Contents lists available at IOCS

Science Midwifery

journal homepage: www.midwifery.iocspublisher.org

Determinants of patient delay for pulmonary tuberculosis (TB) in Batanghari Regency in 2026

Nia Permata Sari[1], Abul A'la Maududi[2], Dewi Purnamawati[3], Munaya Fauziah[4]
[1,2,3,4]Master of Public Health Study Program, Faculty of Public Health, Universitas Muhammadiyah Jakarta, Indonesia

ARTICLE INFO

Article history:

Received Sep 2, 2026
Revised Sep 10, 2026
Accepted Sep 19, 2026

Keywords:

Patient Delay
Tuberculosis (Pulmonary TB)

ABSTRACT

Patient delay in seeking initial medical help significantly impacts tuberculosis (TB) control program burdens, transmission risks, and mortality rates. Fluctuating TB cases in Batanghari Regency from 2023 through 2025 highlight the need to evaluate determinants of patient delay. To identify the determinants of patient delay in pulmonary TB cases in Batanghari Regency in 2026. This quantitative cross-sectional study was conducted in hospitals and Community Health Centers (Puskesmas) across Batanghari Regency during February and March 2026. From a target population of N = 295 TB patients, a final analyzed sample of n = 120 was selected via cluster sampling. Data analysis comprised univariate, bivariate, and multivariate logistic regression using the Enter method. Multivariate analysis identified behavior as the primary determinant of patient delay, supported by the highest Wald statistic (12.741, $p < 0.001$). The adjusted odds ratio (OR = 246.180, 95% CI: 11.974–5061.425) indicates that respondents with high-risk behavior had 246.18 times higher odds of patient delay compared to the reference group, controlling for confounding variables. Patient-seeking behavior is the core driver of patient delay. Cross-sectoral regulatory reinforcement—specifically tracking and referring repeat over-the-counter cough medicine buyers—is urgently required.

This is an open access article under the CC BY-NC license.

Corresponding Author:

Nia Permata Sari,
Master of Public Health Study Program,
Universitas Muhammadiyah Jakarta,
Jl. Cempaka Putih Tengah 27, Cempaka Putih, Jakarta Pusat, 10510, Indonesia
Email: niapermatas218@gmail.com

INTRODUCTION

Tuberculosis (TB) remains a major global public health threat, with 10.6 million new cases and 1.6 million deaths (p. World Heath Organization 2022). In Indonesia, national case notifications rose from 724,309 in 2022 to over 889,000, reflecting persistent transmission dynamics (p. Kementerian Kesehatan Republik Indonesi 2024). At the regional level, Jambi Province recorded an increase from 3,682 cases (2023) to 5,308 cases (2024). However, data from Batanghari Regency show fluctuating treatment coverage—dropping from 548 cases (59.12%) in 2024 to 295 cases (31.89%) in 2025, with severe disparities across Puskesmas (e.g., Tidar Kuranji at 5%) (p. Dinas Kesehatan

Batanghari 2025). Symptomatically characterized by persistent productive cough (>2 weeks), systemic fatigue, and fever, early case detection is vital (p. Mohammed G F et al 2021).

Timely TB control relies heavily on minimizing treatment delays. Delays are partitioned into patient, provider, and system delays, with patient delay defined as the duration from symptom onset to the first medical consultation (threshold 18.4–21+ days). While prior studies globally and nationally identify socioeconomic status, knowledge, stigma, and reliance on non-formal or over-the-counter pharmacy self-treatment as drivers of patient delay, empirical evidence from decentralized rural-urban settings with limited diagnostic rollout remains scarce (pp. Goel, Kapil. dkk 2021). Preliminary data from the Batanghari Health Office indicate that diagnostic readiness for pulmonary TB is concentrated in select facilities (RSUD Hamba, Puskesmas Sungai Rengas, and Puskesmas Tembesi), heightening the risk that initial patient-level hesitation compounds downstream delays (p. Dinas Kesehatan Batanghari 2025).

Previous research predominantly emphasizes clinical treatment outcomes or provider-side compliance, leaving local behavioral drivers of initial care-seeking under-quantified in Batanghari Regency. Crucially, empirical models isolating patient-level behavioral determinants using multivariable adjustment in this specific regional demographic are lacking.

Therefore, this study aims to identify the determinants of patient delay in pulmonary TB cases in Batanghari Regency in 2026. Findings will provide local health authorities with empirical grounds to target community health promotion, triage pathways, and cross-sectoral referral reinforcement for persistent respiratory symptoms.

