

# Mental Health Status and Its Associated Factors Related to Pulmonary Tuberculosis Patients in Primary Health Care Centre in Surabaya, Indonesia

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## ABSTRACT

**Background:** Mental disorders in TB patients are due to long-term treatment, drug side effects, and relapse. This study aimed to analyse the mental health status among TB patients and its associated factors. **Methods:** The study was carried out on 107 Pulmonary TB patients from 5 Primary Healthcare centres in Surabaya, Indonesia. Furthermore, Mental Health Inventory (MHI-18) was used to measure the mental health status. The MHI-18 has four subscales including, anxiety, depression, behaviour control, and positive affection. In addition, the score range of MHI and its subscales is 0-100, where the higher score showed a better mental health status. **Results:** The results showed no difference in the score of mental health status, anxiety, depression, and positive affect in all factors. However, behaviour control depicted a significant difference between sex and marital status. In conclusion, mental health problems can occur in all TB patients irrespective of their characteristics. **Conclusion:** Screening is required for the prevention of severe disease in the early treatment phase and various factors related to mental health should be considered during the implementation of TB management to optimize treatment outcomes.

**Keywords:** mental health status, tuberculosis, anxiety, depression, positive affect, behaviour control.

## INTRODUCTION

WHO (2021) reported that about 10 million people were infected by *Mycobacterium tuberculosis* globally in 2020,<sup>1</sup> including Indonesia due to its large population and high prevalence.<sup>2</sup> The disease is curable and preventable, and a 90% treatment success rate and 85% cure rate are achieved if the TB program is performed well.<sup>1,3</sup>

Depression and anxiety are common mental disorders of global public concerns and TB patients are prone to psychiatric morbidities.<sup>4,5</sup> There is a strong relationship between depression and anxiety and tuberculosis, where one increases the risk of the other. Furthermore, poverty is a risk factor for TB and common mental disorders. Several studies show that anxiety, depression, and mental distress are related to worsening health status, such as progressive symptoms, experiencing symptoms more often, increased use of health services, non-compliance to treatment, and prolonged duration of treatment.<sup>6,7</sup>

Mental disorders in TB patients may be due to long-term treatment, drug side effects, and relapse,<sup>8-10</sup> and the common psychiatric disorder include depression, psychosis, anxiety, and trauma-related disorder.<sup>11</sup> In addition, anxiety and depression are co-occurring in TB patients and are strongly related to non-compliance.<sup>9,12</sup>

The number of mental health problem was high among women, younger age, people with lower income, and lower education.<sup>13</sup> Malnutrition also common cause of both TB and mental health problem.<sup>14</sup> Eventhough TB and mental health problem share cause, mental health problems are neglected in TB patients.<sup>15</sup> because health programs focus on TB. Therefore, screening for a mental health condition and its associated factors are required for prevention and early treatment to prevent further psychiatric disability.<sup>7,16</sup> By knowing what is the major cause of the mental health among TB patients, the prevention and treatment can be applied effectively. This study aimed to analyse the mental health

status among TB patients and its associated factors.

## METHODS

The study was conducted on 107 pulmonary TB patients from 5 primary healthcare centres in Surabaya, Indonesia, from 2020 to 2021. Furthermore, the respondents were selected randomly based on the data from the primary healthcare centre. This study was approved by the Ethics Committee in Health Research of Dr. Soetomo Hospital with ethical clearance number 103/EC/KEPK/FKUA/2021. The study was non-interventional and the data were obtained by interviewing TB patients as respondents.

Mental health status was measured using the Mental Health Inventory (MHI-18) which consists of four subscales including anxiety, depression, behaviour control, and positive affection. The score range of MHI and its subscales is 0-100, where the higher score depicted a better mental health status.<sup>17,18</sup>

The independent variables include sex, age, level of education, working status, marital status, body mass index, and comorbidities. The age was classified based on the Ministry of Health in Indonesia for descriptive analysis: teenager, young adult, late adult, early elderly, middle elderly, and late elderly. For statistical analysis, age was defined as teenager and young adult, late adult and early elderly, and middle and late elderly.

BMI was classified as underweight which is divided into severely and light underweight, normal, and overweight separated into light and severely overweight. The comorbidities were defined as TB patients with other illnesses or not. Also, we analyzed the data using the T-test and ANOVA with  $\alpha$  set at 0.05 to analyse the different mental health between independent variables.

