

The Relationship of Mental Health Literacy (MHL) with Psychological Status in Patients with Diabetes Mellitus - Pulmonary Tuberculosis at the Gorontalo City Health Center

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ABSTRACT

Background: Diabetes Mellitus (DM) and Pulmonary Tuberculosis (Pulmonary TB) are two interrelated chronic diseases that can cause various psychological problems in sufferers. Pulmonary DM-TB patients are at risk of experiencing stress, anxiety, and depression that have an impact on psychological status. One of the factors that is suspected to play a role in this condition is Mental Health Literacy (MHL), which is an individual's ability to understand, recognize, and manage mental health problems.

Objective: This study aims to determine the relationship between Mental Health Literacy and psychological status in patients with Diabetes Mellitus–Pulmonary Tuberculosis at the Gorontalo City Health Center.

Methods: This study used a quantitative design with a cross-sectional approach. The research population amounted to 75 patients with Pulmonary DM-TB registered in six health centers in the Gorontalo City area. A sample of 63 respondents was selected using the purposive sampling technique. Data were collected using the Mental Health Literacy and psychological status questionnaire, then analyzed using the Chi-Square test with a significance level of 0.05.

Results: The results showed that most of the respondents had high Mental Health Literacy as many as 41 respondents (65.1%), while 22 respondents (34.9%) had low Mental Health Literacy. The psychological status of respondents was dominated by the severe distress category of 37 respondents (58.7%) and mild distress as many as 26 respondents (41.3%). The results of the Chi-Square test showed a p-value of 0.006 ($p < 0.05$), which means that there is a significant relationship between Mental Health Literacy and psychological status in patients with Pulmonary DM-TB.

Conclusion: There is a significant relationship between Mental Health Literacy and psychological status in Diabetes Mellitus–Pulmonary Tuberculosis patients at the Gorontalo City Health Center. The better the level of Mental Health Literacy that a patient has, the better their ability to manage psychological conditions during the treatment of chronic diseases.

INTRODUCTION

Diabetes Mellitus with Pulmonary Tuberculosis (DM-TB) is two interrelated global health problems (Nur *et al.*, 2022). Hyperglycemia in people with DM causes impaired functioning of the body's respiratory tissue and immune system. This condition weakens the body's defenses, making it easier to infect *Mycobacterium tuberculosis* (Kang *et al.*, 2023). Decreased function of T lymphocytes, neutrophils, and cytokines in people with diabetes mellitus increases susceptibility to tuberculosis (Kurniawan & Wijaya, 2025).

Diabetes Mellitus with Tuberculosis is now one of the leading causes of global deaths, which is very worrying. According to the report *World Health Organization* (WHO, 2025) there are 10.7 million cases of pulmonary TB worldwide, with 1.6 million deaths. In the same year, the number of DM sufferers reached 537 million adults, and about 15% of them also had pulmonary TB, meaning that there were 1.6 million individuals

facing multiple health problems of pulmonary DM-TB globally. Burden countries include India, China, Indonesia, the Philippines, and Pakistan, which together account for more than 50% of the world's total cases of Pulmonary DM-TB (WHO, 2025)

The prevalence of DM with pulmonary TB in Indonesia in 2023 is 1.2% of cases and will increase in 2024. People with DM have a 2 to 3 times higher risk of developing pulmonary TB than people who do not have DM. Based on data from the Indonesian Health Insurance in 2024, the prevalence of DM comorbidities in pulmonary TB patients nationally was recorded at around 4.2% of all pulmonary TB cases (Prasiska *et al.*, 2024).

According to data from the Gorontalo Provincial Health Office, 2025 also shows an increase in cases with a total of 257 cases. The distribution of pulmonary DM-TB cases was found in several health centers in the Gorontalo city area such as the Central City Health Center with 14 cases, Duingi Health Center 19 cases, Sipatana Health Center 12 cases, North City Health Center 10 cases, South City Health Center 8 cases and West City Health Center 12 cases with a total of 75 cases diagnosed with DM with TB complications. This high number shows that DM is an important risk factor that needs serious attention in the treatment of pulmonary TB.

In general, DM patients with pulmonary TB experience several physical problems which include symptoms such as chronic cough, shortness of breath, chest pain, night sweats, and drastic weight loss. In addition, patients often experience excessive fatigue due to a combination of unstable blood sugar levels and TB infection, heavier side effects of anti-TB drugs, and difficulty meeting nutritional needs because they have to limit their diet according to diabetes rules. This weakened physical condition further aggravates daily activities and slows down the recovery process of Pulmonary TB (Xu *et al.*, 2023). DM patients with pulmonary TB also not only face physical problems but are also prone to psychological disorders such as depression, anxiety, and stress (Jafari *et al.* (2024).

