	2
Gudigenahally			644	133	122	122	91.7	91.7	2	
Beecharrahally			248	46	44	44	95.7	95.7	—	
Maragondanahally			958	321	312	312	97.2	97.2	5	
Nesamangala		Gottakally	170	32	31	31	96.9	96.9	1	
	Kenchanakote	190	29	29	29	100.0	100.0	1		
	Mallenahally	6	4	4	4	100.0	100.0	—		
	Metti Mallahally	183	58	55	55	94.8	94.8	3		
	Ijalaghatta	453	69	68	67	98.6	97.1	2		
	Kadagere	104	17	17	17	100.0	100.0	—		
Thubinakere	648	102	91	91	89.2	89.2	—			
TOTAL			22,266	4,340	4,101	4,090	—	—	82	

(x) Columns (6A) & (6B) include children with lesions from previous BCG Vaccination Columns (7A) & (7B) are calculated on the basis of total number of children registered (column 3)

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APPENDIX TABLE IV

Size Distribution of 1 T.U. Reactions in 0-4 years old Children in the "City" Area

Age Induration	0	1	2	3	4	Total	%
0- 1	179	116	100	118	149	662	36.32
2- 3	134	166	137	169	165	771	42.30
4- 5	35	56	41	55	60	247	13.55
6- 7	4	7	4	6	23	44	2.41
8- 9		3	2	4	3	12	0.66
10-11	1	1	1	4	3	10	0.55
12-13		1	2			3	0.16
14-15	1	2	1	1	1	6	0.33
16-17	1	1	1	2	3	8	0.44
18-19		1		1	8	10	0.55
20-21	1	1	2	5	8	17	0.93
22-23		3	1	3	7	14	0.77
24-25		1	1	5	4	11	0.60
26-27			1	2	4	7	0.38
28-29					1	1	0.05
TOTAL	356	359	294	375	439	1823	

APPENDIX TABLE V

Size Distribution of 1 T.U. Reactions in 0-4 year old Children in Cantonment Area

Age Induration	0	1	2	3	4	Total	%
0- 1	53	49	40	28	35	205	26.98
2- 3	51	70	44	68	90	323	42.50
4- 5	26	41	25	23	36	151	19.87
6- 7	5	8	8	9	11	41	5.40
8- 9	1		3	5	6	15	1.97
10-11	1	2		2	2	7	0.92
12-13	2			2	2	6	0.79
14-15			1	2	1	4	0.53
16-17			1			1	0.13
18-19							
20-21				2		2	0.26
22-23			1		1	2	0.26
24-25					2	2	0.26
26-27				1		1	0.13
28-29							
TOTAL	139	170	123	142	186	760	

APPENDIX TABLE VI

*Size Distribution of 1 T.U. Reactions in 0-4 year old Children in 59 Villages
Around Bangalore*

Age Induration	0	1	2	3	4	Total	%
0- 1	423	274	250	258	348	1553	38.39
2- 3	349	328	319	376	398	1770	43.76
4- 5	44	88	90	125	154	501	12.39
6- 7	3	9	13	31	24	80	1.98
8- 9	1	4	2	8	13	28	0.69
10-11		2	7	4	4	17	0.42
12-13		1	4	6	4	15	0.37
14-15		1		3	4	8	0.20
16-17	1	0	1	1	1	4	0.10
18-19		2	2	2	12	18	0.44
20-21	1		2	5	7	15	0.37
22-23		1	3	3	5	12	0.30
24-25		1	2	2	10	15	0.37
26-27			2	3	3	8	0.20
28-29		1				1	0.02
TOTAL	822	712	697	827	987	4045	

The Place of Home Visiting in Domiciliary Scheme

By.

KHUSHDEVA SINGH

Tuberculosis Centre, Patiala

Domiciliary treatment has now been tried for a considerable period in a large number of tuberculosis clinics in India and in other countries, and is now accepted as a practical approach to give a chance of chemotherapy to all known cases of pulmonary tuberculosis, who could not be hospitalised for want of beds, or those whose stay in the hospital is not deemed necessary.

The success of this line of treatment depends on the success with which the hospital and public health care can be brought to the home of the patient through the application of modern ideas of curative and preventive treatment, and by making the home conditions as similar as possible to those in the hospital.

It, therefore, constitutes not only the arrangement for adequate and continued supply of the needed antimicrobials and the supervision of the regularity in the administration of these drugs but also the routine preventive advice to check the spread of infection in the family and the community, in addition to continued education to remove superstition and ignorance, and arrangements for relief and rehabilitation to those who need it.

