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HEALTH-SEEKING BEHAVIOR AND DELAY IN DIAGNOSIS OF TUBERCULOSIS

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ABSTRACT

Indonesia is the second largest country in terms of the number of tuberculosis (TB) cases. It is estimated that approximately 33% of TB cases remain undiagnosed and unreported. Identifying a health-seeking behavior, including diagnostic delay in Jambi Municipality, is necessary to increase tuberculosis (TB) case findings. This study aims to identify health-seeking behavior, calculate diagnostic delay, and identify factors associated with diagnostic delay, namely individual, social, and structural aspects among TB cases. This study used a cross-sectional design among bacteriologically confirmed pulmonary TB cases with a new treatment history in Jambi Municipality. The number of participating samples was 135 people, and the sampling was done using multi-stage random sampling. This study reveals that the most common health-seeking behaviors among TB cases are visiting drug stores/pharmacies (20.7%) and community health centers (CHCs) (20.0%). Diagnostic delay is experienced by 75.7% of TB cases, with a median of 48 days and an interquartile range of 22-107 days. Variables associated with diagnostic delay are being unmarried (aOR 0.3, 95%CI 0.1-0.9, p = 0.031), moderate social support (aOR 0.2, 95%CI 0.1-0.6, p = 0.004), visit drugstore/pharmacy after symptom onset (aOR 8, 2, 95%CI 1.6-42.3, p = 0.012), the number of health facility visits made before a diagnosis is 2-6 (aOR 3.1, 95%CI 1.1-9.3, p = 0.039), and TB stigma from the community perspective is high (aOR 0.3, 95%CI 0.1-0.8, p = 0.019). Evaluation of public-private mix (PPM) activities, especially those involving pharmacies/drug stores and private health facilities, and evaluation of TB screening at CHCs need to be considered. Massive education, community involvement, and psychosocial support are also needed to prevent delays in TB diagnosis.

Kata Kunci:

Perilaku pencarian pengobatan;
Keterlambatan diagnosis;
Tuberculosis

ABSTRAK

Indonesia menjadi negara urutan ke-2 terbesar untuk jumlah kasus TB. Diperkirakan terdapat sekitar 33% kasus TB tidak terdiagnosis dan atau tidak terlaporkan. Mengidentifikasi perilaku pencarian pengobatan termasuk keterlambatan diagnosis di Kota Jambi diperlukan sebagai upaya untuk meningkatkan penemuan kasus tuberkulosis (TB). Penelitian ini bertujuan mengetahui perilaku pencarian pengobatan, menghitung keterlambatan diagnosis, serta faktor-faktor yang berhubungan dengan keterlambatan diagnosis yaitu aspek individu, sosial, dan struktural pada pasien TB. Penelitian ini menggunakan desain *cross-sectional* pada kasus TB paru terkonfirmasi bakteriologis dengan riwayat pengobatan baru di Kota Jambi. Jumlah sampel yang berpartisipasi sebanyak 135 orang dengan teknik sampling yaitu *multi-stage random sampling*. Hasil penelitian ini menunjukkan bahwa perilaku pencarian pengobatan terbanyak dilakukan oleh kasus TB adalah datang ke toko obat/apotek (20,7%) dan puskemas (20,0%). Keterlambatan diagnosis dialami oleh 75,7% kasus TB dengan median 48 hari dan rentang interkuartil 22-107 hari. Variabel yang berhubungan dengan keterlambatan diagnosis yaitu belum menikah (aOR 0,3, 95% CI 0,1-0,9, p = 0,031), dukungan sosial sedang (aOR 0,2, 95%CI 0,1-0,6, p = 0,004), perilaku pencarian pengobatan TB pertama setelah muncul gejala ke toko obat/apotek (aOR 8,2, 95%CI 1,6-42,3, p = 0,012), jumlah kunjungan fasyankes yang dikunjungi sebelum didiagnosis sebanyak 2-6 (aOR 3,1, 95%CI 1,1-9,3, p = 0,039), dan stigma TB berdasarkan perspektif masyarakat tinggi (aOR 0,3, 95%CI 0,1-0,8, p = 0,019). Evaluasi kegiatan *public-private* mix (PPM) terutama dalam hal pelibatan apotek/toko obat dan fasyankes swasta serta evaluasi skrining TB di puskesmas perlu diperhatikan. Selain itu, pemberian edukasi yang masif, pelibatan masyarakat, dan pemberian dukungan psikososial juga sangat diperlukan untuk mencegah terjadinya keterlambatan diagnosis TB.

