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Around the World

Barriers in accessing to tuberculosis care among non-residents in Shanghai: a descriptive study of delays in diagnosis

Weibing Wang[1], Qingwu Jiang[1], Abu Saleh M. Abdullah[2], Biao Xu[1]

Objectives: To describe accessibility to tuberculosis (TB) diagnosis in non-resident TB patients in Shanghai, China, and to identify factors associated with delay in diagnosis. **Methods**: A face-to-face interview of 222 newly diagnosed, non-resident TB patients registered in two districts of Shanghai: Changning District and Putuo District, was conducted using a structured questionnaire. **Results**: Among the 222 non-resident TB patients, median patient's delay was 21 days and median doctor's delay was 8 days. The duration of doctor's delay was significantly longer in Changning District than Putuo District (13 vs. 5 days, $P < 0.001$). One-fourth of the subjects had a patient's delay longer than 42 days and a doctor's delay longer than 15 days. Logistic regression model shows that patients at lower income level, and who did not have haemoptysis symptom were more likely to have longer patient's delay. Patients who registered in Changning were more likely to have a longer doctor's delay. The proportion of diagnosis or consideration as suspected TB for referral was significantly higher in hospitals than non-hospitals. **Conclusion**: The results of this study indicate that patient- and doctor-related factors contribute significantly to delays in the diagnosis of non-resident TB patients in Chinese cities. Non-resident's poor economic status, clinical status, complexities in referral and diagnostic procedure at different districts accounted for delayed TB care-seeking and diagnosis.

Keywords: China, diagnostic delay, non-resident, poverty, tuberculosis

Background

Tuberculosis (TB) is a disease closely related to poverty. In developed countries, TB is more common among population in the low socioeconomic class, such as immigrants, homeless and refugees.[1,2] In developing countries, however, TB occurs more frequently in poor rural population than urban population. The prevalence of active TB in rural China is higher than that of urban areas (397/100 000 vs. 198/100 000), and the mortality of TB is three times higher in rural areas than that of urban areas.[3]

China has experienced remarkable economic development since the 1980s. The economic development is much faster in urban cities than rural villages. In 2005, the per capita disposable income of urban residents was 3.2 times of that of rural residents.[4] Due to the unbalanced economic development between urban and rural areas, more and more people migrate from the poor rural villages to relatively developed cities.[5,6] There is a resident's registry system in China. Every citizen should register in local public security bureaus. Social and/or medical insurances, pensions, education, health services and welfare are usually provided for local registered residents.[7] Rural immigrants are considered as non-residents in local, who should temporarily register in order to be employed in cities. Demographically residents and non-residents differ in that non-residents include more of those who are young and male at the productive age. Most of the rural migrants are unskilled and uninsured, and they usually live in marginal status taking on heavy physical work with low and unstable payment.[8]

In Shanghai, the notification rate of TB is 51/100 000 in 2003. TB control in Shanghai is organized and managed by the Department of TB Control (DTC) under the municipal Center for Disease Control (CDC), and the district CDCs. The directly observed treatment, short-course (DOTS) strategy has been adopted in Shanghai's municipal TB control programme which provides free diagnosis and anti-TB treatment for smear positive TB patients regardless of residents or non-residents. But from the surveillance data on TB, despite a relatively low prevalence for whole Shanghai population, the proportion of non-resident TB cases among all registered TB cases have been increasing from 19.1% in 1995 to 47.9% in 2003.[9–10]

A number of studies have reported longer delays in health care seeking among poor TB patients due to their limited access to health care facilities.[11–14] Also, poverty, lack of health knowledge, default of health insurance and no/poor access to local welfare service were associated with lack of accessibility to TB care among migrants in urban areas of China.[15] Studies from developed countries reported that immigrants from high TB endemic countries increased infectious risk of the residents of the migrated regions.[16–18] Migration also increases the immigrants' vulnerability to TB.[19] Early identification and treatment of TB cases among non-residents therefore emerges as a public health priority.

