



# Factors Affecting Tuberculosis Patients' Quality of Life in Surabaya, Indonesia

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**Purpose:** Patients with tuberculosis need to religiously take medication daily. However, they experience several side effects from these medications. The main reason for measuring the quality of life is to explain closely related factors that affect the patient's daily life that have been compromised with illness, while considering a patients' well-being that has associations with individual characteristics.

**Patients and Methods:** This study included 157 patients with tuberculosis at 5 primary health-care centers and 2 hospitals in Surabaya. Quality of life is determined based on eight domains: general health, pain, social functioning, physical functioning, role limitation due to physical health, role limitation due to emotional problems, energy, and emotional well-being. The research instrument used to measure the quality of life is the RAND-36 Item Health Survey, whereas that used to measure mental distress is the Self-Reporting Questionnaire.

**Results:** Our study results show that, of the eight domains measuring the quality of life, only age exhibited a significant effect on general health ( $P = 0.018$ ); sex did not significantly affect the quality of life in all domains. The level of education exhibited a significant effect only on role limitation due to emotional problems ( $P = 0.014$ ). Mental distress demonstrated a significant effect on the quality of life in all domains.

**Conclusion:** There are several factors affecting TB patients' quality of life. The study found that age, level of education, and comorbidity affect quality of life in several domains. However, mental distress affects quality of life in all domains.

**Keywords:** demographic variables, mental distress, quality of life, tuberculosis

## Introduction

Tuberculosis (TB) remains a major challenge in the health sector.<sup>1</sup> In Indonesia, its prevalence in 2018 was 321 per 100,000 people.<sup>2</sup> The Ministry of Health has set targets for the National TB Control Program to reduce morbidity by 80% in 2030 and 90% in 2035 and to reduce mortality by 90% in 2030 and 95% in 2035. The duration of TB treatment and the side effects that arise influence the daily life of TB patients, which then affects their quality of life.<sup>3-6</sup>

The World Health Organization defined quality of life as an individual's perception of his/her position in life within the cultural context and value system in how they live. Quality of life is also related to one's goals, hopes, standards, and concerns.<sup>7</sup> In addition, it refers to an individual's assessment of his/her satisfaction and meaningfulness in living life.<sup>8</sup>

There are several factors that affect the quality of life of TB patients, including social support, medical factors, psychological factors, demographic factors, and educational and counseling programs.<sup>9</sup> TB patients tend to have poor quality of life and

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a high risk of experiencing depression.<sup>10</sup> Quality of life can also affect a TB patient's adherence to treatment.<sup>11,12</sup> Social support, age, and education contribute to the quality of life of TB patients.<sup>13</sup>

The quality of life of TB patients is related to psychological domain, environmental conditions, social relationships, and physical conditions (physical domain). Quality of life is also closely connected to psychological and environmental conditions. Age, sex, income, and duration of treatment variables affect the psychological condition aspects of quality of life. Social relations and environmental conditions are only affected by income and treatment duration.<sup>14</sup> The results of the research conducted by Dawar et al on 100 TB patients in 2016 revealed that 32 of the patients were diagnosed with major depressive disorder, including 7 with mild depression, 20 with moderate depression, and 5 with severe depression. The variables that affect the quality of life in the physical condition aspects are income, treatment duration, and employment status.<sup>15-17</sup>

There are several factors, such as sex, age, marital status, educational level, employment status, monthly income, chronic illness, and body mass index, that significantly affect a person's quality of life.<sup>18</sup> The research conducted by Salodia, Sethi, and Khokhar in 2019 demonstrated that 23.6% of TB patients experience depression.<sup>19</sup> The main reason for measuring the quality of life is to explain closely related factors that affect a patient's daily life that have been compromised with illness, while considering a patients' well-being that has associations with individual characteristics.