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INTRODUCTION

Tuberculosis (TB) remains the second leading cause of death after COVID-19 from a single infectious agent in 2022, despite the disease being preventable and treatable. There were 1.3 million people dying from this disease in 2022. The TB incidence trend has also slightly increased since the onset of the COVID-19 pandemic in 2020. The estimate of TB incidence was 10.6 million people in 2022. In addition to drug-sensitive TB cases, there are also approximately 410,000 people who have multidrug/rifampicin-resistant TB (MDR/RR-TB) cases (World Health Organization, 2023). Indonesia is the second largest country for TB incidence worldwide, contributing approximately 10% of the world's total incidence (1,060,000 people, or 385 per 100,000 population). With a treatment coverage of 67%, the remaining 33% of cases are underdiagnosed and underreported.

Once a person develops active TB, they must experience several processes of care-seeking, diagnosis, linkage to care, treatment, and notification to the national TB program (Subbaraman et al., 2016). Surveys on health-seeking behavior can provide information on patients who are symptomatic but do not seek treatment and patients who seek treatment but attend health facilities that do not operate a TB program (Wells, 2017). Health-seeking behavior is any activity undertaken by individuals who perceive themselves as having a health problem or illness to obtain appropriate treatment (Musinguzi et al., 2018). Meanwhile, research on patient and health system delays, including diagnosis and treatment delays, can be conducted to improve low TB case-finding rates (Ukwaja et al., 2013).

Research conducted in various countries indicates that the pathway of TB patients to health services is complex, often involving visits to multiple health facilities (Haldane et al., 2021). Researchers observe that TB suspects and patients follow different care-seeking patterns depending on the type of health facility. Studies in Zambia and China suggest that most patients primarily seek care at government facilities (Kerkhoff et al., 2021; Martinez et al., 2017). In contrast, in Pakistan, India, and the Philippines, most patients begin their TB treatment at private facilities (Fatima et al., 2017; Garfin et al., 2017; Hanson et al., 2017; Veesa et al., 2018). Another notable pattern is the preference for informal sector facilities, such as those observed in Cameroon and Bangladesh (Hossain et al., 2014; Titahong et al., 2021). In Nigeria, most (84%) TB patients initially consult inappropriate health facilities (Abimbola et al., 2015).

Similarly, in Tanzania, TB patients commonly seek care at pharmacies and hospitals after the onset of symptoms (Mhalu et al., 2019). In Vanuatu, 54% of TB patients consult traditional medicine for any illness (Viney et al., 2014). Likewise, a study in Bangladesh finds that many patients with extrapulmonary TB start treatment at pharmacies or private facilities (Sarker et al., 2017) despite the limitations of private facilities in diagnosing TB (Garfin et al., 2017; Hanson et al., 2017).

Regarding patients' residence, TB service-seeking patterns differ between urban and rural areas. A study in Yogyakarta finds that TB patients in urban areas predominantly choose hospitals or pulmonary clinics for diagnosis and treatment, whereas those in rural areas prefer private practitioners (Rintiswati et al., 2009). Several factors influence health-seeking behavior, including socioeconomic conditions, age, gender, financial resources, self-perception of health and illness, type of disease, availability of health services, and access to these services (Gabrani et al., 2021). The health-seeking behavior of TB patients and various types of delays (both patient and health system-related) can result in severe consequences, such as drug resistance, disease transmission, and increased healthcare expenditures (Samal, 2017).

In 2022, Jambi Province reported 13,681 TB cases, but only 2,945 cases were diagnosed and treated, resulting in a treatment coverage of 21.5%. This rate falls significantly below the target of at least 80%, placing Jambi Province as the second lowest among the 34 provinces in Indonesia (Kemenkes RI, 2021). Consequently, approximately 10,736 TB cases (78.5%) remain undiagnosed, untreated, or unreported. In 2020, treatment coverage rates varied across districts and cities in Jambi Province. Sungai Penuh Municipality has the lowest coverage at 8.2%, while Sarolangun District records the highest at 34.8%. However, none of the districts or municipalities achieved the case-finding target of 85% (Dinas Kesehatan Provinsi Jambi, 2021).

In Indonesia, research on TB health-seeking behavior and delays in diagnosis and treatment remains limited. To the best of the author's knowledge, these studies were carried out in two cities on the island of Java: Yogyakarta (Ahmad et al., 2011, 2013; Rintiswati et al., 2009) and Bandung (Lestari

et al., 2020). Meanwhile, no research on health-seeking behavior or delayed diagnosis in TB patients has been conducted in Jambi Province.