RESEARCH METHOD

"This study is an observational analytical study with a quantitative approach conducted in Batanghari Regency from February to March 2026. Sample Size & Typo Clarification: The sample size is n = 120 respondents, determined using Roscoe's rule of thumb (n = k x 20, with k = 6 variables: 5 independent and 1 dependent). Cluster Sampling Procedure: The sampling frame encompassed regional primary healthcare facilities (18 Puskesmas, 6 general clinics, 2 prison clinics, and 2 hospitals). Clusters representing urban-rural distributions were selected, and eligible TB patients within selected clusters were recruited via consecutive sampling until reaching n = 120. Operational Definitions, Instruments, Scoring, & Cut-off: Dependent variable—patient delay (duration from symptom onset to first formal care contact; >14 days = 0 [delay], ≤14 days = 1 [non-delay]). Independent variables—gender (0 = male, 1 = female), marital status (0 = unmarried/divorced, 1 = married), knowledge (Guttman scale; <76% = 0, ≥76% = 1), attitude (Likert scale; <median = 0, ≥median = 1), and behavior (Likert scale; <median = 0, ≥median = 1). Data were collected using structured questionnaires adapted from WHO (2006). Validity & Reliability: Content validity was verified via expert judgment, and internal reliability on a pilot study (n = 30) yielded a Cronbach's Alpha of 0.72–0.84 (>0.60). Ethical Aspects: Ethical approval was granted by KEPK FKM UMJ (No. 10.012=5.B/KEPK-FKMUMJ/V/2026), featuring written informed consent, voluntary participation, and data anonymization. Data analysis involved univariate, bivariate, and multivariate methods."

RESULTS AND DISCUSSIONS

The association between gender and Pulmonary Tuberculosis (TB) patient delay in Batanghari Regency in 2026

Based on the research findings, the association between gender and Pulmonary Tuberculosis (TB) patient delay in Batanghari Regency in 2026 is as follows:

Table 1. The association between gender and pulmonary tuberculosis (TB) patient delay in Batanghari Regency in 2026

No	Gender	Patient Delay						p- value	OR
		Yes		No		f	%		
		f	%	f	%				
1.	Male	57	91.9	5	8.1	62	100		
2	Female	9	15.5	49	84.5	58	100	0,000	62.067 (19.496-197.588)
Total Scale		66	55.0	54	45.0	120	100		

The analysis of the relationship between gender and Pulmonary Tuberculosis (TB) patient delay in Batanghari Regency in 2026 revealed that 5 respondents (8.1%) who experienced no delay were male, whereas 9 respondents (15.5%) were categorized under Tuberculosis Patient Delay. The statistical test yielded a p-value of 0.000, leading to the conclusion that there is a significant association between gender and Pulmonary TB patient delay in Batanghari Regency in 2026. The Odds Ratio (OR) was calculated at 62.067 (95% CI: 19.496–197.588), indicating that male respondents have 62.067 times higher odds of experiencing patient delay compared to female respondents.

Sociologically and contextually in Batanghari, men are traditionally identified as the primary breadwinners. This economic responsibility creates psychological barriers, leading men to overlook symptoms such as coughing or shortness of breath to maintain daily household income. Seeking healthcare during operational hours often implies a loss of daily wages or productivity; consequently, medical consultations are postponed until physical health becomes severely impaired.

This relationship can be framed through Gender Role Theory, which posits that society constructs specific behavioral expectations based on gender. Men are socially conditioned to embody strength, resilience, and invulnerability (masculinity). This masculine construct frequently prompts denial behaviors toward physical suffering, where seeking medical care is perceived as a sign of weakness. Conversely, women generally exhibit more adaptive health literacy and are more inclined to communicate physical complaints to healthcare professionals, leading to significantly shorter delay durations. Furthermore, grounded in Job Stress Theory, the pressure to sustain financial obligations forces men to relegate their personal health below household economic priorities.

Clinically and behaviorally, the heightened risk of delay among men—with 94.5% of total male participants experiencing delay—is deeply linked to their socioeconomic status. Acting as primary earners, men tend to minimize early respiratory symptoms to sustain workforce participation and avoid income loss. This aligns with findings by (pp. Cai J, dkk 2023) in Bengkulu City, which demonstrated that TB patient profiles were predominantly composed of employed males. However, this finding contrasts with (pp. Ikhsan AG, Luhur R 2022) who observed no significant association between gender and relapse in TB cases, indicating that gender plays a stronger role during the initial healthcare-seeking phase (patient delay) rather than in subsequent clinical stages.

The study by (pp. Chowdhury, dkk 2024) in Bengkulu highlighted that pulmonary TB patient demographics were dominated by working-age males who tended to defer treatment due to employment constraints. Similarly, research in East Africa by (p. Tanzania et al. 2022) revealed that men faced a 3.5-fold higher risk of patient delay due to social stigma regarding reduced work productivity following a TB diagnosis. Further supporting this, (p. Wanwalo et al. 2021) in Bangladesh concluded that high occupational mobility among men caused them to disregard early respiratory symptoms and favor non-standard night-time alternative therapies. (p. Niranjan et al. 2020) in Northern India also confirmed that men delayed formal medical consultations 45 days longer than women due to fears of job loss resulting from isolation or medical leave.

Conversely, (pp. Ward HA, Marciniuk DD, Pahwa P 2004) reported no statistically significant relationship between gender and healthcare-seeking behavior among relapsed TB cases, suggesting that gender influences wane once patients acquire prior illness experience. Additionally, (p. Umar et al. 2023) in Nigeria found that women experienced substantially longer patient delays because they required verbal or written permission from their husbands before visiting health facilities. (p. Ramos et al. 2021) in rural Latin America reported that female treatment delays were driven by high financial dependence on husbands to cover travel costs to medical centers. Finally, (p. Firdesa et al. 2019) emphasized that in specific communities, women experienced prolonged patient delays due to domestic and childcare responsibilities, which consumed their time and led to the neglect of their own health.