These psychological disorders caused because DM disease with Pulmonary TB lasts a long time and affects each other. Pulmonary TB can make blood sugar levels difficult to control, while DM can slow down the healing process of pulmonary TB through several mechanisms, such as decreased immune system function, increased number of TB bacteria in the lungs, slower body response to anti-pulmonary TB drugs, and disorders *Microcirculation* which inhibits the repair of damaged lung tissue. High blood sugar levels also cause chronic inflammation, so the process of bacterial elimination and lung tissue regeneration takes longer (Thong *et al.*, 2025). This condition causes fear, worry about health, and mental burden due to long treatment and many taboos. In addition, stigma against pulmonary TB and physical changes due to the disease can make sufferers feel insecure and isolated (Lisa *et al.*, 2024).

According to research conducted by Li *et al.* (2023), around 77.13% of patients with Pulmonary DM-TB experience psychological disorders, which include a variety of emotional conditions related to the management of Pulmonary DM-TB and its impact on quality of life. These psychological disorders often arise in response to the challenges arising from chronic disease management, and can worsen a patient's physical condition, reduce adherence to treatment, and increase the risk of poor prognosis (Huang *et al.*, 2024).

In addition, psychological disorders experienced by patients with Pulmonary DM-TB can affect the patient's overall psychological status, which is an important mental and emotional condition in determining how the patient responds to disease management (Tareek *et al.*, 2022). This disturbed psychological status in patients with Pulmonary DM-TB has an impact on the decline of emotional well-being, social function, and the patient's ability to undergo long-term treatment. This condition can worsen physical health, decrease medication adherence, inhibit the weaning process, and increase the risk of a poor prognosis (Listrianti *et al.*, 2023).

Psychological status can be measured through three main aspects, namely general mental health and social function in terms of emotional well-being. General mental health includes psychological symptoms such as anxiety, depression, and stress that can affect an individual's emotional well-being as well as an individual's ability to live a daily life, social function relates to an individual's ability to interact with others and carry out daily activities effectively (Amatullah *et al.*, 2025). In addition, emotional well-being involves the positive and negative feelings that individuals experience, which reflect their overall emotional state (Oliveira *et al.*, 2023).

This psychological condition is greatly influenced by various factors, namely coping skills, social support, literacy skills, physical health conditions, genetic factors, biological factors, social environment and economic environment. One of the factors that has a great influence is literacy ability, because it is the foundation of individuals in understanding and managing information (Koutra) *et al.*, 2024). Literacy skills involve a person's ability to read, understand, evaluate, and apply information. In health aspects *Literacy* It is not only related to the ability to understand general information, but also includes the ability to understand information related to health and its management. Therefore, for patients with Pulmonary DM-TB, the *Literacy* The most important thing in dealing with psychological conditions is *Mental Health Literacy*, which is the ability to recognize, and manage information related to mental health (UNESCO, 2024).

Mental health literacy is a person's ability to understand basic information about mental health (Jafari *et al.*, 2024). *Mental health literacy* (MHL) refers to a person's understanding of the signs and symptoms of mental health disorders, causative factors, treatment options, and strategies to effectively maintain and improve mental health (Muslic *et al.*, 2021).

Relevansi *Mental Literacy* (MHL) is increasingly important in patients with pulmonary DM-TB due to the high risk of psychological disorders due to the burden of managing two diseases at once, which can interfere with medication adherence and a healthy lifestyle and worsen the overall condition (Handayani *et al.*, 2020). Patients with pulmonary DM-TB are reported to be more prone to psychological disorders than patients with one chronic disease (X. Li *et al.*, 2023). According to research Tran *et al.*, (2025), level *Mental Literacy* reached 52.5%, showing that most patients still have an inadequate understanding of mental health, so that the increase in *Mental Health Literacy* very important.

Indicator *Mental health literacy* (MHL) includes knowledge of the various signs and symptoms of mental health disorders, an understanding of the effectiveness of treatment or treatment methods, and the ability to recognize behavioral changes and the severity of the condition that arises. All of these aspects assist individuals in understanding, preventing, and managing mental health issues (Which *et al.*, 2023). In addition, *Mental Health Literacy* influenced by various factors such as a person's level of knowledge, experience in seeking help, the existence of stigma, ease of access to information, and informal education from the social environment or media (Jafari *et al.*, 2024). All of these factors play a role in shaping *Mental Health Literacy* and affect their psychological state.

Mental health literacy (MHL) in patients with Pulmonary DM-TB helps them understand that chronic conditions can affect psychological health. By recognizing the symptoms of stress, anxiety, or depression that change, patients become better prepared to deal with the emotional impact of a long treatment. This understanding also encourages patients to be more courageous in seeking professional help, such as counseling or therapy, which previously might have been avoided due to a lack of knowledge. With good literacy, pulmonary DM-TB patients can maintain their mental well-being and undergo treatment more comfortably (Tran *et al.*, 2025).