The objective of this study is to describe accessibility to TB diagnosis, as measured by duration of diagnostic delay, among non-resident TB patients in Shanghai, China, and to identify factors associated with delay in diagnosis.

Methods

Study setting

The study was carried out from 1 September 2003 to 30 September 2004. Two districts of Shanghai, Changning

1 Department of Epidemiology, School of Public Health, Fudan University, China
2 Department of International Health, School of Public Health, Boston University, Boston, USA

Correspondence: Biao Xu, MD, PhD, MPH, Professor of Epidemiology, 138 Yi Xue Yuan Road, Department of Epidemiology School of Public Health, Fudan University, Shanghai 200032, China, tel: 86 21 54237710, fax: 86 21 63052506, e-mail: bxu@shmu.edu.cn

District (CHN) and Putuo District (PT), were purposively selected as study sites considering the larger number of non-resident population in these districts and the feasibility of implementing the study.[20] The total number of registered non-residents in CHN and PT were 173 100 and 233 600, respectively, in 2003, accounting for 21.9% and 21.7% of the total populations in these two districts.[20] In 2003, the notification rates of TB were 131/100 000 and 94/100 000 among the non-residents in CHN and PT, respectively, whereas they were 19/100 000 and 39/100 000 among the Shanghai residents.

Passive case-finding principle for TB recommended by WHO is followed in Shanghai's TB control programme, i.e. detecting infectious TB cases by sputum smear microscopy among symptomatic patients who voluntarily attend health facilities. There is also a convergence management system for TB care, i.e. TB diagnosis and treatment is only available in designated district hospitals, tertiary hospitals or the CDC. The health facilities in CHN and PT, like in all the other districts of Shanghai, are composed of hospitals and non-hospitals. Hospitals are layered from community hospitals (primary care) to district hospitals (secondary care) to tertiary hospitals. The non-hospitals include private hospitals, pharmacies and neighbourhood health centres under communities which can provide medical services including over-the-counter (OTC) medicines and treatment under the supervision of licensed doctors. Under the passive case-finding principle and convergence management system, symptomatic TB patients could visit any kind of health facilities, but they should be referred by health providers in hospitals and non-hospitals to the designated health facilities for TB diagnosis and treatment.

In CHN District, the DTC under the district CDC was designated for TB diagnosis, treatment and case management, where a TB clinical care unit was embedded. A weekly consultation meeting was held in the DTC for the diagnosis confirmation of each patient based on patient's smear results, films of CXR and medical charts. In PT District, the DTC was responsible for TB case management, while the TB Care Unit in PT District Centre Hospital was designated for TB diagnosis and treatment, and reported the detected TB cases to the DTC. Diagnosis was made directly by physicians in the hospital; a consultation meeting was held in case of uncertainty in making diagnosis. In both districts, free anti-TB treatment is provided to the smear positive TB patients registered in the DTCs. The criteria of TB diagnosis followed the recommendations of the national TB control programme issued by the Ministry of Health, China and the International Union Against Tuberculosis and Lung Disease (IUATLD).[21]

Study participants

The study subjects were all pulmonary TB patients newly diagnosed in the DTC under the CHN District CDC and the TB Care Unit under the PT District Central Hospital in the study period. Informed verbal consent was sought from all the participants. Approval for this study was obtained from the Ethics Committee of the School of Public Health, Fudan University.

Data collection

All the subjects were interviewed face-to-face at the time of TB diagnosis in each district by trained physicians or post-graduate students of School of Public Health, Fudan University. A semi-structured questionnaire was used to collect information on demographics, socioeconomic characteristics, clinical presentations, disease history and health care seeking experiences of the subjects from the onset of symptoms to obtaining a TB diagnosis.

Definition of non-residence, non-hospital and diagnostic delays

In this study, a 'non-resident' patient was a patient who was not citizen of Shanghai and had registered as a temporary residence in Shanghai for at least 2 months before entering the study.

