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ORIGINAL ARTICLE

Delays in diagnosis and treatment among persons with new pulmonary tuberculosis in Mandalay District, Central Myanmar

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ABSTRACT

Tuberculosis (TB) is a major public health problem, and Myanmar is one of the 20 TB high-burden countries worldwide. Delay in getting TB diagnosis and treatment will lead to a disastrous impact on the community. This study aims to assess the delays in treatment-seeking and associated factors among new pulmonary TB patients in Mandalay District, central Myanmar. A cross-sectional study was conducted in 13 TB at outpatient department (OPD) public health facility sites. Data were collected by face-to-face interviews and treatment-card reviews of new adult patients who registered and started treatment with the standard regimen from December 2015 to May 2016. Delay time was categorised by using median cut-off. Multiple logistic regression analysis was performed to assess the relative impact of predictor variables on delays in seeking treatment. The analysis revealed that being aged 35 years or older (AOR 1.85, 95% CI 1.05–3.28) and low level of knowledge (AOR 2.29, 95% CI 1.29–4.08) contributed to a delay in seeking diagnosis and treatment, while the total medical and transportation cost (AOR 0.45, 95% CI 0.25–0.81) and no symptomatic (AOR 0.43, 95% CI 0.21–0.90) could increase the delay. Strengthening the health education activities for the community about TB and capacity building of health care providers to increase suspicion for identifying TB and early diagnosis are crucial.

Keywords: care seeking, delay, treatment, tuberculosis, Myanmar

INTRODUCTION

Tuberculosis (TB) is a global public health problem and a major cause of morbidity and mortality in many countries. Globally, an estimated 10 million people fell ill with TB in 2018. The burden of disease varies enormously among countries, from fewer than five to more than 500 new cases per 100,000 people per year, with the global average around 130. There were an estimated 1.2 million TB deaths among HIV-negative people in 2018, with a 27% reduction from 1.7 million in 2000, and an additional 251,000 deaths among HIV-positive people, with a 60% reduction from 620,000 in 2000.[1] However, TB incidence decreased by 2% per year, but to reach the 2020 milestone, the annual decrease should be 4–5%. The new TB cases remained undiagnosed or unreported, which highlighted that effective prevention and control strategies should be an urgent issue to tackle.

Myanmar is one of the 22 TB high burden countries worldwide where these 22 countries contribute 80% of all new TB cases each year and the 27 high MDR-TB burden countries that stand for 85% of the global MDR-TB burden. According to the Myanmar National Tuberculosis Program (NTP), TB incidence was approximately 373 per 100,000 in 2014. Even though there were TB control activities performed, a shortage of health workers and a coordination gap delayed case detection.[2]

Early diagnosis and active treatment are key to effective prevention and control of TB. With a timely diagnosis and treatment with first-line antibiotics for six months, most people who develop TB can be cured, and transmission of infection can be curtailed.[1] A systematic review indicated that the most important and largest contributor to total delay was patient delay.[3] Income, knowledge, awareness of disease, stigmatisation, and availability of health care facilities are among the factors that contribute to delays in health seeking among TB patients.[4-11] These could lead to a disastrous impact on the community by increasing the transmission of infection, morbidity, mortality, socioeconomic burden, and prevalence of drug resistance.[1]

Although there is some evidence of delay in seeking treatment among TB patients in Myanmar, the main reasons for this delay were not clearly identified in high-risk areas like Mandalay. This area implements active case finding (ACF) to detect TB cases in the area with limited access and resources.[2] However, many TB cases are habitually delayed in getting treatment favoured by definition of suspected TB symptoms as cough for more than two weeks. Furthermore, smokers could create the assumption of cough as a normal symptom, which can be a low index of TB suspicion by health providers.[11] In fact, the reported number may not represent the actual figure, and there can still be many patients who are less likely to be diagnosed. Identifying the magnitude and factors associated with patient delay in treatment-seeking will help to improve TB control by increasing case findings, provide early treatment, and reduce the infectious duration in the community. These findings could improve patient management through early initiation of effective treatment. The community health centre and health facilities would benefit from this study by recognising the challenges and potential gaps in patient treatment-seeking behaviours in the study area. Therefore, the aim of this study was to assess the delays in treatment-seeking and associated factors among new pulmonary TB patients in Mandalay District, central Myanmar.