All these activities are carried on through Home Visiting and this may be easily defined as the life line of domiciliary service. It aims at treating and checking the progress of the disease to maintain the beneficial results which may have been obtained, and to take precautionary measures to prevent the spread of the disease.

This work is carried out through a team of workers consisting of a doctor, a social worker, a staff nurse and a number of health visitors, and each member of the team visits the home of the patient at repeated intervals according to the need of the patient.

There are three very important prerequisites for the proper development of this work, and these are:

- (1) The home visiting demands a lot of tact, courtesy and resourcefulness on the part of the members of the visiting staff in handling the patients. It is only through tact and courtesy that the patient and his contacts can be motivated to co-operate and take decisive action. Any hurry or tactlessness is at once noted by the patient and it becomes one of the basic causes of irregular treatment. Unless the person concerned, the patient or his contact, is convinced of the seriousness of the situation, he cannot be expected to contribute his part to the ultimate control of disease.

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- (2) Each member of the team has got his own field of work, and if any success is to be achieved, it is very important that the duties of each member be clearly defined. Otherwise, there will be the inevitable risk of blurring of functions and overlapping of activities. This can be avoided to a great extent if all of them jointly outline the part each one of them is going to play.
- (3) The attention of the members of the visiting staff should not only be directed towards the patient, but also to other members of the household, as the success of this work depends on the co-operation and understanding of all of them.

The Domiciliary treatment service was started in the Tuberculosis Centre, Patiala in 1953 and it took two years before the programme was properly developed and brought to some standard.

During the last five years, 1008 patients have been treated through this line of service. Most of these patients were drawn from poor sections of the community, living in overcrowded and insanitary conditions. They were undernourished on account of poor diet, and a great majority of them had fairly active big lesions. Added to this was their ignorance and superstition on account of low level of their knowledge.

The following is a statement of the detail of particulars of the patients under domiciliary schemes:—

1. Total number of patients treated		1008
2. Age groups:		
	between 1 and 5 years	22
	" 6 " 10	56
	" 11 " 15	74
	" 16 " 20	139
	" 21 " 25	189
	" 26 " 30	159
	" 31 " 35	109
	" 36 " 45	128
	" 46 " above	132
3. Sex		
	Male patients	432 576
	Female patients	576
4. Average family members		5.6
5. Monthly Income:		
	(upto rupees one hundred)	792
	(above rupees one hundred)	216
6. Housing conditions:		
	Joint (a number of families living in one house)	347 or 34%
	Single (one family living in a house)	661 or 66%
	Ventilation of the room of the patient	

	Fair—454 or 45%	
	Poor—554 or 55%	
7. Overall Isolation:	Satisfactory	406
	Unsatisfactory	602
8. Space per head :	Below 50 square feet	676
	Above 50 square feet	332
9. Co-operation:	Co-operative	712
	Non-co-operative	107
	Left locality	189
10. Contact examination:	Mantoux test done	3768
	Mantoux positive	1692
	Mantoux Negative	1135
	Absent	941
	B.C.G. Given	1096
	Screening of the chest done	1004
11. Results:	Disease arrested	421
	Under active treatment	331
	Left Locality	189
	Died	67
	Total	1008

In the beginning there were good many cases, even in educated families, where the family members of the patient were unwilling to let the members of the visiting team visit their homes for fear of detection by their neighbours. Therefore, the visits had to be made guardedly and so timed to evade the notice of their curious neighbours. However, with the passage of time this fear and superstition have died out and the people have accepted the home visiting work as a normal routine.

Medical Service

The first thing of importance was to arrange an adequate and continued supply of antimicrobials to the patient during the course of treatment. It was a difficult problem, but with the help of a number of voluntary welfare and governmental bodies, we were able to keep the patient supplied with the Isonicotinic-acid-hydrazide tablets during the whole course of treatment. In addition to this, sincere efforts were made to supplement this medication with Para-amino-salicylic acid, Streptomycin, etc., when these were absolutely needed. This was responsible for gaining the confidence and enlisting the willing co-operation of the patient.

More than this was the need to supervise that the patient was taking the medicine regularly. Once a patient felt well and was relieved of his clinical symptoms to some extent, he became careless about the regularity with which the medicines were to be taken. It was here that the checking and persuasion from the home visit-

ing staff became necessary. For this reason many checks and surprise visits to the homes of the patients had to be made.

Preventive Measures in the Home

(1) *Isolation.* Isolation of the patient is of great value from the point of view of the treatment of the patient himself, leaving aside the question of spread of infection to the inmates of the house. It would be ideal if a separate room could be provided for the patient so that he could be completely isolated from the other members of the family. But this was not possible in all cases. The majority of patients lived in overcrowded houses. The only alternative for them was to be accommodated either in a corner of a room preferably near a window, or in a verandah.

