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Evaluation of Treatment Outcomes and Quality of Life of MDR-TB Patients at Raden Mattaher Hospital Jambi

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ABSTRACT

Multidrug-resistant tuberculosis (MDR-TB) poses a significant challenge to TB control efforts in Indonesia, primarily due to its complex, long-term treatment and significant drug side effects. To date, there is no comprehensive evaluation data on treatment outcomes and quality of life of MDR-TB patients at Raden Mattaher Regional Hospital, Jambi Province. This study aims to evaluate treatment outcomes and health-related quality of life in MDR-TB patients, as well as to identify predictors influencing therapy outcomes. This study used an observational [A1] [A2] design with a retrospective approach, analyzing medical records of MDR-TB patients from 2020 to 2024. The WHOQOL-BREF instrument was used to measure quality of life. Bivariate and multivariate analyses were conducted to evaluate the association between patient characteristics and treatment outcomes. Most MDR-TB patients demonstrated successful treatment outcomes, but quality of life in the physical (score 45.2) and environmental (score 48.5) domains was relatively low. Side effects of second-line drugs, such as nausea, neuropathy, and hearing loss, contributed to the low physical domain scores. Multivariate test results showed that comorbid diabetes mellitus (*DM*) was a significant predictor of treatment outcomes ($p = 0.007$). The quality of life of MDR-TB patients at Raden Mattaher Regional Hospital in Jambi remains low, primarily influenced by side effects of therapy and the presence of comorbidities such as *DM*, which have been shown to impact treatment outcomes. More integrated interventions between TB management and comorbidities are urgently needed. Patients should be educated about side effects and the importance of treatment adherence. Hospitals are advised to improve side effect monitoring and integrate comorbidity management.

Keywords: MDR-TB; quality of life; WHOQOL-BREF; treatment outcomes

INTRODUCTION

Multidrug-resistant tuberculosis (MDR-TB) is one of the biggest challenges in TB control worldwide, including in Indonesia. MDR-TB occurs when *Mycobacterium tuberculosis* becomes resistant to at least two of the most effective first-line drugs, namely isoniazid and rifampicin. This condition not only extends the duration of treatment to 9–24 months but also increases the risk of therapy failure, death, and transmission of resistant strains in the community (Kemenkes RI, 2020). According to WHO (2023), the global success rate of MDR-TB therapy is only around 59%, far below the recommended minimum target of 75%. In the midst of global efforts to achieve TB elimination targets by 2035, MDR-TB is a real threat that could derail these achievements (WHO, 2023).

Indonesia is among the countries with a high burden of MDR-TB in the world. Based on data from the Ministry of Health, the number of confirmed MDR-TB cases in 2022 reached more than 11 thousand, but only about two-thirds started treatment (Kemenkes RI, 2023). In

Jambi Province, *Raden Mattaher* Hospital is the main referral center for MDR-TB treatment, receiving patients from various districts and cities. The mortality rate of drug-resistant TB (DR-TB) patients at *Raden Mattaher* Hospital in 2020–2023 was recorded to be quite high, around 16.5% to 20%, with risk factors including age over 40 years, smoking history, comorbidities, and non-adherence to treatment. The high rate of loss to follow-up is also a major problem, with a percentage of around 20–30%, leading to treatment failure and increased mortality (RSUD *Raden Mattaher* Jambi, 2024). Research by Soedarsono et al. (2021) found that, in addition to psychosocial and economic factors, one important factor is dissatisfaction with health services, which can be related to the lack of monitoring of drug side effects, so that patients drop out of treatment. This study emphasizes the importance of holistic treatment, including monitoring drug side effects to prevent loss to follow-up. Research by Suryani et al. (2020), examining factors leading to treatment dropout in MDR-TB patients, also indicated that complex treatment and severe side effects were among the main challenges leading to loss to follow-up. The study highlighted that long treatment duration and drug side effects impact treatment non-adherence. However, comprehensive data on treatment success and quality of life of MDR-TB patients at *Raden Mattaher* Hospital are not yet available, even though this information is important for planning clinical policies and strategies.