The study has been conducted in Jambi Municipality because the TB case-finding coverage rate remains below 72%, while the national target is 90% by 2023. Jambi Municipality also contributes the largest share of TB case findings in Jambi Province in terms of number and percentage (approximately 26%). Additionally, Jambi Municipality has a diverse range of health facilities, varying in number, type, and ownership (public/private).

The purpose of this study is to examine health-seeking behavior, the proportion of delayed diagnoses, and the factors associated with delayed diagnosis among TB patients in Jambi Municipality. The results of this study are expected to provide a comprehensive understanding of TB health-seeking behavior in Jambi Province. This information is hoped to serve as a foundation for developing strategies to engage health facilities in the TB program, identifying groups at risk of delayed diagnosis, and improving health facility efforts to encourage timely diagnosis among TB patients. Consequently, TB patients are hoped to receive prompt diagnoses, and the transmission of TB cases can be minimized.

METHOD

Type of Research

This study employed a cross-sectional design, an observational method in which researchers simultaneously measure outcomes and exposures (Setia, 2016).

Research Location and Time

The study was conducted in Jambi Municipality from April 2023 to January 2024. The healthcare facilities included health centers and TB clinics that reported TB cases to the Jambi Municipality Health Office.

Population and Sample

The study population comprised drug-sensitive TB patients in Jambi Municipality. There were 3,319 TB cases reported in Jambi Municipality in 2023 (*Dashboard – TBC Indonesia*, n.d.). The sample consisted of drug-sensitive TB patients treated at health facilities implementing the DOTS strategy and meeting the inclusion criteria, which included receiving treatment at TB healthcare facilities in Jambi Municipality, being aged ≥ 18 years, having no prior history of TB treatment, having bacteriologically confirmed TB (either through microscopy or rapid molecular testing), residing in Jambi Municipality, and currently undergoing treatment (< 6 months). Patients who refused to participate, could not be interviewed/contacted, or had severe mental or physical illnesses were excluded.

The sample size for this study was 135 participants, assuming a 95% confidence level, a 10% margin of error, an estimated proportion of TB patients seeking treatment for the first time at the primary health center (PHC) and clinics of 80%, a 10% dropout rate, and a design effect (deff) of 2.

The study sample consisted of TB patients seeking treatment at PHCs and clinics. The selection of health facilities was conducted randomly. From the 20 PHCs and 1 clinic in Jambi Municipality, 11 PHCs and 1 clinic were selected. The sampling process involved two stages: in the first stage, PHCs and clinics were randomly selected, and in the second stage, all patients currently undergoing treatment at each selected PHC and clinic were included as participants.

This study received ethical approval from the Research Ethics Committee of Jambi Health Polytechnic (Poltekkes Jambi), under approval number LB.02.06/2/634/2023, dated 9 October 2023. Before participating, the respondents were provided with detailed information about the study and were required to sign an informed consent form to indicate their willingness to participate. Eligible participants were allowed to refuse participation without any consequences.

Instrument

Data on delayed TB diagnosis were obtained by reviewing TB treatment cards (TB.01). Other variables were assessed through interviews using a structured questionnaire. Trained public health students carried out the interviews. We assessed socio-demographic characteristics and risk factors, including age, sex, education level, income, health insurance status, employment, marital status, smoking habits, and history of contact with TB patients. We also evaluated first-time health-seeking

behavior, the type of health facility visited, delays in diagnosis, knowledge, and the number of health facilities visited using a standard WHO questionnaire on diagnostic and treatment delays in tuberculosis. Before being used widely, this questionnaire underwent content validity assessment by experts from the WHO Regional Office for the Eastern Mediterranean and several researchers with relevant experience and reliability testing (World Health Organization, 2006). TB knowledge was measured using a questionnaire previously used in East Nusa Tenggara (Putera et al., 2015), while stigma was measured using a standardized questionnaire (Fuady, Arifin, et al., 2023), the tuberculosis-related stigma scales (Fuady, Fitriangga, et al., 2023). A questionnaire developed by Nursalam assesses family support variables (Nursalam, 2013). Social support was measured using the standardized Oslo Social Support Scale (OSSS-3). This instrument has been validated and is considered reliable for assessing social support in the general population (Kocalevent et al., 2018).

Knowledge about tuberculosis (TB) used nine questions. Correct answers were assigned a score of 1, while incorrect answers received 0. The total score was obtained by summing the scores of all responses. Knowledge was categorized as poor if the total score ranged from 0 to 7 and good if it ranged from 8 to 9. TB stigma had two perspectives: the patient and the community. Eleven questions evaluated TB stigma from the patient's perspective, while ten assessed it from the community's perspective. Respondents rated each statement using a Likert scale: strongly disagree (0), disagree (1), agree (2), and strongly agree (3). Scores for each perspective were totalled, resulting in a total score range of 0 to 44 for the patient's perspective and 0 to 40 for the community perspective. The patient's perspective was classified as low if the total score ranged from 0 to 18 and high if the score ranged from 19 to 44. From the community's perspective, stigma was classified as low if the score ranged from 0 to 23 and high if the score ranged from 24 to 40.

