

Unveiling the Tapestry of Well-being: The Quality of Life Among Tuberculosis Patients in Tasikmalaya, Indonesia

Miftahul Falah^{1,2}, Tukimin Bin Sansuwito^{2,*}, Regidor III Dioso², Lilis Lismayanti^{1,2},
Nina Pamela Sari¹, Faridah Mohd. Said²

¹Faculty of Health Sciences, Universitas Muhammadiyah Tasikmalaya, Indonesia

²Faculty of Nursing, Lincoln University College, Malaysia

Received November 28, 2023; Revised January 22, 2024; Accepted February 17, 2024

Cite This Paper in the Following Citation Styles

(a): [1] Miftahul Falah, Tukimin Bin Sansuwito, Regidor III Dioso, Lilis Lismayanti, Nina Pamela Sari, Faridah Mohd. Said, "Unveiling the Tapestry of Well-being: The Quality of Life Among Tuberculosis Patients in Tasikmalaya, Indonesia," *Universal Journal of Public Health*, Vol. 12, No. 1, pp. 150 - 156, 2024. DOI: 10.13189/ujph.2024.120116

(b): Miftahul Falah, Tukimin Bin Sansuwito, Regidor III Dioso, Lilis Lismayanti, Nina Pamela Sari, Faridah Mohd. Said (2024). *Unveiling the Tapestry of Well-being: The Quality of Life Among Tuberculosis Patients in Tasikmalaya, Indonesia*. *Universal Journal of Public Health*, 12(1), 150 - 156. DOI: 10.13189/ujph.2024.120116.

Copyright©2024 by authors, all rights reserved. Authors agree that this article remains permanently open access under the terms of the Creative Commons Attribution License 4.0 International License

Abstract In recent years, tuberculosis (TB) has emerged as a persistent global health challenge, demanding continuous attention and comprehensive efforts to mitigate its impact. The prolonged and demanding nature of TB treatment places a considerable burden on patients, affecting various dimensions of their well-being, encompassing the physical, psychological, social, and environmental domains. This study focuses on unraveling the intricacies of the Quality of Life (QOL) experienced by TB patients, with a specific lens on those receiving treatment at the Purbaratu public health center in Tasikmalaya. Employing a descriptive quantitative approach, this research aims to provide a comprehensive portrayal of the QOL among TB patients. The study encompasses the entire active TB patient population under treatment from October 2022 to June 2023, constituting a total of 48 individuals. To capture the nuanced aspects of their well-being, the WHOQOL-BREF questionnaire serves as the principal instrument for data collection. The findings emanating from this investigation indicate that individuals afflicted with TB exhibit a QOL falling within the intermediate stratum, as underscored by an average WHOQOL-BREF score of 264.3 among a cohort of 40 participants, representing 83.3% of the population studied. Consequently, it is anticipated that healthcare services and the nursing profession can proactively engage in health

education initiatives with the aim of ameliorating the QOL for individuals affected by TB. The conclusion suggests a potential avenue for improvement in the well-being of individuals with TB through targeted health education initiatives. It implies a call to action for health services and nursing professions to engage in proactive measures aimed at enhancing the overall QOL for TB patients in the specified community.

Keywords Health Sciences, Mycobacterium, Quality of Life, Tuberculosis

1. Introduction

Tuberculosis (TB) remains a persistent worldwide health issue, with its frequency consistently increasing annually [1]-[2]. Rooted in the chronic infectious nature of *Mycobacterium tuberculosis*, this disease necessitates prolonged treatment, inevitably impacting the multifaceted dimensions of patients' well-being [3]-[4]. The physical, psychological, social, and environmental domains of individuals grappling with TB are intricately interwoven, forming a tapestry of experiences that profoundly shapes their Quality of Life (QOL) [5]-[6].