METHODS

Study design and setting

A cross-sectional study was conducted in 13 TB public health service settings in Mandalay District, Myanmar. The district is the second largest capital city located 270 km from Nay Pyi Taw, a capital city, and consists of six million people, with a population density of 200 per km^2. High burden of TB cases and low accessibility of health care were reported in this area. A total of seven townships in Mandalay District reported a high number of TB cases.[2] Approximately 3,300 cases were treated in the townships' health service settings in 2016.

Sample size estimation and sampling

Sample size was estimated proportionally, considering a 95% confidence interval (CI), 72% of patient's delay in seeking treatment of TB, and 5% marginal error. By adding a 10% nonresponse rate, the minimum sample size was 235. There were 13 TB OPD public health facility sites in seven townships in Mandalay region. The research assistants conducted the data collection at all TB OPD. Simple random sampling was employed to recruited adult TB patients, aged 18 and above and diagnosed with pulmonary TB by sputum, CXR, or both. A total of 233 patients who had never been treated for TB were enrolled.

Measurement

All measurements in this study were translated forward and backward by two Myanmar health professionals to ensure the accuracy and validity with the original content under the local context. An interview questionnaire was used as an instrument to collect the data and the patient's medical record and township TB register. Pretesting was conducted with 30 TB patients in Bago Township, which has similar local context to the study area to assess the participants' understanding. The Cronbach's alpha scores ranged from 0.72 to 0.79. The contents were reviewed and revised for more clarification and to enhance comprehension after pretesting. The questionnaire consisted of three main parts assessing 1) patient's knowledge and stigmatisation, 2) duration of onset to first contact with a health facility, and 3) accessibility and satisfaction with the health facility for initial consultation.

There were 12 questions assessing the patient's knowledge of TB symptoms, TB disease, and treatment of TB.[6, 9, 12, 13] The 60^{th} percentile was used as a cut-off point for low knowledge. Kuder Richardson 21 for these scales was 0.79 in pretesting. Stigma was measured by nine questions[14, 15] regarding feeling ashamed of being diagnosed as a TB patient. A five-point Likert scale was used to determine the stigmatisation: having to hide the TB diagnosis from others, isolation due to TB, feeling guilty of suffering from TB, and the extent to which TB affects the following: relations with others, work performance, marital relations, and family responsibilities and relations. The total score ranged from 9 to 45, and greater scores indicated higher stigma. A score higher than the 25th percentile (> 21) was considered high TB-related stigma. The Cronbach's alpha coefficient for this scale was 0.72 in pretesting.

The time period between onset of symptoms such as cough or haemoptysis and first seeking care for TB at a health facility was recorded and verified by the medical record. There was no consensual definition of appropriate time for seeking care and commencing treatment of TB patients after appearance of symptoms of the disease. The shorter the delay, the less chance of infection transmission to others.

Delay in care seeking occurred if the time interval between the date of onset of suspicious symptoms of TB and first seeking diagnosis or treatment from health care provider, in this study used median as cut-off point which was 14 days. Accessibility was accessed through the distance to a health facility that made a TB diagnosis and travelling time to getting a TB diagnosis with accessible transportation, including medical and travelling costs based on the patient's estimation.[4, 10, 13, 16, 17] Satisfaction with service quality[18] at the initial consultation was assessed by eight questions. A five-point Likert scale was used to identify the patient's satisfaction with the location, services, communication, examination and investigation, privacy, cost, and time. The total score ranged from 8 to 40, and the greater the scores, the higher the satisfaction. Scores higher than the 75th percentile (> 28) were considered high satisfaction. The Cronbach's alpha coefficient for this scale was 0.78 in pretesting.

Data collection procedures

Ethical approval was obtained from the Committee for Research Ethics (Social Sciences) of the university. Research assistants were trained and assigned in health centres and firstly consulted with the township TB coordinator nurses for inclusion and exclusion criteria to check against the township TB register. New adult pulmonary TB patients who visited 13 public health centres of a hospital, township health department, township hospital, and sub-centres during the data collection period were approved and interviewed. The study was conducted through the permission of the programme manager of NTP and the support of the Mandalay regional tuberculosis officer in Myanmar. The researcher contacted the TB medical officer of TB OPD in Mandalay General Hospital, township medical officers, and TB coordinators of each township under the support of the Mandalay regional tuberculosis officer. Data collection was conducted from April to June 2016. All procedures performed in the studies involving human participants were in accordance with the ethical standards of the university and the local ethics committee.