Family support using 12 questions. The respondents were asked to answer each question with always (score 3), often (score 2), sometimes (score 1), and never (score 0). The total family support score ranged from 0 to 36. The total score was then divided by 36 and multiplied by 100. Family support was categorized as good if the score was 76-100 and poor if the score was 0-75. Social support was measured using three inquiries. The respondents rated each question on a scale of 1 to 4 for the first query and 1 to 5 for the second and third queries. The total score range was 3 to 14. A person had weak social support if the total score ranged from 3 to 8, moderate if the score ranged from 9 to 11, and strong if the score ranged from 12 to 14. In this study, a delayed diagnosis of TB was defined as a period of more than 21 days between the first appearance of symptoms and the diagnosis of TB (Owolabi et al., 2020).

Data Collection

In general, this study comprised the preparation and implementation phases. The preparation stage was the questionnaire development, research ethics review, enumerator training, preliminary data collection, obtaining research permits, piloting the questionnaire, and revising the questionnaire. The pilot test was conducted to identify any repetitive, difficult-to-understand, or uncomfortable questions for respondents. The validity and reliability tests of questionnaires were not employed as they had followed international standards and had been used in previous studies. The implementation stage encompassed sample selection, data collection, supervision and monitoring of data collection activities, and data analysis.

Processing and Analysis of Data

Numerical data for sociodemographic characteristics and health-seeking behavior variables are presented as mean, median, standard deviation, and interquartile range, while numbers and proportions for categorical data. Determinants of delayed diagnosis were analyzed using multivariate analysis with logistic regression. EpiData 3.1. was used for data entry. Subsequently, the data were processed and analyzed using STATA version 13, a statistical software for data management, analysis, and graph creation (StataCorp, 1985). An association between the independent and dependent variables was significant if the p-value was <0.05. The strength of the association was identified with the prevalence odds ratio (POR) value using a 95% confidence interval.

RESULT

A total of 135 individuals agreed to participate as respondents in this study. The median age of respondents was 41 years, with an interquartile range of 19-69 years. Additional sociodemographic characteristics of the respondents are shown in Table 1.

Table 1. Sociodemographic Characteristics, Risk Factors, and Clinical Symptoms of TB Experienced by Respondents (n=135)

Variables	N	Percentage (%)
Gender		
Male	80	59,3
Female	55	40,7
Age		
18-30 years	42	31,1
31-40 years	24	17,8
41-50 years	23	17,0
51-60 years	25	18,5
>60 years	21	15,6
Education (n=133)		
No formal education	3	2,3
Elementary/Middle School	37	27,8
High School	74	55,6
University	19	14,3
Employment Status (n=134)		
Employed	91	67,9
Unemployed	43	32,1
Marital Status		
Married	91	67,4
Divorced	7	5,2
Single	37	27,4
Income		
Above district minimum wage	37	27,4
Below district minimum wage	98	72,6
Savings (n=130)		
Has saving	35	26,9
Income = expenses	85	65,4
In debt	10	7,7
Health Insurance		
Yes	119	88,2
No	16	11,8
Family Size		
≤ 5 members	107	79,3
>5 members	28	20,7
Smoking History (n=132)		
Never smoked	61	46,2
Past/current smoker	71	55,8
Comorbidities		
Yes	31	23,0
No	104	77,0
Symptoms		
Cough	119	88,1
Cough with blood	43	31,9
Fever	83	61,5
Weight loss	106	78,5
Chest pain	68	50,4
Night sweats	65	48,1
Others	27	20,0

According to the table, most respondents are male (59.3%) and 18–30 years (31.1%). Most respondents have attained a senior high school education (55.6%), are employed (67.9%), married (67.4%), have an income below the district minimum wage (72.6%), have an income equal to their expenses or no savings (65.4%), and possess health insurance (88.2%). The proportion of respondents with risk factors for TB includes a family size of more than five people (20.7%), a history of smoking (55.8%), and comorbidities (23.0%). The most common clinical symptoms experienced by respondents are cough (88.1%) and weight loss (78.5%).

The breakdown and proportion of health-seeking behaviors first undertaken by TB patients after the onset of TB symptoms can be seen in Figure 1.