Globally, TB remains a significant public health concern, contributing substantially to illness and death [7]-[8]. Despite progress in diagnostic methods and treatment, the reported number of new TB cases exceeded ten million in 2020, resulting in an estimated 1.5 million TB-related deaths worldwide [9]. Approximately a quarter of the global population carries latent TB infection, putting them at potential risk of developing active disease at some point in their lives. The World Health Organization (WHO) predicts that the projected global incidence of TB by the year 2021 is approximately 10.6 million, representing an increment of about 600,000 cases. As of 2020, Indonesia is identified among the top three nations with the highest TB prevalence globally, trailing India and China, and surpassing the Philippines, with a reported total of 969,000 TB cases, equivalent to an occurrence of one new case approximately every 33 days. This statistic reflects a notable 17% increase from the documented figures in 2020, as reported by the WHO in 2022 [9]. Information provided by the Health Service of Tasikmalaya on March 21, 2023, from the 22 public health centers in the Tasikmalaya region reveals a notable increase in TB cases [10]. This surge is ascribed to intensified efforts in the enhancement of TB case detection. Specifically, the recorded diagnoses indicate an upward trend, with 68 individuals identified in 2020, 94 in 2021, and 96 in 2022, as reported by the Department of Health (Dinkes) in 2023.

The QOL in TB patients can be impacted by various factors related to the patient, the disease itself, and the treatment process. Limited research has explored the QOL in adult TB patients using cross-sectional study designs. Chamla [11] validated the SF-36 questionnaire in a Chinese population to evaluate the Health-Related Quality of Life (HRQoL) of patients undergoing TB treatment. The study revealed that SF-36 scores were notably low in TB patients prior to treatment, indicating a decline in HRQoL, particularly affecting physical scales. Additionally, the Chinese version of SF-36 was established as a reliable tool for monitoring HRQoL throughout the course of TB treatment. Rajeswari et al. [12] conducted interviews with patients registered for treatment in government health facilities of two tuberculosis units in south India during July–December 2000. Their findings indicated that only 54% of patients perceived a 'Good mental status' at the end of treatment. Marra et al. [13] investigated the impact of active and latent TB infection (LTBI) on HRQoL. The study discovered substantial improvements in most HRQoL domains for active TB patients by 6 months. However, even at the completion of therapy, HRQoL remained lower compared to LTBI participants and US norms. Dhuria et al. [14] conducted a study involving 90 tuberculosis patients at two directly observed treatment short course (DOTS) cum microscopy centers in an urban area of Delhi. The WHOQOL-BREF (Hindi) questionnaire was utilized to assess QOL at the initiation of treatment, after 3 months of DOTS treatment, and upon completion of

treatment. Their findings revealed that women scored significantly better than men in the physical and environmental domains. Overall QOL scores were lowest for TB category II (patient registered at the DOTS center and expected to complete the treatment) and significantly lower for the psychological and social domains. Saleem et al. [15] evaluated the self-reported HRQoL of pulmonary TB patients in Karachi, Pakistan, using the EQ-5D and EQ-VAS before, during, and after TB treatment completion. The study demonstrated an improvement in the perceived HRQoL of TB patients as treatment progressed. These findings offer insights that can guide targeted treatment plans and inform TB policy and funding decisions for countries with high TB burdens.

This paper embarks on a journey to unravel this complex tapestry, focusing its lens on the unique context of Tasikmalaya, Indonesia. Tasikmalaya has high TB cases (3,541 cases in 2021) and has not yet reached the maximum TB treatment target. Against the backdrop of the global TB concern, our study delves into the specific challenges faced by tuberculosis patients in Tasikmalaya, seeking a comprehensive understanding of their quality of life. The aim is to illuminate the nuances of well-being, offering insights that extend beyond clinical metrics and delve into the intricate fabric of lived experiences.

Employing a descriptive quantitative methodology, we undertake a meticulous exploration of the quality of life among tuberculosis patients. The Purbaratu public health center in Tasikmalaya serves as the focal point for this investigation in the year 2023. As we navigate the realms of physical health, psychological resilience, social interactions, and environmental influences, our study aims to paint a vivid portrait of the challenges and strengths woven into the lives of those affected by tuberculosis in this specific community.

The study used the World Health Organization Quality of Life Assessment-BREF (WHOQOL-BREF) questionnaire as our principal data collection tool. Reflects our commitment to capturing the diverse dimensions of well-being in a culturally sensitive manner. By encompassing the entire active tuberculosis patient population under treatment from October 2022 to June 2023, totaling 48 individuals, our study seeks a holistic representation of the unique fabric of well-being in Tasikmalaya.

As we embark on this exploration, we anticipate that the findings will not only contribute to the academic discourse on tuberculosis and QOL but will also serve as a compass guiding local health services and nursing professions. By illuminating the intricacies of well-being among tuberculosis patients, we aim to catalyze targeted interventions and health education initiatives that weave threads of improvement into the lives of those affected by this pervasive infectious disease. In doing so, we aspire to contribute meaningfully to the enhancement of the QOL for tuberculosis patients in Tasikmalaya, Indonesia.