Diagnostic delay was used to reflect the promptness of patients' access to TB care. In this study two types of diagnostic delay were discussed: 'Patient's delay' was defined as the duration from the onset of symptoms to the first visit to a doctor in a hospital. 'Doctor's delay' was defined as the duration from the first hospital visit to a confirmed TB diagnosis in the designated DTC or designated TB Care Unit. These terms followed the definitions made by Long's study[14] and modified by the authors for this study.

Data analysis

Data were analysed using SPSS for Windows version 11.5. The duration of diagnostic delay was skewed, so medians and quartiles were reported together with the means. Pearson chi-square tests were used to indicate difference in the proportion of TB-related diagnosis made at the first health care seeking between hospitals and non-hospitals. Log rank test was used to compare the pattern of diagnostic delays of non-residents with different socioeconomic and clinical characteristics. Binary logistic regression model was used to identify the risk factors to diagnostic delays. Odds ratio (OR) was used as estimates of relative risk. $OR > 1$ indicates an increased probability of having a longer delay, whereas $OR < 1$ implies a lower probability of a longer delay.

Results

Sociodemographic characteristics of patients

During the study period, 222 newly diagnosed non-resident pulmonary TB patients were recruited, 116 in CHN District and 106 in PT District. Of these patients, 105 and 101 patients received sputum smear tests in CHN and PT, respectively. Smear-positive TB was higher in PT (43.6%; 44/101) than CHN (21.0%; 22/105) ($P < 0.01$).

There were only two subjects who had some kind of medical insurance. Seventy-one percent of the subjects were labour workers employed by small-scale private enterprises, restaurants or pursued as housekeepers/peddlers. Seventy-six percent were aged 20–40 and 6% were illiterate. There were no statistically significant differences in gender, age, educational attainment and holding of medical insurance between the two districts (table 1). The average self-reported individual income per year was 9817 China Yuan (CNY).

Duration and distribution of diagnostic delay in non-resident TB patients in CHN and PT District

Among the 222 non-resident TB patients in these two districts, the median patient's delay was 21 days, and median doctor's delay was 8 days. One-fourth of the subjects had a patient's delay longer than 42 days and a doctor's delay longer than 15 days (table 2).

The durations of patient's delay and doctor's delay were compared between districts and among different demographic and socioeconomic subgroups using univariate analysis. The durations of doctor's delay were significantly longer in CHN than PT (13 vs. 5 days, $P < 0.001$). No significant differences on patient's and doctor's delay were found with regard to the demographics, socioeconomic characteristics and disease presentations (table 3).

Factors associated with patient's delay and doctor's delay in non-resident TB patients

Logistic regression model was applied to analyse the risk factors associated with a longer patient's delay and doctor's delay. A longer patient's delay was defined as presentation in a hospital after 3 weeks (21 days) of the onset of symptoms as the national TB control programme guideline regulated, and the median (8 days) was used as a cutoff point for the doctor's delay. It was found that income level was a significant factor influencing patient's delay. Patients at lower income level (level 1 and level 2) were 3.9 and 5.4 times as likely to have a longer patient's delays (>21 days) as the patients at highest income level ($P<0.05$). Patients with haemoptysis symptom had a shorter patient's delay than those without that symptom ($P<0.05$) (table 4). None of the other factors entered the model.

In terms of doctor's delay, patients registered in PT had 10.6% probability of having a longer doctor's delays (>8 days) than patients registered in CHN ($P<0.01$). None of the other factors entered the model (table 4).

Patients initiated their health care seeking both in hospitals and non-hospitals. Of the 222 non-resident TB patients, 32.4% (72/222) visited non-hospital for their first health care seeking for TB. The proportion of diagnosis/consideration as suspected TB for referral was significantly higher in hospitals (88.7%; 133/150) than non-hospitals (6.9%; 5/72) ($P<0.001$). The average expenditures for first health care seeking in hospitals and non-hospitals were 481 and 96 CNY, respectively ($P<0.05$).