Some of the patients were found in the habit of spitting on the floor or on the walls. They would not even cover their mouth while coughing. All these insanitary habits had to be checked and stopped through tact and education.

They were also advised to keep their dishes, utensils and articles of bedding, clothing, etc., separate so that the chance of spread of infection among the inmates of house was minimised.

(2) *Disposal of Sputum.* Instruction about the disposal of sputum were given in detail and the importance of this as a means of preventing the spread of infection was fully impressed on the mind of the patients and their attendants. Arrangements were made for providing sputum-disposal outfit to those who could not buy it and disinfectant lotion like phenyle was also supplied to those who needed it. In spite of all this, it was not possible to achieve complete success in this endeavour.

(3) *Rest.* Rest is a very important factor in the treatment of tuberculosis, especially when the patient is acutely ill and when the treatment had just been started. The importance of rest was fully impressed both on the patient and the family members. We met with fair amount of success, but there were many patients who would not follow our advice as seriously as was needed. In the case of male patients, it was generally an urge to be up and doing or there was the need to earn their living. Some of the females started doing their homework as soon as there was some relief in the clinical symptoms. Sometimes, it was because there was no other female in the house to look after the children, while in other cases the rest of the family wanted her to work.

Educational Activities

Health education is an important activity of the home-visiting team, and, as such, due attention was paid to this field of work, and we met with good success.

It has got two major approaches, one type of education has to be directed towards the patient, and the other type is meant for the family and the attendants.

As soon as the diagnosis was made, the physician explained to the patient or the guardian, the significance of his findings, the reason for treatment, and the patient's personal responsibility in the programme.

Since the first news of the diagnosis was always a shock to the patient, the maximum effort to educate the patient was made at the time of diagnosis, keeping in

mind at the same time not to burden him with too much information at the outset. This greatly helped in securing the co-operation from him. Education however was a continuing process and was adjusted from time to time to meet the new and changing developments. The members of the visiting staff also conferred with each patient on suitable occasions regarding his progress, and this encouraged him to perform faithfully his part in the treatment routine. It was also borne in mind that it required frequent repetitions of the simple facts about the disease lest the patient might become careless about his illness and forget its inherent dangers.

As the recovery of the patient also depended largely on the co-operation and attention of his family, due care was taken to educate them also on matters which were connected with the welfare of the patient and his family members. The family was advised concerning the diet, the amount of rest or exercise, the necessary sanitary precautions, the extent of patient's disease, the importance of keeping the patient under the care of a clinic, and the importance also of periodic examination of all the contacts.

Group instructions to patients getting treatment on observation beds has now been started as a routine practice. This plan has enabled the instructor to discuss the problems of the group then under treatment, and to offer many valuable suggestions of specific nature.

Examination of Contacts

Case finding is a very important activity in the tuberculosis control programme. As long as unknown cases continue to propagate infection, tuberculosis in a community will not be uprooted.

Mass X-ray examination is rightly receiving a great deal of emphasis, and is undoubtedly an excellent case-finding procedure. However, at Patiala, the examination of the contacts to a known case has been the mainstay of the case-finding programme, and this has been done through home-visiting.

This, especially in the beginning was a difficult task on account of the ignorance of the people, especially regarding the contagious nature of the disease and the time that was involved in their visiting the clinic for screening, etc. However we have made good progress in this field also and all contacts were tuberculin tested, and those found tuberculin negative, were given B.C.G. Positive reactors were invariably examined and physically screened, and if there was the slightest doubt of the evidence of tuberculous lesion, an X-ray was taken, and the treatment was given. All others were re-examined after four to six months and this schedule was followed for at least two years.

With tact and perserance on the part of the health visitor, fairly good success has been achieved. This work has now been made easier as the tuberculin testing and the B.C.G. are done at the home of the patient, and only those contacts are persuaded to visit the clinic where the screening of the chest or any other examination has been considered necessary.

Social Welfare Aspect

(1) *Mental Adjustment.* Like any other chronic illness, tuberculosis has also its social and emotional components, and these are specially important because of several factors like the unpredictability, chronicity, and infectious nature of the disease coupled with isolation, complete rest for some time, and the long term care are involved in the treatment of the patient.

It is therefore very necessary to gain a deep insight into these problems and interpret the disease in terms of how it may affect a life plan. This is a job which can be best helped by a trained social worker. As we have got no trained social worker in our team upto this time, myself and one of the health visitors tried to discharge this duty as best as possible.

