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ORIGINAL ARTICLE

Access to tuberculosis care: What did chronic cough patients experience in the way of healthcare-seeking?

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Abstract

Aims: The directly observed treatment-short course (DOTS) has been adopted in China's modern tuberculosis (TB) control programme since 1992. However, the case detection rate of TB is far below the global 70% target. The aims of this study are to analyse the healthcare-seeking experiences and economic burden of potential TB patients with more than two weeks of cough in counties with and without a DOTS project and to explore the barriers to access for potential TB patients in rural China. **Methods:** A cross-sectional study using questionnaire interviews was conducted in a DOTS project county (Jianhu) and a non-DOTS county (Funing) in Jiangsu Province. A total of 1,204 chronic cough hospital patients were interviewed about their care-seeking experiences. **Result:** The mean patient delays were 34 and 29 days respectively in Jianhu and Funing ($p=0.070$). A shorter patient delay was associated with the availability of medical insurance ($RR=1.36$, $p<0.01$). More than 97% of patients sought care in the general health system, rather than in the special TB dispensary. Only 1.8% (Jianhu) and 5.0% (Funing) of the subjects had been sputum smear tested ($p<0.001$). The average patient's expenditure was CNY346 in Jianhu and CNY256 in Funing ($p>0.05$). **Conclusion:** Potential TB patients' access to TB care needs improving under DOTS. The expenses for treatment of cough are a heavy burden for the poor. Since the low-income patients first seek care at village health stations or township hospitals for cough, it is vital to involve the general health system in the DOTS project.

Key Words: Access, China, health finance, health system, user fees, tuberculosis

Introduction

The World Health Assembly pledged to combat tuberculosis (TB) by setting the goals of 70% case detection of infectious TB and treatment of 85% of these by the end of 2005, through the implementation of the directly observed treatment – short course (DOTS) strategy in the high-burden countries [1]. Although treatment is successful in 82% of cases, the case detection rate of smear-positive TB under DOTS remains at 45% globally [2]. In China, the modern National TB Control Programme (NTP), based on the DOTS strategy, has been implemented since the early 1990s [3] covering 91% of the Chinese population in 2003 [2]. Infectious TB patients should receive free or subsidized TB

diagnosis and treatment under the NTP-DOTS. Yet, a high prevalence of TB persists as evidenced by the 4th National TB survey [4]. The estimated TB case detection rate remains disappointingly low: 43% in the NTP-DOTS area, and 45% for the whole country based on the prevalence data and the official reported rate of TB [2].

The DOTS strategy for detecting infectious TB cases is by sputum smear microscopy among symptomatic patients who voluntarily attend health facilities, i.e. passive case finding. In China, patients with more than two weeks of cough or expectoration are considered to be potential TB cases. They should be subjected to smear microscopy for further diagnosis in hospitals or in special TB dispensaries [5]. In rural counties with NTP-DOTS,

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a referral-based centralized TB management system has been set up. Potential TB patients should self-refer or be referred by a general hospital physician to the County TB Dispensary (CTD), where smear microscopy will be provided free of charge, followed by free or subsidized TB treatment if a smear-positive TB diagnosis is obtained in the CTD [5]. In non-DOTS counties, TB can be diagnosed both in general hospitals and at the CTD using smear microscopy and/or CXR. It is noteworthy that free or subsidized TB diagnosis and treatment is available only at the special TB dispensaries. Neither subsidies nor free diagnosis is provided in general curative health facilities: village health stations, township, and county hospitals.

Prompt healthcare-seeking by potential TB patients and swift and correct TB diagnoses are the critical points to TB case detection. Studies in different countries among identified TB patients have reported that, during the symptomatic period, access to TB care could be influenced by the patient's demographic and socioeconomic characteristics [6–10], the diagnostic capacity of the healthcare facility [11], and the accessibility of DOTS [12]. In view of the prevailing passive case-finding strategy, it would be more relevant to assess access to TB care among potential TB patients, such as symptomatic patients with long-term cough, rather than diagnosed TB patients [13,14].

The objective of this study is to analyse the healthcare-seeking experiences and economic burden of potential TB patients with more than two weeks of cough in counties with and without NTP-DOTS projects and to explore the barriers to access for potential TB patients in rural China.