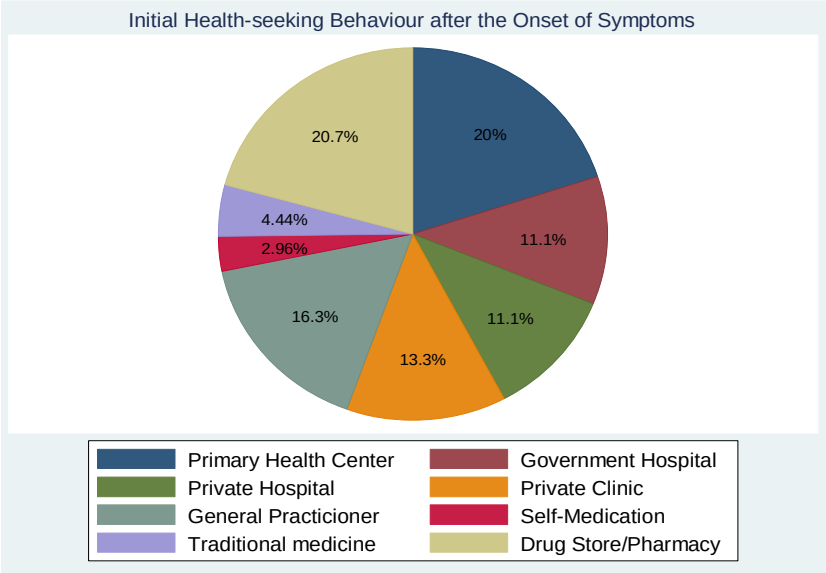

Figure 1. Health-Seeking Behavior after Appearing of TB Symptoms

The distribution and proportion of initial health-seeking behaviors undertaken by TB patients following the onset of symptoms are illustrated in Figure 1. The figure indicates that the most common first responses to TB symptoms are visiting a drugstore/pharmacy (20.7%) or a public health center (20.0%). A proportion of respondents seek care from private or independent doctors (16.3%) and private clinics (13.3%). The proportion of patients visiting public and private hospitals is identical at 11.1%. Only a small percentage opt for traditional medicine (4.4%) or self-medication (2.3%). According to facility ownership, fewer respondents seek care at government health facilities (33.1%) than those who visit private health facilities (40.7%).

Corresponding to the number of health facilities visited before receiving a TB diagnosis, 85.7% of respondents consult 1 to 2 facilities, while 12.0% visit three facilities. A small proportion (2.2%) report visiting 4 to 6 facilities. The median number of facilities visited before diagnosis is 2, with an interquartile range (IQR) of 1 to 2. The diagnostic delay is calculated as the time (in days) between the onset of TB symptoms and the confirmation of the TB diagnosis. Of the 135 respondents, 115 provide analyzable data, as the remaining respondents could not recall the onset of their symptoms. Among the 115 individuals, 87 (75.7%) experienced a diagnostic delay. Table 2 summarizes the time intervals between symptom onset and TB diagnosis.

The median time to diagnosis is 48 days (IQR: 22–107 days). The shortest time to diagnosis is 2 days, while the longest is 1,451 days (nearly four years). According to Table 2, respondents who first seek care at a government hospital are the quickest diagnosed, with a median delay of 26.5 days (IQR: 16–47 days). Conversely, the longest delays are those initially self-medicated experienced, with a median of 189 days (IQR: 35–1,263 days).

Table 2. Difference in Days between Onset of Symptoms and TB Diagnosis Based on First Health-Seeking Behavior (n=115)

First-Time Health-Seeking Behavior	Number and proportion of respondents who were diagnosed late	Mean (SD)	Median	Interquartile range
Primary Health Center	14 (63,6%)	102,4 (171,9)	45	14-78
Government Hospital	7 (58,3%)	75,3 (151,4)	26,5	16-47
Private Hospital	7 (63,6%)	71,4 (82,4)	42	12-133
Private Clinic	13 (86,7%)	84,7 (60,5)	59	34-142
General Practicioner	14 (70%)	126,5 (316,9)	40	15,5-79,5
Self-Medication	3 (100%)	495,7 (668,9)	189	35-1.263
Traditional medicine	6 (100%)	109 (53,2)	129,5	67-150
Drug Store/Pharmacy	23 (88,5%)	101,4 (172,6)	51,5	31-99
Total	87 (75,7%)	108,9 (210,5)	48	22-107

The chi-square analysis results, presented in Table 3, reveal that social support and community TB stigma are significantly associated with diagnostic delays. The respondents with moderate social support have lower odds of experiencing delayed diagnosis (crude OR: 0.4, 95% CI: 0.2–0.9). Similarly, high community TB stigma is associated with reduced odds of delay (crude OR: 0.3, 95% CI: 0.1–0.8). Conversely, the odds of respondents with strong social support experiencing a diagnostic delay are 2.5 times higher (95% CI: 1.1–5.0) than those with moderate social support. Furthermore, the respondents with low TB stigma from the community perspective have 3.3 times higher odds (95% CI: 1.3–10.0) of experiencing a diagnostic delay compared to those with high stigma.