## Patients and Methods

The current study was conducted as observational research using a cross-sectional approach. A total of 157 TB patients from 5 primary health-care centers and 2 hospitals were included in the study. The sample were all TB patients chosen randomly based on data given by primary health-care centers and hospitals excluding pregnant women and children. The study was approved by the Ethics Committee in Health Research of Dr. Soetomo Hospital with ethical clearance number 1636/KEPK/XI/2019 and was approved on 9 September 2019. The study was non-intervention research, data were obtained by interviewing TB patients as respondents. Before the interview, the respondents were given an explanation of the research and publications to be carried out. All respondents information is kept confidential and only used for

research purposes. After getting an explanation, the respondent is allowed to refuse the interview or resign in the middle of the interview. The respondents gave their written consent and permission for publication of the letters and to participate in the research. We confirm that all the research meets the ethical guidelines and has been submitted to the ethics committee.

Quality of life is determined based on eight domains: general health, pain, social functioning, physical functioning, role limitation due to physical health, role limitation due to emotional problems, energy, and emotional well-being. Quality of life was measured using the RAND 36-item health survey. [Table 1](#) contains an explanation of the domains from the RAND 36-Item Health Survey.

Every domain was scored from 0 to 100. The higher score equating to the better quality of life in every domain. In general health, the higher score showed the better health status. In domain pain the higher score showed that there is less pain and how pain did not affect daily activities. The higher score in social functioning and physical functioning showed that there is no limitation in doing social activities and daily activities. In role limitation due to physical health and role limitation due to emotional problem, the higher score showed that there is no limitation in doing daily activities. In domain energy, the higher score means the more energy or less fatigue they have. In domain emotional well-being, the higher score means the absence of feeling sad or nervousness.

The independent variables that were considered were sex, age, level of education, comorbidities, mental distress,

**Table 1** The Explanation of the Domains from RAND 36-Item Health Survey

Domain	Explanation
General health	The evaluation of general health status
Pain	Presence of pain and its limitation due to pain
Social functioning	Limitation in social activities
Physical functioning	Limitation in daily activities
Role limitation due to physical health	Difficulties in doing daily activities due to physical health problem
Role limitation due to emotional problems	Difficulties in doing daily activities due to emotional problem
Energy	Loss energy or presence of fatigue
Emotional well-being	Presence of sad feeling or nervousness

working status, monthly income, and body mass index (BMI). Age variables were classified based on the recommendations of the Ministry of Health in Indonesia: teenagers (15–25 y), young adults (26–35 y), late adults (36–45 y), early elderly (46–55 y), middle elderly (56–65 y), and late elderly (>65 y).<sup>2</sup> Comorbidities were considered when TB patients were diagnosed with other illnesses in addition to TB. Mental distress variables were measured using the Self-Reporting Questionnaire. Scores were then categorized into a probable non-case (score  $\leq 7$ ) and/or probable case (score  $\geq 8$ ).<sup>20</sup> Working status was categorized as working and not working. Respondents who classified as not working are house wife, student, and people who do not have a job. Body mass index (BMI) was categorized, based on the Indonesian Ministry of Health, into severely underweight (BMI < 17.0); light underweight (BMI = 17.0–18.4); normal weight (BMI = 18.5–25.0); light overweight (BMI = 25.1–27.0); and severely overweight (BMI > 27.0). Statistical analysis was conducted using the General Linear Model with  $\alpha$  set at 0.05 to analyze the determinants of quality of life.

## Results

Table 2 shows the characteristics of the respondents, including sex, age, educational level, comorbidities, and mental distress.

Table 2 indicates that some respondents were female. The age groups of teenagers (23.6%) and late adults (22.3%) had the highest numbers of respondents, and the highest level of education was senior high school (47.1%). As many as 63.7% of TB patients did not exhibit comorbidity, and 36.9% were suspected of having mental distress. Most of the respondents had a monthly income less than IDR 500,000. The large number of respondents who had low monthly income can be caused by the high number of respondents who do not work (46.5%). Body mass index of TB patients ranged from severely underweight to severely overweight. Most of the respondents had a normal BMI. However, there are 22.3% who were severely underweight and 12.7% who were underweight. It can be seen that TB patients tend to be severely underweight to normal BMI.