Apart from helping the patient to adjust himself to his illness situation, we helped him and his family to adjust to the new situation caused by the illness. Thus, by working with the patient and the family, we were able to lessen his anxieties to some extent, and to enable the patient to accept the medical recommendations, and work for the continuity of the treatment.

(2) *Economic Relief.* Economic needs are often the major factors in the emotional distress of the patient. As a great majority of patients in this series were from a low-income group, a limited amount of assistance was made available to those who needed it most. It was a difficult problem on account of—the non-avail ability of adequate funds for this purpose, but we tried to solve it by pooling assistance from different sources, such as the Local Municipal Committee, the State Tuberculosis Association, Rehabilitation Department, Hospital Welfare Section of the Indian Red Cross Society, Ex-servicemen, Sailors and Soldiers' Board. The CARE mission, and the gift and relief committee of the National Christian Council of India. All this assistance in kind and coin pooled together was made available through the CARE committee. It not only helped the patients in time of need but also proved to be a great factor in securing and maintaining the co-operation of the patients. All this assistance fell far short of their genuine needs, and it is necessary that the people and the Government are kept constantly reminded of the importance of developing and extending such help for the welfare of the patients and their families.

(3) *Rehabilitation.* Rehabilitation is an integral part of Tuberculosis control programme. It is the underlying motive of the cure, and it plans to bring about social, economic and personal adjustment during and after the cure. As such, it becomes the social worker to restore the patient to social and working life. When an ex-patient cannot find a job, it should be found through such agencies as (1) Relief and Rehabilitation Department of the Government (2) Industrial Welfare Organisation and (3) the Care Committee of the clinics.

Efforts on a small scale were made in this direction also and we have been able to help quite a number patients in this series.

Conclusion

(1) The results of home treatment, as carried out during the last five years in the Institution at Patiala suggest that it is appropriate to treat a great majority of patient in their homes, provided the home-visiting work is developed to such a pitch that it can discharge all its responsibilities to its best.

(2) It was noted that the patients treated at home, as a group made good progress inspite of the fact that a great majority of them came from a poor section of the community, living in overcrowded conditions, on a poor dist, and had big lesions when the treatment was started. The reason, for this to my mind is that those people who have lived and adjusted their lives to poor surroundings can fight against the disease also in those very surroundings provided they are supplied with the necessary medicine and the advice and guidance as how best to make use of their circumstances.

(3) There is little doubt that the long-term home treatment, proves less disruptive to the family life than the treatment in a Tuberculosis Institution. This in itself is a big sociological advantage.

(4) Backed by a good clinic, equipped with a standard laboratory and X-ray service, a reasonable number of observation beds, enough of staff, and adequate supply of medicines, adequate transport and financial resources sufficient to give at least limited assistance to the needful. The Home-Visiting occupies a very important position and plays a very faithful role in domiciliary service scheme. And it can rightly be called the LIFE LINE of this scheme.

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- | | |
|--|------|
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| 2. Tuberculosis Clinic Manual (N.T.A.) | 1947 |
| 3. Transaction Tuberculosis Workers Conference | 1956 |
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Conference | 1956 |
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A Note On Pulmonary Haemodynamic Charges In Chronic Pulmonary Tuberculosis

by

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The pulmonary circulation has not been studied extensively in patients with chronic pulmonary tuberculosis. The literature on this subject is small, and many of the findings have been contradictory. Some investigators have found normal pulmonary artery pressures in such patients during exercise as well as at rest (Dressier, One, Knipping, Vujlsteek, Huggea). A few have found slight increases in pressure during physical exertion (Me Clement, Hurst, Geelen). Other studies have revealed moderate increases at rest (Papaemmanuel, Van Lop, Semb, Di Maria, Soderholm), and severe pulmonary hypertension has been described by Curti, Soderholm, Zmmernann and Di Maria. Haemodynamic studies of the pulmonary circulation have been done routinely in our institute in all patients before pulmonary resection. We believe that it is important to have some estimate of the pulmonary vascular resistance before operation since it is our opinion that the prognosis is poor in those patients subjected to pulmonary resection if pulmonary hypertension exists before the operation. This viewpoint has been reinforced by clinical observations on a large number of patients after operation.