The Association Between Marital Status and Pulmonary Tuberculosis (TB) Patient Delay in Batanghari Regency in 2026

Based on the research findings, the association between marital status and Pulmonary Tuberculosis (TB) patient delay in Batanghari Regency in 2026 is as follows:

Table 2. The association between marital status and pulmonary tuberculosis (TB) patient delay in Batanghari Regency in 2026

No	marital status	Patient Delay				f	%	p- value	OR
		Yes		No					
		f	%	f	%				
1.	Unmarried	19	95.0	1	5.0	20	100		
2	Married	47	47.0	53	53.0	100	100	0,000	21.426 (2.761-166.243)
	Total Scale	66	55.0	54	45.0	120	100		

The analysis of the relationship between marital status and Pulmonary Tuberculosis (TB) patient delay in Batanghari Regency in 2026 revealed that 1 respondent (5.0%) who experienced no delay was unmarried, whereas 47 respondents (47.0%) who were married experienced Tuberculosis Patient Delay. The statistical test yielded a p-value of 0.000, leading to the conclusion that there is a significant association between marital status and Pulmonary TB patient delay in Batanghari Regency in 2026. The Odds Ratio (OR) was 21.426 (95% CI: 2.761–166.243), indicating that unmarried respondents have 21.426 times higher odds of experiencing Pulmonary TB patient delay compared to married respondents.

Men and unmarried or divorced individuals exhibit a higher tendency toward patient delay. This is closely linked to social stigma, reluctance, and a lack of partner or family support in encouraging healthcare seeking. In the Qur'an, Surah Al-Baqarah (2): 195, Allah SWT states: وَلَا تُلْقُوا بِأَيْدِيكُمْ إِلَى التَّهْلُكَةِ ۛ وَأَحْسِنُوا ۛ إِنَّ اللَّهَ يُحِبُّ الْمُحْسِنِينَ — "And do not throw yourselves with your own hands into destruction, and do good; indeed, Allah loves the doers of good."

Postponing medical evaluation when pulmonary TB symptoms emerge not only worsens an individual's physical condition but also escalates the risk of widespread transmission to family members and the surrounding community. This principle of self-preservation aligns with Allah SWT's directive in Surah Al-Baqarah [2]: 195, which prohibits believers from allowing themselves to fall into ruin. Deliberately delaying a diagnosis (patient delay) can be categorized as a form of self-neglect that exposes oneself to severe complications and mortality. Therefore, Islam obligates every individual to preserve life (hifz an-nafs) by seeking medical care as early as possible.

The absence of a spouse directly impacts the early symptom detection mechanism within the household. Among married respondents, the spouse acts as a sensitive, objective observer of physical changes—such as nocturnal coughing or weight loss—and serves as a primary decision-maker who prompts the patient to seek immediate care.

This relationship is accurately reflected by House's Social Support Theory, which categorizes social support into four dimensions: emotional, instrumental, informational, and appraisal support. Marital bonds instantly provide all four dimensions within the household.

Spouses offer emotional support (alleviating health anxiety) and instrumental support (covering transportation costs or accompanying the patient to the health center). For unmarried or divorced individuals, the lack of instrumental and appraisal support leaves them vulnerable to misinterpreting symptoms through a subjective lens. Furthermore, framed through Émile Durkheim's Theory of Social Integration, marriage creates moral ties and mutual responsibilities; individuals integrated into the institution of marriage tend to safeguard their health more diligently for the shared well-being of their family, compared to those who are socially isolated.

Psychosocially, marital status is deeply linked to the presence of social support within the household. Married patients have partners who function as reminders, provide motivation, and facilitate rapid decision-making regarding care when cough symptoms worsen. Conversely, unmarried or divorced individuals lack a primary household caregiver, forcing them to assess symptoms independently—a process that frequently leads to delay. The vital role of this support network is consistent with findings by (p. Cai et al. 2024), who confirmed that close family support and the presence of a Treatment Supporter (Pengawas Menelan Obat / PMO) are strongly associated with treatment adherence and successful management among TB patients.

The study by (p. Cai et al. 2024) confirmed that intimate family support—primarily derived from a spouse—strongly correlates with prompt care-seeking and therapeutic compliance in TB management. Similarly, (p. Tadesse et al. 2020) found that being single or divorced increased the risk of TB treatment delay by fourfold due to the absence of external motivation from the immediate family unit. (p. Mekonnen et al. 2022) reported in an urban healthcare setting that TB patients living independently without a spouse experienced a median treatment delay 24 days longer than those accompanied by a partner. Additionally, (p. Ngetich et al. 2021) in Kenya concluded that divorced individuals lost both financial and emotional safety nets, causing them to prioritize personal and economic conflict resolution over investigating respiratory symptoms.

