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Health-seeking behaviour and patient-related factors associated with the time to TB treatment initiation in four African countries: a cross-sectional survey

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ABSTRACT

Introduction In 2022, tuberculosis (TB) was the second-leading cause of global deaths from a single infectious agent. Delays in initiating TB treatment can lead to increased morbidity and mortality. We describe the total delay in treatment initiation, identify patient-related factors associated with time to treatment initiation and explore health-seeking behaviour prior to treatment initiation among people living with TB (PLTB) in four African countries.

Methods Cross-sectional survey nested in a large prospective cohort of adults (≥18 years) with drug-susceptible pulmonary TB. PLTB enrolled in South Africa, Tanzania, Mozambique and The Gambia between September 2017 and January 2020. Structured questionnaires were used to collect data on demographics and map the patient experience prior to treatment initiation. Total delay (weeks) was the time between the onset of the first TB symptom and the initiation of treatment at the health facility. We developed a Cox regression model to study the relationship between explanatory variables and the time-to-event outcome, TB treatment initiation.

Results We enrolled 1400 participants (South Africa: 344, Tanzania: 282, Mozambique: 407, The Gambia: 367) (mean age 36 years, 66% male). Overall HIV prevalence was 42% but varied by country (South Africa: 68%, Tanzania: 49%, Mozambique: 45%, The Gambia: 7%). The overall median total delay was 6 weeks (IQR 4–10). People living with HIV (vs HIV negative; adjusted HR (aHR)=1.33 (95% CI 1.2 to 1.5)) and those living with a partner (vs married; aHR=1.35 (95% CI 1.1 to 1.6)) or single (vs married; aHR=1.24 (95% CI 1.1 to 1.4)) had a higher chance of initiating TB treatment. Primary care facilities and pharmacies were the main providers where individuals first sought care after experiencing TB symptoms.

Conclusion There are delays in TB treatment initiation among presumptive TB individuals. Partnerships with pharmacies, active case finding and decentralised TB services may be important to incorporate into the National TB Control Programme.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ Despite the known delay in tuberculosis (TB) care seeking, data on the relation between HIV-related factors (HIV status and HIV treatment) and TB care seeking are lacking.

WHAT THIS STUDY ADDS

⇒ People living with HIV and those single or living with a partner had a higher chance of starting TB treatment. Pharmacies were among the first healthcare providers that were visited.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ Interventions at the pharmacy level such as TB education and self-screening tools will empower individuals to seek TB care, especially those who are HIV-negative.

INTRODUCTION

In 2022, tuberculosis (TB) was the second-leading cause of global deaths due to a single infectious agent.[1] The first pillar of the WHO End TB Strategy emphasises early TB diagnosis[2]; and early TB diagnosis reduces morbidity, mortality and transmission. Most developing countries implement a passive approach to TB detection which relies on the people presenting themselves and self-reporting symptoms to the health facility.[3 4] A delay in seeking healthcare to diagnose TB is a major problem for TB management.[5] Consequently, a delay in TB treatment initiation can lead to increased morbidity as well as increased transmission.[6]

Studies in Africa found a median time between TB symptom onset and treatment

initiation of 30 days in South Africa,[5] 77 days in Nigeria[7] and up to 150 days in Mozambique.[8] Other studies in Africa evaluating the time between TB symptom onset and first care-seeking found a median of 28 days in Nigeria[9] and a mean of 21 days in Zambia.[10] A systematic review analysing 12 studies in Ethiopia, which defined delay as >21 days from TB symptom onset to the presentation at a healthcare facility, found a 44% prevalence of delay.[11] A study in The Gambia found a median delay of 34 days between the onset of symptoms to TB diagnosis.[12] Factors associated with delay include multiple care-seeking visits,[8 9 13] lack of suspicion of TB,[5] substance use,[13] low TB knowledge[8] and coexistence of a chronic disease.[8] Some of the first providers visited include government facilities,[9 10] private facilities,[5 7 9] traditional healers[5 7 14 15] and pharmacies.[7 14] The existing literature is not readily comparable due to varying measures of central tendency, cut-off points and definitions for delay. There are limited studies that use a multicountry approach to explore the patient perspective. Data on the relation between HIV-related factors (HIV status and HIV treatment) and TB care seeking are lacking in Africa. We describe the total delays in initiating TB treatment, identify patient-related factors associated with the time to treatment initiation and explore health-seeking behaviour prior to treatment initiation among symptomatic individuals in four African countries. This analysis will assist in identifying points of intervention and inform efforts to improve early case detection.