Material and methods

Study setting

We report a cross-sectional study conducted in 2002–03 in two neighbouring counties of Jiangsu Province, China: Jianhu County (JH) – with subsidized diagnosis and treatment in an NTP-DOTS project financially supported by the Ministry of Health and the provincial government, and Funing County (FN) – a non-DOTS county. The average annual income per capita (2001) was CNY3618 in JH and CNY3411 in FN (US\$ 1=Y8.3). FN had a higher proportion of rural population compared with JH (78% vs. 56%) [15]. The health system is based on the Chinese three-tier system in both counties: village health stations, township hospitals, and county hospitals. In the village health station, patients can only receive care

for common illnesses, e.g. fever, pain, as the village health workers have only limited medical training. In both counties, there is a County TB Dispensary (CTD) that is responsible for TB care and case management. JH has participated in an NTP-DOTS project since 1996 with free (1996–99) or subsidized (1999–September 2002) TB diagnosis and treatment for smear-positive TB patients. Only the CTD is authorized to diagnose TB. Sputum smear tests are not available in township hospitals or the county hospital. Physicians in general hospitals are encouraged to refer TB suspects to the CTD. In FN County, no centralized free or subsidized TB care was offered at the time of sampling. Smear microscopy could be administered in township and county hospitals as well as in the CTD. From 18 September 2002, both JH and FN were assigned by the Chinese government to participate in a Canadian International Development Agency (CIDA) co-funded DOTS project providing free diagnosis and treatment to infectious TB cases. In JH, due to the long-term NTP-DOTS implementation, no major system change was required except the financial issue. But in FN, It took time to develop the referral system and the management of TB care. In both counties, no subsidies were given to chronic cough patients before they obtained a smear-positive TB diagnosis.

Sampling and subjects

In JH and FN, each township has a township hospital providing general health services mainly to the township population. One-third of the township hospitals (six in JH and eight in FN) were purposively sampled according to the socioeconomic status (low, middle, and high) of the townships and feasibility of data collection (physicians able and agreeing to conduct interviews with patients). Each county has a county general hospital serving the whole county population. The county hospitals were also included as sample clusters.

Patients with more than two weeks of cough who visited the outpatient department of the sampled township and county hospitals during the recruitment period were the study subjects. Based on the outpatient records in hospitals, the daily expected eligible cough patients were 2–3 cases in total in all sampled township hospitals, and 10–14 in total in the two county hospitals, so all the outpatients with more than two weeks' cough in the sampled township hospitals during 1 January to 31 December 2002 were asked for interview, whereas only three weeks' worth of eligible outpatients (2 April 2003 to 23 April 2003) in the county hospitals were asked for interview.

Data collection

The subjects recruited in the township hospitals were interviewed by the treating physicians, who had a two-day training course given by the researchers prior to the interview. The researchers also revisited each township hospital monthly and re-interviewed 5% of subjects at the end of the study for quality control. The subjects recruited in the county hospitals were interviewed by the researchers and postgraduate students from the School of Public Health, Fudan University. A semi-structured questionnaire was designed for the interview that covered general demographic and socioeconomic information on the subjects and information on time, place, and the direct expenditure they had encountered for each care episode from the onset of the current episode of cough to the day of interview.

Data analysis

All the data were input into the database using Epi Info 6.04. SPSS 11.0 was used in the analysis. Means, medians, and quartiles were used for description. Student's *t*-test was applied to test the differences in days of delays and expenditures. Logistic regression analysis and Cox regression were employed to analyse the factors influencing the patients' selection of health facility for first care-seeking and the duration of care-seeking delay. Dummy variables were used for grouped variables in the multivariate analysis.

Definitions

"Delay to first healthcare provider" is defined as the duration from the onset of the current episode of cough to the first visit to any healthcare provider, including doctors, village health workers, pharmacists, and private doctors. "Patient's delay" is defined as the duration from the onset of the current episode of cough to the first visit to a medical doctor in a township or county and above hospital. These two delays will be the same if a patient's first healthcare-seeking occurs in a hospital. The definitions were modified from Long et al. for this study [8].

Ethical considerations

This study was approved by IRB of the School of Public Health, Fudan University, China and the Ethics Committee of Karolinska Institutet, Sweden

Results

Background characteristics of the subjects

In total, 1,204 chronic cough patients, 550 in JH and 654 in FN, were recruited; 262 from county hospitals, 942 from township hospitals. Patients from FN had a higher proportion of occupation as farmers, a lower proportion of coverage of medical insurance, and a lower mean household and individual income compared with patients from JH ($p < 0.0001$) (Table I). Among these 1,204 subjects, 316 (58%) in JH and 583 (89%) in FN had sought healthcare at least once before the interview. The mean duration between the current cough episode and the interview was 35 days in JH and 48 days in FN ($p < 0.01$).