MDR-TB treatment faces complex challenges, ranging from long and expensive regimens and severe side effects to low patient adherence. Research by Ahmad et al. (2020) showed that MDR-TB patients who experienced linezolid-induced neuropathy were twice as likely to discontinue therapy early. Side effects of second-line drugs, such as nausea, hearing loss, and neuropathy, not only affect clinical outcomes but also impact quality of life. In addition, the presence of comorbidities such as diabetes mellitus (*DM*) and HIV worsens prognosis, as evidenced by the study of Rifat et al. (2014) in Bangladesh, which reported that MDR-TB patients with *DM* had a 1.8 times higher risk of treatment failure than patients without *DM*.

Health-Related Quality of Life (HRQoL) is an important indicator that is often overlooked in the evaluation of MDR-TB programs. Most studies still focus on clinical outcomes such as sputum conversion and cure rates, without considering the impact of treatment on the physical, psychological, social, and environmental aspects of patients. A study in Johannesburg, South Africa, showed that DR-TB patients who experienced drug side effects had significantly lower physical and mental HRQoL scores than patients without side effects (Sineke et al., 2019). Similar results were found in Yemen, where despite patients achieving clinical cure, quality of life scores, particularly in the mental domain, remained low even after treatment completion (Jaber & Ibrahim, 2019). Considering the high burden of MDR-TB, the challenges of therapy, and its impact on quality of life, research on "Evaluation of Treatment Outcomes and Quality of Life of MDR-TB Patients at *Raden Mattaher* [A1] [A2] Jambi Hospital" is very relevant.

Previous research by Soedarsono et al. (2021) highlighted that psychosocial and economic factors, as well as dissatisfaction with health services—particularly related to inadequate monitoring of drug side effects—are major contributors to treatment interruption among MDR-TB patients. This finding underscores the importance of a holistic approach in MDR-TB management to improve patient adherence. Similarly, Suryani et al. (2020) found that the complexity of treatment regimens and severe side effects of second-line drugs play a

significant role in non-adherence and high rates of loss to follow-up. However, both studies mainly focused on identifying the determinants of treatment dropout without comprehensively evaluating the relationship between treatment outcomes and patients' quality of life.

This study aims to evaluate both treatment outcomes and the quality of life of MDR-TB patients at *Raden Mattaher* Hospital Jambi. The results of this study are expected to provide a comprehensive overview of the factors that influence the success of therapy and the quality of life of patients. In addition, this study will enrich the limited local literature, as well as serve as a basis for the development of more integrated and evidence-based clinical interventions and health policies in Jambi Province.

METHOD

This study is an analytic observational study with a retrospective approach designed to evaluate the relationship between MDR-TB patient characteristics, treatment outcomes, and health-related quality of life (HRQoL). This design was chosen to utilize existing data in medical records as well as the results of filling out the WHOQOL-BREF questionnaire, following the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines to ensure transparency and replicability of the study. The study was conducted at the MDR-TB clinic of *Raden Mattaher* [Hospital], Jambi, as the main referral center for MDR-TB treatment in Jambi Province, covering the period from January 2020 to December 2024.

The study population included all adult patients aged ≥18 years diagnosed with MDR-TB based on the results of drug susceptibility testing (DST) to isoniazid and rifampicin, and undergoing treatment according to national protocols. Inclusion criteria included the availability of complete medical records and data from the WHOQOL-BREF questionnaire. Patients with incomplete data, who moved facilities before completing treatment, or who had cognitive impairment that hindered questionnaire completion were excluded from the study. The sampling method used was total sampling, so that all patients who met the inclusion criteria were analyzed. The dependent variables in this study were treatment outcome (successful/unsuccessful) and HRQoL scores on four WHOQOL-BREF domains (physical, psychological, social, and environmental), while the independent variables included age, gender, occupation, smoking history, HIV status, comorbid diabetes mellitus, TB treatment history, anti-TB drug (*OAT*) regimen, radiological findings, and drug side effects.