Data analysis

Descriptive statistics were performed to describe the participant characteristics. Binary logistic regression was employed to determine the risk factors associated with delay in seeking treatment. Variables with a p-value < 0.25 in binary logistic regression were included in the multivariable model. Crude and adjusted odds ratios (ORs) were reported for association between exposure and outcome variable with 95% CIs. A p-value < 0.05 was considered statistically significant.

RESULTS

A total of 250 individuals were approached, and 233 were willing to participate in the study (response rate of 93%). The median age was 39 years. The ratio of men to women was 2:1. The majority (82%) had cough as a TB symptom. The median of days to seek health care treatment was 14 days, due to self-recovery without any treatment and financial constraints. Approximately half of respondents (49%) were classified as having a low level of TB-related knowledge (Table 1).

Table 1: Socio-demographic characteristics, patients' delay, and TB-related knowledge (n = 233)

Characteristics	Number	Percent
Age in years		
Median = 39, QD = 6.5, range 18–67		
Gender		
Male	150	64.4
Female	83	35.6
Marital status		
Single	77	33.0
Married	134	57.5
Divorced or separated	12	5.2
Widowed	10	4.3
Occupation		
Government staff	7	3.0
Private employee	19	8.9
Self-employed	75	32.2
Labourer	70	30.0
Dependent/retired	62	23.3
Co-morbidity with HIV		
HIV positive	18	7.7
HIV negative	215	92.3
Having cough as TB symptom		
Yes	190	85.2
No	43	14.8
Patient delay (days)		
Less than 14	101	43.3
14 or more	132	56.7
Median 14, QD 12.7		
Reasons for delay in seeking TB treatment		
Hoped the symptoms would go away	91	83.5
Financial constraints	24	22.0
Fear of diagnosis results	11	10.1
Scarcity of health care facilities	10	9.2
Perceived poor quality of health services	7	6.4
TB-related knowledge		
Low score	114	48.9
High score	119	51.1
Median 9, QD 1.5, range 2–12		

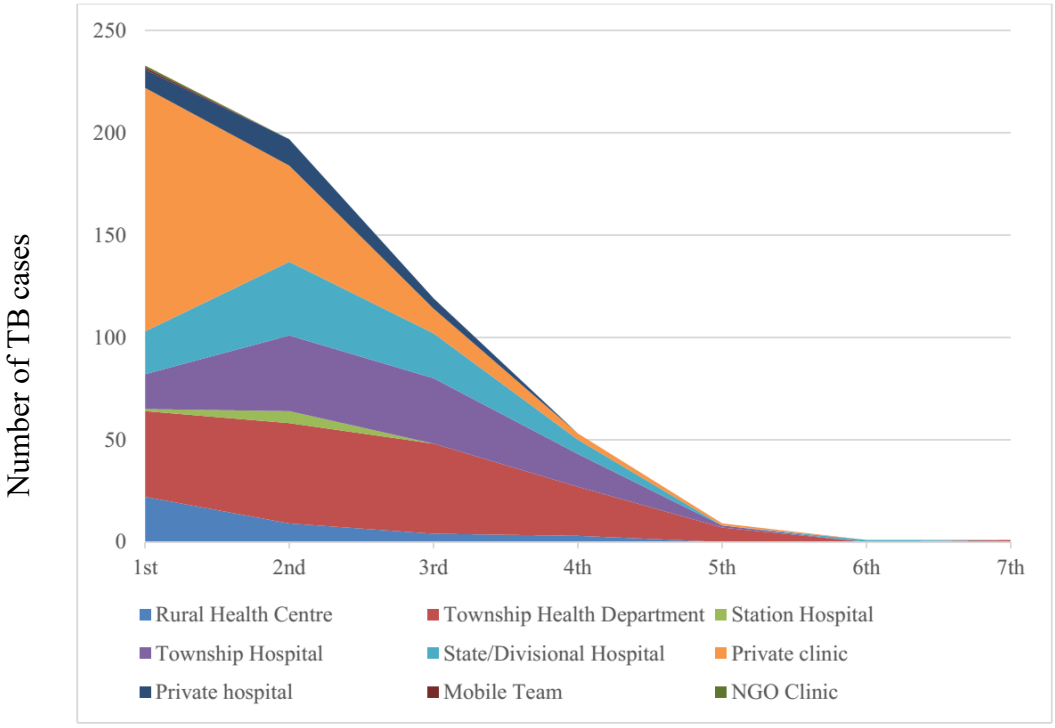

Figure 1. Contact point of health facilities to start TB diagnosis and treatment

Figure 1 shows the contact health facilities to start TB treatment. Over half (51%) contacted a private clinic, and 50% of patients visited health facilities three to five times before starting the TB treatment.