This understanding is very important, especially for patients with pulmonary DM-TB, this is in accordance with research conducted by Jafari *et al.*, (2024), showing that *Mental Health Literacy* is closely related to a person's psychological status. The higher a person's understanding of *Mental Health Literacy*, the lower the levels of depression, anxiety, and stress they experience, all of which are part of psychological status. Patients who experience *Mental Health Literacy* tend to have less knowledge about *Mental Health Literacy*. In addition, people who have *Mental Health Literacy* Good people are more likely to seek professional help when dealing with health issues *mental*. Improvement *Mental Health Literacy* can also improve the quality of life, showing that understanding *Mental Health Literacy* can well help individuals manage their condition and improve overall well-being.

Some of the results of the study conducted Guo *et al.*, (2023), Chauhan *et al.*, (2024), Jafari *et al.*, (2024) shows the relationship between chronic diseases, health literacy, and *distress* psychologically, where *Health Literacy* acting as a partial mediator. However, the study is still general because it only assesses the existence of chronic diseases without distinguishing between the types of diseases or comorbid conditions that may affect psychological susceptibility. In addition,, *literacy* health care is still in general scope and has not specifically assessed the *Mental Health Literacy*.

The initial observation was made by the researcher on September 23, 2025 at the Gorontalo City Health Center. During interviews conducted with 5 patients diagnosed with Pulmonary DM-TB at the time of the medication schedule, it was found that 3 patients with Pulmonary DM-TB felt depressed after being diagnosed, saying that they had difficulty sleeping, coughing, shortness of breath, chest palpitations, and feeling afraid. While 2 people can accept this condition. Of the 5 patients, none had an understanding of mental health, especially about how to manage stress, emotional symptoms, and proper handling. Knowledge of mental health symptoms, risk factors, and coping strategies is still very limited.

RESEARCH METHODS

Research Location and Time

This research has been carried out in the working areas of the Duingi Health Center, Sipatana Health Center, North City Health Center, South City Health Center, West City Health Center, and Central City Health Center. This research has been carried out on January 26 – February 16, 2026

Research Design

This study is a quantitative research with descriptive analysis of correlation with the research design *cross sectional*. According to Subhaktiyasa, (2024), Research *Purposive Sampling* is a sampling technique where subjects are deliberately selected based on certain criteria that are considered relevant by the researcher. On In this type of study, independent variables and dependent variables are measured or observed only once in a given time without any follow-up. This study aims to find out the relationship between *Mental Health Literacy* with psychological status in pulmonary DM-TB patients, using questionnaires given at the same time (Sihotang, 2023).

This study uses a quantitative approach with descriptive analytical design and *purposive sampling methods*. This means that data on independent variables (*Mental Health Literacy*) and dependent variables (psychological status) were collected simultaneously at the same time, thus allowing researchers to find out whether there is a relationship between the two variables. This design was chosen because it is efficient in terms of time,

cost, and allows to reach all respondents who meet the criteria.

Population and Sample

The population of this study is patients with a diagnosis of DM with pulmonary TB at the Central City Health Center, Dungi Health Center, Sipatana Health Center, North City Health Center, South City Health Center and West City Health Center. The population in this study is all patients with Diabetes Mellitus with Pulmonary Tuberculosis at the Central City Health Center, Dungi Health Center, Sipatana Health Center, North City Health Center, South City Health Center and West City Health Center, totaling 75 patients. The sample in this study is 63 samples. Data Analysis Techniques

Data Analysis

Univariate Analysis

Analysis *Univariate* using descriptive statistical methods to describe the parameters of each variable (Satriadi *et al.*, 2023). In this study, an analysis was carried out *Univariate* with a frequency distribution table and of each variable. The frequency distribution was based on the characteristics of the respondents, namely name, age, gender, address, education, marital status, occupation, living status, length of time suffering from pulmonary DM-TB, and research variables, namely *Mental Health Literacy* with psychological status in pulmonary DM-TB patients.

Bivariate Analysis

Bivariate analysis is an analysis carried out on two variables that are suspected to be related or correlated. This analysis was carried out to determine the relationship between the two variables, namely independent variables (*Mental Health Literacy*) and dependent (Psychological Status), using statistical tests namely *Chi Square* with a significant rate of 5% (0.05) (Satriadi *et al.*, 2023).

In the early stages of bivariate analysis, the researchers planned to use *the Pearson Product Moment correlation test* to test the relationships between the study variables. However, after a prerequisite test was performed, the results were obtained that the data did not meet the assumptions required in the use of *the Pearson test*, mainly because the data distribution was abnormal and the measurement scale of the variables was not entirely at the interval or ratio level.

Alternatively, the researcher considered the use of *the Spearman Rank correlation test*. However, after further evaluation, the method was also considered inappropriate because the research data had been categorized into several groups and was no longer presented in the form of original scores or rankings. Based on these considerations, the researcher finally chose the *Chi-Square* test as the most suitable analysis method.

RESULTS

Respondent Characteristics

Characteristics of Respondents by Age

Table 1 Frequency Distribution of Respondent Characteristics Based on the Age of DM-TB Patients at the Gorontalo City Health Center.