Variables with a p-value < 0.25 are inserted in the logistic regression. These variables include age, education level, marital status, income, insurance coverage, comorbidities, social support, initial health-seeking behavior, the first health facility consulted, the number of health facilities visited before diagnosis, stigma from the patient perspective, and stigma from the community perspective. The final model using backward elimination have found that factors significantly associated with the delayed diagnosis are being unmarried (aOR: 0.3, 95% CI: 0.1–0.9, p = 0.031), moderate social support (aOR: 0.2, 95% CI: 0.1–0.6, p = 0.004), initial health-seeking at a drugstore/pharmacy (aOR: 8.2, 95% CI: 1.6–42.3, p = 0.012), visiting 2–6 health facilities before diagnosis (aOR: 3.1, 95% CI: 1.1–9.3, p = 0.039), and high community stigma (aOR: 0.3, 95% CI: 0.1–0.8, p = 0.019).

Table 3. Determinants of Delay in TB Diagnosis

Variable	Delayed diagnosis				*Crude OR* (95%CI)	*Crude p*	*Adjusted OR* (95%CI)	*Adjusted p*
	Yes		No					
	n	%	n	%				
Age								
≤42 years	46	52,9	19	67,9	*Reference*			
>42 years	41	47,1	9	32,1	1,9 (0,8-4,6)	0,168		
Gender								
Female	37	42,5	12	42,9	*Reference*			
Male	50	57,5	16	57,1	1,0 (0,4-2,4)	0,976		
Education								
High	10	11,8	5	17,9	*Reference*			
Low	27	31,8	5	17,9	2,7 (0,6-11,4)	0,175		
Middle	48	56,5	18	64,3	1,3 (0,4-4,4)	0,639		
Occupation								
Working	56	65,1	19	67,9	*Reference*	0,791		
Not working	30	34,9	9	32,1	1,1 (0,5-2,8)			
Marital status								
Married	60	68,9	14	50,0	*Reference*		*Reference*	
Unmarried	22	25,3	13	46,4	0,4 (0,2-0,9)	0,043	0,3 (0,1-0,9)	0,031
Divorced	5	5,8	1	3,6	1,2 (0,1-10,8)	0,892		
Income								
Above UMK	19	21,8	10	35,7	*Reference*			

Below UMK	68	78,2	18	64,3	1,9 (0,8-5,0)	0.145		
Health insurance								
Yes	79	90,8	23	82,1	*Reference*			
No	8	9,2	5	17,9	0,5 (0,1-1,6)	0,216		
Comorbidities								
Yes	22	25,3	3	10,7	2,8 (0,8-10,3)	0,116		
No	65	74,7	25	89,3	*Reference*			
TB knowledge								
Good	61	70,1	22	78,6	*Reference*			
Poor	26	29,9	6	21,4	1,6 (0,6-4,3)	0,388		
Family support								
Good	68	78,2	23	82,1	*Reference*			
Poor	19	21,8	5	17,9	1,3 (0,4-3,8)	0,653		
Social support								
Strong	40	45,9	9	32,1	*Reference*		*Reference*	
Moderate	31	35,6	18	64,3	0,4 (0,2-0,9)	0,045	0,2 (0,1-0,6)	0,004
Week	16	18,4	1	3,6	3,6 (0,4-30,8)	0,242		
Health care facility visited for the first time								
Health care facility	55	63,2	25	89,3	*Reference*		*Reference*	
Self-medication	3	3,5	0	0	1	-		
Traditional medicine	6	6,9	0	0	1	-		
Drugstore/pharmacy	23	22,6	3	10,7	3,5 (0,9-12,7)	0,058	8,2 (1,6-42,3)	0,012
Health care facility consulted for the first time								
Clinic or lung/TB clinic	4	4,6	3	10,7	0,3 (0,1-1,6)	0,146		
Primary Health Center	29	33,3	6	21,4	*Reference*			
Government hospital/clinic	12	13,8	5	17,9	0,5 (0,1-1,9)	0,315		
Private hospital/clinic	25	28,7	8	28,6	0,6 (0,2-2,1)	0,471		
General Practitioner	14	16,1	6	21,4	0,5 (0,1-1,8)	0,272		
Others	3	3,5	0	0	-	-		
Health care facility consulted for the first time								
NTP	33	37,9	9	32,1	*Reference*			
Non-NTP	54	62,1	19	67,9	0,8 (0,3-1,9)	0,581		
Number of health facilities visited before diagnosis								
1	41	47,1	18	64,3	*Reference*		*Reference*	
2-6	46	52,9	10	35,7	2,0 (0,8-4,9)	0,118	3,1 (1,1-9,3)	0,039
TB stigma from the patient's perspective								
Low	46	52,9	10	35,7	*Reference*			
High	41	47,1	18	64,3	0,5 (0,2-1,2)	0,118		
TB stigma from a community perspective								
Low	46	52,9	7	25,0	*Reference*		*Reference*	0,019
High	41	47,1	21	75,0	0,3 (0,1-0,8)	0,013	0,3 (0,1-0,8)	