Methods and Materials : The usual cardiac catheterization techniques have been employed in these studies. All of the patients included in this report had chronic pulmonary tuberculosis. If the patient has had a thoracoplasty or has significant fibrosis and retraction on one side, it has been our practice to introduce the catheter in the opposite arm. The anatomic distortions involving the subclavian vein and the superior vena cava as a result of a thoracoplasty or extensive fibrosis may prevent the catheter from entering the right atrium if one uses the arm vein on the involved side. Arrythmias have sometimes occurred after introduction of the catheter into the pulmonary artery, and sometimes it is necessary to re position the catheter to avoid this particular complication. Catheterization studies have been done in 230 patients. One death occurred. This was a result of perforation of the atrium near the coronary sinus ; this was followed by a cardiac temponade. Except for this one instance there were no other significant complications. One hundred-fifty of these patients have been selected for this study.

The others were excluded because of previous surgical procedures or because of collapse therapy.

Results : The relationship between chronic pulmonary tuberculosis and haemodynamic changes in the pulmonary circulation may be summarized as follows : (1) Normal pulmonary artery pressures were observed at rest in 63.8 per cent of the cases. The pulmonary artery pressure was moderately increased in 18.3 per cent, and pulmonary hypertension was found in 18 percent. (2) Pulmonary artery pressures did not change greatly during exercise although increases of 6-8 per cent were found in some patients. (3) The cardiac output at rest, determined by the Pick principle, was within normal limits. The cardiac index ranged from 2.5 to 4.4 liters per minute per M^2 . After exercise the cardiac index rose to 5.1 to 5.5 liters per minute per M^2 . The cardiac index was not particularly different in patients with pulmonary hypertension than in normal patients. (4) Thoracoplasty was generally followed by an increase in the pulmonary artery pressure. Pneumothorax, on the other hand, had only a slight effect on pulmonary artery pressure. Patients with empyema, however, sometimes had pulmonary artery pressures higher than those in patients who had been subjected to thoracoplasty. The resting cardiac index was higher in patients who had been subjected to surgical collapse therapy than in unoperated patients, it varied from 4.2 to 4.6 liters per minute per M^2 . (5) There was a poor correlation between the clinical or radiographic features of a patient's disease and his pulmonary artery pressures. Both extremes were seen. An occasional patient with severe parenchymal disease had perfectly normal pressures while other patients with rather unimpressive lesions had much higher pressures than one might expect in view of the severity of the disease.

Discussion and Conclusions : Chronic pulmonary tuberculosis does affect the haemodynamics of the pulmonary circulation. An increase in pulmonary artery pressure was observed in 35 per cent of the patients. Moderate to severe pulmonary hypertension was present in 18 per cent. It is difficult to evaluate the patient for pulmonary hypertension or increased pulmonary vascular resistance on the basis of the clinical examination. We feel that it is important therefore that cardiac catheterization be done in those patients who are being considered for pulmonary resection. Pulmonary hypertension is an indication that the vascular reserve of the lung has been compromised severely and suggests that a further reduction in the vascular network as a result of pulmonary resection may lead to an intolerable increase in vascular resistance.

News & Notes

1. The Seventeenth Tuberculosis and Chest Diseases Workers' Conference will be held in Cuttack for four days, beginning on the 31st January, 1961. Shri Y. N. Sukhthanker, Governor of Orissa, is expected to inaugurate the Conference. Shri D. P. Karmarkar, Union Health Minister, is addressing the inaugural session.

Arrangements for holding the Conference in Cuttack are being made by Dr. B. K. Acharya, Honorary Secretary & Treasurer, State Tuberculosis Association of Orissa, SCB Medical College, Cuttack. Delegates who require accommodation in Cuttack during the Conference period should contact Dr. Acharya. Delegates may also inform him whether they wish to join excursions to TB institutions and other places of general interest so that adequate transport and other arrangements may be made.

Detailed programme of the Conference is given below.

TUESDAY, the 31st January, 1961

- | | |
|---------------------|--|
| 10.30 to 10.40 A.M. | Welcome by Shri R. P. Misra, Health Minister, Orissa |
| 10.40 to 11.00 A.M. | Address by Dr. P. V. Benjamin, Technical Adviser, TB Association of India and TB Adviser, Government of India |
| 11.00 to 11.15 A.M. | Address by Shri D. P. Karmarkar, Minister for Health, Government of India |
| 11.15 to 11.30 A.M. | Inauguration by Shri Y. N. Sukhthanker, Governor, Orissa |
| 11.30 to 11.55 A.M. | Presidential Address by Dr. J. Frimodt-Moller |
| 11.55 to 12.00 Noon | Vote of Thanks |
| 12.00 to 2.00 P.M. | LUNCH INTERVAL |
| 2.00 to 2.15 P.M. | Observation of Sputum negative cases of Pulmonary Tuberculosis Dr. B. K. Sikand |
| 2.15 to 2.30 P.M. | Work in relation to treatment Dr. P. K. Sen |
| 2.30 to 2.45 P.M. | Progress in the II Year of patients with quiescent pulmonary tuberculosis after a year of chemotherapy at home or in Sanatorium and the influence of further chemotherapy on the relapse rate Dr. C. V. Ramakrishnan |
| 2.45 to 3.00 P.M. | Controlled comparison of four different regimens for a year in the domiciliary treatment of pulmonary TB Dr. C. V. Ramakrishnan |

