

# Case-Finding for Pulmonary Tuberculosis in Penang

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## Summary

The process of case-finding was studied in 100 consecutive patients with pulmonary tuberculosis treated by the Chest Clinic, Penang Hospital. The median time from the onset of the illness until the initial medical consultation was two weeks (patient's delay). This delay was longer in males, patients with lower than secondary education and drug abusers. Only 47% of patients were put on treatment with a correct diagnosis within one month of the first consultation (doctor's delay). Almost all patients had at least one symptom suggestive of tuberculosis at presentation and the mean number of consultations before diagnosis was three. Patients who first visited government medical facilities had shorter doctor's delay than those who first saw private practitioners, and patients who first consulted a private practitioner were the least likely to be appropriately investigated by sputum examination and chest radiography. The median total delay was three months and at the time of diagnosis, 95% of patients had moderate or far advanced disease radiologically.

In order to shorten doctor's delay, all medical practitioners, especially those in the private sector, should be made aware of the importance of early diagnosis and the proper management of tuberculosis. Health education campaigns for the public should also be undertaken to shorten patient's delay.

**Key Words:** Case-finding, Pulmonary tuberculosis

## Introduction

Tuberculosis remains a major public health problem in Penang. The number of new infectious cases treated annually has increased over the past five years. The annual incidence of bacteriologically positive cases for Penang in 1992 of 46.2 per 100,000 far exceeds the overall rate for Peninsular Malaysia of 27.1 per 100,000 population<sup>1</sup>. More than 80% of new cases of pulmonary tuberculosis are in a moderately advanced or far advanced stage radiologically<sup>2</sup> at the time of diagnosis and these advanced cases contribute considerably to the mortality and morbidity from the disease. In 1992 84.8% of new bacteriologically positive cases of pulmonary tuberculosis treated in Penang had moderately or far advanced lesions compared to an overall rate of 76.4% for Peninsular Malaysia<sup>1</sup>.

Case-finding is passive and depends on patients with

symptoms seeking treatment at medical and health facilities (Figure 1). Rapid diagnosis of pulmonary tuberculosis depends on the doctor's awareness and recognition of the significance of the patient's symptoms, and appropriate investigation by sputum examination (direct smear for AFB) and chest radiography. The time lapse or delay from the onset of the disease until the start of effective treatment can be divided into two parts: the first is 'patient's delay' ie., the time interval between the appearance of symptoms until the first visit to a medical facility, and the second part is "doctor's delay" ie., the time interval from the first consultation to the start of treatment with a proper diagnosis. 'Total delay' is the sum of these two delays. These two indices may be considered to reflect the awareness about tuberculosis and the importance of early diagnosis and treatment on the part of patients and medical services respectively.

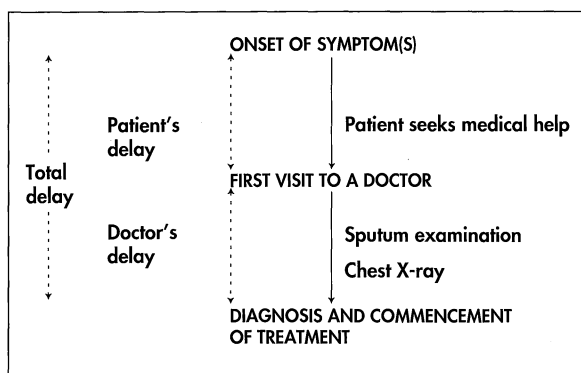


Fig. 1: Process of passive case-finding

This study was designed to investigate these two forms of delay and to determine the contributing factors.

## Materials and Methods

A study was done on 100 consecutive patients presenting to the Chest Clinic, Penang Hospital, with a new diagnosis of pulmonary tuberculosis during a four month period from November 1992 to March 1993. Patients transferred in from other treatment centres and abandoned retrieved cases were excluded. Patient characteristics, clinical data and results of investigations were recorded from review of the patients' case notes. Each patient was interviewed soon after diagnosis by the Medical Officer/Physician in charge to obtain information on the process of case-finding. All details pertaining to medical consultations from the onset of the illness until diagnosis were ascertained as completely as possible by obtaining verbal or written reports from the medical institutions visited and by tracing old patient records.