MATERIALS AND METHODS

Study population

This study was part of the TB Sequel cohort study whose primary objectives were to describe the evolution of pulmonary symptoms and functional lung impairment resulting from TB and to identify risk factors contributing to the lung outcome.[16] From September 2017 to January 2020, TB Sequel enrolled adults with pulmonary TB at the start of TB treatment from four African countries (South Africa, Tanzania, Mozambique and The Gambia) and followed these participants for a minimum of 2 years after treatment initiation.

TB services are provided free of charge at government health facilities in the countries where TB Sequel was conducted. People living with TB (PLTB) were recruited from government health facilities by field workers. In the TB Sequel study, PLTB were enrolled within 7 days of treatment initiation and were managed according to the local standard of care in each country.[16] Inclusion criteria included age 18 years and older; provided written informed consent; willing to be tested for HIV; willing to provide a sputum sample and positive for pulmonary TB using a microbiological test (Xpert MTB/RIF or culture). For this analysis, adults with drug-susceptible (DS) TB and newly enrolled PLTB were included (ie, excludes retreatment or reinfection or PLTB who interrupted initial treatment and returned to the study).

Study design

A cross-sectional survey using TB Sequel data collected at TB treatment initiation.

Study procedures

Informed consent was obtained from eligible participants. At study enrolment, data were collected by trained members of the study team who were fluent in local languages. All data were collected on paper forms and later entered into the electronic study database, OpenClinica, an open-source clinical data management system that was used to collect TB Sequel data. Questionnaires were available in English and were verbally translated into local dialect by trained regional study staff.

Study variables

Self-reported information on the presence and duration of characteristic TB symptoms (cough, haemoptysis, fever, unintended weight loss and night sweats) was collected at enrolment using structured questionnaires. The primary outcome was total delay, measured as a continuous variable and defined as the time (in weeks) between the onset of the first symptom characteristic of TB and the start of TB treatment (figure 1).

The sociodemographic characteristics of participants included age, categorised into 18–29 years, 30–39 years, 40–49 years and ≥50 years, sex (male or female), employment status (unemployed or employed) and highest education level (none, primary, secondary and vocational). Clinical characteristics of the study population included HIV status (negative, positive), antiretroviral therapy (ART) status (on ART, not on ART or ART status unknown), any previous TB (yes or no) and sputum smear status. Sputum smear is graded as scanty, 1+, 2+ and 3+. Scanty is when the sputum contains 1–9 AFB in 100 fields, grade 1+ for 10–99 AFB in 100 fields, grade 2+ if 1–10 AFB per field (check 50 fields) and grade 3+ for more than 10 AFB per field (check 20 fields), respectively.

Data were also collected on the participants' health-seeking behaviour using structured questionnaires, adapted from the generic WHO TB patient cost tool[17 18]; the first provider that they visited when they experienced TB symptoms, the number of providers that they visited prior to being diagnosed with TB and the reasons for not seeking care at a public health facility first.

Data analysis

The deidentified data were exported from OpenClinica and imported into STATA V.16 (StataCorp) for cleaning and analysis.