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3.00 to 3.45 P.M. DISCUSSION

WEDNESDAY, the 1st February, 1961

- 9.30 to 12.30 P.M. Panel discussion on Problems of Drug Resistance Moderator : Dr. J. Frimodt-Moller
- 2.30 to 12.45 P.M. Rate of inactivation of Isoniazid in South India patients and its relationship to response to chemotherapy Dr. P. R. J. Ganga-dharan
- 12.45 to 1.00 P.M. DISCUSSION
- 1.00 to 3.00 P.M. LUNCH INTERVAL
- 3.00 to 3.15 P.M. Problems connected with indigent patients Shri B. M. Cariappa
- 3.15 to 3.30 P.M. Changing emphasis on problems of Domiciliary management of pulmonary Tuberculosis Mrs. M. Paul
- 3.30 to 3.45 P.M. Advantage and disadvantage of Domiciliary management of pulmonary TB Miss M. Jayalakshmi
- 3.45 to 4.00 P.M. Study of Rehabilitation needs of TB patients in a Clinic Miss K. Das
- 4.00 to 4.15 P.M. Health Education in Tuberculosis Control Shri K. B. Mathur
- 4.15 to 5.00 P.M. DISCUSSION

THURSDAY, the 2nd February, 1961

- 9.30 to 10.00 A.M. Tuberculosis Trends in Hongkong —A major success for BCG Vaccination Dr. A. S. Moodie, (Guest Speaker) Hongkong.
- 10.00 to 10.30 A.M. DISCUSSION
- 10.30 to 10.45 A.M. BCG Vaccination of New Born and Follow up in twin cities of Hyderabad and Secunderabad. Dr. C. R. Naidu and Dr. K. Somayya
- 10.45 to 11.00 A.M. DISCUSSION
- 11.00 to 11.30 A.M. INTERVAL
- 11.30 to 11.45 A.M. Evolution of Primary Tuberculosis Dr. J. Frimodt-Moller
- 11.45 to 12.00 Noon DISCUSSION
- 12.00 to 12.15 P.M. Tropical Eosinophilia and its aetiology Dr. J. K. G. Webb

12.15 to 12.30 P.M.	DISCUSSION
12.30 to 12.45 P.M.	Pneumoconioses among coalminers Dr. M. N. Gupta in Bihar
12.45 to 12.55 P.M.	Pulmonary Alveolar Microlithiasis Dr. J. Frimodt- —a case report Moller
12.55 to 1.10 P.M.	DISCUSSION
1.10 to 3.00 P.M.	LUNCH INTERVAL
3.00 to 3.15 P.M.	Surgery of Pulmonary Sunpurations Lt.-Col. S. N. Chak
3.15 to 3.30 P.M.	DISCUSSION
3.30 to 3.45 P.M.	Result of Single Drug Isoniazid Dr. B. C. Sarbadhi- Therapy in Pulmonary Tuberculosis kari and its place in India
3.45 to 4.00 P.M.	DISCUSSION
4.00 to 5.00 P.M.	A panel to be selected by the delegates with their questions for discussion

FRIDAY, the 3rd February, 1961

9.30 to 9.45 A.M.	Electrophoresis in Pulmonary TB Dr. N. Selvaradja
9.45 to 10.00 A.M.	DISCUSSION
10.00 to 10.15 A.M.	Emotional Factors in the causation Dr. P. Mohd. Ali of Pulmonary Tuberculosis
10.15 to 10.30 A.M.	DISCUSSION
10.30 to 10.45 A.M.	Effect of Chemotherapeutic drugs Dr. H. B. Dingley on Pulmonary Dead Space in Pulmonary Tuberculosis
10.45 to 11.00 A.M.	DISCUSSION
11.00 to 11.30 A.M.	INTERVAL
11.30 to 12.30 P.M.	BUSINESS SESSION
AFTERNOON	Meeting of the Standing Technical Committee

2. The Proceedings of the sixteenth Conference of Tuberculosis Workers held in January, 1960 in Poona have been published. Cost Rs. 12/- per copy.