Accessibility of health care service showed that the median distance was 4 miles, which took 20 minutes. The median total medical and transportation cost was 17 USD. Three quarters of the patients perceived low quality of services of the initial contact. In addition, they identified high cost of treatment and long distance from home as barriers to getting service (Table 2).

Table 2: Accessibility to health care service among pulmonary TB patients

Accessibility	Number	Percent
Distance to health facility that made TB diagnosis		
Median 4, QD 2.5, range 1–20 miles		
Travelling time to health facility to get TB diagnosis		
Median 20, QD15, range 2–180 minutes		
Mode of transport to nearest health facility		
On foot	14	6.0
Public transport	37	15.9
Own transport	182	78.1
Cost of transportation (USD)		
Median 2.2, QD 1.1, range 0.2–12		

Table 2: Accessibility to health care service among pulmonary TB patients (cont.)

Accessibility	Number	Percent
Total medical and transportation cost (USD)		
Median 17, QD 3.1, range 3–22		
Satisfaction with care at initial-contact health facility		
Low	175	75.1
High	58	24.9
Median 26, QD 2.25, range 14–37		
Barriers to getting to health facility		
High cost	111	47.6
Distance from home	106	45.5
Transportation difficulties	68	29.2
Opening time of health facility	92	39.5
Health care services are not available	38	16.3

Multiple logistic regression analysis identified significant factors associated with patient delay in seeking TB treatment. Being aged 35 years or older (AOR 1.85, 95% CI 1.05–3.28) and a low level of knowledge (AOR 2.29, 95% CI 1.29–4.08) contributed to delay in seeking treatment, while the high medical and transportation cost (AOR 0.45, 95% CI 0.25–0.81) and no symptomatic (AOR 0.43, 95% CI 0.21–0.90) could cause them to delay (Table 3)

Table 3: Logistic regression model of delay in seeking TB treatment (n = 233)

	Delay in seeking TB treatment					
Variables	Yes (%)	No (%)	COR[a] (95% CI)[c]	*p-value*	AOR[b] (95% CI)[c]	*p-value*
Age in years						
Less than 35	51.3	48.7	1		1	
35 +	62.3	37.7	1.57 (0.93–2.64)	0.090	1.80 (1.00–3.23)	0.047
Gender						
Male	56.0	44.0	1			
Female	57.8	42.2	1.07 (0.61\2–1.85)	0.787		
Occupation						
Employed	54.4	45.6	1		1	
Unemployed	62.9	37.1	1.42 (2.58)	0.247	1.71 (0.89–3.29)	0.106
Co-morbidity with HIV						
HIV negative	57.2	42.8	1			
HIV positive	50.0	50.0	0.74 (0.28–1.95)	0.554		
TB-related knowledge						
High score	47.1	52.9	1		1	
Low score	66.7	33.3	2.25 (1.32–3.82)	0.003	2.32 (1.27–4.05)	0.005

Table 3: Logistic regression model of delay in seeking TB treatment (n = 233) (cont.)

Variables	Delay in seeking TB treatment		COR[a] (95% CI)[c]	*p-value*	AOR[b] (95% CI)[c]	*p-value*
	Yes (%)	No (%)				
Having cough as TB symptom						
Yes	60.5	39.5	1		1	
No	39.5	60.5	0.42 (0.21–0.83)	0.014	0.43 (0.21–0.90)	0.025
TB-related stigma						
Low	45.2	54.8	1		1	
High	60.8	39.3	1.88 (1.04–3.39)	0.034	1.52 (0.80–2.90)	0.198
Distance to health facilities						
Less than 3 miles	53.6	46.4	1			
3 miles +	58.8	41.1	1.23 (0.73–2.09)	0.429		
Travelling time to health facilities						
Less than 30 minutes	59.3	40.7	1		1	
30 minutes +	45.5	54.5	0.57 (0.29–1.10)	0.098	0.82 (0.38–1.80)	0.132
Total cost of treatment (USD)						
Less than 17	66.0	34.0	1		1	
17 +	50.0	50.0	0.56 (0.30–0.88)	0.016	0.45 (0.25–0.81)	0.008
Satisfaction with care at initial-contact health facility						
High	56.9	43.1	1			
Low	56.6	43.4	0.98 (0.54–1.79)	0.965		