2. Methods

2.1. Study Design and Procedure

A cross-sectional design was employed in this study with the objective of offering a comprehensive depiction of the Quality of Life (QOL) among tuberculosis (TB) patients. Data collection was executed through a questionnaire. Prior to this, an informed consent process and a clear time frame for data collection were established.

The World Health Organization Quality of Life Assessment-BREF (WHOQOL-BREF) is a widely used tool for assessing an individual's quality of life across various domains. Here are some advantages associated with the use of WHOQOL-BREF:

- **Comprehensive Measurement:** The WHOQOL-BREF provides a comprehensive evaluation of an individual's well-being by considering physical health, psychological well-being, social relationships, and environmental factors. This holistic approach allows for a thorough assessment of different aspects of life.
- **Cross-Cultural Applicability:** One of the strengths of WHOQOL-BREF is its cross-cultural applicability. It has been developed with input from diverse cultural groups, making it suitable for use in various populations around the world. This allows for the comparison of quality of life across different cultures and settings.
- **Validity and Reliability:** The questionnaire has undergone rigorous testing to ensure its validity and reliability. This means that the WHOQOL-BREF consistently measures what it intends to measure and produces reliable results, enhancing its credibility as a research and assessment tool.
- **Flexible and Time-Efficient:** The WHOQOL-BREF is a shorter version of the original WHOQOL questionnaire, making it more practical for use in research and clinical settings. Its brevity allows for quicker administration, reducing the burden on respondents and making it more feasible for use in various contexts.
- **Outcome Measurement in Health Interventions:** Researchers and healthcare professionals often use WHOQOL-BREF to assess the impact of health interventions and treatments on individuals' quality of life. This makes it a valuable tool in healthcare research and clinical practice.
- **Patient-Centered Approach:** The questionnaire adopts a patient-centered approach by directly measuring the individual's perception of their own quality of life. This perspective is essential for understanding the subjective well-being of individuals and tailoring interventions to address specific needs.
- **Policy and Program Evaluation:** WHOQOL-BREF data can be used to evaluate the effectiveness of public health policies and programs. It provides

insights into the overall impact of interventions on the quality of life of populations, aiding policymakers in making informed decisions.

2.2. Study Participants and Sampling

The population in this study was active tuberculosis patients in the work area of Purbaratu public health center, Tasikmalaya from October 2022 to June 2023, and the sample size was 48 patients. This study used total sampling technique to select sample.

2.3. Study Instruments

The QOL questionnaire, adapted from the "WHOQOL-BREF," comprises 26 questions. The validity value ranged from $r = 0.742$ to 0.860 , and the reliability value was $R = 0.880$. Respondents are instructed to select a number on a scale from 1 to 5 to answer questions from the "WHOQOL-BREF." These responses are then summed up and transformed into the 0-100 scale, as defined by the WHO. The total quality of life score is classified into different groups: low QOL scores range from 0 to 200, medium QOL scores from 201 to 300, and high QOL scores from 301 to 400. The WHO emphasizes four domains crucial for assessing an individual's overall quality of life, promoting a balanced perspective, and considering the concept of quality. This assessment is guided by the framework of the WHOQOL-BREF [16]-[17].

2.4. Data Analysis

A univariate analysis was used in this study to explore the frequency distribution of QOL patients. All data bases of the study were entered into the IBM SPSS software Version 26. Analysis in the study focused on QOL TB patients.

2.5. Ethical Aspects

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee. This study was approved by the Health Office of Tasikmalaya City with register number: 353. In this study, Ethical aspects become crucial concern before conducting the research. For example, the researcher has met with patients to explain the research purpose, processes, and methods of the study. The potential patients are informed that there is no risk, no coercion, or cost for participating, and they are also ensured that participation is voluntary. Informed consent was obtained from all subjects involved in the study. The researcher maintains the security of the data, thereby ensuring the patients' permission to use their data. Moreover, the anonymity of the respondents' identity is strictly maintained for confidentiality purposes. The research advises the patients that they are free to decline or

withdraw from the study at any moment. Any publications based on the study data remain anonymous.