Table 1 Sociodemographic characteristics of non-resident TB patients in CHN and PT districts

Characteristics		CHN		PT		*P*
		N	%	*N*	%	
Gender	Male	75	64.7	73	68.9	0.506
	Female	41	35.3	33	31.1	
Age (years)	10–19	9	7.8	10	9.4	0.950
	20–29	57	49.1	49	46.2	
	30–39	33	28.4	30	28.3	
	≥40	17	14.6	17	16.0	
Education level	Illiterate	4	3.4	9	8.5	0.076
	Elementary school[a]	21	18.1	30	28.3	
	High school	82	70.7	59	55.7	
	College or above	9	7.8	8	7.5	
Occupation	Labour worker[b]	79	68.1	79	74.5	0.564
	Manager or technician	17	14.7	13	12.3	
	Unemployment	20	17.2	14	13.2	
Medical insurance	Insured	1	0.9	1	0.9	0.948
	Non-insured	115	99.1	105	99.1	

a: Education years ≤9 years including dropout from the elementary school
b: Labour worker includes housekeeper, waiter, peddler and other labour worker

Table 2 Delays in seeking health care among non-resident TB patients in CHN and PT Districts (Days)

Diagnostic delay	Mean (±SD)	Median (Quartile)
Patient's delay	40.6 ± 79.5	21 (4–42)
Doctor's delay	21.0 ± 61.1	8 (3–15)

Discussion

Patient's delay in seeking TB care

The findings of this study suggest that there was a prolonged health care seeking for TB in Chinese non-resident TB patients after onset of symptoms. The median patient's delay in this study (21 days) was shorter than the reported median of 4.3 weeks,[22] 7.7 weeks[14] or 8.0 weeks[23] indicated in other Asian and African countries, but longer than the median of 10 days[11] or 12.5 days[24] in other studies in rural China. The delayed health care seeking in the current study should be considered

Table 3 Mean and Median (Quartile) delays in non-resident TB patients with different demographic and socioeconomic characteristics in CHN and PT districts (Days)

	Variables	Patient's delay			Doctor's delay		
		Mean	Median (Quartile)	*P**	Mean	Median (Quartile)	*p**
District	CHN	49.0	20 (4–39)	0.598	32.8	13 (8–21)	<0.001**
	PT	33.4	21 (5–48)		11.2	5 (2–9)	
Gender	Male	54.5	20 (3–39)	0.329	18.6	7 (3–14)	0.198
	Female	40.5	21 (7–55)		25.9	9 (5–18)	
Age (years)	10–19	43.4	23 (18–60)	0.820	13.7	9 (6–18)	0.799
	20–29	49.8	15 (5–31)		16.9	6 (3–15)	
	30–39	35.3	21 (5–55)		28.3	9 (3–15)	
	≥40	29.8	22 (1–36)		20.6	8 (4–14)	
Education Level	Illiterate	35.9	26 (15–31)	0.259	9.9	7 (2–13)	0.779
	Elementary school[a]	46.2	25 (15–60)		25.6	9 (2–15)	
	High school or above	38.7	17 (3–34)		20.5	8 (4–15)	
Occupation	Preschool or student	14.6	15 (9–18)	0.263	22.4	13 (6–34)	0.782
	Labor worker[b]	42.5	22 (5–42)		22.0	7 (3–14)	
	Manager or technician	29.0	12 (2–32)		24.3	7 (3–16)	
	Unemployment	50.5	20 (4–60)		12.0	9 (4–15)	
Income Quartile[c]	Level 1	40.0	21 (4–42)	0.087	19.8	8 (4–14)	0.687
	Level 2	49.2	30 (20–60)		22.3	6 (2–13)	
	Level 3	38.2	18 (4–31)		22.7	11 (8–18)	
	Level 4	35.1	8 (2–30)		19.3	8 (4–14)	
Haemoptysis	Yes	43.8	15 (1–29)	0.130	19.7	5 (2–9)	0.304
	No	34.7	23 (7–51)		29.1	9 (5–16)	
Cavity	Yes	38.0	20 (15–52)	0.319	18.0	6 (2–20)	0.675
	No	59.3	20 (4–42)		39.4	8 (3–14)	

a: Education years ≤9 years including dropout from the elementary school
b: Labour worker includes housekeeper, waiter and peddler and other labour worker
c: Quartile of individual income from low (Level 1) to high (Level 4)
*: *P*-values from Kaplan–Meier method with log rank test; ***P*<0.01