Quality of life consists of eight domains: general health, pain, social functioning, physical functioning, role limitation due to physical health, role limitation due to emotional problems, energy, and emotional well-being. In every domain, the higher score means the better quality of life the respondent have.

**Table 2** Respondent Characteristics

Characteristics	Category	n	%
Sex	Male	75	47.8
	Female	82	52.2
	<b>Total</b>	<b>157</b>	<b>100</b>
Age	Teenager (15–25 y)	37	23.6
	Young adult (26–35 y)	30	19.1
	Late adult (36–45 y)	35	22.3
	Early elderly (46–55 y)	25	15.9
	Middle elderly (56–65 y)	27	17.2
	Late elderly (>65 y)	3	1.9
	<b>Total</b>	<b>157</b>	<b>100</b>
Level of education	Elementary school	32	20.4
	Junior high school	26	16.6
	Senior high school	74	47.1
	Diploma and above	25	15.9
	<b>Total</b>	<b>157</b>	<b>100</b>
Comorbidity	Yes	57	36.3
	No	100	63.7
	<b>Total</b>	<b>157</b>	<b>100</b>
Mental distress	Probable case (score $\geq 8$ )	58	36.9
	Probable non-case (score $\leq 7$ )	99	63.1
	<b>Total</b>	<b>157</b>	<b>100</b>
Working Status	Yes	84	53.5
	No	73	46.5
	<b>Total</b>	<b>157</b>	<b>100</b>
Monthly income Indonesian Rupiah (IDR)	< 500,000	55	35.0
	500,000–1,000,000	21	13.4
	1,000,000–2,000,000	25	15.9
	2,000,000–3,000,000	34	21.7
	>3,000,000	22	14.0
	<b>Total</b>	<b>157</b>	<b>100</b>
Body mass index	Severe underweight	35	22.3
	Underweight	20	12.7
	Normal	87	55.4
	Overweight	6	3.8
	Severe Overweight	9	5.7
	<b>Total</b>	<b>157</b>	<b>100</b>

Table 3 indicates that the physical functioning domain has the highest average value (70.97) and it means that generally the respondents had good physical function and there is no limitation in doing daily activities. Role limitation due to physical health domain has the lowest average

**Table 3** Quality of Life of Patients with Tuberculosis

Dependent Variable	Domain	Minimum	Maximum	Mean	Standard Deviation
Quality of life	General health	20	95	63.67	17.184
	Pain	0	100	55.22	29.019
	Social functioning	0	100	70.70	26.468
	Physical functioning	0	100	70.97	24.004
	Role limitation due to physical health	0	100	36.78	41.753
	Role limitation due to emotional problems	0	100	48.30	43.379
	Energy	10	90	59.60	18.322
	Emotional well-being	16	88	65.77	16.450

value (36.78). It means that generally the respondents' physical health tended to affect their daily activities.

Table 4 indicates that sex did not significantly affect quality of life, and only age significantly affected the general health domain ( $P = 0.018$ ). The level of education significantly affected the physical functioning domain ( $P = 0.016$ ) and role limitation due to physical health ( $P = 0.020$ ). Comorbidity had a significant effect on general health ( $P = 0.029$ ), pain ( $P = 0.026$ ), physical functioning ( $P = 0.012$ ), role limitation due to physical health ( $P = 0.001$ ), and role limitation due to emotional problems ( $P = 0.024$ ). Moreover, mental distress significantly affected the quality of life of TB patients in all domains. Working status, monthly income, and BMI did not affect quality of life in every domain.