We analysed the sociodemographic characteristics of study participants, stratified by country. Data were presented using proportions for categorical variables and medians with corresponding IQRs for continuous variables. To describe the total delay in each country, we present the median (IQR) in weeks, among those with data available for the onset of the first symptom

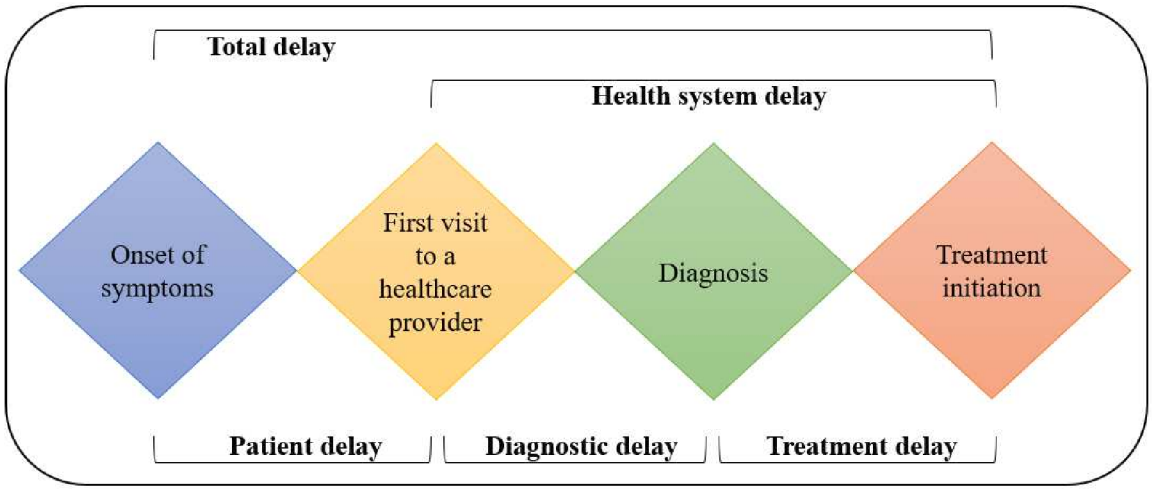

Figure 1 Definitions of delay.

characteristic of TB (in weeks) and a date of TB treatment initiation.

We used Proportional hazards regression, also known as the Cox regression model, which allowed us to investigate the effect of several independent variables on a time-to-event outcome (time to TB treatment initiation). We tested the assumption of proportional hazards, an important assumption in the Cox regression model is that the hazards are proportional, which means that the HR is constant over time (p>0.05 satisfies the proportional hazards assumption). We used DAGitty 3.0[19] to create directed acyclic graphs (DAGs). Covariates whose inclusion in the final models would potentially reduce bias due to confounding were identified based on their relationship to the causal factor and the treatment initiation outcome. The various relationships were assessed using published literature. We calculated the crude and adjusted HR (aHR) and 95% CIs for each covariate model. We interpreted the HR as follows; HR>1 indicated a higher chance of starting TB treatment compared with the reference group and HR<1 indicated a lower chance of starting TB treatment compared with the reference group. Health-seeking behaviour variables were not included in the DAGs and Cox regression models because these are time-dependent and are likely to be higher in those with a longer delay. All the exposures that are included in the models, although measured at the start of treatment can be assumed to be the same at the start of symptoms. There were 15 participants who did not have a measurement for the outcome (ie, the date that TB treatment was initiated) and were excluded from the analysis.

Patient and public involvement

Patients were invited to participate in our research. Patients and the public were not involved in the design, conduct, reporting or dissemination plans of our research.

RESULTS

Study population

From September 2017 to January 2020, a total of 1429 participants were enrolled into the TB Sequel study. For this analysis, 29 were excluded with drug-resistance TB infection. Therefore, we analysed 1400 participants (South Africa: 344, Tanzania: 282, Mozambique: 407, The Gambia: 367) (table 1). The median age was 34 years (IQR: 27–43 years) and two-thirds (67%) of the sample were aged between 18 and 39 years across all countries.

Among all TB Sequel participants, 11% had a history of TB and this varied between 6% and 17% across the countries. TB Sequel participants from South Africa were mostly male (63%), with a median age of 37 years (IQR 31–45), single (51%), HIV positive (68%) and over two-thirds had completed secondary school. TB Sequel participants from Tanzania were mostly married males (60%) who were unemployed (63%). TB Sequel participants from Mozambique were mostly males (65%) who were unemployed (76%). TB Sequel participants from The Gambia were mostly single (52%), males (74%) who were unemployed (62%). HIV prevalence and previous TB were the lowest in The Gambia.