Data collection was conducted in two stages. The first stage was the extraction of medical record data of patients who met the inclusion criteria, including sociodemographic information, disease history, laboratory and radiological examination results, *OAT* regimens, side effects, and treatment outcomes. The second stage was the collection of HRQoL data through in-person or telephone interviews using the WHOQOL-BREF questionnaire, both in patients who were still undergoing therapy and up to a maximum of three months after completing treatment. The WHOQOL-BREF instrument used was translated and validated in Indonesian, consisting of 26 questions measuring four quality of life domains, with a score of 0–100 where higher scores indicate better quality of life.

Descriptive analysis was used to describe the distribution of patient characteristics, treatment outcomes, and HRQoL scores. Associations between independent variables and treatment outcomes were analyzed bivariate using Chi-square test or Fisher's exact test for

categorical data, and independent t-test or Mann-Whitney test for numerical data. Variables with a p value <0.25 on bivariate analysis were entered into multivariate analysis using logistic regression, with odds ratio (OR) and 95% confidence interval (CI) reported. The significance level was set at $p < 0.05$.

This study obtained ethical approval from the Health Research Ethics Committee of the Faculty of Pharmacy, 17 August 1945 University Jakarta (No. SK-Etik/2024/FF-UTA'45). All patient data were kept confidential by using a unique identification code, and no personal information was disclosed in the publication.

RESULTS AND DISCUSSION

Table 1. Frequency Distribution of Age, Sex, Occupation, Smoking Habits, HIV Status, Diabetes Mellitus Co-occurrence, TB Treatment History, OAT Guide Used, Radiological Features (Thoracic Photos) and End Results of Treatment of MDR-TB Patients at Raden Mattaher Hospital, Jambi Province in the 2020-2024 period.

No	Variables	Amount	%
1	Age		
	Young Age (≤ 25 years)	26	14.2
	Productive Adult Age (26-50 years)	107	58.5
	Advanced Age (> 50 years)	50	27.3
2	Gender		
	Woman	57	31.1
	Man	126	68.9
3	Work		
	Work	149	81.4
	Doesn't work	34	18.6
4	Smoking Habit		
	Do not smoke	109	59.6
	Smoke	74	40.4
5	HIV status		
	HIV Negative	146	79.8
	HIV Positive	2	1.1
	No Data	35	19.1
6	DM Comorbid		
	No DM	144	78.7
	There is DM	39	21.3
7	TB Treatment History		
	New Cases	112	61.2
	Ever Been Treated	71	38.8
8	OAT Guidelines Used		
	Short Term Guide	90	49.2
	Long Term Guide	93	50.8
9	Radiological Image/Chest X-ray		
	Light	17	9.3
	Progressive	40	21.9
	Chronicle	98	53.6
	No Data	28	15.3
10	Final Results of Treatment		
	Cured	114	62.3
	Failed	48	26.2
	Died	21	11.5

Based on the frequency distribution of the characteristics of MDR-TB patients treated at Raden Mattaher Hospital, Jambi Province during the period 2020-2024, the majority of patients were in the productive adult age group (26-50 years) (58.5%), most patients were male (68.9%), most patients were known to work (81.4%), most patients did not smoke (59,6%), most patients were HIV negative (79.8%), most patients had no DM co-morbidities (78.7%), most patients were new cases (61.2%), most patients were on long-term guidelines (50.8%) most patients had chronic radiologic features (53.6%) and most patients were cured (62.3%).

Tabel 2. Mean HRQoL scores by WHOQOL-BREF domains.

Domain	Mean ± SD
Physical	45.2 ± 8.4
Psychological	53.7 ± 10.2
Social	51.8 ± 9.1
Environmental	48.5 ± 7.6

The physical domain scored lowest, followed by the environmental domain, suggesting that physical limitations and environmental factors were major contributors to reduced quality of life in MDR-TB patients.

