# "Discovery to Treatment" Window in Patients With Smear-Positive Pulmonary Tuberculosis

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## Summary

Delay in commencing treatment in patients diagnosed with smear-positive pulmonary tuberculosis (PTB) may promote the spread of PTB in the community. Socio-demographic and clinical data from 169 patients (119 retrospectively and 50 prospectively collected) treated for smear-positive PTB in our hospital Chest Clinic from June 2002 to February 2003 were analysed. One hundred and fifty eight (93.5%) patients were started on treatment in less than 7 days from the time when the report first became available while 11 (6.5%) patients had their treatment started ≥ 7 days. The median 'discovery to treatment' window was 1 day (range, 0 to 24 days). Of the factors studied, longevity of symptoms, absence of fever or night sweats and having sought traditional medicine were associated with delay in treatment commencement. The urgency and importance of anti-TB treatment should be emphasized especially to patients who are inclined towards treatment with traditional medicine.

Key Words:     Smear positive, Pulmonary tuberculosis, Treatment delay, Traditional medicine, Malaysia

## Introduction

Tuberculosis (TB) is reemerging as a significant worldwide public health problem. This is primarily due to the HIV/AIDS pandemic in the sub-Saharan region and inadequate control in several parts of the world[1]. In Malaysia, the number of cases detected per year has not declined substantially. Since 1989, there was an average of 11,500 to 12,000 cases detected per year. In 1995, there were 11,778 cases detected of which 6500 cases were sputum smear-positive and therefore, infectious[2].

Both patients' procrastination in seeking medical attention and doctors' delay in diagnosis and commencing treatment of pulmonary TB, contribute to the continual spread of TB in the community. Studies on case finding in Malaysia have shown that the average time for patient to consult doctor was around 2 weeks[3,4], and for doctor to diagnose and treat was between one month[4] and 7 weeks[3]. The overall delay time could be as high as 3 months[3,4].

The human factor, whether arising from the patient, clinician or the hospital system of case finding, can potentially cause delay in commencing treatment after the confirmation of sputum microbiology. To understand the contribution of this 'discovery to treatment' window factor, we studied the time lapse between the date when the sputum report first became available and the date when anti-TB treatment was commenced for patients with smear-positive pulmonary TB, and the variables that affect this window period.

## Materials and Methods

Data from 169 patients treated for pulmonary TB in the Chest Clinic of an urban-based 800-bed hospital from June 2002 to February 2003 was collected using a standard questionnaire. Data of the first 119 consecutive patients were collected retrospectively from the medical records while those of the latter 50 were collected prospectively in the final six weeks of the study period. Only patients with smear-positive pulmonary TB were included. All data collected consisted of patients' socio-demographic details that included availability of personal phone (mobile or fixed line), occupation and distance of residence (by means of radius) from hospital; length and type of symptoms, sputum mycobacterium load, date of first report of positive sputum and of treatment commencement, and mode of contact between healthcare personnel and the patient when the patient was informed to come for treatment. Prospective data consisted of additional information obtained by personal interview on whether traditional medicine was sought, the number of visits to doctors (from private, government and traditional medicine), total family income, and mode of transport to hospital. Verbal consent was obtained from patients attending the Chest Clinic for the collection of prospective data.

The primary aim was to assess the time interval in days between date of first sputum report and of anti-TB treatment commencement ('discovery to treatment' window), and to investigate the variables associated with the 'delay' of treatment commencement. 'Delayed' treatment was arbitrarily defined as ≥ 7 days of 'discovery to treatment' window. We considered this within-one-week period as being a reasonable time frame to contact patients, whether by post, telephone or visits by TB nurse, and for the patient to attend the Chest Clinic.

Continuous data was expressed as mean or median according to the normality of distribution. Differences of variables between the 'delayed' and 'not delayed' groups were tested with two-tailed t test or Mann Whitney test accordingly. Categorical data was tested with chi-squared test or two-tailed Fisher's exact test when the expected cell frequencies were less than five. All analyses were carried out using SPSS' statistical software (Version 11.0 for Windows). A $p < 0.05$ (two-tailed) value was considered as statistically significant.

## Results

According to our criteria, treatment of 11 (6.5%) patients was delayed while 158 (93.5%) patients were started on treatment in less than 7 days from the time the report first became available. Overall, the median 'discovery to treatment' window was 1 day with a range of 0 to 24 days (Figure 1).