## RESULTS

The characteristics of pulmonary TB patients in Surabaya, Indonesia is shown on **Table 1**. **Table 2** showed the characteristic of the respondents, including sex, age, level of education, working status, marital status, body mass index, and

**Table 1.** Subject's characteristic.

Characteristic	Category	n	%
Sex	Male	51	47.7
	Female	56	52.3
	Total	<b>107</b>	<b>100</b>
Age	Teenagers (15-25 y)	22	20.6
	Young adult (26-35 y)	20	18.7
	Late adult (36-45 y)	25	23.4
	Early elderly (46-55 y)	14	13.1
	Middle elderly (56-65 y)	23	21.5
	Late elderly (>65 y)	3	2.8
	Total	<b>107</b>	<b>100</b>
Level of education	Lower educational level	41	38.3
	Higher educational level	66	61.7
	Total	<b>107</b>	<b>100</b>
Working status	Working	47	43.9
	Not working	60	56.1
	Total	<b>107</b>	<b>100</b>
Marriage status	Married	39	36.4
	Not married	68	63.6
	Total	<b>107</b>	<b>100</b>
Body Mass Index	Severe underweight	22	20.6
	Underweight	14	11.2
	Normal	61	57.0
	Overweight	5	4.7
	Severe Overweight	5	4.7
Total	<b>107</b>	<b>100</b>	
Comorbidity	Yes	39	36.4
	No	68	63.6
	Total	107	<b>100</b>

comorbidity. About 56% were female, while 23.4% were late adults. Furthermore, 61% of the respondents had higher education and 43% had a job. The majority had normal body mass

index without comorbidity.

**Table 2** showed that mental health status and its subscales had a low mean score, indicating that the mental health of respondents was not good except for the positive affect which had a higher average mean.

**Table 3** showed no difference in the score of mental health status, anxiety, depression, and positive affect in all factors. However, there was a significantly different in the score of behavioural control between females and males and married and not married.

**Table 2.** Mental health status of tuberculosis patients.

Variable	Min	Max	Mean	SD
Mental Health	6.67	76.67	41.85	12.55
Anxiety	0	80.00	33.12	18.95
Depression	0	84.00	33.53	16.97
Behaviour control	0	100.00	41.03	18.47
Positive affect	0	100.00	63.97	24.84

**Table 3.** P-value of factors affecting pulmonary tb patients.

Factors	p-value				
	Mental Health	Anxiety	Depression	Behaviour control	Positive affect
Sex	0.12	0.95	0.77	0.01*	0.16
Age	0.85	0.30	0.68	0.23	0.55
Level of education	0.60	0.95	0.45	0.65	0.79
Working status	0.39	0.28	0.93	0.69	0.58
Marriage status	0.14	0.84	0.39	0.01*	0.72
BMI	0.93	0.66	0.89	0.72	0.52
Co-morbidity	0.55	0.99	0.24	0.36	0.75

\*Significantly different

## DISCUSSION

Depression increases the risk of worsening the health status, such as comorbidities, disability, suffering, and health-related cost in TB patients. However, the relationship between comorbid TB and depression is not understood.<sup>8,19,20</sup> The patient's psychosocial condition can be worsened by depression, which affects the treatment outcomes. In addition, TB patients with depressive symptoms reduce social relationships, especially at the stage of coughing blood which leads to low self-esteem and hopelessness.<sup>21</sup>

Although their scores are low, the study analysis showed a difference in the score of mental health status, anxiety, depression, and positive affect. This shows that patients with pulmonary TB may experience mental health problems regardless of their demographic variables and whether they have comorbidities.<sup>22</sup>

Mental health affects the ability to handle stress and make a decision, and this varies between men and women. Women are busier than men because they have more responsibilities such as domestic work and jobs. Although there is no difference in mental distress between men and women,<sup>23</sup> there is a variation in behaviour control. Men and women have different values, attitudes, and behaviour due to gender roles, stereotypes, and fundamental genetic and physiological differences.<sup>24,25</sup>

Mental health problems occur in all age groups, with the young being at high risk of mental health challenges and they receive less attention.<sup>26</sup> The younger people establish independence and take responsibility for their actions.<sup>16</sup> However, older people experience a decline in physical condition and health, hence they experience many limitations. TB exacerbates older people's physical health, making it a risk factor for mental health problems in older population.<sup>27</sup>

Generally, education is closely related to health because higher education improves health status due to healthy behaviour.<sup>28</sup> The people with higher education have better health status because education is strongly related to job and income, which play a role in health behaviour, human relationship, family, and community well-being.<sup>29,30</sup>

People with higher education have access to information, which can be harmful if not managed properly. The imprecise knowledge makes TB patients afraid and worried. Furthermore, information overload makes a person feel overwhelmed, confused, powerless, and mentally exhausted, leading to difficulty in making decisions which causes information avoidance.<sup>31</sup>

Those with lower education have difficulty understanding some information<sup>32</sup> which impacts their ability to overcome problems, such as being diagnosed with TB, hence they are prone to mental health problems. Also, they are at risk of unreliable information due to limited knowledge to manage it.