Table 4 Odds ratio (OR) and 95% confidence interval for factors associated with the risk of having a longer patient's delay and doctor's delay

Factors	Patient's delay >21 days		Doctor's delay >8 days	
	OR (95% CI)	P^*	OR (95% CI)	P^*
District: PT/CHN	1.164 (0.554–2.446)	0.689	0.106 (0.045–0.245)	<0.001***
First visit in: Hospital/non-hospital	0.917 (0.369–2.279)	0.852	0.648 (0.220–1.905)	0.430
Age group		0.584		0.376
10–19/≥40	0.524 (0.090–3.051)	0.472	1.042 (0.142–7.665)	0.968
20–30/≥40	0.473 (0.155–1.440)	0.187	0.451 (0.139–1.458)	0.183
30–40/≥40	0.738 (0.260–2.097)	0.569	1.009 (0.324–3.139)	0.988
Gender: Male/female	0.922 (0.392–2.165)	0.851	1.475 (0.562–3.869)	0.429
Duration of residence		0.220		0.675
<1 years/≥5 years	2.426 (0.830–7.094)	0.106	1.271 (0.387–4.178)	0.692
1–5 years/≥5 years	1.793 (0.767–4.192)	0.178	1.552 (0.588–4.099)	0.375
Education		0.725		0.834
Illiterate/high school or above	0.783 (0.193–3.174)	0.732	0.699 (0.143–3.426)	0.659
Elementary[a]/high school or above	0.681 (0.262–1.770)	0.430	1.158 (0.404–3.323)	0.784
Occupation		0.416		0.910
Labour worker[b]/unemployed	0.510 (0.105–2.472)	0.403	0.907 (0.160–5.136)	0.912
Manager or technician/unemployed	1.143 (0.379–3.447)	0.813	1.173 (0.347–3.968)	0.797
Income quartile		0.012**		0.598
Level 1/level 4	3.859 (1.040–14.314)	0.043**	1.132 (0.257–4.995)	0.870
Level 2/level 4	5.369 (1.717–16.787)	0.004***	0.651 (0.181–2.337)	0.510
Level 3/level 4	1.305 (0.457–3.726)	0.618	1.428 (0.447–4.563)	0.548
Haemoptysis: Yes/no	0.347 (0.127–0.948)	0.039**	0.645 (0.231–1.805)	0.404
Cavity: Yes/no	0.902 (0.695–1.170)	0.436	1.233 (0.231–1.80)	0.263

a: Education years ≤9 years including dropout from the elementary school
b: Labour worker includes housekeeper, waiter and peddler and other labour worker
*: *P*-value from logistic regression; **$P<0.05$; ***$P<0.01$

in the context of non-residents' living status in urban city. As reported in this study, the average annual individual income was about 9817 CNY, whereas the average expenditures for an outpatient visit were 481 CNY in hospitals and 96 CNY in non-hospitals, and only two patients had some kind of health insurance. Low income and uninsured status may cause patients become reluctant to seek health care or force them to utilize non-hospital settings for cheaper options. In this study, 71% of the rural non-residents were employed by small-scale private enterprises or restaurants, or pursued as housekeepers/peddlers. The non-resident patients would lose their job if they leave for seeking health care and if their employer find them suffering from TB. These challenges are most caused by a default of laws which should ensure the right of non-residents in working and in access to health care.