3. Results

The sociodemographic characteristics of tuberculosis patients in the Purbaratu Community Health Center Working Area, Tasikmalaya City in 2023 were gathered from 48 respondents. The prevalent age group was >45 years, comprising 23 individuals (47.9%). Most respondents were male, accounting for 27 individuals (56.3%). The highest educational attainment reported was elementary school, with a total of 26 people (54.2%). In terms of occupation, the most common category was "others," including laborers and unemployed individuals, encompassing 38 people (70.8%). The frequency distribution of characteristics of TB in the working area of Purbaratu Health Center, Tasikmalaya can be seen in Table 1.

Table 1. Frequency Distribution of Characteristics of TB patients in the working area of Purbaratu Health Center, Tasikmalaya

Category	N	Percentage
Age		
<20 years old	3	6,3
20-45 years old	22	45,8
>45 years old	23	47,9
Total	48	100
Gender		
Male	27	56,3
Female	21	43,8
Total	48	100
Education		
Elementary School	26	54,2
Junior High School	12	25
Senior High School	8	16,7
University	2	4,2
Total	48	100
Occupation		
Students	2	4,2
Entrepreneur	3	6,3
Farmer	1	2
Others	42	87,5
Total	48	100

The findings derived from the data presented in Table 2 reveal the average QOL scores across different domains. Specifically, the mean QOL score in the physical domain

is 61.7, in the psychological domain is 69.8, in the social domain is 68.9, and in the environmental domain is 63.9. The cumulative average QOL score across all four domains for the sampled population is calculated to be 264.3.

The findings presented in Table 3 indicate that most participants in this study showed an average QOL, making up 83.3% of the sample size. A smaller percentage, comprising 12.5% of the respondents, exhibited a high QOL, while a minority, accounting for 4.2% of the participants, fell into the low QOL category among tuberculosis patients.

Table 2. Distribution of QOL frequencies among tuberculosis patients in the working area of Purbaratu City Health Center, Tasikmalaya

Domain	Score	Transformation
Physic	1.036	61.7
Psychology	1.005	69.8
Social	495	68.9
Environment	1.226	63.9
Total	3.762	264.3

Table 3. Distribution of QOL tuberculosis patients by category in the service area of Purbaratu City Health Center, Tasikmalaya

Category	N	Percentage
High	6	12.5%
Middle	40	83.3%
Low	2	4.2%
Total	48	100%

4. Discussion

Tuberculosis (TB) poses a significant threat to the elderly population due to the natural aging process leading to a decline in their immune system [18]. The study identified that the majority of respondents were aged over 45, a trend consistent with Rachmawati et al.'s [19] discovery that a significant proportion of respondents fell within the 46-60 age range.

The research findings imply that age is a significant factor influencing an individual's quality of life [20]-[21]. Notably, the respondents in this study were predominantly male. Furthermore, a substantial portion of tuberculosis patients had completed only elementary school education, which is considered a risk factor for tuberculosis transmission. A lower educational level may impact one's understanding of tuberculosis, including aspects related to maintaining a healthy lifestyle and home environment. Adequate knowledge is crucial for promoting healthier behaviors [22]-[23]. In terms of occupation, most respondents were either laborers or unemployed. It is worth noting that, given the age distribution, some respondents have entered the elderly phase. QOL is observed to have an impact on occupational engagement [24].

The findings of this research highlight that a significant number of tuberculosis patients in the operational area of the Purbaratu public health center in Tasikmalaya in 2023 are situated within the intermediate category. This is evident from an average score of 264.3 among 40 individuals, constituting 83.3% of the sample. The moderate QOL observed in these patients could potentially be linked to the advanced stages of treatment, where individuals may have adapted to the impacts of the disease or the effects of TB treatment. However, it's important to note that this study did not include an investigation into this variable, which represents a limitation of the research. The study overall suggests a positive health quality among tuberculosis patients, indicating that individuals with a clear sense of purpose and interest in life tend to exhibit a moderate to good QOL in terms of health.

This study aligns with the research conducted by Ita et al. [25], where 34 respondents showed that the overall health quality of individuals with pulmonary tuberculosis was classified as good in 67.6% of cases. This consistency is also reflected in the findings from Pawenrusi et al.'s [26] investigation on the "Image of the QOL in Pulmonary Tuberculosis Patients in the General Chamber of Public Lung Health (BBKPM) of Makassar," which indicated that the Quality of Life (QOL) for tuberculosis patients was predominantly good, representing 56.8% of cases, while 43.2% were classified as poor. The assessment of life quality is multifaceted and can be influenced by various factors, including age, where old age may impact physical quality, and gender, particularly a higher risk among males due to factors such as smoking habits. These factors collectively contribute to the overall QOL for individuals with tuberculosis [27]-[28].