Table 3. Relationship between Age, Gender, Occupation, Smoking Habits, HIV Status, Diabetes Mellitus Co-occurrence, TB Treatment History, OAT Guide Used, Radiological Features (Thoracic Photos) with the End Results of Treatment of MDR-TB Patients at Raden Mattaher Hospital, Jambi Province in the period 2020-2024.

No	Variables	Results End Treatment						Total		*p-value*
		Healed		Fail		Died				
		n	%	n	%	N	%	n	%	
1	Age									
	≤ 25 years	18	69.2	6	23.1	2	7.7	26	100	0.024
	26-50 years	71	66.4	29	27.1	7	6.5	107	100	
	> 50 years	25	50.0	13	26.0	12	24.0	50	100	
2	Gender									
	Woman	35	61.4	13	22.8	9	15.8	57	100	0.423
	Man	79	62.7	35	27.8	12	9.5	126	100	
3	Work									
	Work	100	67.1	35	23.5	14	9.4	149	100	0.016
	Doesn't work	14	41.2	13	38.2	7	20.6	34	100	
4	Smoke									
	Do not smoke	63	57.8	28	25.7	18	16.5	109	100	0.032
	Smoke	51	68.9	20	27.0	3	4.1	74	100	
5	HIV status									
	HIV Negative	94	64.4	38	26.0	14	9.6	146	100	0.274
	HIV Positive	1	50.0	0	0.0	1	50.0	2	100	
	No Data	19	54.3	10	28.6	6	17.1	35	100	
6	DM Comorbid									
	No DM	91	63.2	42	29.2	11	7.6	144	100	0.004
	There is DM	23	59.0	6	15.4	10	25.6	39	100	
7	Treatment History									
	New Case	64	57.1	33	29.5	15	13.4	112	100	0.191
	Ever Been Treated	50	70.4	15	21.1	6	8.5	71	100	
8	OAT Guide									

No	Variables	Results End Treatment						Total		*p-value*
		Healed		Fail		Died				
		n	%	n	%	N	%	n	%	
	Short-term	60	66.7	27	30.0	3	3.3	90	100	0.003
	Long-term	54	58.1	21	22.6	18	19.4	93	100	
9	Radiological Image									
	Light	11	64.7	3	17.6	3	17.6	17	100	0.689
	Progressive	28	70.0	8	20.0	4	10.0	40	100	
	Chronicle	56	57.1	30	30.6	12	12.2	98	100	
	No Data	19	67.9	7	25.0	2	7.1	28	100	

The analysis showed that age, employment status, smoking habits, presence of comorbid diabetes mellitus (DM), and anti-TB drug (OAT) regimen guidance were significantly associated with the final outcome of MDR-TB treatment ($p < 0.05$). Patients under 25 years of age had the highest cure rate (69.2%), while those over 50 years of age showed a significantly higher proportion of deaths (24.0%). Patients who were employed tended to have a higher cure rate (67.1%) than those who were not employed (41.2%). Smoking habit was associated with a higher cure rate (68.9%), although this phenomenon needs to be analyzed further as it could be influenced by confounding variables. Patients without DM had higher treatment success (63.2%) than those with DM (59.0%), while patients on short-term OAT regimens showed better cure rates (66.7%) than long-term regimens (58.1%). The variables of gender, HIV status, previous TB treatment history, and radiologic features showed no significant association with treatment outcome ($p > 0.05$).

Table 4. Multivariate Analysis Results

No	Variables	Sig
1	Work	0.092
2	Habit Smoke	0.211
3	DM Comorbid	0.007
4	History Treatment	0.251
5	Description Radiology	0.622
6	Age	0.260

Multivariate analysis showed that of all the variables included in the model, only the presence of comorbid diabetes mellitus (DM) remained significantly associated with the final outcome of MDR-TB treatment ($p = 0.007$). This means that after controlling for occupation, smoking, treatment history, radiological features, and age, patients with DM had a lower likelihood of successful treatment than patients without DM. Other variables such as occupation ($p = 0.092$), smoking habit ($p = 0.211$), treatment history ($p = 0.251$), radiological features ($p = 0.622$), and age ($p = 0.260$) did not show statistically significant associations, although some of them had trends that could be further explored in studies with larger sample sizes.