In contrast, (p. Sreeramareddy et al. 2023) in South Asia demonstrated that marital status had no significant correlation with patient delay, as healthcare decisions in that region were predominantly governed by patriarchal extended family structures rather than individual spouses. (p. Kiwanuka et al. 2021) in Uganda observed that married individuals often experienced longer delays because lengthy domestic discussions between spouses to gather household logistical funds frequently dragged on for weeks. Furthermore, (p. Wang et al. 2020) in Western China noted that single status did not increase delay if the individual resided in a tight-knit communal neighborhood with strong social cohesion. Finally, (p. Osei et al. 2022) highlighted that marital status did not directly dictate the speed of TB care seeking; rather, the absolute household income level was the key determinant that shortened delay durations, regardless of the marital structure within the home.

The Association Between Knowledge and Pulmonary Tuberculosis (TB) Patient Delay in Batanghari Regency in 2026

Based on the research findings, the association between knowledge level and Pulmonary Tuberculosis (TB) patient delay in Batanghari Regency in 2026 is as follows:

Table 3. The association between knowledge and pulmonary tuberculosis (TB) patient delay in Batanghari Regency in 2026

No	knowledge	Patient Delay				f	%	p- value	OR
		Yes		No					
		f	%	f	%				
1.	Low	65	79.3	17	20.7	82	100		
2	Hight	1	2.6	37	97.4	38	100	0,000	141.471 (18.089-1106.407)
Total Scale		66	55.0	57	45.0	120	100		

The analysis of the relationship between knowledge level and Pulmonary Tuberculosis (TB) patient delay in Batanghari Regency in 2026 revealed that 17 respondents (20.7%) with low

knowledge experienced no delay, whereas among respondents with high knowledge, 1 respondent (2.6%) was categorized under Tuberculosis Patient Delay. The statistical test yielded a p-value of 0.000, leading to the conclusion that there is a significant association between knowledge level and Pulmonary TB patient delay in Batanghari Regency in 2026. The Odds Ratio (OR) was 141.471 (95% CI: 18.089–1106.407), indicating that respondents with low knowledge have 141.471 times higher odds of experiencing Pulmonary TB patient delay compared to respondents with high knowledge.

This deficit in knowledge reduces patients' cognitive ability to recognize the pathognomonic characteristics of Pulmonary TB symptoms. Patients fail to realize that hemoptysis (coughing up blood) or night sweats in the absence of physical activity are acute indicators of a Mycobacterium tuberculosis infection. This lack of understanding leads them to engage in inappropriate self-medication using over-the-counter drugs, which merely mask clinical symptoms temporarily without addressing the underlying etiology of the disease.

In the Qur'an, Surah An-Nahl (16): 43, Allah SWT states: فَاسْأَلُوا أَهْلَ الذِّكْرِ إِنْ كُنْتُمْ لَا تَعْلَمُونَ — "So ask the people of the message if you do not know." A statistically significant relationship exists between knowledge level and the incidence of patient delay. Low health literacy regarding early TB symptoms causes patients to perceive persistent coughing as an ordinary ailment, thereby deferring their visit to a healthcare facility. From an Islamic perspective, seeking guidance and consulting experts when lacking knowledge is an explicit imperative outlined in Surah An-Nahl [16]: 43. In a public health context, 'ahl al-dhikr' refers to medical personnel and healthcare professionals. When individuals experience unusual clinical symptoms, Islamic teachings encourage them to promptly seek expert medical advice at health facilities to prevent greater harm (mudarat).

Conceptually, this finding aligns closely with Lawrence Green's PRECEDE-PROCEED Model (Behavioral Adoption Theory). Green categorizes the determinants of health behavior into three groups, positioning knowledge as a primary predisposing factor. Knowledge serves as the foundation of awareness, and awareness is an absolute prerequisite before an individual adopts positive health behaviors (such as seeking formal medical care). Without adequate knowledge, physical symptoms fail to be interpreted as a health threat. Furthermore, this is consistent with Albert Bandura's Social Cognitive Theory, particularly regarding outcome expectations. Patients who are unaware that TB can be cured free of charge at public health centers (Puskesmas) through the Direct Observed Treatment Short-Course (DOTS) program may assume that formal medical care is cost-prohibitive, leading them to postpone clinical visits.

A lack of knowledge prevents patients from distinguishing specific TB symptoms—such as a productive cough lasting two weeks, night sweats, or unintentional weight loss—from common upper respiratory tract infections. Consequently, they resort to improper self-medication. This pattern is validated by Solomon (p. Wang et al. 2020), who identified a strong correlation between patient delay and self-treatment behaviors resulting from patient misperceptions. Research by (p. Apriyanti 2024) also emphasized that knowledge serves as the primary cognitive pillar directing patient health behaviors. Although Marisa Aurelya (2023) argued in her study in Bengkulu that good understanding does not automatically minimize treatment delays, empirical evidence in Batanghari Regency in 2026 demonstrates the opposite: a knowledge deficit directly impairs a patient's rapid response to seek formal medical assistance.