3. Out of the 200 applications received for the 1961 TB Health Visitors' Course, 22 candidates have been selected. The candidates selected are three from Kashmir, four from Kerala, three from Punjab, two from Uttar Pradesh and one

each from Assam, Bihar, Madras and Manipur and Himachal Pradesh. Five candidates from Delhi have also been selected. Out of these twenty-two, six are females.

4. At the next World Health Assembly to be held in New Delhi in February, 1961, the technical discussion will be on "Recent Advances in Tuberculosis Control". The working paper suggested by the World Health Organisation for this discussion was considered by the Standing Technical Committee of the Association held in September, 1960.

5. The Fifth Edition of the Directory of Tuberculosis Institutions in India has just been published. Copies of the same are available at Rs. 7/- per copy.

6. Government of India have provided funds in the budget of the Health Ministry for assisting non-official organisations engaged in anti-tuberculosis work by way of grants. Details about this can be had from the Tuberculosis Association of India.

XVI International Tuberculosis Conference, Toronto

7. Under the auspices of the International Union Against Tuberculosis, the next International Tuberculosis Conference will be held in Toronto, Canada, from the 10th to 14th of September, 1961. Dr. G. J. Wherret of Canada will be its President.

There will be academic and scientific conferences as well as visits to hospitals and clinics. Tours in the city of Toronto and nearby places will give an opportunity to come into contact with various aspects of Canadian Life. A full day trip to Niagara Falls and pre and post convention tours in Canada and the United States are being arranged. Arrangements will be made for travel with reduced fares for Chartered aircraft through national travel agents.

Full details of the Conference can be obtained from the General Secretary of the Conference Dr. C. W. L. Jeans, 265 Elgin Street, Ottawa, Canada or from Dr. W. Gellner, Executive Director, International Union Against Tuberculosis, 15 Pomerue Street, Paris 16, France.

The Indian Journal of Tuberculosis

ABSTRACTS

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December, 1960

Abst. No. 1

The influence of Corticosteroid Hormones in the Treatment of Tuberculous Meningitis in Negroes.

The mortality rate amongst the 17 patients treated with antituberculous drugs alone was 52.9 per cent as compared to 18.8 per cent amongst the 16 who received Corticosteroids Hormones in addition to antituberculous drugs.

In the former group, 4 patients had Cerebro Spinal block and all died. In steroid regimen only one of the 9 patients with Cerebro Spinal block died.

Corticosteroids hormones used with isoniazid, Streptomycin and P. A. S. are extremely valuable in the treatment of advanced cases of tuberculous meningitis, particularly when used early in the presence of Cerebro Spinal block.

B. F. Vol Javee and R. F. Corpe : Amer. Rev. Resp. Dis.: Vol. 81, No. April, 60.

A Rapid Mouse Test For the Diagnosis of Pulmonary Tuberculosis.

III. Validation of the Test with Specimens from 1,000 Patients.

Of the 362 patients in the study, 145 patients (40 per cent) yielded specimens which were positive by the mouse test in twenty days whereas the specimens from 75 patients (20 per cent) were positive by culture in fifty-two days.

Of the 75 patients positive by culture, 84 per cent gave positive results by mouse test in five days and 96 per cent in ten days whereas no cultures were positive in ten days.

David Gate and Elizabeth A. Lockhart: Amer. Rev. Resp. Dis., Vol. 81, No. 5, May, 60.

A Comparison of Isoniazid Cycloserine with Isoniazid P.A.S. in the Therapy of Cavitory Pulmonary Tuberculosis.

X. A Report of the Veterans Administration-Armed Forces Co-operative Study.

The efficacy of Cycloserine and Isoniazid regimen was measured against Isoniazid and para-aminosalicylic and P.A.S. given concurrently to a control group of patients with Cavitory tuberculosis in fourteen co-operating Hospitals.

In the Isoniazid Cycloserine group there was roentgenographic progression of the disease in 7 per cent compared with an incidence of 2 per cent amongst the Control group.

Clinical failure to respond to treatment necessitated change of drug regimen in 12 per cent of the cases as compared with 2 per cent in Isoniazid P.A.S. treated group.

Toxic symptoms were in 18 instances in the Isoniazid Cycloserine group of the nature of one had convulsive seizure, one instance of optic neurites, 3 hypersensitivity reactions and 13 had mental aberrations or behaviour changes.

In the Isoniazid P.A.S. group there were 9 hypersensitivity reactions including one death from acute yellow atrophy.

Patrick B. Storey: Amer. Rev. Resp. Dis., Vol. 81, No. 6, June, 60.

Out Patient Chemotherapy for Tuberculosis.

Of the 264 tuberculous patients discharged from the hospital with medical consent and recommended to continue outpatient Chemotherapy, 26% did not return to the Clinic for renewal of Drug Supply.