The mean (SD) age was 43 (17.2) years and there was a male preponderance (78%). Most patients were Malays (52%), followed by Chinese (26%), Indians (16%) and others (5%). Only 4% of all patients were of non-Malaysian nationality and they were all in the group treated early. Less than half the patients (49%) had access to personal telephone. Judging from the distance of residence to hospital by radius in km, almost half the patients (49%) were within 5 km, 18% between 5 and <10 km, 17% between 10 and <20 km, and 15% at 20 km or more. The majority of the patients were unemployed or retired (40%), the rest were labourers (27%), professionals (15%), housewives (9%) and students (6%). Of the 50 patients interviewed on total family income per month, the majority (62%) earned <RM1000, 30% earned between RM1000 and <RM3000 and 8% earned RM3000 or more. Half the patients traveled to the clinic with transport by friends or relatives, 32% had personal transport and 18% used public transport. On how initial contact was made, the majority (76%) was started on treatment as inpatients, 16% as outpatients, 6% were informed by a community doctor, and 0.7% by phone. In all these variables, there was no significant difference between the 'delayed' and 'non-delayed' groups (Table I).

Almost half the patients (49%) had sputum heavily smeared (4+) with mycobacterium bacilli. 7% were moderately heavily smeared (3+), 15% were moderately smeared (2+) and 26% mildly smeared (1+). There was no significant difference between the two groups. On length of symptoms prior to commencement of treatment, the majority (44%) had symptoms between 1 to <3 months, a quarter (25%) had <1 month's symptoms, 12% had symptoms between 3 and <6 months and 17% had 6 months or more of symptoms. A larger proportion of patients in the 'delayed' group had significantly longer duration of symptoms than those in the 'non-delayed' group [40 vs 15% for ≥ 6 month; 30 vs 11% for 3 to <6 months; p=0.035]. On the frequency of respiratory symptoms, cough ranked the highest (94%), followed by weight loss (70%), fever or night sweats (59%), anorexia (55%), haemoptysis (25%) and finally breathlessness (18%). Between the two

groups, fever or night sweats was reported significantly more often in the 'delayed' group, compared to the 'non-delayed' group [62 vs 18%, p=0.004]. There were no significant differences between the two groups for the other variables (Table II).

On the number of visits to doctors prior to receiving treatment, the overall mean total visits to all doctors was 3. There were no significant differences between the two groups in the number of visits to government or private doctors, but for traditional medicine, significantly more patients in the 'delayed' group had visited doctors of this category than in the 'non-delayed' group [75 vs 8%, p=0.007; mean number: 5 vs 0, p<0.031] (Table III).



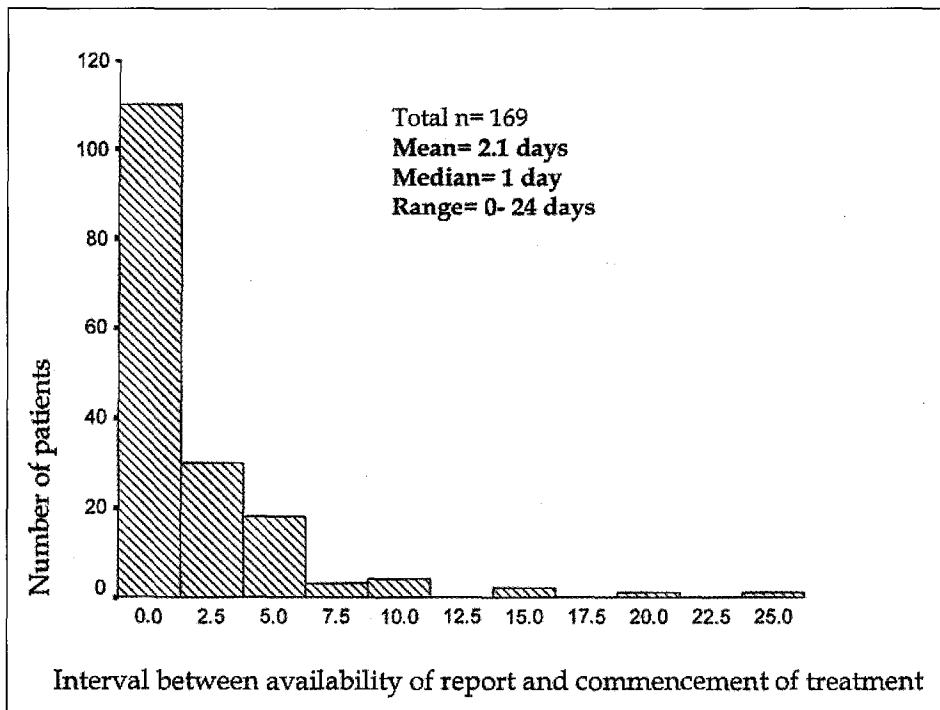Total n= 169
Mean= 2.1 days
Median= 1 day
Range= 0- 24 days

