

The importance of health-related to quality-of-life assessment in pulmonary tuberculosis patients: A literature review

La importancia de la evaluación de la calidad de vida relacionada a la salud en pacientes con tuberculosis pulmonar: una revisión de la literatura

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SUMMARY

Introduction: Pulmonary tuberculosis (TB) has still become a community health problem in the worldwide. TB is a public health threat with significant annual impacts on morbidity and mortality, and a negative impact on overall patients' life. Health-related quality of life (HRQoL) is critical in TB patients, as it is correlated with treatment outcomes and all aspects of the patient's life. This literature review aims to evaluate HRQoL in TB patients and the most affected aspects of it.

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Methods: Literature studies in online databases such as Google Scholar, PubMed, and journal sites were collected using relevant keywords ("quality of life for pulmonary tuberculosis patients" or "quality of life and health-related tuberculosis" or "quality of life evaluation for pulmonary tuberculosis").

Results: Psychological or mental aspects affect the quality of life because they are the main aspect of a person to recognize themselves and the environment and decide what action needs to be taken in a patient with pulmonary tuberculosis. In this case, will have an impact on the continuity of extended therapy and the need to be disrupted routine control. This can result in successful treatment for the normal six months. For this reason, every aspect of life in TB patients is interrelated, especially the physical and mental aspects that play a role in determining HRQoL.

Conclusion: Although many factors affect HRQoL aspects in TB patients, the psychological aspect is the most influential.

Keywords: Health-related quality of life, tuberculosis patients, mental health, and physical health.

RESUMEN

Introducción: La tuberculosis pulmonar (TB) se ha convertido en un problema de salud comunitaria en todo el mundo. La TB constituye una amenaza para la salud pública con un impacto anual significativo en la morbilidad y la mortalidad, y un impacto negativo

en los aspectos generales de la vida de los pacientes. La calidad de vida relacionada con la salud (CVRS) es fundamental en los pacientes con tuberculosis (TB), ya que se correlaciona con los resultados del tratamiento y con todos los aspectos de la vida del paciente. Esta revisión de la literatura tiene como objetivo evaluar la CVRS en pacientes con TB y los aspectos más afectados de la misma.

Métodos: *Se recopilaron estudios de literatura en bases de datos en línea como Google Scholar, PubMed y sitios de revistas utilizando palabras clave relevantes ("calidad de vida para pacientes con tuberculosis pulmonar" o "calidad de vida y tuberculosis relacionada con la salud" o "evaluación de la calidad de vida para tuberculosis pulmonar").*

Resultados: *Los aspectos psicológicos o mentales afectan la calidad de vida, debido a que son los principales aspectos para que una persona se reconozca a sí misma y al entorno y decida qué acciones se deben tomar en un paciente con tuberculosis pulmonar. En este caso, tendrá un impacto en la continuidad de la terapia prolongada y la necesidad de interrumpir el control de rutina. Esto puede resultar en un tratamiento exitoso durante los seis meses normales. Por esta razón, todos los aspectos de la vida de los pacientes con TB están interrelacionados, especialmente los aspectos físicos y mentales que juegan un papel en la determinación de la CVRS.*

Conclusión: *Aunque muchos factores afectan los aspectos de la CVRS en los pacientes con TB, el aspecto psicológico es el que más influye.*

Palabras clave: *Calidad de vida relacionada con la salud, pacientes con tuberculosis, salud mental y salud física.*

INTRODUCTION

Tuberculosis (TB) is still considered the most complex disease in the world since the number of cases increases every year (1,2). The World Health Organization (WHO) estimates that 8.6 million new cases of TB occur each year. Extrapulmonary TB accounts for around 15 % to 20 % of all TB cases and more than 50 % of TB cases in HIV-positive patients (3). There are still many problems found in preventing TB including lack of knowledge (4) and resistance to drugs such as rifabutin (5).