Total delay

In all the study countries, participants reported delays in treatment initiation (table 2). Overall, the median total delay was 6 weeks. Tanzania had the longest median total delay (8 weeks) and Mozambique had the shortest (4 weeks). Overall, 13% started TB treatment ≤2 weeks after symptom onset.

Risk factors for time to TB treatment initiation

No association with the time to TB treatment initiation was found with age, sex, education, employment, previous TB and HIV treatment (table 3). Risk factors that were associated with time to TB treatment initiation after adjusting for potential confounding factors identified in the DAGs (online supplemental 1); people living with HIV (PLHIV) have a higher chance of starting TB

Table 1 Sociodemographic and clinical characteristics of the study population at enrolment (N=1400)

	South Africa	Tanzania	Mozambique	The Gambia	Total
	n (column%)	n (column %)	n (column %)	n (column %)	N (column %)
Sample size	344	282	407	367	1400
Median age, years (IQR) (missing: 3)	37 (31–45)	35 (28–43)	34 (27–42)	32 (24–40)	34 (27–43)
18–29	67 (19.5)	79 (28.1)	147 (36.3)	166 (45.2)	459 (32.9)
30–39	140 (40.7)	101 (35.9)	132 (32.6)	100 (27.3)	473 (33.9)
40–49	89 (25.9)	66 (23.5)	68 (16.8)	64 (17.4)	287 (20.5)
≥50	48 (14.0)	35 (12.5)	58 (14.3)	37 (10.1)	178 (12.7)
Sex					
Male	216 (62.8)	168 (59.6)	265 (65.1)	270 (73.6)	919 (65.6)
Female	128 (37.2)	114 (40.4)	142 (34.9)	97 (26.4)	481 (34.4)
Marital status					
Married	80 (23.3)	135 (47.9)	43 (10.6)	148 (40.3)	406 (29.0)
Living with partner	59 (17.2)	3 (1.1)	147 (36.1)	0	209 (14.9)
Single	174 (50.6)	68 (24.1)	169 (41.5)	190 (51.8)	601 (42.9)
Divorced	18 (5.2)	49 (17.4)	35 (8.6)	20 (5.5)	122 (8.7)
Widowed	13 (3.8)	27 (9.6)	13 (3.2)	9 (2.5)	62 (4.4)
Education (missing: 1)					
No schooling	11 (3.2)	29 (10.3)	34 (8.4)	125 (34.1)	199 (14.2)
Primary school	43 (12.5)	177 (62.8)	138 (34.0)	51 (13.9)	409 (29.2)
Secondary school	267 (77.6)	63 (22.3)	211 (52.0)	180 (49.1)	721 (51.5)
Vocational	23 (6.7)	13 (4.6)	23 (5.7)	11 (3.0)	70 (5.0)
Employment status (missing: 96)					
Employed	173 (51.6)	98 (37.0)	96 (23.7)	114 (38.3)	481 (36.9)
Unemployed	162 (48.4)	167 (63.0)	310 (76.4)	184 (61.7)	823 (63.1)
Previous TB (missing: 1)					
Yes	60 (17.4)	24 (8.5)	46 (11.3)	20 (5.5)	150 (10.7)
No	284 (82.6)	258 (91.5)	360 (88.7)	347 (94.6)	1249 (89.3)
HIV status					
Negative	109 (31.7)	143 (50.7)	225 (55.3)	340 (92.6)	817 (58.4)
Positive	235 (68.3)	139 (49.3)	182 (44.7)	27 (7.4)	583 (41.6)
ART status					
On ART	88 (38.9)	97 (75.2)	126 (78.8)	5 (71.4)	316 (60.5)
Not on ART	138 (61.1)	32 (24.8)	34 (21.3)	2 (28.6)	206 (39.5)
Unknown	9 (3.8)	10 (7.2)	22 (12.1)	20 (74.1)	61 (10.5)
Cough (missing: 4)					
Yes	325 (94.5)	281 (100.0)	394 (97.5)	367 (100.0)	1367 (97.6)
No	10 (5.5)	0	10 (2.5)	0	29 (2.1)
Night sweats (missing: 4)					
Yes	168 (48.8)	220 (78.3)	246 (60.9)	232 (63.2)	866 (61.9)
No	176 (51.2)	61 (21.7)	158 (39.1)	135 (36.8)	530 (37.9)
Coughing blood (missing: 5)					
Yes	21 (6.1)	47 (16.7)	43 (10.6)	61 (16.6)	172 (12.3)
No	322 (93.9)	234 (83.3)	361 (89.4)	306 (83.4)	1223 (87.4)
Weight loss (missing: 4)					