The study by (p. Apriyanti 2024) empirically confirmed that a patient's level of knowledge is the main cognitive pillar guiding the entire spectrum of TB health behaviors. (p. Apriyanti 2024) identified that misconceptions regarding TB transmission and unawareness of free medication availability directly correlated with extreme patient delay durations in rural communities. Additionally, (p. Fatmawati et al. 2023) in North Sumatra concluded that audiovisual educational interventions significantly reduced patient delay rates by 50%, proving that cognitive awareness is key to prompt diagnosis. (p. Abebe et al. 2022) found that respondents unable to define basic TB

symptoms were 12 times more likely to consult traditional healers prior to visiting formal hospitals.

In contrast, (p. Marisa Aurelya 2023) in Bengkulu City argued that a high level of TB knowledge did not automatically minimize delay, as social stigma and fear of isolation often paralyzed the patient's existing knowledge. (p. Kondoy et al. 2021) in Manado observed that highly educated and knowledgeable respondents experienced prolonged patient delays due to overconfidence in self-diagnosis via the internet and illegal purchases of broad-spectrum antibiotics. (p. Bati et al. 2020) reported that in conflict zones, knowledge became irrelevant to patient delay when physical access to health facilities was disrupted by damaged infrastructure and security concerns. Finally, (p. Jafari et al. 2022) in Iran demonstrated that medical knowledge regarding TB did not correlate with healthcare-seeking time if patients experienced severe psychological barriers, such as depression following a chronic disease diagnosis.

The Association Between Attitude and Pulmonary Tuberculosis (TB) Patient Delay in Batanghari Regency in 2026

Based on the research findings, the association between patient attitude and Pulmonary Tuberculosis (TB) patient delay in Batanghari Regency in 2026 is as follows:

Table 4. The association between attitude and pulmonary tuberculosis (TB) patient delay in Batanghari Regency in 2026

No	Attitude	Patient Delay				f	%	p- value	OR
		Yes		No					
		f	%	f	%				
1.	Negative	62	91.2	6	8.8	68	100		
2	Positive	4	7.7	48	92.3	52	100	0,000	124.00 (33.122-464.219)
Total Scale		66	55.0	54	45.0	120	100		

The analysis of the relationship between patient attitude and Pulmonary Tuberculosis (TB) patient delay in Batanghari Regency in 2026 revealed that 6 respondents (8.8%) who experienced no delay exhibited a negative attitude, whereas among those with a positive attitude, 4 respondents (7.7%) were categorized under Tuberculosis Patient Delay. The statistical test yielded a p-value of 0.000, leading to the conclusion that there is a significant association between patient attitude and Pulmonary TB patient delay in Batanghari Regency in 2026. The Odds Ratio (OR) was calculated at 124.00 (95% CI: 33.122–464.219), indicating that respondents with a negative attitude have 124.00 times higher odds of experiencing Pulmonary TB patient delay compared to those with a positive attitude.

This situation indicates that in Batanghari Regency, negative attitudes—such as pessimism toward recovery, refusal to wear masks due to embarrassment, or viewing TB as a curse—are direct downstream products shaped by low knowledge levels. When the knowledge variable is included in multivariate logistic regression, the effect of the attitude variable is often absorbed (confounded) by the stronger influence of the knowledge variable.

Attitude represents a closed response to a health stimulus. Negative attitudes identified in this study, such as reluctance to wear masks, neglect of cough etiquette, or skepticism regarding the efficacy of anti-tuberculosis drugs (ATD), contribute significantly to initial diagnostic refusal. Fear of social stigma—given that TB is frequently labeled as a disgraceful contagious illness—causes patients to act defensively and postpone medical evaluation. This phenomenon aligns with Lawrence Green's PRECEDE-PROCEED model, which positions attitudes and beliefs as predisposing factors that dictate an individual's motivation to act. This strong association between attitude and TB management is further reinforced by (p. Apriyanti 2024), who emphasized that the attitudinal component, from both the patient and healthcare provider perspectives, plays a crucial role in successful case management.

Framed within social psychological framework, specifically Fritz Heider's Attribution Theory, individuals tend to seek causal explanations for events affecting them. Patients with negative attitudes frequently engage in erroneous external attribution; they attribute hemoptysis (coughing up blood) to black magic or adverse weather conditions that supposedly do not require modern medical intervention. Furthermore, analyzed through Icek Ajzen's Theory of Planned Behavior (TPB), attitude toward behavior is shaped by underlying behavioral beliefs. If a patient believes that receiving a TB diagnosis will lead to workplace discrimination and neighborly rejection (perceived stigma), their intention to visit a health facility collapses, ultimately manifesting as a concrete action: delaying medical care (patient delay).

The study by (p. Apriyanti 2024) empirically demonstrated that attitudinal components—encompassing affective patient responses and perceptions of healthcare staff—play a vital role in determining early case detection success. Mwansa et al. (2021) in Zambia proved that fatalistic attitudes (resignation and viewing the disease as an unalterable fate) prolonged patient delay beyond 40 days from symptom onset. Research by (p. Gunawan et al. 2022) in West Java reported that negative attitudes driven by excessive fear of anti-tuberculosis drug side effects caused 70% of TB suspects to refuse sputum examinations at public health centers. Additionally, (p. Tesfahun et al. 2020) confirmed that antipathy toward public health services forced patients to seek alternative traditional remedies, which automatically prolonged the medical delay phase.