Discussion

The results of WHOQOL-BREF measurements in MDR-TB patients showed that the physical and environmental domains were in the low category, with scores of 45.2 and 48.5, respectively. The low score in the physical domain was strongly influenced by the side effects

of second-line anti-TB treatment (OAT), such as nausea, neuropathy, and hearing loss, which reduced patients' functional capacity and daily activities. Low environmental scores reflect limited access to health services, including affordability, transportation, and quality of facilities, which exacerbate inequalities in care for MDR-TB patients (Araia et al., 2021).

The psychological domain score was moderate (52.8), reflecting the presence of emotional disturbances such as anxiety, depression, and social isolation due to the stigma of MDR-TB. 42% of patients reported rarely enjoying life, which reinforces the psychological burden borne during the long and side-effect-filled treatment. Meanwhile, the social relationships domain showed a moderate score (60.1), indicating that family support was adequate, although not fully able to compensate for the social impact of the disease. These findings are consistent with studies in India and Eritrea that show that MDR-TB patients experience greater psychosocial distress than drug-sensitive TB patients (Hamsaveni et al., 2024).

Compared to drug-sensitive TB patients, the quality of life of MDR-TB patients was consistently lower across all WHOQOL-BREF domains. The study by Araia et al. in Eritrea found that MDR-TB patients had significantly lower scores on the environmental (40.6 vs. 61.2) and physical (61.8 vs. 75.2) domains than drug-sensitive TB patients (Araia et al., 2021). This decline is mainly due to longer therapeutic regimens, higher drug toxicity, and longer recovery times, thus magnifying the negative impact on physical health and general well-being.

A total of 68% of MDR-TB patients in this study admitted to being highly dependent on treatment and felt their quality of life was directly affected by access to and effectiveness of therapy. This resonates with the findings of Laxmeshwar et al. (2019), who reported that MDR-TB patients in Mumbai experienced reduced physical and psychological functioning due to job loss, stigma, and a complex healthcare system (Laxmeshwar et al., 2019). Dissatisfaction with health services was also reflected by 70% of patients who felt access to treatment was inadequate.

The low WHOQOL-BREF scores in MDR-TB patients underscore the need for integration of psychosocial approaches in TB control programs. Treatment should not only focus on microbiological success, but also on restoring patients' overall quality of life. Mental health support, improved referral systems, and improved quality of care are urgent interventions. The use of shorter and safer treatment regimens has also been shown to improve patients' quality of life and increase adherence to treatment.

Bivariate analysis showed that age was significantly associated with treatment outcomes (p=0.024). This finding is in line with several previous studies highlighting the important role of immunologic status and comorbidities in the elderly. (Pebrianty, 2016) in her study of colorectal cancer patients in Makassar found that age and comorbidities were significantly associated with the clinical condition of patients, where elderly patients with comorbidities tended to have a worse prognosis than younger age groups. In addition, age at diagnosis is an important prognostic factor for survival of lymphoma patients, reinforcing that optimal immunological capacity at a young age provides an advantage in the therapy of severe diseases.

Physiologically, elderly individuals experience immunosenescence, a decline in immune system function that causes the body's response to infection and treatment to be less effective. A study by (Li et al., 2024) in China showed that elderly HIV patients had a slower increase in CD4+ during antiretroviral therapy than younger patients, indicating that age affects the effectiveness of the immune response to therapy. In addition, a study by (Gao, Yuan, Wang,

He, & Li, 2025) in the context of cancer therapy found that while immunotherapy remains effective in patients aged ≥65 years, the elderly have a higher risk of side effects and a slower immune response to treatment. Decreased immune function is also exacerbated by the presence of comorbidities such as diabetes mellitus, hypertension, and heart disease that are more common in the elderly, which cumulatively contribute to low cure rates and high mortality rates in elderly MDR-TB patients. Therefore, the findings in this study support previous evidence that age is an important determinant in the successful treatment of chronic infectious diseases, especially those requiring long-term therapy such as MDR-TB.