Continued

Table 1 Continued

	South Africa	Tanzania	Mozambique	The Gambia	Total
Yes	274 (79.7)	248 (88.3)	203 (50.3)	358 (97.6)	1083 (77.4)
No	70 (20.4)	33 (11.7)	201 (49.8)	9 (2.5)	313 (22.4)
Fever (missing: 4)					
Yes	90 (26.2)	213 (75.8)	155 (38.4)	323 (88.0)	781 (56.0)
No	254 (73.8)	68 (24.2)	249 (61.6)	44 (12.0)	615 (44.1)
Smear status (missing: 2)					
Negative	62 (18.0)	13 (4.6)	62 (15.2)	31 (8.5)	168 (12.0)
Scanty	38 (11.1)	18 (6.4)	56 (13.8)	0	112 (8.0)
1+	58 (16.9)	32 (11.4)	36 (8.9)	39 (10.6)	165 (11.8)
2+	120 (34.9)	28 (10.0)	78 (19.2)	81 (22.1)	307 (22.0)
3+	66 (19.2)	189 (67.5)	175 (43.0)	216 (58.9)	646 (46.2)

ART, antiretroviral therapy; TB, tuberculosis.

treatment compared with HIV negative (aHR=1.33 (95% CI 1.2 to 1.5)) and those living with a partner (aHR=1.35 (95% CI 1.1 to 1.6)) or being single (aHR=1.24 (95% CI 1.1 to 1.4)) have a higher chance of starting TB treatment compared with those married. Compared with participants from The Gambia, those enrolled from Tanzania (aHR=0.56 (95% CI 0.5 to 0.7)) had a lower chance of starting TB treatment. There was no evidence that the proportional hazards assumption was violated (marital status, p=0.987; HIV status, p=0.197; Tanzania, p=0.229).

Health-seeking behaviour

In all study countries, participants visited one or more providers before being diagnosed with TB (table 4). Specifically, in The Gambia, as many as 90% visited two or more providers prior to their diagnosis. The first provider that was visited varied by country (South Africa: 70% Primary care, Tanzania: 52% Pharmacy, Mozambique: 63% Primary care, The Gambia: 31% Pharmacy). There were various reasons given for not visiting a public health facility at the onset of TB symptoms (n=331), but three that were predominant were; South Africa: 51% said it was time-consuming, Mozambique: 46% said that the clinic was too far and The Gambia: 55% specified other reasons including thinking that they had a common cold or a minor illness.

DISCUSSION

Among PLTB enrolled in four African countries, very long delays to treatment initiation were reported, with the longest delays reported in Tanzania. When evaluating risk factors associated with delayed TB treatment initiation, PLHIV (vs HIV negative) and those single or living with a partner (vs married) had a higher chance of starting TB treatment. Compared with The Gambia, participants from Tanzania had a lower chance of starting TB treatment. In all countries, participants visited multiple providers to seek care; primary health facilities and pharmacies were commonly the first providers that were visited. Reasons for participants not going to a public health