Patients' choice of facility for the first care-seeking for the current episode of cough

The first health facility that patients visited varied from village health stations (VHS) or other non-hospital facilities such as pharmacy and private clinic to county TB dispensary. In JH, 40% of the patients (222 of 550) visited the VHS and other non-hospitals first, whereas in FN it was a significantly higher proportion, 78% (508 of 654) ($\chi^2 = 173.47$, $p < 0.0001$). There were only two patients (<1%) in JH and four (<1%) in FN who opted to go directly to the CTD for first care-seeking.

Logistic regression analysis was applied to identify factors associated with the patients' choice of health facility (0=VHS/other non-hospital, 1=hospital). It was found that patients from JH were more likely to choose hospitals for their first care-seeking (OR=4.5, $p < 0.01$). Patients under 40 years of age were less likely to initiate care-seeking in a hospital. Patients with better education had a higher probability of visiting a hospital first (OR=1.8, $p < 0.01$). The lower the income of the patients the less the probability of initiating healthcare-seeking in hospitals (OR=0.82 for group 3, $p > 0.05$, OR=0.46 and 0.44 respectively for groups II and I, $p < 0.01$) (Table II).

"Delay to first healthcare provider" and "patient's delay" for the current episode of cough

The mean delay to first healthcare provider was longer in JH than in FN with a statistically significant difference (25 vs. 13 days, $p < 0.01$); whereas the difference between the two counties in patient's delay to visit a hospital doctor was smaller and not statistically significant (34 vs.

Table I. Background characteristics of subjects in JH County and FN County.

Characteristics	JH County		FN County		p-value ^a	
	No.	%	No.	%		
Age, years	15–19	35	6.4	44	6.7	0.064
	20–39	152	27.6	185	28.3	
	40–59	181	32.9	253	38.7	
	>=60	182	33.1	172	26.3	
Gender ^b	Male	327	59.8	409	63.6	0.206
	Female	220	40.2	239	36.4	
Education	<=6 years	270	49.1	335	51.2	0.429
	>6 years	280	50.9	319	48.8	
Occupation ^{b,c}	Farmer	311	56.8	452	69.3	<0.0001**
	Work away from home town	21	3.8	33	5.1	
	Non-farmer	216	39.4	167	25.6	
Medical Insurance	Non-insured	434	80.5	605	92.5	<0.0001**
	Insured	107	19.5	49	7.5	
Family income ^b		9088		6614		<0.0001**
Individual income		2701		1766		<0.0001**
Sites of interviewing	Township hospital	439	79.8	503	76.9	0.223
	County hospital	111	20.2	151	23.1	

^ap-value from chi-squared test or Student's *t*-test. ***p*<0.01. ^bMissing values for gender, occupation, medical insurance, family income, and individual income were 9, 4, 9, 18, and 19 respectively. ^cOccupation was grouped as farmers (farming work on land only), work away (both farming work on land and physical work away from home town), and non-farmers (no farming work on land).

29 days, *p*>0.05) (Table III). Within each county, no statistical differences were found between subjects interviewed before and after implementation of the CIDA-funded NTP-DOTS project. However, the difference in delay to first healthcare provider was no longer significant between subjects from JH and FN after the CIDA-DOTS.

Table II. Logistic regression for impact of economic and non-economic factors on cough patients' hospital visiting for first care-seeking in JH and FN County.

Item	OR	95% CI of OR		p ^a
		Lower	Upper	
County: JH/FN	4.468	3.407	5.860	<0.0001**
Gender: Male/Female	0.918	0.690	1.221	0.557
Age, years				
15–19/>=60	0.515	0.270	0.985	0.045*
20–39/>=60	0.471	0.303	0.732	0.001**
40–59/>=60	0.877	0.617	1.248	0.466
Education: >=6 years/ <6 years	1.821	1.276	2.599	0.001**
Occupation				
Farmer/non-farmer	0.719	0.490	1.054	0.091
Work away/non-farmer	1.828	0.945	3.537	0.073
Insurance: With/without	1.379	0.884	2.152	0.156
Income quartile				
Group 1/Group 4	0.438	0.290	0.659	<0.0001**
Group 2/Group 4	0.464	0.315	0.684	<0.0001**
Group 3/Group 4	0.819	0.500	1.341	0.427
Constant	0.623			0.068

^a**p*<0.05; ***p*<0.01. *p*-value from Logistic regression.

Considering hospital doctors have the key role in identifying suspected TB cases and referring them for diagnosis, the influencing factors in patients' delays were further analysed using a Cox proportional hazard model. Here RR>1 indicates a greater probability of a shorter delay, while RR<1, a lower probability.