Number of patients

Interval between availability of report and commencement of treatment

**Fig. 1: 'Discovery to treatment' window (in days) in patients treated for pulmonary TB**

## Table I: Socio-demographic variables of patients

| | 'Discovery to treatment' | | | |
|---|---|---|---|---|
| | Entire Group (n=169) | <7 days (n=158) | ≥7 days (n=11) | p |
| Total % patient | 100 (169) | 93.5 (158) | 6.5 (11) | - |
| Mean age (SD) | 43 (17.2) | 43 (17.1) | 48 (18.7) | 0.337 |
| Male % | 78.1 (132) | 78.5 (124) | 72.7 (8) | 0.655 |
| Ethnic groups | | | | |
| Malay | 52.1 (88) | 52.5 (83) | 45.5 (5) | - |
| Chinese | 26.0 (44) | 25.3 (40) | 36.4 (4) | - |
| Indian | 16.6 (28) | 16.5 (26) | 18.2 (2) | - |
| Others | 5.3 (9) | 5.7 (9) | 0 (0) | 0.747 |
| Non-Malaysia nationality | 4.1 (7) | 4.4 (7) | 0 (0) | 1.00 |
| Telephone available | 49.1 (83) | 48.7 (77) | 54.5 (6) | 0.709 |
| Radius bet residence and hospital | | | | |
| <5 km | 49.1 (82) | 47.5 (74) | 72.7 (8) | - |
| 5 to < 10 km | 18.3 (31) | 19.0 (30) | 9.1 (1) | - |
| 10 to 20 km | 17.2 (29) | 17.1 (27) | 18.2 (2) | - |
| ≥ 20 km | 15.4 (26) | 16.5 (26) | 0 (0) | 0.295 |
| Occupation | | | | |
| Professional | 15.7 (26) | 16.8 (26) | 0 (0) | - |
| Labour | 27.1 (46) | 27.1 (43) | 27.3 (3) | - |
| Unemployed or retired | 40.4 (68) | 40.0 (63) | 45.5 (5) | - |
| Student | 6.6 (11) | 5.8 (9) | 18.2 (2) | - |
| Housewife | 9.6 (16) | 9.7 (15) | 9.1 (1) | 0.498 |
| Total family income per month | | | | |
| <RM1000 | 62.0 (104) | 60.9 (96) | 75.0 (8) | - |
| RM1000 to <3000 | 30.0 (51) | 30.4 (48) | 25.0 (3) | - |
| RM3000 to <5000 | 8.0 (13) | 8.4 (13) | 0 (0) | - |
| RM5000 and above | 0 (0) | 0 (0) | 0 (0) | 0.778 |
| Mode of transport | | | | |
| Personal | 32.0 (55) | 34.8 (55) | 0 (0) | - |
| Friends or relatives | 50.0 (83) | 47.8 (75) | 75.0 (8) | - |
| Public | 18.0 (30) | 17.4 (27) | 25.0 (3) | 0.358 |
| How was the contact made | | | | |
| By phone | 0.7 (1) | 0.7 (1) | 0 (0) | - |
| As inpatient | 76.2 (128) | 77.1 (122) | 57.1 (6) | - |
| In outpatient clinic | 16.6 (28) | 16.7 (26) | 14.3 (2) | - |
| Informed by community doctor | 6.6 (12) | 5.6 (9) | 28.6 (3) | 0.124 |

Unless otherwise stated, values are percentages and absolute number of patients in parenthesis
SD= standard deviation

## Table II: Sputum mycobacterium load and clinical presentations of patients

| | 'Discovery to treatment' | | | |
|---|---|---|---|---|
| | Entire Group (n=169) | <7 days (n=158) | ≥7 days (n=11) | p |
| Sputum smear positivity | | | | |
| 1+ | 26.9 (45) | 26.3 (41) | 36.4 (4) | - |
| 2+ | 15.6 (26) | 14.7 (23) | 27.3 (3) | - |
| 3+ | 7.8 (13) | 7.7 (12) | 9.1 (1) | - |
| 4+ | 49.7 (84) | 51.3 (81) | 27.3 (3) | 0.337 |
| Length of symptoms before treatment | | | | |
| < 1 month | 25.6 (43) | 26.0 (41) | 20.0 (2) | - |
| 1 to < 3 months | 44.2 (74) | 46.6 (73) | 10.0 (1) | - |
| 3 to <6 months | 12.8 (21) | 11.6 (18) | 30.0 (3) | - |
| 6 months and above | 17.3 (29) | 15.8 (25) | 40.0 (4) | 0.035 |
| Respiratory symptoms | | | | |
| Cough | 94.7 (160) | 94.3 (149) | 100 (11) | 0.416 |
| Breathlessness | 18.9 (32) | 19.0 (30) | 18.2 (2) | 1.000 |
| Haemoptysis | 25.4 (43) | 26.6 (42) | 9.1 (1) | 0.293 |
| Weight loss | 70.4 (119) | 70.3 (111) | 72.7 (8) | 1.000 |
| Anorexia | 55.6 (94) | 55.7 (88) | 54.5 (6) | 0.941 |
| Fever or night sweats | 59.8 (101) | 62.7 (99) | 18.2 (2) | 0.004 |