The number of morbidities and mortalities caused by TB has escalated in all countries worldwide (6,7). This number has made TB a public health threat and global emergency

disease (8). Addressing the number of these cases, WHO has a policy of global action plan to reduce the number of morbidity around the world through Millennium Development Goals (MDGs) 2015 (9,10) followed by Sustainable Development Goals policy (SDGs) 2030 (11,12). In Indonesia, the number of TB cases increased between 2013 – 2016, in which the incidence rate was 391 cases per 100 000 population. The number of new TB cases in Indonesia was as many as 420 994 cases in 2017 (data as of May 17, 2018) (4).

This policy has been agreed upon and implemented throughout the world. However, the mortality and morbidity caused by TB remain high. It was reported that in 2017, TB reached 10 million cases, and the mortality rate was estimated at 1.6 million (13). High morbidity and mortality rate is related to treatment programs, which is also one of this disease's problems. This is because there are still high rates of non-compliance with medication in TB patients. This non-compliance behavior is mainly due to the patients' lack of motivation. Another cause is the level of knowledge; in this case, a person's level of knowledge is related to the adherence to the intake of anti-tuberculosis drugs (14).

Tuberculosis (TB) is an infectious disease caused by the bacteria *Mycobacterium tuberculosis* (*M. tuberculosis*). This bacteria is an acid-resistant bacteria (15,16) due to its morphology and cell wall structure, which is rich in lipids and wax (17) *M. tuberculosis* is an intracellular pathogen that can survive for an extended period in macrophages (18). *M. tuberculosis*' ability to cause disease is entirely dependent on macrophage apoptosis during infection. Under their many capabilities and capacity for immunological monitoring, the elimination of cellular debris, microbial clearance, and the resolution of inflammation, pulmonary macrophages play essential roles in the initial innate immune response (19). *M. tuberculosis* can infect any area of the body, although it most frequently infects the lungs, causing pulmonary TB (15). According to data, untreated pulmonary TB might result in respiratory complications (20).

Besides its high morbidity and mortality rate, duration of treatment and its combination could make differences in TB patients' quality

of life. Nevertheless, six months after, quality of life (QoL) psychiatric treatment is still at a low level (10). Studies suggest that QoL surveys of pulmonary TB patients can affect the QoL of patients both physically and mentally (21). Without proper rehabilitation, TB patients will tend to have more disability, lower quality of life, and higher mortality rate (22). Therefore, it is necessary to evaluate the QoL in TB patients (13). This evaluation can help to estimate patients' conditions during and after therapy. Evaluation is an important matter because it can affect the result of pulmonary TB patients' life aspects (23).

Studies have shown that there are many factors related to the impact of tuberculosis on health-related quality of life (HRQoL) TB patients, such as sociodemographic factors (age, employment, household, knowledge, and gender) and QoL aspect itself such as physical, mental, social, and environment (24), being the physical and mental aspects the most affected aspect of all.

The study in Malaysia states that there is a QoL reduction in the physical health aspect which is not restored as originally (24). The study in Brazil demonstrated that psychological problems such as depression and anxiety disorders; this caused no improvement in psychological aspect value at each phase and continued to the final therapy (2). A good evaluation must be done so that therapy focus is consistent in physical and mental patients to improve the QoL in tuberculosis patients' (24,25). This literature review aims to determine the aspects of HRQoL in pulmonary tuberculosis patients and the factors that cause it.

METHODS

Secondary data is collected both from online sites and offline. The data obtained are literature books, scientific articles, and scientific journals that are formulating the problem. Literature studies were searched by using relevant keywords ("tuberculosis", "health-related quality of Life", "pathophysiology", "physic and mental aspect"), through online databases such as Google Scholar and PubMed and the address websites of the relevant journal. The journals chosen were journals from 2010 to 2020 with the minimum publication category indexed by Scopus and

SINTA 4. The exclusion criteria are journals not indexed by Scopus or SINTA 4, and then data is analyzed with bibliographic annotation analysis. Bibliographic annotation can be summarized as a list of sources used in a study, with a conclusion associated with each source.