Table 2 Description of total delay by country

	South Africa n=336	Tanzania n=281	Mozambique n=401	The Gambia n=367	Total n=1385
	n (%)	n (%)	n (%)	n (%)	N (%)
Duration of total delay					
1–2 weeks	73 (21.7)	9 (3.2)	64 (16.0)	32 (8.7)	178 (12.9)
3–4 weeks	82 (24.4)	59 (21.0)	174 (43.4)	139 (37.9)	454 (32.8)
5–6 weeks	52 (15.5)	20 (7.1)	21 (5.2)	25 (6.8)	118 (8.5)
7–12 weeks	66 (19.6)	106 (37.7)	109 (27.2)	140 (38.2)	421 (30.4)
13–18 weeks	28 (8.3)	38 (13.5)	17 (4.2)	16 (4.4)	99 (7.2)
>19 weeks	35 (10.4)	49 (17.4)	16 (4.0)	15 (4.1)	115 (8.3)
Median total delay, weeks (IQR)	5 (3–9)	8 (5–16)	4 (3–8)	6 (4–8)	6 (4–10)

Total delay (weeks) calculated as the time from the first onset of symptoms and the start of TB treatment.

Table 3 Factors associated with time to TB treatment initiation (n=1385)

Variable	Median total delay (weeks)	Unadjusted HR (95% CI)	P value	Adjusted HR (95% CI)	P value	Adjusted covariates
Age (years)						
18–29	5	Reference		Reference	0.996	Country, employment, sex
30–39	6	0.96 (0.8 to 1.1)	0.536	0.99 (0.9 to 1.1)		
40–49	4	0.95 (0.8 to 1.1)	0.540	0.98 (0.8 to 1.2)		
≥50	6.5	0.97 (0.8 to 1.2)	0.742	0.98 (0.8 to 1.2)		
Sex						
Male	6	Reference		Reference	0.765	Country, employment
Female	5	1.02 (0.9 to 1.1)	0.702	1.02 (0.9 to 1.1)		
Marital status						
Married	8	Reference		Reference	0.004	Age, employment, sex
Living with partner	4	1.34 (1.1 to 1.6)	0.001	1.35 (1.1 to 1.6)		
Single	5	1.21 (1.1 to 1.4)	0.003	1.24 (1.1 to 1.4)		
Divorced	6	1.03 (0.8 to 1.3)	0.785	1.05 (0.8 to 1.3)		
Widowed	6	1.05 (0.8 to 1.4)	0.709	1.01 (0.7 to 1.4)		
Education						
No schooling	6	Reference		Reference	0.577	Age, country, sex
Primary school	8	0.85 (0.7 to 1.0)	0.062	0.94 (0.8 to 1.1)		
Secondary school	5	1.02 (0.9 to 1.2)	0.768	0.95 (0.8 to 1.1)		
Vocational	7	0.89 (0.7 to 1.2)	0.400	0.82 (0.6 to 1.1)		
Employment status						
Employed	6	Reference		Reference	0.770	Country, education, sex
Unemployed	5	1.03 (0.9 to 1.1)	0.655	1.02 (0.9 to 1.1)		
Previous TB						
No	6	Reference		Reference	0.118	Age, HIV, sex
Yes	4	1.17 (1.0 to 1.4)	0.064	1.15 (1.0 to 1.4)		
HIV status						
HIV–	7	Reference		Reference	<0.001	Age, country, education, sex
HIV+	5	1.20 (1.1 to 1.3)	0.001	1.33 (1.2 to 1.5)		
ART status						
Not started ARTs	5	Reference		Reference	0.128	Country
On ARTs	4	0.84 (0.7 to 1.0)	0.052	0.86 (0.7 to 1.0)		
Country of origin						
The Gambia	6	Reference		Reference	<0.001	Employment, HIV, education, sex
Mozambique	4	1.18 (1.0 to 1.4)	0.024	1.09 (0.9 to 1.3)		
Tanzania	8	0.60 (0.5 to 0.7)	<0.001	0.56 (0.5 to 0.7)		
South Africa	5	0.96 (0.8 to 1.1)	0.639	0.86 (0.7 to 1.0)		

ART, antiretroviral therapy; TB, tuberculosis.

facility initially included feeling that it was either too far, time-consuming or individuals did not suspect that they had TB.