Group differences were tested using the Chi-square test of significance.

## Results

### General patient characteristics

There were 74 males and 26 female patients and the age range was 17 to 88 years with a mean age of 48 years. The mean age of the male patients was 47.8 years (median age 45 years) and the mean age of the female patients was 48.5 years (median age 56

years). There were 97 Malaysian patients including 27 Malay, 54 Chinese and 6 Indian patients; the non-Malaysians comprised 2 Indonesians and one Burmese. Of the 20 men and 6 women who were sputum direct smear negative, 5 (25%) and 2 (33%) respectively had positive sputum cultures for *M. tuberculosis*. In one patient who was sputum smear negative, the diagnosis was made post-mortem from a positive sputum culture result. In the 19 bacteriologically negative cases, 5 had histopathological evidence of tuberculosis (1 from pleural biopsy, 2 from fine needle aspiration lung biopsy, 1 from lobectomy and 1 from fine needle aspiration biopsy of neck node). In the remainder the diagnosis was based upon radiological and clinical response to a therapeutic trial. Only 5% of patients had minimal lesions on chest X-ray at the time of diagnosis; 40% had moderately advanced and 55% had far advanced lesions radiologically.

Among the men, 55 (74%) were smokers whereas only 4 (15%) of the women smoked. There were 14 male patients who were drug abusers including 10 who were intravenous drug addicts. Two drug addicts were positive for anti-HIV antibody, one was in prison and three had just been taken into police custody at the time of first consultation.

Diabetes mellitus was a common medical condition which was present in 12 of the female patients (46%) and 10 of the male patients (14%). Two male patients had concomitant lung cancer with tuberculosis and another had undergone lung resection for squamous cell carcinoma a year prior to diagnosis of pulmonary tuberculosis. There was a past history of treatment for tuberculosis in 9 patients who had been treated and cured 3 to 20 years previously.

### Symptoms and mode of presentation

Overall, 86 of the patients had presented for investigation and treatment of symptoms. The remaining 14 had presented for other reasons i.e., 6 for pre-employment medical examination, 1 for medical check-up to enter an old folks' home, 2 for investigation as contact of a tuberculosis patient and 5 because their chest X-ray had been found to be abnormal during examination for an unrelated medical condition. However, 10 of these 14 patients already

had at least one symptom suggestive of tuberculosis at the time of first consultation and another developed symptoms on follow-up.

Table I shows the frequency of symptoms at first consultation and it is evident that almost all patients (96%) had at least one symptom at presentation.

Table II shows the medical facilities visited for first consultation and the medical facilities where the diagnosis of tuberculosis was made. Nearly half of the patients initially consulted a private practitioner and 45% first visited government run hospitals, polyclinics or health centres. In 86% of cases a definitive diagnosis of pulmonary tuberculosis was made in government hospitals; a proportion of these patients, 37/86(43%), had been referred by private doctors for further investigation and management. In an urban setting, private doctors play a very crucial role in delivering primary health care and they may have lacked either the facilities or the expertise to make a definitive diagnosis and initiate treatment.

#### Patient's delay, doctor's delay and total delay

Table III shows the cumulative distribution of patient's delay. Overall, 51% of cases had consulted a doctor

**Table I**  
Frequency of symptoms at first presentation

Symptoms	Per cent*
Present	96
Cough	89
Sputum	84
Loss of weight	81
Loss of appetite	73
Fever	49
Fatigue	46
Shortness of breath	37
Chest pain	35
Haemoptysis	31
Night sweats	16
Hoarseness of voice	15
Others	7
Absent	4

\*All percentages computed out of 100

by 2 weeks and 66% within 1 month of the onset of symptoms. However 10% visited a doctor more than 6 months after symptoms first appeared and the longest delay was 2 years. Based on the proportion of