This study aligns with the research conducted by Pahrul et al. [29], where 31 respondents demonstrated varying quality of life, with 18 individuals (58.1%) characterized as having good QOL and 13 individuals (41.9%) experiencing poor quality of life. The research findings regarding the QOL among tuberculosis patients, particularly in the physical domain, indicate that individuals with extensive physical manifestations of the disease can still perform day-to-day activities [30]. This conclusion is drawn from questionnaire responses provided by respondents, revealing that symptoms like coughing and numbness, which are common in advanced stages of tuberculosis, are not significantly hindering everyday activities. Despite the potentially limiting conditions, the overall quality of sleep and the ability to work have shown improvement [31]. Tuberculosis, with its associated pain and sensory discomfort, can profoundly impact physical health. It is crucial for healthcare providers to furnish comprehensive information on potential treatment effects and offer health education to patients and their families, facilitating prompt responses to any adverse effects [32].

In terms of the psychological domain, the research outcomes suggest that tuberculosis patients possess the

capacity to shape and navigate their lives to some extent. Questionnaire results indicate that many respondents enjoy their lives and maintain a sense of normalcy, demonstrating an ability to concentrate well. This aligns with the study conducted by Chung et al. [33], which categorized the psychological dimension of the QOL for tuberculosis patients as good. A significant proportion of respondents in this study did not report psychological disorders such as stress, depression, or anxiety. Furthermore, a substantial number demonstrated acceptance of their physical condition, indicating resilience in the face of the disease.

It's noteworthy that the psychological well-being of tuberculosis patients in advanced stages may not experience a significant decline, differing from other studies that observe poor quality of life among elders, particularly vulnerable to chronic diseases [34]. This underscores the importance of individual circumstances and health conditions in shaping psychological quality of life. According to the World Health Organization (WHO), one indicator of psychological QOL is the enjoyment of living, heavily influenced by a healthy psychological state [35].

To preserve the psychological well-being of patients, it is imperative for the healthcare department overseeing their treatment to attentively address any psychological symptoms that may arise [36]. This approach aims to cater to the specific psychological needs of tuberculosis patients. Additionally, the nursing profession plays a crucial role in delivering comprehensive explanations and health education to both patients and their families. This extends beyond medication guidance to encompass psychological support.

The study exclusively concentrates on TB patients receiving treatment at the Purbaratu public health center in Tasikmalaya. This narrow focus may limit the generalizability of the findings to broader populations or diverse healthcare settings. Furthermore, the study employs a descriptive quantitative approach, which may not fully capture the complexity and nuances of the factors influencing QOL. A more comprehensive understanding could be gained through qualitative methods, allowing for a deeper exploration of patients' experiences.

5. Conclusions

The study, focused on tuberculosis patients at the Purbaratu public health center in Tasikmalaya in 2023, utilized descriptive quantitative methods and the WHOQOL-BREF questionnaire to assess the QOL of patients undergoing treatment. The results indicate that, on average, these patients fall into the middle category of QOL, with a score of 264.3 out of 40 individuals, representing 83.3% of the sample. This suggests a moderate level of well-being among the patients. The abstract proposes the need for health services and nursing professions to offer health education, aiming to enhance the QOL for

individuals dealing with tuberculosis.

Acknowledgements

Research was funded by Universitas Muhammadiyah Tasikmalaya.