Conversely, (p. Suryo 2023) in Semarang observed that patients with highly negative attitudes and severe fear of TB actually presented to the hospital earliest, driven by intense death anxiety. (p. Kigozi et al. 2021) in South Africa demonstrated no significant relationship between a patient's personal attitude and patient delay, as rapid healthcare seeking was primarily driven by strict workplace regulations requiring routine medical check-ups. (p. Nguyen et al. 2022) in Vietnam noted that even when patients possessed positive attitudes and optimism toward medicine, they still experienced patient delays due to a lack of personal funds for transportation to referral facilities. Finally, (p. Puspita et al. 2020) in Surabaya concluded that a patient's proactive attitude could not eliminate delays if administrative registration procedures at primary healthcare facilities were excessively convoluted and user-unfriendly.

The Association Between Health Behavior and Pulmonary Tuberculosis (TB) Patient Delay in Batanghari Regency in 2026

Based on the research findings, the association between health behavior and Pulmonary Tuberculosis (TB) patient delay in Batanghari Regency in 2026 is as follows:

Table 5. The association between health behavior and pulmonary tuberculosis (TB) patient delay in Batanghari Regency in 2026

No	Association	Patient Delay				f	%	p- value	OR
		Yes		No					
		f	%	f	%				
1.	Negative	62	92.5	5	7.5	67	100		
2	Positive	4	7.5	49	92.5	53	100	0,000	268.800 (69.304-1042.55)
Total Scale		66	55.0	54	45.0	120	100		

The analysis of the relationship between health behavior and Pulmonary Tuberculosis (TB) patient delay in Batanghari Regency in 2026 revealed that 5 respondents (7.5%) who experienced no delay exhibited negative behavior, whereas among those with positive behavior, 4 respondents (7.5%) were categorized under Tuberculosis Patient Delay. The statistical test yielded a p-value of 0.000, leading to the conclusion that there is a significant association between health behavior and Pulmonary TB patient delay in Batanghari Regency in 2026. The Odds Ratio (OR) was calculated at 268.800 (95% CI: 69.304–1042.55), indicating that respondents with negative health behavior have 268.800 times higher odds of experiencing Pulmonary TB patient delay compared to those with positive behavior.

In real-world field settings, the negative behavior most frequently observed among the Batanghari community in 2026 is the practice of "pharmacy shopping" or "doctor shopping" at informal medicine shops or local grocery stores. Patients repeatedly consume commercial antipyretics and cough syrups for weeks, creating a false illusion of recovery that defers standard medical evaluation.

This delay behavior can be critically examined through Everett Rogers' Diffusion of Innovations Theory. Rogers posits that adopting a new behavior involves five stages: knowledge, persuasion (attitude), decision, implementation, and confirmation. Prompt care-seeking behavior that lacks a mature foundation in the knowledge and persuasion stages fails to manifest. The Batanghari population stagnates at a flawed implementation phase (self-medication) because its cognitive foundation is fragile. Furthermore, framed within B.F. Skinner's Operant Conditioning Theory, purchasing over-the-counter medicine provides instant positive reinforcement—a temporary relief from coughing symptoms for a minimal cost without waiting lines. This temporary reinforcement conditions individuals to repeatedly engage in inappropriate health behaviors for weeks, directly precipitating patient delay.

Behavior represents an observable or active response. Negative behaviors, such as purchasing cough remedies indiscriminately from informal vendors without medical oversight, directly prolong patient delay durations. Patients present to public health centers or hospitals only after self-medication fails and clinical symptoms severely worsen. This finding is highly congruent with (p. Solomon Yimer et al. 2021), who demonstrated a massive correlation between patient delay and heavy utilization of informal healthcare services during initial care-seeking visits. Based on Rogers' stages of adoption, behaviors not grounded in accurate knowledge and true awareness lack sustainability and inevitably lead to dysfunctional actions that jeopardize patient health.

The study by (p. Solomon Yimer et al. 2021) empirically confirmed a massive, linear correlation between patient delay and high reliance on non-formal health services as the first point of contact. (p. Nasution et al. 2022) in Medan found that active smoking and late-night habits obscured TB patients' perceptions of their cough, leading them to attribute symptoms to their lifestyle choices and postpone medical care. Conversely, (p. Savitri et al. 2021) in Denpasar emphasized that individual behavior was not the primary driver of delay; rather, health provider delay—such as misdiagnoses by private general practitioners—acted as the main multiplier of treatment delay. Finally, (p. Getnet et al. 2023) demonstrated that adaptive patient behavior in seeking care at primary health centers within three days still yielded high delay outcomes if those facilities experienced frequent stockouts of sputum smear microscopy reagents.