UMK = upah minimum kabupaten/kota (district minimum wage district minimum wage), NTP = *national tuberculosis program*

DISCUSSION

The study reveals that 71.8% of the respondents seek care at a health facility as their initial action following the onset of TB symptoms. In comparison, 28.2% pursue informal treatments, such as visiting drugstores/pharmacies, consulting traditional healers, or self-medicating. This finding contrasts with a study conducted in Bandung, which reported that 78.6% of TB patients initially sought treatment from informal healthcare providers or general practices (Lestari et al., 2020). Among the respondents in this study who visit formal health facilities, 43.3% seek care at government-owned facilities, whereas 56.7% opt for private health facilities. These results align with studies from Zambia and China, where government facilities were the primary choice for most TB patients (Kerkhoff et al., 2021; Martinez et al., 2017). Conversely, studies in Pakistan, India, and the Philippines indicated that private facilities were the preferred option for initial treatment (Fatima et al., 2017; Garfin et al., 2017; Hanson et al., 2017; Veesa et al., 2018). Patterns in Cameroon and Bangladesh showed higher reliance on informal healthcare providers (Hossain et al., 2014; Titahong et al., 2021). In this study, only 27.4% of respondents seek care from informal healthcare providers, significantly lower than in these regions. A systematic review from India identified socio-cultural determinants of health-seeking behaviors in urban populations, including age, literacy, income, and stigma. Low-income respondents often prefer government facilities, while those with higher incomes tend to favor private care (Samal, 2016).

The median duration from symptom onset to TB diagnosis in this study is 48 days (IQR: 22–107 days), consistent with findings from a systematic review across low- and middle-income countries, which reported that 42% of pulmonary TB patients delayed seeking care by at least one month. Notably, half of these studies documented median diagnostic delays exceeding two months (Getnet et al., 2017). Such delays increase the likelihood of disease transmission, particularly among bacteriologically positive TB patients (Rabin et al., 2013).

The World Health Organization (WHO) recommends that tuberculosis (TB) diagnosis be completed within 2–3 weeks of symptom onset (WHO, 2011). However, this study reveals that approximately 76% of the respondents are diagnosed with TB more than three weeks after symptoms appeared. The actual diagnostic delay might be even longer than reported. The reason is that the symptom onset date provided by respondents likely reflects the onset of severe symptoms instead of the initial appearance of symptoms (Getnet et al., 2017). Although only three respondents self-medicated after symptoms appeared, all experienced delayed diagnosis, with the longest delays observed among all health-seeking behaviors. This finding aligns with a study conducted in Georgia, which reported that TB patients who engaged in self-medication faced significantly longer diagnostic delays (Rabin et al., 2013).

Regarding the type of health facility, diagnostic delays are generally longer in private facilities than in government ones, except in community health centers. Patients who initially sought care at government hospitals experienced the shortest diagnostic delays, corroborating findings from Kerala, India, where delays were more prevalent in private facilities (Menberu et al., 2022). This disparity may be attributed to substandard TB services in private facilities (Adepoju et al., 2022). Conversely, longer delays in community health centers may result from healthcare workers' inability to recognize TB symptoms or failure to conduct or refer patients for further diagnostic investigations (Osei et al., 2015). Even when patients visit government health facilities offering TB diagnostics, negative test results often lead to alternative treatments before a definitive TB diagnosis is established. Patients are also frequently treated for upper respiratory tract infections, typhoid, or malaria before receiving a TB diagnosis (Mbuthia et al., 2018).