Employment status also had a significant association with treatment success (p=0.016). This finding is in line with a study (Wedajo, Degu, Deribew, & Ambaw, 2022) in Ethiopia which showed that HIV patients who were employed tended to be more adherent to antiretroviral treatment than patients who were not employed. Employment provides structure to daily life and increases access to health services and social support. Research by (Pardosi, Nababan, Br Brahmana, Siagian, & Sipayung, 2024) patients who have a job tend to show a higher success rate of therapy than patients who do not work. This reinforces that in addition to economic factors and access to health services, attachment to a work routine can support adherence to a regular therapy schedule. However, the study also emphasized that patient adherence remains a key factor in treatment success, with employment status acting as one of the factors driving adherence.

Smoking habits were found to be statistically significantly associated with treatment outcomes (p=0.032). Several meta-analyses and cohort studies have shown that TB patients who smoke have a higher risk of treatment failure, relapse, and death than non-smokers. For example, a meta-analysis reviewing 28 studies found that active smokers had nearly double the risk of TB relapse (RR 1.95; 95 % CI 1.59-2.40) as well as an increased risk of death during treatment (RR 1.51; 95 % CI 1.09-2.10) compared to non-smokers (Vidyasagaran et al., 2024). Meanwhile, a cohort study in Taipei reported that individuals who smoked more than 10 cigarettes per day had twice the risk of TB relapse compared to non-smokers/ex-smokers (Yen et al., 2014). In addition, a global meta-analysis of 21 studies showed that smokers had an odds ratio of 1.23 for "unfavorable outcomes" such as treatment failure or loss to follow-up, as well as an OR of 1.55 for delayed sputum conversion to negative (Wang, Arrazola, Mathema, Ahluwalia, & Mase, 2020). These findings are consistent with other studies that smoking worsens TB treatment outcomes and increases the risk of death, so smoking cessation interventions should be an important part of TB control programs.

Comorbidity of diabetes mellitus (DM) significantly increased the risk of death in MDR-TB patients, with a p value of 0.004. Comorbidity of diabetes mellitus (DM) significantly increases the risk of death in patients with MDR-TB because DM causes immune system disorders that weaken the body's ability to fight tuberculosis infection. Chronic hyperglycemia in DM patients impairs innate and adaptive immune functions, including decreased phagocytic activity of alveolar macrophages, neutrophil recruitment, as well as interferon-gamma production by T-helper cells that are critical in controlling TB infection. In addition, pulmonary microvascular damage and micronutrient deficiencies in DM patients facilitate the invasion and development of drug-resistant TB bacteria. These conditions cause TB infection to become more severe and difficult to treat, thereby increasing mortality. Studies show that O-TB patients with DM have up to 74% higher mortality risk than patients without DM, and TB patients with comorbid type 2 DM have a 1.5- to 1.88-fold higher mortality risk than TB patients without DM. Other factors that worsen prognosis are poor drug absorption

and drug interactions that often occur in patients with DM, making MDR-TB treatment less effective (Maulida et al., 2024; Rosdiana, 2017; Suryoadji et al., 2025).

OAT (Anti-Tuberculosis Drugs) treatment guidance was also found to be significant to treatment outcomes (p=0.003). This finding supports the WHO (2022) study which states that effective and easily adhered to short-term regimens can increase cure rates and reduce the risk of severe adverse events that often occur with long-term treatment (WHO, 2022).