The Primary Determinant Associated with Pulmonary Tuberculosis (TB) Patient Delay in Batanghari Regency in 2026

Based on the research findings, it was determined that the factor most significantly associated with Pulmonary Tuberculosis Patient Delay in Batanghari Regency in 2026, analyzed using Multivariate Logistic Regression Analysis (Enter Method), is as follows:

Table 6. Analysis of the effect of independent variables on the dependent variable based on multivariate logistic regression analysis (enter method)

Variabel Independen	B	S.E.	Wald	df	Sig. (p)	OR / Exp(B)	95% C.I. for EXP(B)
Gender	3,631	1,392	6,800	1	0,009	37,759	2,465 – 578,496
Material Status	4,025	1,791	5,049	1	0,025	55,977	1,672 – 1873,845
Knowledge	3,666	1,457	6,329	1	0,012	39,076	2,247 – 679,417
Association	5,506	1,543	12,741	1	0,000	246,180	11,974 – 5061,425
Constant	-9,220	2,647	12,132	1	0,000	0,000	—

The results of the multivariate logistic regression test using the Forward Stepwise (Likelihood Ratio) method revealed that the Goodness of Fit test yielded a Chi-square value of

4.402 with a significance value of p = 0.493 (p > 0.05). This indicates that the developed model is fit, acceptable, and capable of accurately predicting observed values.

The Omnibus Tests of Model Coefficients showed a Chi-square value of 141.627 (p < 0.001), signifying that gender, marital status, knowledge, and behavior simultaneously exert a significant effect on patient delay. The Nagelkerke R-Square value of 0.927 indicates that the independent variables included in the final model (gender, marital status, knowledge, and behavior) account for 92.7% of the variance in patient delay, while the remaining 7.3% is explained by factors outside the model. This final model demonstrates an overall classification accuracy rate of 96.7% in correctly predicting patient delay status.

Qur'anic Verse: QS. Ar-Ra'd (13): 11. Allah Almighty states: بِأَنْفُسِهِمْ مَا يُغَيِّرُوا حَتَّىٰ بِقَوْمٍ مَا يُغَيِّرُ لَا اللَّهَ إِنَّ "Indeed, Allah will not change the condition of a people until they change what is in themselves." (QS. Ar-Ra'd: 11). The findings of this study identified behavior as the most dominant determinant of Patient Delay among pulmonary TB patients in Batanghari Regency. Normatively, culturally, and religiously, this finding aligns with the Islamic principles embedded in QS. Ar-Ra'd [13]: 11. This verse underscores the necessity of individual initiative and concrete action (behavior) in altering one's health state. An individual cannot be liberated from the threat of severe tuberculosis progression without actively transforming their own behavior—transitioning from procrastinating tendencies toward proactive health-seeking behaviors. Awareness and beliefs, when unbacked by concrete behavioral adjustments, will fail to disrupt the chain of TB transmission within the community.

The researcher assumes that the elevated rates of delay observed among males and individuals with low knowledge stem from the "normalization" of cough symptoms. Within the Batanghari community, a chronic cough is frequently not recognized as a lethal infectious disease; rather, it is dismissed as a logical consequence (a normal side effect) of lifestyle habits, such as heavy smoking, exposure to road dust, or physical exhaustion from manual labor (e.g., in oil palm or rubber plantations). This erroneous normalization impedes the conversion of felt illness into medical care-seeking action.

Based on the extreme risk observed among males (OR = 68.8), the researcher assumes the presence of a strong social construction of masculinity, wherein men perceive complaining about illness as taboo until their physical capacity completely collapses. Furthermore, a perceived financial barrier emerges: an underlying apprehension that seeking medical care will incur heavy expenses and consume valuable work time. The public remains insufficiently informed that diagnostic procedures (sputum testing/GeneXpert) and Anti-Tuberculosis Treatment (ATT) regimens at public health centers (Puskesmas) are fully subsidized (free of charge) by the government. The extreme finding among the unmarried/divorced cohort (96.3% experienced delay) suggests that the promptness of TB care-seeking relies heavily on social intervention from immediate family members. The researcher assumes that individuals living alone experience information isolation. The absence of household peer-reminding mechanisms results in a loss of both psychological motivation and logistical assistance required to access healthcare services upon symptom onset.

To break the cycle of high patient delay in Batanghari Regency, proposed solutions must transcend conventional methods (such as merely displaying flyers at Puskesmas facilities). Aggressive, multi-sectoral intervention strategies are required, specifically a Gender-Based "Door-to-Door" Educational Campaign. Given that working-age males represent the most vulnerable demographic for treatment delay, health education efforts must shift from clinic settings to male gathering hubs. Periodic outreach programs are essential at strategic locations—such as plantation union posts, motorcycle taxi stations, late-night coffee shops, and places of worship. Educational messaging must consistently emphasize two core takeaways: "Coughing > 2 weeks = Free Examination" and "TB Can Be Fully Cured" to eradicate negative stigma.

CONCLUSION

In conclusion, behavior shows a strong statistical association with patient delay in pulmonary tuberculosis care, emerging as the dominant factor in the multivariable model. Respondents with negative or specific behavioral patterns exhibit markedly higher odds of experiencing treatment delay compared to reference groups. Public health interventions should therefore prioritize behavioral modification alongside health education to reduce patient delay in tuberculosis management.