Being unmarried is a protective factor against diagnostic delays (aOR 0.3; 95% CI 0.1–0.9), indicating that married respondents are 3.3 times more likely to experience delays (95% CI 1.1–10). This finding aligns with a study in Ethiopia, which suggested that married individuals often prioritize work to support their families, potentially delaying healthcare-seeking behavior (Jima et al., 2023). However, a meta-analysis from Ethiopia reported that being unmarried was a risk factor for delayed diagnosis (Fetensa et al., 2022).

The respondents who initially seek care at drugstores/pharmacies have 8.2 times higher odds (95% CI 1.6–42.3) of experiencing diagnostic delays than those who visit health facilities. A study in Peru similarly found that pharmacies rarely provide TB-related advice, screening, or treatment, contributing to diagnostic delays (Bonadonna et al., 2017).

Social support, particularly from family and friends, significantly motivates individuals to access healthcare services. The association between social support and health-seeking behavior may be mediated by the patient's perception of symptom severity. Insufficient social support can increase the perceived severity threshold, leading to treatment delays (Bonadonna et al., 2017). Social support comprises instrumental (e.g., informational) and emotional components. A study in China demonstrated an inverse relationship between instrumental support and barriers to TB treatment, particularly for educated urban residents. Contrarily, emotional support correlated positively with emotional barriers, a relationship more pronounced among less-educated rural residents (Rui & Du, 2023). In this study, where most respondents have a high school education, moderate social support appears to be a protective factor against diagnostic delays. However, high social support has also been linked to delays due to increased reliance on traditional health services (Ambaw et al., 2019).

The median number of health facilities visited before diagnosis in this study is two, significantly lower than the median of six reported in a Bandung study (IQR: 4–8) (Lestari et al., 2020). Frequent visits to multiple facilities highlight missed opportunities for timely TB diagnosis (Miller et al., 2021). Notably, 43.7% of the respondents in this study initially self-medicate or seek care from informal providers and independent doctors, many of whom cannot diagnose TB (Lestari et al., 2020).

The stigma associated with TB has been assessed using a community-based questionnaire. Most respondents strongly agree with statements about being avoided during meals and socially distanced, reflecting pervasive TB stigma. This stigma is often defined by misinformation and fear of contagion (Oladele et al., 2021). A Cambodian study noted that higher TB knowledge scores were inversely associated with stigma (Teo et al., 2020). In this study, 70.1% of respondents experiencing diagnostic delays demonstrate good TB knowledge, suggesting the complexity of stigma's role in health-seeking behavior.

This study's strength lies in its generalizability, as the sampling technique has been designed to represent TB patients treated at public health centers in Jambi Municipality. However, several limitations must be acknowledged, including an insufficient sample size to detect differences across some variables and potential recall bias when reporting dates such as symptom onset or initial health visits. Efforts to mitigate this bias include setting inclusion criteria to interview only patients undergoing recent treatment and anchoring dates to specific events using a digital calendar.

CONCLUSIONS AND RECOMMENDATIONS

The most common initial health-seeking behaviors after the onset of symptoms are visiting a pharmacy (20.7%) and a health center (20%). A total of 75.7% of tuberculosis (TB) patients experience delays in diagnosis. The median time from symptom onset to TB diagnosis is 48 days, with an interquartile range of 22–107 days. Several variables are significantly associated with delayed diagnosis, including being unmarried (adjusted odds ratio [aOR] 0.3, 95% confidence interval [CI] 0.1–0.9, p = 0.031), moderate social support (aOR 0.2, 95% CI 0.1–0.6, p = 0.004), first health-seeking behavior at a pharmacy or drugstore (aOR 8.2, 95% CI 1.6–42.3, p = 0.012), visiting 2–6 health facilities before diagnosis (aOR 3.1, 95% CI 1.1–9.3, p = 0.039), and experiencing high levels of TB-related stigma from a community perspective (aOR 0.3, 95% CI 0.1–0.8, p = 0.019).

To address these challenges, a comprehensive evaluation of the Public-Private Mix (PPM) initiative is essential, specifically focusing on the role of pharmacies and drugstores in referring TB suspects to nearby health facilities. Similarly, the effectiveness of PPM activities in private health facilities should be assessed. Furthermore, TB screening practices at community health centers should be evaluated to identify and mitigate gaps in service delivery. Large-scale community education campaigns are needed to increase TB awareness and promote timely health-seeking behavior. The TB program in Jambi Municipality should prioritize the development of targeted strategies to accelerate diagnosis among populations at risk of delays. Community engagement is also crucial to encourage TB suspects to seek medical care promptly and to provide psychosocial support to individuals diagnosed with TB. These efforts can contribute to reducing delays in TB diagnosis and improving overall treatment outcomes.

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