**Table II**  
Medical facilities where patients first visited  
and where diagnosis of tuberculosis was made

Type of facility	First facility visited No.	Facility where diagnosis was made No.
Government chest clinic	6	44
OPD of government hospital	13	13
Inpatient ward of government hospital	14	29
Town polyclinic	9	3
Rural health centre	3	2
Private practitioner	48	1
Private hospital	7	8
Total	100	100

**Table III**  
**Cumulative distribution of patient's delay**

	% visiting medical facility by:					
	2 weeks	1 month	2 months	3 months	6 months	> 6 months
<b>Total</b> n=100	51.0	66.0	73.0	78.0	90.0	100
<b>Sex</b>						
Male n=74	45.9	56.8*	66.2	73.0	86.5	100
Female n=26	65.4	92.3*	92.3	92.3	100.0	100
<b>Age</b>						
≤ 29 years n=18	66.7	77.8	77.8	77.8	88.9	100
30-49 years n=31	41.9	58.1	64.5	74.2	93.5	100
≥ 50 years n=51	51.0	66.7	76.5	80.4	88.2	100
<b>Marital status</b>						
Married n=45	57.8	68.9	77.8	82.2	93.3	100
Single/separated/ divorced/widowed n=55	45.5	63.6	69.1	74.5	87.3	100
<b>Bacteriology</b>						
Positive n=81	49.4	65.4	69.1	75.3	90.1	100
Negative n=19	57.9	68.4	89.5	89.5	89.5	100
<b>Race</b>						
Malay n=27	59.3	74.1	74.1	77.8	92.6	100
Chinese n=54	48.1	61.1	70.4	77.8	90.7	100
Indian n=16	56.3	68.8	81.3	81.3	87.5	100
Others n=3	33.3	66.7	66.7	66.7	66.7	100
<b>Educational status</b>						
Nil or primary n=64	43.8	56.3*	65.6	68.8	87.5	100
Secondary n=36	63.9	83.3*	86.1	94.4	94.4	100
<b>Drug abuse</b>						
Yes n=14	14.3	14.3*	28.6	42.9	78.6	100
No n=86	57.0	74.4*	80.2	83.7	91.9	100

\*Statistically significant difference,  $p < 0.01$

patients with patient's delay of 1 month or less, there was no significant relationship between patient's delay and age, marital status, bacteriological status or race. However fewer male patients had presented by one month compared to female patients (56.8% vs. 92.3%,  $p < 0.01$ ), patients with lower than secondary education

were less likely to see a doctor within one month compared to those with secondary education (56.3% vs. 83.3%,  $p < 0.01$ ) and very few drug abusers consulted a doctor within one month compared to patients who did not abuse drugs (14.3% vs. 74.4%,  $p < 0.01$ ).

Table IV shows the cumulative distribution of doctor's delay. Overall, 47% of cases had a doctor's delay of 1 month or less (an 'acceptable delay'). In 17% of cases the doctor's delay exceeded 3 months and the longest delay was 2 years. Based on the proportion of cases with a doctor's delay of 1 month or less, there was no significant difference in doctor's delay with regard to patient characteristics such as age, sex, race and bacteriological status at the time of diagnosis. However

when doctor's delay was analysed according to place of first consultation, large differences were evident. The proportion of cases with an 'acceptable delay' was 85% for patients who first visited a government hospital out-patients department but was only 33% for those who first visited a private practitioner.

With reference to the total number of visits to medical facilities, the diagnosis was made at the first visit to a