[a] *COR: crude odds ratio*
[b] *AOR: adjusted odds ratio*
[c] *95% CI: confidence interval of 95%*

DISCUSSION

This study revealed a substantial delay in treatment-seeking behaviours among TB patients in the Mandalay District of Myanmar. Our study indicated that 56% of patients considered delays in seeking treatment (14 days +). The delay in seeking treatment among TB patients we found is lower than in studies conducted in Hubei province, China,[4] and Adama town, eastern Ethiopia.[6] The difference observed can be due to differences in study setting, characteristics of study participants, and socio-demographic and economic background. The key reason for delay was the patients do not suspect having TB due to poor awareness of the nature of the disease and belief in self-recovery. The other half of the respondents sought care at a private clinic at the first point and had to visit three to five times before starting treatment. It would be due to more accessibility to private clinics as an initial health care. Patients with initial visit to private health sector had significant delay compared to public health sector. It enlightens more capacity building to private health sector and stronger linkage between public and private health sector for TB case notification and treatment. In order to reduce the patient delay period, increased accessibility to care[10, 13, 16] at the community level through a volunteer

group or mobile health care service should be considered.

Our study revealed that patients who are 35 years or older were 1.8 times more likely to delay seeking care. Similar findings were found in London[14] and Wuhan,[7] which indicated older people with TB were more likely to experience both presentation and health care delays. This could be explained by the fact that those aged 35 years and older were the breadwinner and their time was occupied by their job. In addition, as two-third of the patients in our study were male, previous studies indicated that men tend to neglect symptoms until the disease reaches a serious stage.[19, 20] Therefore, early detection of new TB cases should be focused on males 35+ years old, who are more likely to engage in activities outside the home and transmit TB infection to family and the community.

Lack of knowledge regarding TB was one predictor for seeking treatment, as those with a low level of knowledge were 2.3 times more likely to delay. This finding was in line with previous research studies in Ethiopia[12, 13] and Uganda.[9] This could be due to the fact that less educated people do not have the choice to seek health care in either the public or private sector due to economic constraints. In addition, individuals with limited knowledge have less exposure to information about prevention strategies, cure rate, transmission concerns, and treatment options. As a consequence, they might delay seeking diagnosis and treatment. Moreover, awareness about MDR-TB was found to be crucial for minimising delays in diagnosis and treatment,[1] and patients with poor awareness might not seek early disease confirmation, making it difficult to access diagnosis and treatment centres. Patients with low levels of knowledge and awareness might not seek effective health services early, leading to transmission within the community.[21]

This study found that over half of the TB cases contacted a private clinic on their first visit, where they had to pay a high cost but could shorten the diagnosis period. As the multivariate analysis showed, patients pay more medical and transporation cost leads to delay. Those who pay more may prefer to start at private facilities where they have been diagnosed with delay by going through multiple consultations at different health facilities. Due to the nature of the illness, TB patients and their households can face severe direct and indirect financial and economic costs, which have been addressed by the WHO End TB Strategy.[1] This highlights the importance of strengthening the public service system to reach suspected TB groups in endemic areas.

Cough increased patients' delay and made them less suspicious of TB due to poor awareness of symptoms of TB. A health facility-based cross-sectional study in Ethiopia demonstrated that those not suspected of TB were 1.8 times more likely to delay seeking treatment.[6] This might be due to patients considering a cough as a transient symptom from a upper respiratory tract illness and hoped the symptom would go away, therefore they were not seek care or treatment.

In terms of a national control programme at the policy level, integration of public and private sectors could be key strategy in early identification of patients with active TB. In addition, emphasising community literacy, expansion of TB services, mobile screening services, and arming community figures to identify and link presumptive cases could be effective strategies to improve case detection in high-risk settings. Further studies could be conducted to implement collaboration between the public and private sectors to

shorten the delay of TB diagnosis. Emphasising TB literacy could motivate vulnerable groups to seek services on time.

CONCLUSION

In this study, we identified a delay in TB treatment-seeking care in the Mandalay District of Myanmar. Over half of TB patients delayed seeking treatment at health facilities. Private clinics were found to be the first contact point for seeking care. Being aged 35 years or over and a low level of knowledge were found as predictors of delay in care seeking. Moreover, the findings revealed that medical and transportation cost and having a cough increase patients' delay. We recommend early diagnosis and treatment to reduce transmission, regardless of whether delay affected completion. Community-based TB awareness through community volunteers to targeted groups should be accelerated.

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