The risk of patient's delay was not significantly different between JH and FN (*p*>0.05). The insured patients visited the hospitals earlier than the uninsured with an RR of 1.36 (*p*<0.01). Patients under 20 years old had a higher likelihood

Table III. Healthcare-seeking delays of chronic cough patients in JH and FN County.

County	Mean (days)	Median (25%, 75%) (days)	Mean in CIDA NTP (days)		p-value ^b
			Before	After	
Delay to first healthcare provider					
JH	25.23	15 (5–23)	25.76	23.89	0.769
FN	13.29	5 (3–12)	11.99	16.64	0.139
p-value ^a	<0.0001		<0.0001	0.111	
Patient's delay					
JH	34.49	20 (15–31)	35.31	32.43	0.655
FN	28.52	21 (15–31)	26.64	33.34	0.067
p-value	0.070		0.058	0.852	

^ap-value for difference in delays between counties from Student's *t*-test. ***p*<0.01. ^bp-value for difference in delays between before and after implementation of CIDA NTP-DOTS within the county from Student's *t*-test.

Table IV. Cox regression for impacts of economic and non-economic factors on patient's delay in JH and FN County.

Variable	RR (95% CI)	p-value ^a
County: JH/FN	0.884 (0.781–1.002)	0.053
Gender: M/F	1.088 (0.959–1.234)	0.190
Age, years		
15–19/>=60	1.387 (0.973–1.764)	0.028
20–39/>=60	0.921 (0.760–1.116)	0.401
40–59/>=60	0.928 (0.794–1.085)	0.348
Education: >6 years/<=6 years	1.158 (0.993–1.350)	0.061
Occupation		
Farmer/non-farmer	1.052 (0.876–1.264)	0.586
Work away/non-farmer	0.860 (0.622–1.189)	0.362
Insured/uninsured	1.356 (1.097–1.677)	0.005**
Quartile of family income		
Group 1/Group 4	0.857 (0.706–1.042)	0.122
Group 2/Group 4	1.080 (0.893–1.305)	0.426
Group 3/Group 4	1.108 (0.923–1.329)	0.271

** $p < 0.01$. p -value from Cox regression.

of going to the hospital earlier than patients aged 60 and above (RR=1.39, $p < 0.05$) (Table IV).

Patient's medical expenditure for cough-related care

On average, patients spent Y346 in JH and CNY256 in FN for cough-related medical care ($p > 0.05$). In both counties, the highest expenditure was in county hospitals, and the lowest in non-hospital facilities. Higher expenditure, CNY222, occurred in non-hospitals in JH than in FN, CNY133 ($p < 0.05$), which was close to the mean expense of CNY249 at the township hospitals of JH, and higher than the mean expenses at township hospitals in FN, CNY200 (Table V). The lower the income the higher the proportion of income used for expenditure for cough-related care; from 53% for the poorest quartile both in JH and FN to 7% in JH and 9% in FN for the highest income quartile.

Completion of sputum smear microscopy

There were 24 subjects who had visited the CTDs, 15 in JH (2.7%) and 9 in FN (1.4%)

(chi-squared=2.792, $p=0.095$). In total, 43 patients had obtained a sputum smear tests, 10 in JH (1.8%) and 33 in FN (5.0%), (chi-squared=9.038, $p=0.003$). Forty-six and 68 patients respectively had a hospital visit for more than two weeks of cough before the interview, implying that they met the requirements for microscopy tests. Among them, 11% in JH and 25% in FN had obtained smear microscopy (chi-squared=3.518, $p=0.061$).

Discussion

One of the critical issues in the global efforts to raise the efficiency of TB control programmes is to improve case detection. Results of our study were from a hospital-based cross-sectional study among chronic cough patients, which provides new knowledge concerning the care-seeking of potential TB cases (not the actual TB patients) who have reached the hospitals under different TB management systems and the factors associated with care-seeking and patient delays. The most important finding is the importance of involving the general health system, especially the village health stations and township hospitals, in order to reach the low-income groups who are more susceptible to TB infection.

One of the critical difficulties facing the China TB control programme is the low case detection rate. The 4th National TB Survey reported that among the 1,304 TB patients identified in the survey, only 32.8% had been diagnosed in hospitals or TB dispensaries before the survey [4]. Only a few studies have reported results related to examining chronic cough patients' care-seeking experiences [13,14,16]. Passive case-finding among symptomatic patients who voluntarily attend health facilities is the main strategy for identification of TB patients. The gap between the current low case detection and the target rate suggests that a high proportion of symptomatic cases do not present themselves at any health facility, whether or not the facilities are involved in any specially funded NTP-DOTS project [17].