People are susceptible to mental distress, regardless of their employment status. The TB patients were responsible for their job, study, or household activity and they need to continue their responsibilities while receiving treatment simultaneously.<sup>33</sup> Meanwhile, patients who are not working are housewives and students. Due to exposure to responsibilities and workload, tuberculosis may harm patients' mental health and this may worsen in housewives.<sup>23</sup> Students were at high risk for mental health problems due to the pressure from teachers, parents, and several factors such as demanding academic content, study workload, tight schedules, lack of break, conflict with friends, and stigma toward TB.<sup>34-36</sup> The high-level stress, TB symptoms, and the treatment's side effect experienced by students affect their daily life.<sup>34</sup> Additionally, stressful situations due to TB negatively affect workability,<sup>37</sup> hence TB can worsen the patients' responsibility and workload, as well as mental health.

TB patients experience mental distress whether they have comorbid conditions or not because they feel traumatized after the diagnosis. In addition, the duration of treatment and drug side effects impact the psychological condition, such as depression and anxiety.<sup>4</sup> Patients with longer illness duration are prone to depression and anxiety, and being diagnosed of tuberculosis can cause psychological trauma.<sup>38</sup>

Marital status showed a significant result in behaviour control because the spouse monitors and attempts to control the healthy behaviours,

hence it is of better advantage to men than women.<sup>39</sup> Also, lack of support increases psychological distress, especially for the spouse.<sup>40</sup> Generally, TB patients may experience mental distress if their families are not supportive. Several patients experienced excessive worry or mental anguish and did not tell their spouses about the illness due to extreme rejection.<sup>41</sup>

The analysis results show that TB patients are at risk of experiencing mental health problems, so the management of the TB program needs to be integrated with the mental health program. Depression, as one of the mental health problems, poses a substantial risk to achieving the WHO End TB Strategy goals. Integrating TB and mental health programs can reduce costs, improve quality of service and patients quality of life, mortality prevention, reduce symptoms of depression and anxiety, and increase adherence to treatment in TB patients.<sup>42,43</sup>

## CONCLUSION

Mental health problems can occur in TB patients regardless of their characteristics. The study results showed no difference in the score of mental health and its subscale except for behavioural control. Furthermore, the behavioural control score was significantly different between married and unmarried people and males and females. Therefore, mental health problems can occur in all patients irrespective of their demographic variables and whether they have comorbidity. Screening for a mental health condition is required to prevent severe disease in the early treatment phase. The implementation of TB management needs to consider various factors related to mental health to optimize treatment outcomes.

## DATA AVAILABILITY

The data used to support the findings of this study are included within the article.

## CONFLICTS OF INTEREST

The authors have no conflicts of interest to disclose.

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## REFERENCES

1. WHO. Global Tuberculosis Report 2021. 2021.
2. Mahendradhata Y, Trisnantoro L, Listyadewi S, et al. The Republic of Indonesia health system review. 2017;7:1.
3. Izudi J, Tamwesigire IK, Bajunirwe F. Treatment success and mortality among adults with tuberculosis in rural eastern Uganda: A retrospective cohort study. *BMC Public Health*. 2020;20(1):1–10.
4. Wang XB, Li XL, Zhang Q, et al. A survey of anxiety and depressive symptoms in pulmonary tuberculosis patients with and without tracheobronchial tuberculosis. *Front Psychiatry*. 2018;9:1–10.
5. Hayward SE, Deal A, Rustage K, et al. The relationship between mental health and risk of active tuberculosis: a systematic review. *BMJ Open*. 2022;12(1):e048945.
6. Rao A, Rizvi N. Frequency of depression and anxiety among Tuberculosis patients. *J Tuberc Res*. 2016;04(04):183–90.
7. Lara-Espinosa J V., Hernández-Pando R. Psychiatric problems in pulmonary tuberculosis: Depression and anxiety. *J Tuberc Res*. 2021;09(01):31–50.
8. Basu G, Chatterjee C, Singh R, Biswas S. Depression and its correlates among Tuberculosis patients: experience from a DOTS clinic of a sub divisional hospital of West Bengal. *Indian J Res Reports Med Sci [Internet]*. 2012;2(4):14–7. Available from: [www.ijrrms.com](http://www.ijrrms.com)
9. Duko B, Gebeyehu A, Ayano G. Prevalence and correlates of depression and anxiety among patients with tuberculosis at Wolaita Sodo University Hospital and Sodo Health Center, Wolaita Sodo, South Ethiopia, Cross sectional study. *BMC Psychiatry [Internet]*. 2015;15(1):1–7. Available from: <http://dx.doi.org/10.1186/s12888-015-0598-3>
10. Husain MO, Dearman SP, Chaudhry IB, Rizvi N, Waheed W. The relationship between anxiety, depression and illness perception in tuberculosis patients in Pakistan. *Clin Pract Epidemiol Ment Heal*.