**Table IV**  
**Cumulative distribution of doctor's delay**

	% having diagnosis and treatment by:					
	2 weeks	1 month	2 months	3 months	6 months	>6 months
<b>Total</b> n=100	31.0	47.0	73.0	83.0	91.0	100
<b>Sex</b>						
Male n=74	32.4	48.6	71.6	82.4	90.5	100
Female n=26	26.9	42.3	76.9	84.6	92.3	100
<b>Age</b>						
≤ 29 years n=18	22.2	38.9	72.2	88.9	94.4	100
30-49 years n=31	32.2	54.8	67.7	77.4	87.1	100
≥ 50 years n=51	33.3	45.1	76.5	84.3	92.2	100
<b>Bacteriology</b>						
Positive n=81	33.3	44.4	74.1	82.7	91.4	100
Negative n=19	21.1	57.9	68.4	84.2	89.5	100
<b>Race</b>						
Malay n=27	37.0	48.1	66.7	85.2	88.9	100
Chinese n=54	29.6	44.4	70.4	77.8	90.7	100
Indian n=16	18.8	43.8	87.5	93.8	93.8	100
Others n=3	66.7	100.0	100.0	100.0	100.0	100
<b>Place of first medical consultation*</b>						
Chest clinic n=6	66.7	66.7	100.0	100.0	100.0	100
OPD of government hospital n=13	61.5	84.6	92.3	100.0	100.0	100
Inpatient ward of government hospital n=14	35.7	42.9	64.3	71.4	78.6	100
Town clinic n=9	33.3	55.6	77.8	77.8	77.8	100
Health centre n=3	66.7	66.7	66.7	100.0	100.0	100
Private practitioner n=48	14.6	33.3	68.8	81.3	93.8	100
Private hospital n=7	28.6	42.9	57.1	71.4	85.7	100

\* A higher proportion of patients who first visited private medical facilities had doctor's delay of over 1 month compared to patients who first visited government run medical facilities,  $p < 0.01$

medical facility in only 11% of cases. In 45% of cases the diagnosis was made after more than 3 consultations.

Table V shows where previous visits were made before diagnosis was established. A patient may visit one facility after another or the same one all the time before the diagnosis is finally made. A significant number of patients visited private practitioners and a smaller number visited out-patients department of government hospitals several times without being detected. The largest number of visits made by a patient to the same medical facility before diagnosis was an amazing 34 times to one of the town polyclinics.

Table VI shows the proportion of patients investigated by chest radiography and sputum examination at the

first medical facility attended. All patients attending a government chest clinic had these investigations done, but for patients attending a government hospital out-patients department the percentage investigated by these two tests was 39% and 31% respectively. For patients who first visited a private practitioner, only 15% had chest radiography and 2% had sputum tests done.

Analysis of total delay, which is the sum of patient's delay and doctor's delay, showed that only 14% of patients were detected and put on treatment within 1 month of the onset of the illness, 40% within 2 months and 57% within 3 months, while for 25% of cases, the total delay was more than 6 months. The median total delay was 3 months, the median patient's delay was 2 weeks and the median doctor's delay was 5 weeks.

**Table V**  
**Medical facilities visited prior to diagnosis (other than chest clinics)**

Medical facilities	Number of visits prior to diagnosis						Total
	1X	2X	3X	4X	5X	>5X	
OPD of government hospital	33	7	1	2	1	1	45 (32.8)
Inpatient ward of government hospital	12	3	0	0	0	0	15 (11.0)
Town polyclinic	6	3	0	0	0	2	11 (8.0)
Rural health centre	1	1	1	0	0	0	3 (2.2)
Private practitioner	17	14	9	4	1	6	51 (37.2)
Private hospital	10	1	1	0	0	0	12 (8.8)
<b>All</b>	79 (57.6)	29 (21.2)	12 (8.7)	6 (4.4)	2 (1.5)	9 (6.6)	137 (100.0)

Figures in brackets are percentages

One patient may be entered more than once eg., OPD 2X, GP 1X

## Discussion

Case-finding is the strategy given the highest priority in the National Tuberculosis Control Programme because of the ready availability of well organised, effective treatment services once the diagnosis has been made. Rapid case-detection is also needed in order to shorten the duration of active disease and to reduce the number of infectious sources in the community and morbidity and mortality from the disease. The problem of delay in diagnosis has been studied in other countries including Korea, Japan and Hong Kong<sup>3-5</sup> and a study on the case-finding process was done in Malaysia in 1978<sup>6</sup>, but there was no specific analysis of patient's delay, doctor's delay and total delay.