Yes	Age (Years)	Frequency (n)	Percentage (%)
1.	21 – 30	5	7,9
2.	31 – 40	8	12,7
3.	41 – 50	7	11,1
4.	51 – 60	28	44,4
5.	≥ 61	15	23,8
Total		63	100

Source : Primary Data, 2026

Based on table 1, it shows that the respondents in the study were mostly 51-60 years old as many as 28 respondents (44.4%) and a small number of 21-30 years old as many as 5 respondents (7.9%).

Characteristics of Respondents by Gender

Table 2 Frequency Distribution of Respondent Characteristics Based on the Gender of DM-TB Patients at the Gorontalo City Health Center

Yes	Gender	Frequency (n)	Percentage (%)
1.	Men – men	40	63,5
2.	Women	23	36,5

Total	63	100
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Source : Primary Data, 2026

Based on table 2, it shows that most of the respondents are male as many as 40 respondents (63.5%) and the number of female respondents is less, which is as many as 23 respondents (36.5%)

Characteristics of Respondents Based on Living Status

Table 3. Frequency Distribution of Respondent Characteristics Based on the Living Status of DM-TB Patients at the Gorontalo City Health Center

Yes	Residency Status	Frequency (n)	Percentage (%)
1.	Living with family	62	98,4
2.	Independent Living	1	1,6
Total		63	100

Source : Primary Data, 2026

Based on table 3, it shows that the respondents in the study mostly live with families as many as 62 respondents (98.4%) and the number of respondents who live alone as much as 1 respondent (1.6%).

Characteristics of respondents based on length of time of suffering from DM-TB

Table 4. Distribution of Frequency of Respondent Characteristics Based on the Length of Time Suffering from DM-TB at the Gorontalo City Health Center

Yes	Long Suffering from DM-TB	Frequency (n)	Percentage (%)
1.	1 Month	8	12,7
2.	2 Months	8	12,7
3.	3 Months	11	17,5
4.	4 Months	16	25,4
5.	5 Months	10	15,9
6.	6 Months	4	6,3
7.	7 Months	1	1,6
8.	12 Months	1	1,6
9.	2 years	3	4,8
10.	10 years	1	1,6
Total		63	100

Sumbet : Primary Data, 2026

Based on table 4, it shows that respondents based on the length of suffering from DM-TB are most found in respondents who suffer for 4 months, namely as many as 16 respondents (25.4%) and the least number of respondents are found in the duration of suffering from 7 months, 12 months, and 120 months, only 1 respondent (1.6%) respectively.

Univariate Analysis

Distribution of Respondents Based on *Mental Health Literacy*

Table 5. Distribution of Frequency of Respondent Characteristics Based on *Mental Health Literacy* of DM-TB Patients at the Gorontalo City Health Center

Yes	Mental Health Literacy	Frequency (n)	Percentage (%)
1.	Low	22	34,9
2.	Height	41	65,1
Total		63	100

Source : Primary Data, 2026

Based on table 5 shows that *Mental Health Literacy* Most of the respondents were in the high category, which was as much as 41 respondents (65.1%) and respondents with low category namely 22 respondents (34,9%).

Distribution of Respondents by Psychological Status

Table 6. Distribution of Respondent Frequency Based on the Psychological Status of DM-TB Patients at the Gorontalo City Health Center

Yes	Psychological Status	Frequency (n)	Percentage (%)
1.	<i>Mild Distress</i>	26	41,3
2.	<i>Severe Distress</i>	37	58,7
Total		63	100

Source : Primary Data, 2026

Based on table 6, it shows that most of the respondents in the study have *survere distress* as many as 37 respondents (58.7%) and a small number have *mild distress* as many as 26 respondents (41.3%).

Bivariate Analysis

Table 7. The Relationship between Mental Health Literacy and Psychological Status in Patients with Diabetes Mellitus – Pulmonary Tuberculosis at the Gorontalo City Health Center

<i>Mental Health Literacy</i>	Psychological Status				Total		<i>P-Value</i>
	<i>Mild Distress</i>		<i>Severe Distress</i>				
	n	%	n	%	n	%	
Low	4	6,3	18	28,6	22	34,9	0,006
Height	22	34,9	19	30,2	41	65,1	
Total	26	41,3	37	58,7	63	100	

Source : Primary Data, 2026

Based on research conducted on the relationship between *mental health literacy* and psychological status in DM-TB patients at the Gorontalo City Health Center. The table above is obtained a cross-tabulation between *mental health literacy* and psychological status. Of the 22 respondents (34.9%) with *low mental health literacy*, there were 4 respondents (6.3%) who had *mild distress* psychological status, 18 respondents (28.6%) had *severe distress* psychological status. Of the 41 respondents (65.1%) with *high mental health literacy*, there were 22 respondents (34.9%) who had *mild distress* psychological status, 19 respondents (30.2%) had *severe distress* psychological status.