- 2008;4:1–5.
11. Sweetland AC, Galea J, Shin SS, et al. Integrating tuberculosis and mental health services: global receptivity of national tuberculosis program directors. *Physiol Behav.* 2019;176(3):139–48.
  12. Ige OM, Lasebikan VO. Prevalence of depression in tuberculosis patients in comparison with non-tuberculosis family contacts visiting the DOTS clinic in a Nigerian tertiary care hospital and its correlation with disease pattern. *Ment Health Fam Med.* 2011;8(4):235–41.
  13. Reile R, Sisask M. Socio-economic and demographic patterns of mental health complaints among the employed adults in Estonia. Sarker MNI, editor. *PLoS One* [Internet]. 2021;16(10):e0258827. Available from: <https://dx.plos.org/10.1371/journal.pone.0258827>
  14. Qader G, Seddiq MK, Rashidi KM, et al. Prevalence of tuberculosis among mentally ill patients in conflict-stricken Afghanistan: A cross-sectional study. *Int J Infect Dis* [Internet]. 2019;89:45–50. Available from: <https://linkinghub.elsevier.com/retrieve/pii/S1201971219303467>
  15. Shyamala KK, Naveen RS, Khatri B. Depression: A neglected comorbidity in patients with Tuberculosis. *J Assoc Physicians India.* 2018;66(12):18–21.
  16. Jurewicz I. Mental health in young adults and adolescents - Supporting general physicians to provide holistic care. *Clin Med J R Coll Physicians London.* 2015;15(2):151–4.
  17. Ritvo PG, Fischer JS, Miller DM, Andrews H, Paty DW, LaRocca NG. MSQLI multiple sclerosis quality of life inventory: a user's manual the consortium of multiple sclerosis centers health services research subcommittee. 1997;30-31,47-50.
  18. Yuvaraj, B.Y; Poornima, S; Rashmi S. Screening for overall mental health status using mental health inventory amongst medical students of a government medical college in North Karnataka, India. *Int J Community Med Public Heal.* 2016;3(12):3308–12.
  19. Koyanagi A, Vancampfort D, Carvalho AF, et al. Depression comorbid with tuberculosis and its impact on health status: Cross-sectional analysis of community-based data from 48 low- and middle-income countries. *BMC Med.* 2017;15(1):1–10.
  20. Shrestha P, Subba UK, Brouwer M, Sweetland AC. Depression among TB patients and associated factors in Kathmandu Valley, Nepal. *Glob Ment Heal.* 2020;7.
  21. Dasa TT, Roba AA, Weldegebreal F, et al. Prevalence and associated factors of depression among tuberculosis patients in Eastern Ethiopia. *BMC Psychiatry.* 2019;19(1):1–7.
  22. Peretomode O. Work and stress among academic administrators of higher education. 2012;8(13).
  23. Tyagi P. Mental health among married women students. *Int J Indian Psychol.* 2017;5(1).
  24. Wizemann M, Pardue ML. Does sex matter? *Cambridge Law Journal.* 2002;61:1–52.
  25. Van Hooft EAJ, Taris TW, Born MP, Van Der Flier H. Ethnic and gender differences in applicants' decision-making processes: An application of the theory of reasoned action. *Int J Sel Assess.* 2006;14(2):156–66.
  26. Addy ND, Agbozo F, Runge-Ranzinger S, Grys P. Mental health difficulties, coping mechanisms and support systems among school-going adolescents in Ghana: A mixed-methods study. *PLoS One* [Internet]. 2021;16(4 April 2021):1–19. Available from: <http://dx.doi.org/10.1371/journal.pone.0250424>
  27. Seidel D, Brayne C, Jagger C. Limitations in physical functioning among older people as a predictor of subsequent disability in instrumental activities of daily living. *Age Ageing.* 2011;40(4):463–9.
  28. Jürges H, Reinhold S, Salm M. Does schooling affect health behavior? Evidence from the educational expansion in Western Germany. *Econ Educ Rev.* 2011;30(5):862–72.
  29. Alsulami H. The effect of education and experience on wages: The case study of Saudi Arabia. *Am J Ind Bus Manag.* 2018;08(01):129–42.
  30. Raghupathi V, Raghupathi W. The influence of education on health: an empirical assessment of OECD countries for the period 1995-2015. *Arch Public Health.* 2020;78(1):20.
  31. Soroya, Saira Hanif, Farooq Ali, et al. From information seeking to information avoidance: Understanding the health information behavior during a global health crisis. 2021;(January).
  32. Juliasih NN, Mertaniasih NM, Hadi C, Soedarsono, Sari RM, Alfian IN. Factors affecting tuberculosis patients' quality of life in Surabaya, Indonesia. *J Multidiscip Healthc.* 2020;13:1475–80.
  33. Skinner D, Claassens M. It's complicated: Why do tuberculosis patients not initiate or stay adherent to treatment? A qualitative study from South Africa. *BMC Infect Dis* [Internet]. 2016;16(1):1–9. Available from: <http://dx.doi.org/10.1186/s12879-016-2054-5>
  34. Blazer C. Student stress. Information Capsule. Volume 1006. *Res Serv Miami-Dade Cty Public Sch* [Internet]. 2010;1006(October):18. Available from: <http://131.211.208.19/login?auth=eng&url=http://ovidsp.ovid.com/ovidweb.cgi?T=JS&CSC=Y&NEWS=N&PAGE=fulltext&D=eric3&AN=ED536513;%5Cnhttp://sfx.library.uu.nl/utrecht?sid=OVID:ericd&id=pmid:&id=doi:&issn=&isbn=&volume=&issue=&spage=&pages=&date=2010&title=>
  35. Mboya IB, John B, Kibopile ES, Mhando L, George J, Ngocho JS. Factors associated with mental distress among undergraduate students in northern Tanzania. *BMC Psychiatry.* 2020;20(1):1–7.
  36. Nieuwoudt JE. Psychological distress among students in enabling education: An exploratory study. *Aust J Adult Learn.* 2021;61(1):6–25.
  37. Pachi A, Bratis D, Moussas G, Tselebis A. Psychiatric morbidity and other factors affecting treatment adherence in pulmonary tuberculosis patients. *Tuberc*