In this study the median patient's delay of 2 weeks compares favourably with a median delay of 1.8 months in Korea<sup>3</sup> and 17 days in Japan<sup>4</sup>. This may be because medical services are readily accessible and within reasonable distance for the largely urban population on Penang Island. However nearly a quarter of the patients delayed beyond 3 months before presenting to a doctor. Patient's delay may be affected by several factors, namely, lack of awareness of the significance of symptoms, poor motivation to seek

medical consultation, lack of confidence in medical services and insufficient access to local medical facilities. An in-depth study of knowledge and attitudes regarding tuberculosis among newly diagnosed cases attending the National Tuberculosis Centre, Kuala Lumpur, was carried out in 1992<sup>7</sup> and the results indicate that patients had inadequate knowledge about many basic aspects of tuberculosis such as causation, transmission, vaccination, treatment, prevention and control. Since educational status below secondary level was found to be a contributing factor for patient's delay, it is likely that ignorance is the underlying reason for patients not seeking treatment early and health education campaigns for the public should be undertaken to remedy this. With reference to drug abusers, doctors must maintain a high index of suspicion for tuberculosis in this group, since they usually lack concern for their health, and are unlikely to be favourably influenced by health education measures.

In this series 48% of patients first visited a private practitioner and another 7% visited a private hospital. These results are similar to observations in Hong Kong<sup>5</sup> where 57% of patients first visited a private doctor, but differ from the findings from Korea<sup>3</sup> where

**Table VI**  
**First medical facility attended and investigation**  
**by chest radiography and sputum examination**

First medical facility attended	No. of patients	Chest X-ray		Sputum tests	
		No.	%	No.	%
Chest clinic	6	6	100.0	6	100.0
OPD of government hospital	13	5	38.5	4	30.8
Inpatient ward of government hospital	14	13	92.9	10	71.4
Town polyclinic	9	4	44.4	2	22.2
Rural health centre	3	0	0	2	66.7
Private practitioner	48	7	14.6	1	2.1
Private hospital	7	7	100.0	4	57.1
<b>All</b>	<b>100</b>	<b>42</b>	<b>42.0</b>	<b>31</b>	<b>31.0</b>

55% of patients first visited a health centre. The median doctor's delay of 5 weeks is longer than the median doctor's delay quoted in other studies, for example, 2 weeks in Korea and 1 month in Japan. The mean number of visits made to medical facilities before diagnosis was three, indicating that most patients had made repeated visits to doctors before the disease was suspected. The percentage of patients appropriately investigated with sputum examination and chest radiography was lowest for patients who first visited a private practitioner. This could account for the dismal rate of diagnosis for private practitioners and the relatively longer doctor's delay for these patients. Because of the important role of the private sector in medical services in Penang, due attention must be given to improving the diagnostic skills of private doctors. If investigations are not readily available, patients suspected of having tuberculosis should be referred early to government chest clinics for further assessment and management. Management of tuberculosis patients by private doctors can also be done in close liaison with government clinics especially with respect to contact tracing and defaulter tracing.

For patients who first visited a government hospital outpatients department or town polyclinic, the doctor's delay was shorter but the percentage of patients who had chest radiography and sputum examination was still well below 50%. Hence there is a need to alert

all medical practitioners to the possibility of tuberculosis in patients with respiratory symptoms and to impress upon them the importance of appropriate investigations for early case-detection.

In this study on 100 consecutive new patients with pulmonary tuberculosis, the patient's delay was over 1 month in 34%, the doctor's delay was over 1 month in 53% and total delay exceeded two months for 60% of cases. Measures are needed to shorten patient's delay and doctor's delay in order to improve tuberculosis case-finding. The public should be educated about the early symptoms of tuberculosis and a comprehensive health education programme should be carried out and targeted particularly at those with little or no formal education from all ethnic groups. It is necessary to improve the awareness of all medical practitioners, especially those in the private sector, regarding case-finding for tuberculosis. This can be done through lectures, circulars, newsletters and regular feedback regarding patients found to be suffering from the disease.

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