Total delay

TB treatment initiation was delayed in all the countries studied. Previous studies conducted in Africa have found similar and even longer total delays.[5 7–10 13 20] This study evaluated passive case finding. These individuals are a source of transmission, remaining infectious in the community for as long as they delay TB treatment. According to the smear status, almost half exhibit high bacillary loads (3+) at treatment initiation. Such individuals first need to recognise their symptoms and then necessitate going to the health facility in contrast to those found through active case finding. Therefore, active case finding overcomes patient delay and may be important to incorporate into the National TB Control Programme (NTCP) to reduce transmission, morbidity and mortality. Since time and distance were the two main reasons for delay, decentralised TB services should also

Table 4 Health-seeking behaviour by country and median total delay

	Median total delay (weeks)	South Africa	Tanzania	Mozambique	The Gambia	Total
Number of providers visited prior to TB diagnosis (n=1076)						
1	5	237 (70.5)	77 (40.7)	185 (74.3)	32 (10.6)	531 (49.4)
2	8	79 (23.5)	76 (40.2)	56 (22.5)	92 (30.5)	303 (28.2)
3	8	17 (5.1)	32 (16.9)	7 (2.8)	98 (32.5)	154 (14.3)
≥4	8	3 (0.9)	4 (2.1)	1 (0.4)	80 (26.5)	88 (8.2)
First provider visited at the onset of TB symptoms (n=1072)						
Pharmacy	8	50 (14.9)	97 (51.6)	38 (15.3)	94 (31.2)	79 (26.0)
Traditional practitioner	4	1 (0.3)	6 (3.2)	0	16 (5.3)	23 (2.2)
Primary care, public	5	234 (69.9)	8 (4.3)	155 (62.5)	43 (14.3)	440 (41.0)
Private practitioner	6	28 (8.4)	12 (6.4)	16 (6.5)	23 (7.6)	79 (7.4)
Public hospital	7	22 (6.6)	44 (23.4)	39 (15.7)	80 (26.6)	185 (17.3)
Private hospital	8	0	21 (11.2)	0	45 (15.0)	66 (6.2)
Reasons for not going directly to a public health facility on the onset of symptoms (n=331)						
Distance to the facility	8	8 (10.4)	7 (9.9)	20 (45.5)	5 (3.6)	40 (12.1)
Too expensive	4.5	0	4 (5.6)	0	2 (1.4)	6 (1.8)
Time-consuming	8	39 (50.7)	18 (25.4)	5 (11.4)	5 (3.6)	67 (20.2)
Lack of facilities	14	4 (5.2)	4 (5.6)	2 (4.6)	1 (0.7)	11 (3.3)
Mistrust in government health services	6	3 (3.9)	4 (5.6)	1 (2.3)	31 (22.3)	39 (11.8)
Belief system	11.5	12 (15.6)	7 (9.9)	2 (4.6)	7 (5.0)	28 (8.5)
No treatment available	8	0	2 (2.8)	1 (2.3)	12 (8.6)	15 (4.5)
Other	8	11 (14.3)	25 (35.2)	13 (29.6)	76 (54.7)	125 (37.8)

be considered. Furthermore, community health workers should educate PLTB on the importance of TB screening and testing and recognising TB-related symptoms early.

Risk factors for time to TB treatment initiation

We observed that PLHIV have a higher chance of treatment initiation compared with HIV negative. This may be because PLHIV are already in care and receiving ART thus enabling TB treatment initiation. PLHIV are also more frequently screened for TB since they are a high-risk group. A study conducted in Thailand also found that PLHIV sought TB care quicker than those who were HIV negative.[21] Those who are HIV negative may not suspect that they have TB and could mistake their symptoms for another illness, resulting in them delaying seeking TB care. TB education and self-screening tools can empower individuals to seek TB care.