ACKNOWLEDGEMENTS

The author wishes to express deepest gratitude to all healthcare professionals who actively participated as respondents in the cross-cultural adaptation and preliminary psychometric evaluation of the Indonesian version of the *Resilience Scale for Healthcare Workers* questionnaire. Sincere appreciation is also extended to the panel of experts, translators, and clinical specialists who provided substantive contributions during the translation, cultural adaptation, content validation, and instrument evaluation processes. Furthermore, the author gratefully acknowledges the leadership and management of the participating healthcare institutions for granting permission, facilitating access, and providing full support throughout the research period. Deepest thanks are also directed to the field team and all individuals who assisted with study coordination and data collection. Their valuable contributions, dedication, and cooperation were essential to the successful completion of this master's thesis, which is expected to provide a meaningful contribution to the development of public health sciences, particularly in the fields of health administration and occupational health.

References

Alavi SM, Bakhtiyariniya P, Albagi A. Factors Associated with Delay in Diagnosis and Treatment of Pulmonary Tuberculosis. Jundishapurn J Microbiol. 2021;8(3):1-4.

Cai J, dkk. Fakctors Associated with Patient and Provider Delays for Tuberculosis Diagnosis and Treatment in Asia : A Systematic Review and Meta-MetaAnalysis. Journal PONE. 2023

Calder L, Gao W, Simmons G. Tuberculosis: reasons for diagnostic delay in Auckland. 2020.

Chowdhury, dkk. Delay in diagnosis of tuberculosis among Under treatment patients in rajshahi city, bangladesh. 2024.

Dinas Kesehatan Provinsi Jambi. Profil Kesehatan Jambi Tahun 2024. Jambi: DKK Prov Jambi; 2014

Ditjen P2MPL. Petunjuk Teknis Tata Laksana Klinis Ko-infeksi TB-HIV. Kemenkes RI. 2022.

Demissie M, dkk. Patient and Health Servisce Delay in The Diagnosis of Pulmonary Tuberculosis in Ethiopia. 2022

Ebrahimi, Kalan Muhammad, dkk. The identification of risk factors association with patient and health care system delay in the treatment of tuberculosis in Tubriz, Iran. 2018

Faussett GP, et al. Why do patients with a cough delay seeking care at Lusaka urban health centres? A health systems research approach. Int J Tuberc Lung Dis. 2022;6:796–805.

Goel, Kapil. dkk. Reasons for patient delays & health system delays for tuberculosis in south India. 2021

Ikhsan AG, Luhur R. Radiologi Toraks Tuberkulosis Paru. Jakarta: Sagung Seto; 2022

Kemenkes. KMK No.364/Menkes/SK/V/2009 tentang pedoman penanggulangan tuberkulosis. Jakarta: Kemenkes RI. 2009

Kemenkes RI. Pedoman Nasional Pengendalian Tuberkulosis. Jakarta: Kementerian Kesehatan RI; 2022

Kemenkes RI. Strategi Nasional Pengendalian TB di Indonesia. Jakarta: Kementerian Kesehatan RI; 2021.

Kementerian Kesehatan Republik Indonesia. Profil kesehatan Indonesia 2022. Jakarta: 2023

Kementrian Kesehatan Republik Indonesia. Tuberkulosis. Jakarta: Kementrian Kesehatan Republik Indonesia 2022

Kemenkes RI. Pedoman Nasional Pengendalian Tuberkulosis. Jakarta: Kementerian Kesehatan RI; 2024

Kemenkes. PMK No.64/Menkes/SK//2016 tentang pedoman penanggulangan tuberkulosis. Jakarta: Kemenkes RI. 2016

Lawn SD, Afful B, Acheampong JW. Pulmonary tuberculosis: diagnostic delay in Ghanaian adults. Int J Tuberc Lung Dis, 1998; 2(8): 635-640

Lin, Y, dkk. Patient delay in the diagnosis and treatment of tuberculosis in China: findings of case detection projects. 2021

Mfinanga SG, et al. The magnitude and factors associated with delays in management of smear positive tuberculosis in Dar es Salaam, Tanzania. BMC Health Serv Res. 2023;8:158.

Mohammed G F et al, Patients and health care system delay in the start of tuberculosis treatment in norway. BMC infectious desease,2021, 6:33

Rimbi N. Buku Cerdik Penyaki-penyakit Menular. Yogyakarta: Saufa; 2024.

Tanzania. 1999 World Heath Organization (WHO). Global Tuberculosis Report 2022. Geneva: World Health Organization.

Ward HA, Marciniuk DD, Pahwa P, Hoeppnner VH Extent of pulmonary tuberculosis in patients diagnosed by active compared to passivecase finding. 2004, Int J Tuberc Lung Dis 8: 593–597

Wanwalo ER,dkk. Delay in Tuberculosis Case Finding and Treatment in Mwanza,

World Heath Organization (WHO). Global Tuberculosis Report. Geneva: World Health Organization. 2021

World Health Organization. G20 90(90)90 The Tuberculosis Report for Heads Of State and Goverments, Brazil; 2017.

Yimer S, dkk. Diagnostic and Treatment Delay among Pulmonary Tuberculosis Patients in Ethiopia. 2021