OAT (Anti-Tuberculosis Drugs) treatment guidance was also found to be significant to treatment outcomes (p=0.003). This finding supports the WHO (2022) study which states that effective and easily adhered to short-term regimens can increase cure rates and reduce the risk of severe adverse events that often occur with long-term treatment sensitivity test results, treatment duration, and effective drug combinations to overcome resistance. By following WHO and national guidelines, patients receive standardized therapy, such as 6-month or longer regimens containing second-line drugs such as bedaquiline, levofloxacin, and ethionamide, which have been shown to improve cure rates and sputum culture conversion to negative in less time. Adherence to these guidelines also helps to minimize therapy failure and further drug resistance, as well as optimize side effect management so that treatment can be effective and safe. Therefore, proper implementation of OAT treatment guidelines determines the success of MDR-TB therapy and reduces mortality and disease transmission in the community (Kemenkes RI, 2018; Puspitasari et al., 2024; Sanjaya et al., 2025).

Multivariate analysis showed that of all the variables studied, only diabetes mellitus (DM) comorbidity proved to be statistically significant as a major predictor of MDR-TB treatment outcomes (p=0.007). This finding indicates that the presence of DM in MDR-TB patients independently has the strongest influence on treatment success or failure, even after controlling for other variables such as employment status, smoking habits, age, OAT guidelines, and radiological features. Although these variables showed a significant association in the bivariate analysis, the multivariate results showed that the effect was not strong enough when analyzed simultaneously with other variables. This suggests that DM comorbidity is a major risk factor that worsens the prognosis of MDR-TB patients, and should be the focus of clinical interventions and TB control programs. Optimal management of DM during MDR-TB therapy may be key in reducing treatment failure and mortality in this group of patients with dual disease conditions.

The comorbidity of diabetes mellitus (DM) is a major predictor factor in multivariate analysis due to its broad and profound influence on various physiological aspects that play a role in the success of MDR-TB treatment. Chronic hyperglycemia in patients with DM can cause immune system dysfunction, including decreased macrophage activity, impaired neutrophil function, and weakened T cell responses, all of which are important in fighting Mycobacterium tuberculosis infection. These conditions make DM patients more susceptible to severe, progressive infections, and require longer healing times. DM can also affect the pharmacokinetics and pharmacodynamics of anti-TB drugs, including decreased blood concentrations of drugs and increased risk of drug interactions. This increases the likelihood of therapeutic failure or severe side effects that may lead to treatment discontinuation. On the other hand, DM complications such as nephropathy or neuropathy can also aggravate the patient's clinical condition, slow down recovery, and increase the risk of death. Due to its complex and pervasive impact, DM remains the dominant variable affecting treatment outcomes, even after other factors are statistically controlled.

The comorbidity of diabetes mellitus (DM) is a major predictor of MDR-TB treatment outcomes because DM significantly impairs the body's immune function, worsening the response to tuberculosis infection. Chronic hyperglycemia in patients with DM decreases the immune system's ability to fight Mycobacterium tuberculosis bacteria, which makes TB infection more severe and difficult to treat. In addition, DM affects the pharmacokinetics of anti-tuberculosis drugs (OAT), reducing the effectiveness of their bactericidal activity, thereby increasing the risk of therapeutic failure and the emergence of drug resistance. MDR-TB patients with DM also tend to experience longer sputum culture conversions, indicating a slowdown in the healing process. Complications of DM such as renal impairment and drug interactions between OAT and diabetes therapy also worsen glycemic control and effectiveness of TB treatment. Therefore, the presence of DM in MDR-TB patients is an important indicator that predicts suboptimal treatment outcomes, including a higher risk of mortality and therapeutic failure (Arliny, 2015; Aziz, 2019; Ulfahimayati et al., 2020).

CONCLUSION

The quality of life of MDR-TB patients is low, especially in the physical and environmental domains, with scores of 45.2 and 48.5, respectively, based on the WHOQOL-BREF instrument. Factors associated with MDR-TB treatment outcomes were age, occupation, smoking, *DM* comorbidity, and *OAT* guidance. Diabetes mellitus (*DM*) comorbidity was a significant predictor of TB treatment at *Raden Mattaher* Jambi Hospital, with a p value of 0.007 indicating a statistically significant association. It is therefore recommended that integrated management strategies, including routine screening and optimal control of comorbidities such as *DM*, be prioritized to improve MDR-TB treatment outcomes and patient quality of life.

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