RESULTS

In Table 1 are listed the articles used for this review. Based on existing studies, 9 out of 12 works of the literature showed that the mental aspect is the most affected in patients with pulmonary tuberculosis. In addition, emotional support also helps pulmonary tuberculosis patients live their daily lives well, affecting scores on a better mental aspect. Most studies also mention that physical aspects affected TB patients. In some studies, the physical aspect showed a great improvement after TB treatment. Another aspect that was also influenced by pulmonary TB was the patient's general health. This aspect was reduced when patients were diagnosed with pulmonary TB. Two studies showed that patient's general health remained poor even after TB therapy regimens were given.

DISCUSSION

According to WHO, QoL is an individual's perception of a person's lifestyle, individual existence, and relationship to life goals, expectations, standards, and concerns. QoL's problem is commodious and complex. This includes physical health, psychology, self-reliance level, social relation, and environment where they belong (36,37). HRQoL is a concept that impacts someone's physical and mental health (36). When patients have a psychological and physical problem, it can be said that they have low QoL due to health definition is mental health and physical health (38).

Many QoL evaluation instruments have identical evaluated aspects. Generic measurement can be used in almost all populations, regardless of the underlying condition or disorder. In 1996, WHO released an instrument evaluation to evaluate HRQoL called World Health

Table 1

Bibliographical Annotation Analysis in Journals about Health-Related Quality of Life Tuberculosis Pulmonary

Study	Year	Country	Instrument	Rated Aspect	Time	Result
Louw (25)	2012	South Africa	SF-12	General health, Bodily Pain, Physical Function, Physical Role, Social Function, Mental Health, Energy and Fatigue (Vital), Emotional Role, Sociodemographic	After 6-month treatment	In the physical aspect, there was an increase in value and was significant. Psychological stress has a negative impact on the physical and mental aspects of the patient.
Kittikraisak (26)	2012	Thailand	EQ-5D	Quality of Life: aspects of mobility, self-care, habitual activities, pain or comfort, and anxiety/depression, as well as sociodemographic	Variable	General health, Bodily Pain, Physical Function, Physical Role, Social Function, Mental Health, Energy and Fatigue (Vital), Emotional Role, Sociodemographic
Atif (24)	2014	Malaysia	SF-36	General health, Bodily Pain, Physical Function, Physical Role, Social Function, Mental Health, Energy and Fatigue (Vital), Emotional Role, Sociodemographic	Start Treatment, End of Intensive phase, and end of Treatment	Physical component summary (PCS) and Mental component summary (MCS) have low values because they are below the standard value <47 Norm-based scorings (NBS). This still happened until the end of therapy, although there was an increase in the value at each treatment phase. Depression risk occurs in the early phases of treatment.
Dasa (27)	2019	Ethiopia Timur	PHQ-9	Sociodemographic dan condition, Depression	One month after the intensive phase	Age, income, new TB patients, and patients in the first 3 months of treatment were all associated with psychological aspects of depression.
Abrham (28)	2018	Ethiopia Timur	SF-36v2	General health, Bodily Pain, Physical Function, Physical Role, Social Function, Mental Health, Energy and Fatigue (Vital), Emotional Role, Sociodemographic	After Treatment	The general health aspect has the worst quality of life-related to health compared to other aspects.
Shahdadi (29)	2018	Iran	SF-36	General health, Bodily Pain, Physical Function, Physical Role, Social Function, Mental Health, Energy and Fatigue (Vital), Emotional Role	On Treatment	Physical and mental aspects have improved. However, the mental aspect has a lower value than the physical aspect. Some factors influence this value, namely family status, income, and educational status.
Zarova (30)	2018	Zimbabwe	MSPSS, EQ-5D	Quality of Life: aspects of mobility, self-care, habitual activities, pain or comfort, and anxiety/depression, as well as sociodemographic	On Treatment	The mental aspect improves when the patient gets support.

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HEALTH-RELATED TO QUALITY-OF-LIFE ASSESSMENT IN PULMONARY TUBERCULOSIS PATIENTS

...continuation Table 1.