In addition, the results of *the statistical test* using *the Chi-Square test* obtained a *p-value* of 0.006 which means ($p < 0.05$) with a significance level of $\alpha = 0.05$. Therefore, it can be concluded that H_0 is rejected and H_1 is accepted, which means that there is a significant relationship between *Mental Health Literacy* and Psychological Status in DM-TB Patients at the Gorontalo City Health Center.

DISCUSSION

Mental Health Literacy in DM-TB Patients in Gorontalo City

Based on the results of the study, it showed that *the Mental Health Literacy* of respondents was mostly in the high category, namely 41 respondents (65.1%) and respondents in the low category, which was 22 respondents (34.9%). From the results of the study, most of the respondents have *high* mental health literacy. This is supported by aspects of basic knowledge of mental health as well as an understanding of myths and misconceptions about mental disorders. Respondents in this category are generally able to understand the importance of maintaining mental health, recognize correct information about mental disorders, and are not easily convinced by stigma or false negative assumptions related to mental health problems. The high level of *Mental Health Literacy* in most respondents can be influenced by the ease of access to information, as well as the increasing spread of education about mental health in the community and social media.

Based on the distribution of respondents' answers to the *Mental Health Literacy* variable, when viewed from the distribution of answers in each aspect, it can be seen that most of the respondents have a good level of mental health literacy. In the aspect of basic knowledge of mental health, respondents tended to give supportive answers, especially related to the understanding that mental health is an important part of a person's health, mental disorders can be caused by various factors, and mental problems can occur in all age groups. Respondents also showed an understanding that mental disorders can be prevented and treated with the right approach, as well as the importance of seeking professional help if experiencing mental health problems.

Meanwhile, in the aspect of understanding myths and misconceptions about mental disorders, respondents showed a tendency to be able to distinguish between correct and inaccurate information about mental disorders. This can be seen from the answers of respondents who understand that mental disorders are not only caused by stress or wrong thinking, but can also be influenced by biological, environmental, and other conditions. In addition,

most respondents also understand that individuals with mental disorders can still get treatment and live a good life if they get the appropriate support.

According to the theory of *Mental Health Literacy* put forward by Anthony F. Jorm (1997), mental health literacy is the ability of individuals to acquire, understand, and use information about mental health, manage, and prevent mental disorders. Most individuals are in the category of high *Mental Health Literacy*, which indicates that individuals have a good understanding of mental health, are able to recognize the right information related to mental disorders, and do not easily believe in stigma and misunderstandings that develop in society. The high level of *Mental Health Literacy* also reflects that individuals have a good awareness of the importance of mental health so that they can form a more positive attitude in understanding mental health conditions.

In line with research Jolly *et al.* (2022) which explains that *Mental Health Literacy* It includes the individual's knowledge and attitudes in recognizing signs of mental disorders such as stress, in daily life, as well as the ability to take appropriate actions to maintain mental health. The study also emphasized that individuals with *Mental Health Literacy* Good people have a better understanding of mental health, are able to distinguish myths and facts related to mental disorders, and have a more positive attitude towards efforts to seek help and manage mental health. Thus, the high level of *Mental Health Literacy* The respondents in this study showed that most of the respondents already had good basic knowledge of mental health and the correct understanding of mental disorders so that they could support the behavior of maintaining mental health more optimally.

In addition, out of 63 respondents, 22 respondents had a low level of *Mental Health Literacy*. This shows that there are still some individuals who have limitations in understanding mental health issues. This can be seen from the results of the study which shows that the average demographic data of respondents is at the age of >50 years. Where at that age, a person is included in the category of early elderly, namely the aging phase.

Aging is one of the important factors that affect *mental health literacy*. In general, after entering old age, a person will experience a decline in cognitive function. Cognitive function concerns the quality of knowledge that a person has. Cognitive function is the ability to think, remember, learn, use language, memory, consideration, problem-solving, and executive abilities (Ekasari *et al.*, 2018).

This is supported by research by Kilic (2023), who states that the decline in cognitive and physical abilities as we age is correlated with a decrease in *mental health literacy* which results in limitations in recognizing symptoms and seeking help. The elderly are a risk group with low levels of MHL.

According to Timothy A. Salthouse's (2010) theory, older age correlates with a decrease in *mental health literacy* because this condition makes the ability of the elderly to recognize the symptoms of mental disorders lower, so they also tend to be slower or less appropriate in seeking professional help. This is supported by recent research showing that the higher the age, the lower the level of MHL, which has an impact on limitations in symptom recognition and low seeking behavior.

Psychological Status of DM-TB Patients in Gorontalo City

Based on the results of the study, it showed that most of the respondents had a psychological status with a level of *severe distress* as many as 37 respondents (58.7%) and respondents with a level of *mild distress* as many as 26 respondents (41.3%). This is supported by aspects of general mental health, social functioning, and emotional well-being. A general mental health condition that is suboptimal can cause individuals to experience stress more easily, and difficulty coping with daily stress. In addition, the disruption of social functions can also have an impact on the reduced ability of respondents to establish social interactions, communicate, and carry out roles in the family and community environment. Meanwhile, the low emotional well-being aspect suggests that respondents tend to experience negative feelings, or dissatisfaction with the conditions they experience.