## Discussion

Patients with TB had a lower quality of life in all domains compared with healthy people.<sup>21</sup> Some research results revealed that sex does not affect the quality of life of TB

patients.<sup>13,22</sup> Quality of life is influenced by various factors, including education, employment status, and income.<sup>18</sup> In Indonesia, both men and women have the same rights in obtaining education and employment.<sup>23</sup> The number of health facilities in Indonesia continues to increase, and TB patients in larger cities have easy access to facilities.<sup>24</sup> No one should be discriminated against, especially when obtaining health services, social facilities, and equal opportunities.<sup>24</sup> As no differences were observed in obtaining education, employment, or access to health facilities, both men and women can achieve an equal quality of life.

Age influences general health because, as people age, their health conditions decline in general. Older people are less likely to maintain their diet and health conditions.<sup>25,26</sup> Age did not influence any of the other domains, because older people can overcome and adjust to these conditions and thus feel that they do not experience obstacles in running their daily lives.<sup>27,28</sup>

The results revealed that the level of education affected the quality of life in role limitation due to emotional

**Table 4** P-Value of Factors Affecting the Quality of Life of TB Patients

Factors	Quality of Life (P-value)							
	General Health	Pain	Social Functioning	Physical Functioning	Role Limitation due to Physical Health	Role Limitation due to Emotional Problems	Energy	Emotional Well-Being
Sex	0.406	0.248	0.426	0.181	0.346	0.297	0.427	0.097
Age	0.018*	0.551	0.262	0.093	0.227	0.306	0.403	0.238
Educational level	0.300	0.139	0.163	0.016*	0.120	0.020*	0.273	0.408
Comorbidity	0.029*	0.026*	0.161	0.012*	0.001*	0.024*	0.360	0.964
Mental distress	0.001*	0.001*	0.001*	0.001*	0.001*	0.004*	0.001*	0.001*
Working status	0.183	0.441	0.560	0.201	0.763	0.408	0.302	0.838
Monthly income	0.841	0.806	0.363	0.212	0.789	0.097	0.343	0.260
BMI	0.523	0.802	0.537	0.965	0.900	0.713	0.848	0.470

Note: \*Significantly affects quality of life.

problems. Educational level was a strong predictor of quality of life.<sup>29</sup> An individual who has a higher education more easily receives new information.<sup>30,31</sup> The ability to receive information has an impact on one's way of thinking, including the ability to overcome problems, such as emotional issues. Individuals with a higher education tend to have more knowledge and, thus, find ways to overcome problems as they have fundamental knowledge, reasoning abilities, emotional self-regulation, and interactional abilities. Thus, the level of education can improve one's ability to overcome limitations due to emotional problems.<sup>31,32</sup> One study has reported that emotions are closely related to ways of thinking and solving problems.<sup>33</sup>

The presence of comorbidities results in TB patients experiencing more symptoms and pain, aside from TB itself. The number of symptoms experienced by patients affects their quality of life.<sup>34</sup> The decline in physical condition and the increase in the number of chronic symptoms are closely related to mental distress, which can have an impact on quality of life.<sup>35,36</sup>

The prevalence of depression in TB patients is higher than in the general population.<sup>37</sup> Mental distress among TB patients can affect their health conditions and quality of life,<sup>38</sup> a finding which is similar to our research result. Poor quality of life is often experienced by people with mental distress.<sup>39</sup> This is in line with the research by Uddin et al who stated that an individual without mental distress has a better quality of life.<sup>40</sup>

## Conclusion

Sex does not significantly influence the quality of life of TB patients, and age only affects the general health domain. Moreover, the level of education affects physical functioning and role limitation due to emotional problems. Comorbidity affects several domains, namely, general health, pain, physical functioning, role limitation due to physical health, and role limitation due to emotional problems. Mental distress has a significant effect on quality of life in all domains.

Future study is warranted to investigate the implementation of practices to improve quality of life factors for effective TB patient care with optimal clinical outcomes. Management of TB patients should include the implementation of care to support the quality of life factors in addition to increased patient immunity and appropriate anti-TB drug therapy.

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## Disclosure

The authors declare no conflicts of interest.

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