Study	Year	Country	Instrument	Rated Aspect	Time	Result
Kisaka (31)	2016	Uganda	SF-36	General health, Bodily Pain, Physical Function, Physical Role, Social Function, Mental Health, Energy and Fatigue (Vital), Emotional Role, Sociodemographic	Before Treatment, Intensive phase, and Advanced phase	Before therapy, the general health aspect was the lowest and the mental health aspect the highest. The aspects of mental health and physical health have improved in each phase. At the start of treatment, patients with informal employment were associated with decreased HRQoL, patients with unmarried status had good HRQoL, patients with social status in an economically related society were able to have better HRQoL than patients with low economic status. Increasing age can reduce HRQoL.
Dos Santos (2)	2017	Brazil	SF-36, HADS, WHOQOL-HIV Compared Brazilian Number Score	General health, Bodily Pain, Physical Function, Physical Role, Social Function, Mental Health, Energy and Fatigue (Vital), Emotional Role, Sociodemographic and depression	when diagnosing TB	All aspects scored lower under the Brazilian Norm Score (BNS). More than 1/3 of patients have depression or anxiety. Tuberculous patients have poor HRQoL, and many patients experience depression and loss. Several aspects of this study reported that aspects of body pain, general health, social functioning, emotional roles, and mental health were significantly reduced in patients with possible patient reports without the possibility of anxiety. For example, depression causes the patient to smoke, which is related to the psychological aspects of the patient.
Abdulelah (32)	2016	Iraq		Physical well-being, social and economic well-being, emotional well-being/living, functional well-being, spiritual well-being	Start treatment or baseline, end of the intensive phase, and end of TB treatment	After two months of intensive care, physical and functional aspects have improved. At the end of therapy, health-related quality of life health was significant in all aspects
Jaber (33)	2016	Yaman	SF-36	General health, Bodily Pain, Physical Function, Physical Role, Social Function, Mental Health, Energy and Fatigue (Vital), Emotional Role, Sociodemographic	Initial Treatment, End of Intensive Phase, End of Advanced Treatment	At the start of therapy, the physical and mental aspects were still below standard (47–53 normal based score (NBS)). In the final intensive phase, improvement was found but the score was still below the research standard (47–53 normal based score (NBS)). In the final phase of treatment, the physical aspect increased above the NBS score and the mental aspect increased slightly, which means that the patient was mentally depressed until the end of treatment because the score was below the NBS standard (47–53 normal based score (NBS)).

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...continuation of Table 1.

Study	Year	Country	Instrument	Rated Aspect	Time	Result
Dar (34)	2018	India, Kashmir	WHOQOL-BRIEF	Physical health, mental health, psychological health, social and environment	Initial Treatment and End of Intensive Phase	In the initial phase of treatment, the quality of life is low in physical aspects, followed by psychological, social, and environmental relationships. At the end of the intensive phase, there was an increase in several aspects, especially psychological aspects whose scores were higher than other aspects but were not significantly high, and social aspects did not experience any improvement in value.
Wahyuni (35)	2018	Indonesia	SF-36	General health, Bodily Pain, Physical Function, Physical Role, Social Function, Mental Health, Energy and Fatigue (Vital), Emotional Role, Sociodemographic	End of Intensive Phase	In this study, it was found good scores on aspects of pain and aspects of physical function. Meanwhile, the lowest quality of life for pulmonary TB patients is the aspect of general health followed by the emotional role aspect.

Note: SF-36 (Short Form 36), NBS (Normal Brazilian Scores), PCS (Physical Component Summary), PHQ-9 (Patient Health Questionnaire-9), SF-12 (Short Function 12), SF-36v2 (Short Form 36 version 2), VAS (Visual Analog Scale), WHOQOL-BREF (WHO-Quality of Life-BREF), WHOQOL-HIV (World Health Organization-Questioner of Life-HIV), HADS (Hospital Anxiety and Depression Scale), FACIT-TB (Instrument Functional Assessment of Chronic Illness Therapy TB), EQ-5D (Europe Questioner 5 Domain), HRQoL (Health-related quality of life), MCS (Mental Component Summary), NBS (norm-based scoring), MSPSS (Multidimensional Scale of Perceived Social Support).