In this study, those who were single or living with a partner had a higher chance of treatment initiation compared with those married. Similarly, a study conducted in South Africa found that the majority of those who delayed TB care-seeking were married.[22] Also, a study in Ethiopia found that delays were shorter among widowed/divorced compared with the married.[23] Marital responsibilities, cultural norms, permission seeking and TB stigma may be reasons for married individuals delaying TB care-seeking. A systematic review highlighted that in Malawi, India and Bangladesh, women are affected by TB stigma due to their vulnerable position in the marriage.[24] Cultural and social variations should be considered when developing interventions to improve health-seeking behaviour. Compared with The Gambia, participants from Tanzania had a lower chance of starting TB treatment, highlighting the role of facility-related factors such as time spent on referrals between facilities or the time spent treating patients with medication other than those used to treat TB, which result in health system delays in initiating TB treatment.

A previous study in Tanzania found that age, sex, HIV status, education level, household income and visiting healthcare facilities were not associated with delay.[15] Similarly, this study found that sociodemographic characteristics (age, sex, education and employment) were not associated with a delay in treatment initiation.

Health-seeking behaviour

Multiple providers were visited resulting in longer delays to TB diagnosis and treatment initiation. A study in Nigeria found that multiple care-seeking was associated with patient delay.[9] The reason for a patient visiting multiple providers is because they are not screened for TB at the first provider visited. Primary care facilities and pharmacies were the main providers where PLTB first sought care. This highlights an opportunity to

accelerate early case detection at the health system level by considering partnerships between the NTCP and pharmacies. In a previous study, 19 pharmacies (urban/rural and/or licensed/informal) in 15 high TB burden low-middle-income countries were engaged to improve TB case detection.[25] The participating pharmacies were involved in TB screening, referrals, sputum collection and transport. Lessons learnt from this intervention were pharmacies may need to be incentivised and trained to assist the NTCP, potential interventions in the pharmacy need to be flexible to focus on the highest-risk individuals to accommodate busy periods, and sputum collection and transport should be prioritised to reduce loss to follow-up. Intervening at the pharmacies, which are often the first point of care, would naturally eliminate visits to multiple providers and detect presumptive PLTB.

Strengths

Although this is a cross-sectional survey by design, the outcome is a measure of time. All the exposures are measured at the start of treatment but can be assumed to be the same at the onset of symptoms. Thus, allowing us to make inferences about causality, for example, PLHIV have a shorter delay due to being in care and a greater opportunity to be diagnosed. We also identified a potential health system intervention in pharmacies which would eliminate visits to multiple providers.

Limitations

Recall bias is a limitation because we ask participants about their symptom history at the start of TB treatment. This study focused on passive case finding, which innately misses presumptive TB who do not seek care, may never get diagnosed and may not start treatment. Routine settings rely on passive case finding; therefore, the results are representative of PLTB with symptoms who use TB services. Quantitative data on patient delay and health system delay were not collected separately, which would have been useful for programmatic and policy decisions. However, we attempted to explore health-seeking behaviour to understand what happens between the onset of symptoms and TB treatment initiation. In addition, exclusion criteria for the main study may have biased findings and these included (1) those who could not produce sputum, (2) those recently treated and (3) those with drug-resistant TB. These excluded PLTB could have contributed uniquely. However, sputum was necessary for a microbiological diagnosis of TB and having recent or drug-resistant TB may confuse the PLTB's description of their onset of symptoms (ie, although symptoms are no different from DS TB, their ability to accuracy recall the timing of the onset of symptoms may be affected or they may struggle to distinguish new symptoms from the exacerbation or worsening of symptoms related to their previous episode of TB).

CONCLUSIONS

There are delays in TB treatment initiation among presumptive TB individuals. TB education and self-screening tools will empower individuals to seek TB care, especially those who are HIV-negative. Pharmacies are often the first point of care; this highlights an opportunity to accelerate early case detection at the health system level by considering partnerships between the NTCP and pharmacies. To overcome patient delays, active case finding and decentralised TB services may be important to incorporate into the NTCP. Social, cultural and facility-related variations should be considered when developing interventions.

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