REFERENCES

- [1] N. N. Hansel, A. W. Wu, B. Chang, G. B. Diette. Quality of life in tuberculosis: patient and provider perspectives. *Quality of life research*. Vol. 13, 639-652, 2004. DOI: 10.1023/B:QURE.0000021317.12945.f0
- [2] J. Brown, S. Capocci, C. Smith, S. Morris I. Abubakar, M. Lipman. Health status and quality of life in tuberculosis. *International Journal of Infectious Diseases*. Vol. 32, 68-75, 2015. DOI: 10.1016/j.ijid.2014.12.045
- [3] B. Chang, A. W. Wu, N. N. Hansel, G. B. Diette. Quality of life in tuberculosis: a review of the English language literature. *Quality of life research*. Vol. 13, 1633-42, 2014. DOI: 10.1007/s11136-004-0374-1
- [4] M. Bauer, A. Leavens, K. Schwartzman. A systematic review and meta-analysis of the impact of tuberculosis on health-related quality of life. *Quality of life research*. Vol. 22, 2213-2235, 2013. DOI: 10.1007/s11136-012-0329-x
- [5] A. D. Kakhki, M. R. Masjedi. Factors associated with health-related quality of life in tuberculosis patients referred to the national research institute of tuberculosis and lung disease in Tehran. *Tuberculosis and respiratory diseases*. Vol. 78, No. 4, 309, 2015. DOI: 10.4046/trd.2015.78.4.309
- [6] S. J. Park, M. An, H. S. So. Relationships of stigma, family support, and quality of life in tuberculosis patients. *The Journal of the Korea Contents Association*. Vol. 15, No. 9, 285-294, 2015. DOI: 10.5392/JKCA.2015.15.09.285
- [7] A. Deribew, M. Tesfaye, Y. Hailmichael, N. Negussu, S. Daba, A. Wogi, T. Belachew, L. Apers, R. Colebunders. Tuberculosis and HIV co-infection: its impact on quality of life. *Health and quality of life outcomes*. Vol. 7, 1-7, 2009. DOI: 10.1186/1477-7525-7-105
- [8] A. A. Jaber, A. H. Khan, S. A. Syed Sulaiman, N. Ahmad, M. S. Anaam. Evaluation of health-related quality of life among tuberculosis patients in two cities in Yemen. *PLoS one*. Vol. 11, No. 6, e0156258, 2016. DOI: 10.1371/journal.pone.0156258
- [9] World Health Organization. 2023. https://www.who.int/health-topics/tuberculosis#tab=tab_1
- [10] Purbaratu Tasikmalaya Community Health Center. 2023. <https://puskesmas-purbaratu.tasikmalayakota.go.id/>
- [11] D. Chamla. The assessment of patients' health-related quality of life during tuberculosis treatment in Wuhan, China. *The international journal of tuberculosis and lung disease*. Vol. 8, No. 9, 1100-1106, 2004. <https://www.ingentaconnect.com/content/iatld/ijtd/2004/00000008/00000009/art00010#>
- [12] R. Rajeswari, M. Muniyandi, M. R. Balasubramanian, P. R. Narayanan. Perceptions of tuberculosis patients about their physical, mental and social well-being: a field report from south India. *Social science & medicine*. Vol. 60, No. 8, 1845-53, 2005. DOI: 10.1016/j.socscimed.2004.08.024
- [13] C. A. Marra, F. Marra, L. Colley, S. Moadebi, R. K. Elwood, J. M. Fitzgerald. Health-related quality of life trajectories among adults with tuberculosis: differences between latent and active infection. *Chest*. 2008; Vol. 133, No. 2, 396-403, 2008. DOI: 10.1378/chest.07-1494
- [14] M. Dhuria, N. Sharma, N. P. Singh, R. C. Jiloha, R. Saha, G. K. Ingle. A study of the impact of tuberculosis on the quality of life and the effect after treatment with DOTS. *Asia Pacific Journal of Public Health*. Vol. 21, No. 3, 312-320, 2009. DOI: 10.4103/0970-0218.39249
- [15] S. A. Aaleem, A. Malik, A. Ghulam, J. Ahmed, H. ussain. Health-related quality of life among pulmonary tuberculosis patients in Pakistan. *Quality of Life Research*. Vol. 27, 3137-3143, 2018. DOI: 10.1007/s11136-018-1954-9
- [16] L. G. Vu, L. H. Nguyen, C. T. Nguyen, G. T. Vu, C. A. Latkin, R. Ho, C. S. Ho. Quality of life in Vietnamese young adults: A validation analysis of the World Health Organization's quality of life (WHOQOL-BREF) instrument. *Frontiers in Psychiatry*. Vol. 13, 968771, 2022. DOI: 10.3389/fpsy.2022.968771
- [17] A. N. Aggarwal, D. Gupta, A. K. Janmeja, S. K. Jindal. Assessment of health-related quality of life in patients with pulmonary tuberculosis under programme conditions. *The International Journal of Tuberculosis and Lung Disease*. Vol. 17, No. 7, 947-953, 2013. DOI: 10.5588/ijtld.12.0299
- [18] L. N. Ferreira, L. N. Pereira, M. da Fé Brás, K. Ilchuk. Quality of life under the COVID-19 quarantine. *Quality of Life Research*, Vol. 30, 1389-1405, 2021. DOI: 10.1007/s11136-020-02724-x
- [19] D. Rachmawati, N. Nursalam, R. Hargono, B. Widjanarko Otok. Quality of life and subjective well-being modeling of pulmonary tuberculosis patients. *Journal of Public Health Research*, Vol. 10, No. 2, 2180, 2021. DOI: 10.4081/jphr.2021.2180
- [20] E. Tornu, L. Quarcoopome. Correlates of quality of life among persons living with tuberculosis: A cross-sectional study. *PLoS One*, Vol. 17, No. 11, e0277192, 2022. DOI: 10.1371/journal.pone.0277192
- [21] S. Salehitali, K. Noorian, M. Hafizi, A. H. Dehkordi. Quality of life and its effective factors in tuberculosis patients receiving directly observed treatment short-course (DOTS). *Journal of Clinical Tuberculosis and Other Mycobacterial Diseases*, Vol. 15, 100093, 2019. DOI: 10.1016/j.jctube.2019.100093
- [22] C. Byrd-Bredbenner, J. Martin-Biggers, G. A. Povis, J. Worobey, N. Hongu, V. Quick. Promoting healthy home environments and lifestyles in families with preschool children: homeStyles, a randomized controlled trial. *Contemporary clinical trials*, Vol. 64, 139-151, 2018. DOI: 10.1016/j.jctube.2019.100093
- [23] Melina, Sukono, H. Napitupulu, A. Sambas, A. Murniati, V. A. Kusumaningtyas. Artificial Neural Network-Based Machine Learning Approach to Stock Market Prediction Model on the Indonesia Stock Exchange During the