- Res Treat. 2013;2013:1–37.
38. Singh L, Pardal P, Prakash J. Psychiatric morbidity in patients of pulmonary tuberculosis-an observational study. *Ind Psychiatry J*. 2015;24(2):168.
  39. Umberson D. Gender, marital status and the social control of health behavior. *Soc Sci Med*. 1992;34(8):907–17.
  40. Ayana TM, Roba KT, Mabalhin MO. Prevalence of psychological distress and associated factors among adult tuberculosis patients attending public health institutions in Dire Dawa and Harar cities, Eastern Ethiopia. *BMC Public Health*. 2019;19(1):1–9.
  41. Central TB Division. National framework for a gender-responsive approach to TB in India [Internet]. 2019. Available from: [https://tbcindia.gov.in/WriteReadData/1892s/388838054811\\_NTEP\\_Gender\\_Responsive\\_Framework\\_311219.pdf](https://tbcindia.gov.in/WriteReadData/1892s/388838054811_NTEP_Gender_Responsive_Framework_311219.pdf)
  42. Sweetland AC, Jaramillo E, Wainberg ML, et al. Tuberculosis: an opportunity to integrate mental health services in primary care in low-resource settings. *The Lancet Psychiatry* [Internet]. 2018;5(12):952–4. Available from: <https://linkinghub.elsevier.com/retrieve/pii/S221503661830347X>
  43. Pasha A, Siddiqui H, Ali S, Brooks MB, Maqbool NR, Khan AJ. Impact of integrating mental health services within existing tuberculosis treatment facilities. *Med Access @ Point Care* [Internet]. 2021 Jan 27;5:239920262110113. Available from: <http://journals.sagepub.com/doi/10.1177/23992026211011314>