Based on the distribution of respondents' answers to the psychological status variable, when reviewed from each aspect of the questionnaire, it can be seen that the psychological condition of the respondents tends to be in the category of quite good even though there are still variations in several dimensions. In the general mental health aspect, most respondents showed good ability to carry out daily activities such as concentrating, making decisions, and enjoying activities, although it was still found that some respondents occasionally experienced psychological distress, sleep disturbances, and difficulties in dealing with certain problems. In terms of social function, respondents are generally still able to carry out social roles, interact with the environment, and engage in useful activities, although in certain conditions there are respondents who feel powerless or not optimal in carrying out their social roles. Meanwhile, in the aspect of emotional well-being, respondents showed a variety of emotional conditions, where some still experienced feelings of depression, unhappiness, and lack of hope for the future, but others were still able to enjoy daily activities and had a more stable emotional state. This condition can be understood that in general, respondents still have quite good coping skills in dealing with DM-TB disease stressors, although in some respondents the perception of the disease as a serious threat can cause psychological pressure when the coping resources they have are not fully adequate.

According to the theory of Richard Lazarus (1984) in Pradipta (2024), it states that stress arises when individuals assess a condition as a threat and feel that their coping resources are insufficient to overcome it. Patients with DM-TB often view their disease as a serious threat to life, both in terms of health, productivity, and social role. Concerns about diabetes complications, the risk of transmitting TB to families, and possible treatment failures

can increase the perception of the threat. If the coping mechanism is not effective, then this condition develops into severe *distress*.

This is in line with research by Rissaadah *et al* (2025) which shows that individuals with multiple chronic diseases have a higher risk of experiencing psychological disorders than individuals without comorbidities. Chronic illnesses that require long-term treatment can cause prolonged stress, and feelings of worry about health conditions, which ultimately lead to increased prevalence of stress and decreased quality of life. In addition, physical limitations and ongoing care needs can also affect an individual's social functioning as well as emotional well-being.

In addition, out of 63 respondents, 26 respondents were found with *mild distress*, which means that the number of respondents to DM-TB patients with *psychological distress* levels in the mild distress *category* is less than the severe *distress* category. This is supported by aspects of general mental health, social functioning, and emotional well-being which shows that some respondents are still able to adapt to the chronic disease conditions experienced even though there is still a psychological burden, where this condition is also influenced by the patient's ability to carry out daily social activities and the support they receive from the surrounding environment, so that it can help in reducing the level of psychological stress that is felt, but attention is still needed because there is a variation in the level of distress which shows that not all patients are in a stable psychological condition.

Based on the distribution of respondents' answers to the psychological status variable, when reviewed from each aspect of the questionnaire, it can be seen that the psychological condition of the respondents shows various descriptions related to the ability to adapt to stress due to chronic DM-TB disease. In terms of concentration and cognitive function, some respondents were still able to concentrate on carrying out daily activities and were able to respond to situations quite well, although there were also respondents who reported disorders such as difficulty sleeping due to worry and feeling constantly under pressure. In terms of decision-making ability and social roles, respondents generally still feel able to make decisions and feel that they play a role in useful activities, which shows that there is a relatively maintained social function. However, in the aspect of emotional condition and self-perception, respondents are still found who experience feelings of helplessness, unhappiness, inability to face problems, and lack of hope for the future. Overall, this suggests that although some respondents had good coping skills, there was still variation in the level of psychological distress that indicated the need for further attention to the patient's mental health condition comprehensively.

According to the theory of Cohen & Wills (1985), social support acts as a protective factor that can reduce the negative impact of stress on an individual's psychological state. In patients with chronic illnesses, the stress caused by the disease condition can trigger psychological distress, but the existence of social support from family, friends, and the surrounding environment can serve as a buffer that helps individuals in dealing with this stress. This social support can improve adaptability, provide a sense of comfort, and help patients continue to carry out daily social activities, so that the level of distress experienced can be in the lighter category compared to the heavier category. Thus, the variation in the level of distress that occurs in patients shows that the better the social support received, the less likely an individual is to experience high psychological distress.

This is supported by research (Beverly *et al.*, 2020), showing that social support has an important role in lowering negative impacts *Diabetic distress*. The results of this study confirm that patients with good social support tend to have higher adaptability in undergoing chronic diseases, so the level of psychological distress experienced is lower. In addition, emotional, instrumental, and social support from family and the surrounding environment has been proven to improve patients' ability to carry out self-care and reduce the impact *depression* as well as psychological distress. These findings are in line with the condition of DM-TB patients, where some respondents are still able to function socially and emotionally well due to environmental support, although there are still variations in distress levels that indicate that not all patients are in a stable psychological state.