Organization-Questioner of Life (WHOQoL), which consists of four aspects: the measurement domain as 4 aspects of QoL (39). Another evaluation instruments are Short-Form 36 (SF-36). This instrument is often used to evaluate QoL in tuberculosis patients (13,40) SF-36 measured two aspects. There are physical and mental dimensions (41). The research conducted in Shanghai, China, stated that SF-36 is a questioner used internationally and already proved the validity and reliability (42).

There is also Europe Quality-5 Domain (EQ-5D), an instrument that is often used in Europe. This instrument has two parts. The first part is health status descriptions, and the second part is Europe Quality-Visual Analog Scale (EQ-VAS), a visual analog scale about the present condition (13,26,43). Another instrument is Short Form 12 (SF-12), a short form representative for SF-36. The difference is in the number of questions. Hospital Anxiety and

Depression Scale (HADS) is the instrument that used by psychiatric to measure patients' anxiety, depression, and psychological aspect, which can impact QoL in tuberculosis patients.

There are many factor or aspect which related with QoL in pulmonary TB patients like a financial problem during diagnosis and treatment, successful or failed anti-tuberculosis therapy, the detrimental effect of anti-tuberculosis, value deflation after the final treatment, congenital disease, HIV infections, economic status, demography factor such as age and gender, disease symptoms and functional limitation due to disease, stigma, and ex-communication from society after tuberculosis diagnosed and emotional and anxiety disorder (13). There is also a perception in society that tuberculosis patients can infect the disease environment. This social problem can impact the psychological aspect (8,44).

Research in Ethiopia stated that the physical aspect has a high value in affecting health-related to QoL patients (13,27,28). TB sufferers tend to change their behavior because of feeling isolated by their environment. The environmental stigma against TB sufferers also causes depression (2). This can evoke anxiety in TB patients and interfere with their psychological aspect (2,24,30,33). Studies in Pakistan show that depression in TB patients does not improve until the final treatment phase. The study also stated that TB patients who were undergoing treatment had a high association with depression, anxiety, and other psychological problems (43).

Low education levels and bad social, economic status can make a deflation QoL (13). Education level influences knowledge about tuberculosis and has an impact on research value. People who go to school have more knowledge about tuberculosis than people who do not attend school (45). Several studies stated that a lack of knowledge about tuberculosis and its therapy causes anxiety and frustration (10,21). A study in Zimbabwe stated that low education level gives a bad influence on mental health (30) in concordant with a study in Indonesia, also found that education level can impact knowledge about TB and has patients' QoL (45).

Most patients with TB cannot work to earn a living (25) and they may have a financial burden due to medical expenses and the possibility of losing their jobs due to the disease (13,27). Low income also causes psychological pressure and depression because of the inability to fill up individual and household demands (13,25). Another study in Ethiopia showed that low financial levels could affect the quality of life and patients' psychological condition.

Comorbid factors in TB patients also have a terrible impact on QoL. A study in India stated that patients with comorbid diabetes mellitus would have bad QoL than TB patients without the comorbid disease (13). Another study stated that TB patients with HIV disease (TB-HIV) experienced an improvement in recovery, but no significant changes were found in these patients (8).

In addition, failure of TB treatment can affect their psychological aspects, because they have to start the treatment phase from the

beginning, intensive treatment, and follow-up treatment for 8 months (8,44). The duration of tuberculosis therapy escalates anxiety conditions and depression, which cause indolent manner for medicine intake, this also creates a risk for tuberculosis multidrug resistance or TB-MDR (46). A study in Indonesia states that significant family factors influence the QoL among pulmonary TB patients through promoting successful treatment, social support, and recovery (47). In society, TB-MDR patients get more stigma and discrimination from huge society, even though the patients belong to a high social class (28,48).

CONCLUSION

The most influential aspect of HRQoL in TB patients is the psychological aspect of TB disease's such as psychological pressure, social stigma, fear of disease, and lack of support from surroundings cause deflation of QoL patients. Intensive treatment and evaluation in every phase of treatment are necessary to make a maximal therapy on tuberculosis patients, especially in Indonesia.

Conflicts of Interest

The authors declare no conflict of interest.

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