Table V. Patient's expenditure on medical care related to cough at different levels of health facilities before the time of the interview.

Health facility	JH County (CNY)			FN County (CNY)			p^a
	No.	Mean	Median (25%, 75%)	No.	Mean	Median (25%, 75%)	
VHS and similar ^b	235	221.75	100(50, 200)	514	132.88	110(70, 150)	0.016*
Township hospitals	67	249.11	127(51, 270)	67	199.92	121(75, 227)	0.469
County hospitals	63	640.97	306(120, 650)	116	580.12	415(125, 524)	0.755
Total	316	345.52	127(60, 300)	583	255.561	135(80, 238)	0.077

^aStudent's t -test: $p < 0.05$. ^bVillage health station and other non-hospital facilities.

We found that both in JH and in FN very few potential TB cases had accessed the designated TB special clinic – the CTD. Cough is a common and non-specific symptom and cough patients are accustomed to visit general healthcare facilities. Patients from FN and patients who were poor, less educated, and younger were more likely to initiate their care-seeking in non-hospitals, most commonly at the village health stations. However, sputum smear microscopy was not available at the village health stations in the two counties involved and also not at the township and county hospitals in JH. The low proportion of smear tests indicates that doctors in hospitals did not consider providing smear microscopy or referring these patients to CTD for diagnosis. The reasons could be lack of awareness and/or financial incentives to keep paying patients at the hospitals [9].

Few studies have reported the healthcare-seeking delay in potential TB patients with prolonged cough. A study in Vietnam reported that the patient's delay was 41 days for women and 19 days for men among chronic cough patients.¹⁴ In our study, the mean patient's delay was 35 days in JH and 29 in FN with no significant differences between men and women. The patient's delay was significantly related to medical insurance. Only 8% of the patients in FN and 20% in JH had some kind of medical insurance. The majority of the patients had to pay out of their own pockets. The average patient's medical expenditure ranged from CNY100 at non-hospitals and village health station to CNY415 at the county hospital. Considering that the annual average income of the subjects was CNY1760–2700, the patients' economic burden for cough-related care was high, especially for the poorest segments of the population.

It was surprising to find that the delays were not shorter, nor was the proportion of smear-tested patients higher in JH, although NTP-DOTS projects had been implemented for seven years. A qualitative study of the patients' perceptions of TB care in the two counties showed that TB patients did not perceive long-term cough as a symptom of TB. In JH, most of the TB patients did not know there was a CTD where they could get subsidized or free TB care [9]. In fact, the potential TB patients' access to TB care relied on referral by the physicians in township or county hospitals. A study of the diagnostic delay of TB patients in the two counties reported that the mean duration from TB patients' first hospital visit to TB diagnosis was longer in JH (31 days) than in FN (10 days) [18]. The centralized management system under NTP-DOTS in rural China may improve the accuracy of TB diagnosis

and the quality of treatment by the strengthened training of physicians and other staff [10] but this system needs to be well embedded into the general health system, including the village health station, which is the preferred first point of contact for most poor patients. It is essential to involve the general health system including the village health stations in TB control so that potential TB patients can be identified and referred to the CTD for diagnosis in time. The 4th National TB survey in China demonstrated that the referral rate to a TB dispensary of TB patients from non-TB special health facilities was only 13% [4,20]. As a consequence of the market-oriented health reforms in China since the mid-1980s, the health facilities have to raise revenue through fee-for-service charges. Revenue-related bonus systems provide incentives for hospital management and doctors to provide as many – and lucrative – services as possible. Referrals imply loss of revenue. Hospitals try to recruit as many patients as possible, strive to keep the patients as long as possible, and use more drugs and expensive technologies to maximize profits [21]. The perverse incentives provide a background to the observed problems including the high expenditures on cough care in the general health system and the low proportion of smear microscopy examination.

Conclusion

The majority of potential TB patients first sought care in the general health system. The subsidized NTP-DOTS projects have not significantly improved potential TB patients' access to TB care. The poor suffer from a heavy economic burden for cough-related care. We suggest that it is necessary to involve the general health system, especially the basic level, in the diagnosis of TB to achieve higher case detection rates and more effective TB control. Physicians and village health workers in the general health system should be well trained in observing TB symptoms and the regulations for case referrals. Further operational research is indicated to examine the incentives for TB referrals, the scope for the involvement of the general health system in TB control and how to raise the awareness of TB symptoms in the general population.

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