The Relationship between *Mental Health Literacy* and Psychological Status in Patients with Diabetes Mellitus – Pulmonary Tuberculosis at the Gorontalo City Health Center

Based on research conducted on the relationship between *mental health literacy* and psychological status in DM-TB patients at the Gorontalo City Health Center. The table above is obtained a cross-tabulation between *mental health literacy* and psychological status. Of the 22 respondents (34.9%) with *mental health literacy*, there were 4 respondents (6.3%) who had *mild distress* psychological status, 18 respondents (28.6%) had *severe distress psychological status*. Of the 41 respondents (65.1%) with *high mental health literacy*, there were 22 respondents (34.9%) who had *mild distress* psychological status, 19 respondents (30.2%) had *severe distress psychological status*.

Based on the theory of Anthony F. Jorm (2002) in this distribution, it shows the tendency that respondents with *Mental Health Literacy* low more are in the category *distress* weight compared to *distress* lightweight. On the other hand, respondents with mental *High Health Literacy* tend to be more in the category *distress* lightweight. This indicates that the level of mental health literacy can play a role in influencing a person's psychological status.

Based on the results of the statistical test using *Chi-Square*, it shows a *p-value* of 0.006 ($p < 0.05$) with a significance level of $\alpha = 0.05$. This means that there is a significant relationship between *mental health literacy* and psychological status in DM-TB patients in Gorontalo City. Thus, the null hypothesis (H_0) is rejected and the

alternative hypothesis (H1) is accepted. These findings reinforce the assumption that the better a person's level of mental health literacy, the greater their ability to manage the stress and psychological pressure experienced. On the other hand, low mental health literacy can cause individuals to be less able to understand their emotional state, reluctant to seek help, and more susceptible to experiencing *severe distress*.

From the results of the study, respondents with *Mental Health Literacy* Low, namely 4 respondents (6.3%) had a psychological status of the *mild distress*. These findings show that low MHL is influenced by the age characteristics of the respondents. In certain age groups, especially adults or the elderly, individuals tend to have better life experiences and coping mechanisms so that they are able to manage stress and suppress the emergence of *distress* lightweight. In addition, at older age there is often a tendency to perceive psychological symptoms as normal or part of a physical condition, so that *distress* Mild Unrecognized or Reported. Therefore, the small proportion *Mild distress* in the group *Mental Health Literacy* low indicates that psychological conditions are not only affected by the level of *Mental Health Literacy*, but also by the age factor that plays a role in the way individuals understand, respond and report their psychological conditions (Tiera *et al.*, 2025)

In addition to the age factor, the length of suffering from DM-TB affects low MHL and psychological status with the category *Mild distress*. This is because respondents who have suffered from DM-TB for a long time tend to experience the process of adapting to the condition of their disease, so that they have better coping skills in dealing with stress and psychological pressure. This adaptation makes the respondents no longer feel *distress* in the weight level, but only in the light level. However, on the other hand, the length of suffering from the disease can also cause saturation in undergoing treatment as well as decrease motivation to seek and understand health information, which contributes to low MHL. Therefore, the combination of the adaptation process to the disease and the low understanding of mental health causes respondents with a longer duration of DM-TB to tend to be in the category *Mild distress* despite having low levels of MHL (Koutra, 2024).

This is supported by research conducted by Schimmelmman *et al.* (2023) which states that the low *Mental Health Literacy* not always related to *distress* severe, because the psychological condition is also influenced by other factors such as age, long suffering from illness. Respondents who have been suffering from Diabetes Mellitus - Tuberculosis for a long time tend to undergo an adaptation process and have a more stable coping mechanism, so the psychological distress experienced is at a mild level (*Mild distress*) despite having low MHL.

The results of the study also showed that most of the respondents had low MHL with a category psychological status *severe distress* 18 respondents (28.6%). This is because low MHL can contribute to high levels of *distress* psychological. This is because respondents with low MHL tend to have limitations in recognizing the symptoms of mental disorders, understanding the conditions experienced, and not knowing the right way to handle them, so that the stress felt is not handled properly and develops into heavier distress Irmawati (2025). In addition, chronic disease conditions experienced, such as Diabetes Mellitus - Tuberculosis, can exacerbate the psychological burden due to the length of treatment, as well as the demands of complex disease management (Chen *et al.*, 2025)

Another related factor is the educational characteristics of respondents, where low education levels can limit an individual's ability to access, understand, and process health information, including mental health. As a result, respondents with low education tend to have *Mental Health Literacy* who are lower and less able to make prevention and early treatment efforts for psychological problems, so they are more vulnerable to experiencing *severe distress*. Therefore, the combination of low levels of education, limited understanding of mental health, and the burden of prolonged chronic illness causes respondents to be more at risk of developing *distress* Psychologically Heavy (Elsiandi *et al.*, 2024).