The risk factor analysis shows that the income of TB patients significantly influenced the patient's delay (table 4). It is consistent with another study in a different Chinese setting,[11] in which economic barriers in terms of low income, negatively influenced patients' health care seeking behaviour. The significant difference of patient's delay among patients in different levels of income highlights the impact of financial factor for non-residents' timely access to TB health care. Therefore, TB control programme for non-residents should address economic factors to maximize its efficiency because impromptus TB diagnosis will increase the risk of the spread of TB in population.

The finding that poverty contributes to rural immigrants' patient's delays is not surprising, but more importantly, it is not easily remedied. Besides extent of the free TB diagnosis and treatment, health education of symptoms, tuberculin skin test during registration and active case finding possibly enhance case detection rate and shorten diagnostic delay. It is crucial to provide basic financial welfare for the non-residents. Health education on TB should be provided in a feasible and accessible way to the rural non-residents in cities. This study also indicates that patients with haemoptysis had shorter diagnostic delays than those with less severe symptoms. This is consistent with results from other studies.[25–27]

Doctor's delay in diagnosis referral

In this study, the median duration of doctor's delay (8 days) was longer than the reported median of 6 days[11] or 2 days[24] in other studies in rural Chinese population, but there was no evident discrepancy compared with that of studies in other countries that varied from 1 week[23] to 4.2 weeks.[14] The prolonged doctor's delay may be associated with several factors. First, there is a more complex health care system in cities with more facilities and general hospitals than rural areas, making referral system among different facilities more complicated. Second, fee for service incentives of health providers may delay patients' referral at community or district level in both districts. Under the present 'market-oriented' health care system in China, health facilities' profit depends on the medical fee from patients. Sometimes, hospitals try to retain patients for treatment instead of referral, resulting in the prolonged referral process. On the other hand, non-resident patients who are mostly uninsured and floating are less likely to follow the recommendation of timely referral.

It was found that doctor's delay in CHN district was longer than that in PT district (13 vs. 5 days). This could be related to the differences in the logistic formalities of TB care system between the two districts. In PT district, after a patient arrived in the district centre hospital, he or she can obtain TB diagnosis directly in the TB Care Unit of the hospital; whereas in CHN district, even after a patient has reached the hospital, he or she has to be referred to the DTC in the district CDC for TB diagnosis, where weekly consultation meeting system was built, extending the duration from preliminary diagnosis to confirmation diagnosis up to 1 week.

The results show a quite large proportion (32.4%) of non-resident TB patients who visited non-hospitals first for their symptoms. Meanwhile, the proportion of diagnosis or considerations as TB suspects for referral was significantly higher in hospitals than non-hospital settings. At present, the health workers at non-hospitals are required to suggest TB suspects to the designated higher level health facilities, such as district TB dispensaries. However, two main reasons might

have prevented them from doing so: lack of skills and experiences to identify TB suspects, and financial incentives to keep patients within their facilities.[28–29]

Conclusions

Non-resident TB patients in Shanghai suffered a 21-day's (in median) patient's delay and an 8-day's (in median) doctor's delay. The results of this study indicate that patient and health system related factors contribute significantly to delays in the diagnosis of non-resident TB patients in Chinese cities. Non-resident's poor economic status, the onset symptom and the complexities in referral and diagnostic procedure at different districts accounted for delayed TB care-seeking and diagnosis.

To reduce the diagnostic delays and improve the accessibility to TB care among the non-residents in cities, free TB care should be enhanced and a more rapid referring system should be initiated to refer patients from low level general hospitals or clinics to the designated health facilities. To achieve more rapid referring system, local health authorities should address the complexities associated with fee for service incentives in relation to TB diagnosis. It is also important to enact effective labour codes to ensure the right of wage subsidy in the process of health care seeking by non-residents patients.

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Conflict of interest. None declared.

Key point

- The article states that the barriers in accessing TB health care by non-residents were seriously limited in the city. There are few studies focusing on the diagnostic delay of immigrants worldwide. And no similar study has been found on the barriers in accessing TB health care by immigrant in cities. This study calls for an enhanced free TB care policy in cities to build a more rapid referring system that refers patients from community hospitals or clinics to district hospitals or to the district CDC.

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