40% did not take any drug or less than 50 % of the drug prescribed.

25% were taking within 90% of the regimen advised.

H D. Ireland; Am. Rev. Resp. Dis., Vol. 82, No. 3, Sept., 60.

Characteristics of Mycobacterial Populations Found in the Sputum of Tuberculous Patients After Prolonged Isoniazid Therapy:

Single sputum specimen of 46 patients who had Isoniazid Therapy for at least 2 years was studied regarding characteristics of Isoniazid-resistant Populations of tubercle bacilli.

Based on guinea Pig Virulence, the Isoniazid resistant sputum isolates seemed to fall into 5 different types of populations of tubercle bacilli.

Based on their Catalase activity it fell into three categories:

Ind. J. Tub., Vol. VIII, No. 1

ABSTRACTS

(1) those of high Catalase activity which were guinea pig virulent.

(2) those of moderate Catalase activity which were not virulent for guinea pig.

(3) those of low Catalase activity which were usually non-virulent for guinea pigs.

Lenora R. Peizer; Aaron, D. Chaves; Daniel Widelock; Amer. Rev. Resp. Dis.; Vol. 82, No. 4, October, 60.

Thioglycollate, Peroxidase, Natural Red, Serpentine Cord, and Niacin Tests for Group Differentiations of *M. Tuberculosis Anonymus (Atypical) Acid Fast Bacilli* and Saprophytic Mycobacteria.

Peroxidase, neutral red Serpentine Cord and niacin tests can distinguish human tubercle bacilli from atypical and saprophytic mycobacteria but they cannot distinguish between atypical from the Saprophytic group of organisms.

But Thioglycollate test can distinguish between all three groups.

Maurice S. Tarshis; Dis. Chest., VOL XXXVIII, No. 4, Oct., 60.

A Study of Respiratory Effects of Prednisone in diffuse Air Way distraction.

Prednisone was given to 14 patients with Chronic pulmonary emphysema and comparison was made between its effect on their symptoms and pulmonary function tests.

Half the patients noted subjective improvement while receiving prednisone, none showed any significant change in pulmonary function tests including Air Flow and gas exchange.

The failure of Prednisone in fairly high doses to produce improvement in any of the objective tests of pulmonary function suggests that long term steroid therapy is not justified in chronic pulmonary emphysema.

James H. Cullen and William M. Reidt, Amer. Rev. Resp. Diseases; Vol. 82, No. 4, October, 60.

A Study of Essential Haemoptysis.

97 patients with Haemoptysis of undetermined origin were followed over a period of 9J years. Of the various causes of haemoptysis of undetermined origin are:

1. Mucosal ulceration beyond the vision of Bronchoscopist.
2. Undetected Bronchiectasis of a single Radicle.
3. Pulmonary Hypertension.
4. Systemic Hypertension.

5. Blood Dyscrasias.

6. Small infarct without x-ray evidence.

7. Vicarious menstruation.

8. Varicosites about the Carina and upper lobe orifices.

81 or (83.5 percent) have been followed for periods ranging from 1 to 10 years.

4 of the 81 were dead of causes unrelated to the haemoptysis.

77 or (95 percent) are known to be living. 3 of the known living patients subsequently were found to have mitral stenosis congestive failure, or primary Pulmonary hypertension.

None of the cases subsequently developed Carcinoma or tuberculosis.

The patient should have a periodic check up and specially the Pulmonary artery pressures should be investigated.

Raymond J. Barrett and William M. Tut tie; Jour. Thor and Cardio Vascular Surg., Vol 40, No.4, October, 60.

Post-operative Empyema: Etiology, Prevention and Treatment.

Mortality, morbidity and Postoperative complications are directly related with the extent of pulmonary resection.

The Principle of fully expanded lung and empty or obliterated pleural space can be accomplished after lobectomy and segmental resection. The Principle cannot be applied after Pneumonectomy. Accordingly a more meticulous sterile-technique must be carried out after Pneumonectomy.

Postoperative Empyemas have been divided according to the extent of resection i.e. after

(a) Pneumonectomy,

(b) When less than a Pneumonectomy has been done. These two categories have been further divided into:

(a) Those with Bronchopleural fistula,

(b) Those without Bronchopleural fistula. The best treatment for empyema is prevention. The actual treatment can be divided into:

(a) aspiration and sterilization by needle or closed thoracotomy tube,

(b) open or closed drainage followed by Thoracoplasty when needed.

O.C. Brantigan and C.Y. Hadidian. Dis. Chest, Vol. XXXVIII, No. 4, Oct., 60.