In line with research conducted by Jafari (2024) which shows that there are 18 respondents with the category *severe distress* which has low MHL. This condition can occur because individuals with low MHL have limitations in recognizing the symptoms of mental disorders, understanding how to handle them, and knowing when and where to seek help. In addition, the educational factor also plays an important role, where in this study most of the respondents have a junior high school education, which shows that the majority of respondents are at the lower secondary education level. Individuals with higher levels of education tend to have a better understanding of mental health, while lower education leads to limitations in accessing and understanding information. Therefore, low levels of education can contribute to low MHL, which ultimately increases the risk of severe psychological distress in respondents.

Based on the results of the study, it was also found that respondents with *Mental Health Literacy* high with a psychological status category *Mild distress* 22 respondents (34.9%). These findings show that individuals with good MHL tend to have the ability to recognize the early symptoms of psychological disorders, understand the conditions experienced, and make appropriate handling efforts so that *distress* that is experienced does not develop into heavier (Caskie *et al.*, 2023). This condition is also related to the characteristics of respondents who live with their families, where the existence of family can provide emotional support, motivation, and assistance in dealing with health problems. Such family support can help respondents manage stress and strengthen adaptive coping mechanisms. Therefore, the combination of high MHL and good family support causes respondents to tend to experience distress at a mild level (*Mild distress*) and being able to maintain a more stable psychological state (Nugraha *et al.*, 2023)

In line with research conducted by Luo *et al.* (2024) Family support has a positive effect on the psychological condition of individuals through increased self-efficacy and perceived social support. Individuals who are in a healthy and supportive family environment tend to receive better emotional and social support, so they are able to manage stress, anxiety, and psychological stress more adaptively. Family support also plays a role in increasing individual confidence in dealing with health problems, which ultimately helps maintain the stability of psychological conditions. In addition, good health literacy strengthens the individual's ability to understand the conditions experienced and make optimal use of the available support. Thus, the combination of good family health and high health literacy contributes to preventing increased *distress* to a heavier level and support a better psychological state (Money *et al.*, 2023)

Based on the results of the study, it was also found that respondents with *Mental Health Literacy* high with a psychological status category *severe distress* 19 respondents (30.2%). These findings show that the height of the *Mental Health Literacy* It is not always followed by a better psychological state. Respondents with *Mental Health Literacy* Patients tend to have a better understanding of the disease conditions they are experiencing, including the risks and long-term impacts of Diabetes Mellitus - Tuberculosis, which can increase psychological anxiety and distress. This condition is also related to the job characteristics of respondents, where working respondents tend to face job demands and economic pressure that can weigh psychological burdens. In addition, the difficulty in dividing time between work and medication can lead to physical and mental fatigue (Which *et al.*, 2023). Therefore, although the respondent has *Mental Health Literacy* The pressure of work accompanied by a high understanding of the condition of the disease can cause the respondent to experience *severe distress*.

In line with research conducted by A. Li (2021) Explaining that individuals with chronic illnesses often experience high psychological distress due to the complexity of the disease, the need for long-term treatment, as well as concerns about complications and quality of life. Respondents with *Mental Health Literacy* They tend to have a better understanding of the Diabetes Mellitus-Tuberculosis disease experienced, including the risk of complications, the length of treatment, and the impact of the disease on physical conditions. This deeper understanding can increase awareness of the threat of disease so that it triggers more worry, stress, and psychological pressure. Thus, high mental health literacy is not necessarily directly related to better psychological conditions, especially in patients with complex chronic illnesses that require long-term management (Minhat *et al.*, 2023).

Based on the explanations above, and supported by the research conducted, the researcher assumes that MHL (*mental health literacy*) has an important role in improving a person's psychological well-being and quality of life. Given the high risk of psychological disorders in patients with DM-TB, increasing MHL is critical for detecting disorders at an early stage, seeking mental health services, and receiving available treatment. In addition, mental health education, integrated counseling in treatment services, and social support from families and health workers can be effective strategies to reduce *distress* levels and improve patients' quality of life.

CONCLUSION

Mental Health Literacy of DM-TB patients in Gorontalo City, the majority of respondents were in the high category, namely 41 respondents (65.1%)

The psychological status of DM-TB patients in Gorontalo City, the majority of respondents were in the category of *severe distress*, namely 37 respondents (58.7%)

The results of the *statistical test* using the *Chi-Square test* obtained a *p-value* of 0.006 ($p < 0.05$) which means that there is a significant relationship between *Mental Health Literacy* and Psychological Status in DM-TB Patients at the Gorontalo City Health Center

ADVICE

It is expected to increase understanding of mental health and is expected to be more active in seeking information related to the signs and symptoms of psychological disorders and stress management during treatment.

It is expected to increase attention to mental health aspects and provide more comprehensive services, not only focusing on the physical aspects of the disease but also paying attention to the psychological well-being of patients.

It is hoped that this study can be used as a reference for future research and is expected to add other variables that have the potential to be confounding factors, such as social support, medication adherence and the severity of the condition to get a more comprehensive picture.

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