Unless otherwise stated, values are percentages and absolute number of patients in parenthesis

## Table III: Frequency and nature of visits to doctors

| | 'Discovery to treatment' | | | |
|---|---|---|---|---|
| | Entire Group (n=50) | <7 days (n=46) | ≥7 days (n=4) | p |
| Median (range) number of visits to doctors | | | | |
| Government | 1 (0-10) | 1 (0-10) | 1 (0-3) | 0.904 |
| Private | 1.5 (0-20) | 1 (0-20) | 4 (0-10) | 0.175 |
| Traditional medicine | 0 (0-10) | 0 (0-4) | 5 (0-10) | 0.031 |
| Total | 2 (0-21) | 2 (0-21) | 5.5 (0-12) | 0.321 |
| Had sought traditional medicine, % (n) | 14 (7) | 8.7 (4) | 75 (3) | 0.007 |

## Discussion

We have shown that the median 'discovery to treatment' window was 1 day with a large majority of patients having had their treatment started within a week. The National TB Programme proposed that a minimum of two positive sputum specimens obtained on 2 successive days is required to commence anti-TB treatment. Such a window period is highly acceptable. We have also shown that the longevity of symptoms, absence of fever or night sweats, and seeking of traditional medicine were associated with delayed treatment.

An important finding from both the studies [3, 4] in Malaysian patients was that the delay in diagnosis and treatment occurred more in patients who first visited private practitioners, compared to those who visited government doctors. Furthermore, they were less likely to be investigated with sputum microscopy and chest

radiograph. In our study, there were no significant differences between the number of patient visits to government and private doctors. However, the number of visits for treatment with traditional medicine and whether traditional medicine was sought was associated with delayed treatment.

Our finding is novel and may be a reflection of a highly established tradition of medical pluralism in Malaysia where doctors, sinsehs and bomohs are readily available in society [5, 6, 7]. Patients may move between the modern medicine and the traditional medicine system or use both systems simultaneously [6]. The choice of 'healer' is commonly made on the basis of ethnicity, and the nature and duration of the problems. The traditional approach appears to persist because they are more easily accessible by the patients and that more emphasis is placed on the affective and social aspects of healing [5]. Strong beliefs in traditional medicine or doubts in modern medicine had led to cases of self-discharge from hospital against medical advice [8] and have been shown to cause problems in the management of TB patients in Sabah [9]. It is conceivable that the delay in commencing treatment is due in part, to patients seeking a 'second opinion' or not believing in the modern medicine approach to treat TB. The other explanation for this may be related to the patients' reluctance to accept the diagnosis rather than the treatment itself, perhaps because of the stigma attached to TB that still exists till today in Malaysia.

The absence of fever or night sweats, and the longevity of symptoms may lead to a sense of lack of urgency to seek or receive medical attention, or a dismissive attitude. It is possible that the low index of suspicion for pulmonary TB on the part of the doctor may contribute to the delay of the definitive treatment [3, 4].

In this study, we could not show any association between patients' socio-demographic factors and delayed treatment. In particular, total family income, professional background, distance from hospital, mode of transport to hospital, and methods of contact by phone or others were not associated with delayed treatment.

In the interpretation of these findings and their implication, it should be borne in mind that most data here was retrospectively collected from medical notes. As such, there may be inaccuracies and incompleteness in the records that could affect the integrity of the data. Although socio-demographic data such as address, age and availability of telephone are unlikely to be wrong, others such as duration and nature of symptom would not be as accurate as those collected prospectively from face-to-face interview using a structured questionnaire.

TB is still a global health threat. The inability of the control programme in Malaysia to reduce the incidence of TB signals an urgent need to address the issue of case finding, treatment and follow-up. One important aspect in this battle against TB is the emphasis on the urgency and importance of anti-TB treatment especially in those who are inclined towards traditional medicine.

## Acknowledgements

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