- COVID-19. *Engineering Letters*, Vol. 30, No. 3, 988–1000, 2022. https://www.engineeringletters.com/issues_v30/issue_3/EL_30_3_09.pdf
- [24] A. N. Aggarwal. Quality of life with tuberculosis. *Journal of clinical tuberculosis and other mycobacterial diseases*, Vol. 17, 100121, 2019. DOI: 10.1016/j.jctube.2019.100121
- [25] W. Ita, S. Yusran, L. O. Sety. Description of the Quality of Life of Pulmonary TB Sufferers in the Working Area of the Kendari City Perumnas Health Center in 2019. *Endemis Journal*. Vol. 1, No. 1, 11-20, 2020. DOI: 10.37887/ej.v1i1.11457
- [26] E. P. Pawenrusi, M. Akbar. Description of the Quality of Life in Pulmonary Tuberculosis Patients at the Makassar Community Lung Health Center. *Jurnal Mitrashat*. Vol. 10, No. 1, 168-177, 2020. DOI: 10.51171/jms.v10i1.134
- [27] M. S. Awan, M. Waqas, M. A. Aslam. Factors influencing quality of life in patients with active tuberculosis in Pakistan. *World Applied Sciences Journal*, Vol. 18, No. 3, 328-331. DOI: 10.5829/idosi.wasj.2012.18.03.3350
- [28] Z. Z. Araia, A. B. Mesfin, A. H. Mebrahtu, A. G. Tewelde, A. T. Tewelde, S. Ngusbrhan Kidane. Health-related quality of life in tuberculosis patients in Eritrea: comparison among drug-susceptible and rifampicin/multidrug-resistant tuberculosis patients. *Patient Related Outcome Measures*, Vol. 12, 205-212, 2021. DOI: 10.2147/PROM.S316337
- [29] D. Pahrul, H. Desvitasari, A. Fatriansari. Analysis of TB Sufferers' Understanding of Pulmonary Tuberculosis on Quality of Life. *Jurnal Kesehatan: Jurnal Ilmiah Multi Sciences*. Vol. 11, No. 2, 86-94, 2021. DOI: 10.52395/jkjims.v11i02.327
- [30] S. A. Dar, N. N. Shah, Z. A. Wani, D. Nazir. A prospective study on quality of life in patients with pulmonary tuberculosis at a tertiary care hospital in Kashmir, Northern India. *Indian journal of tuberculosis*. Vol. 66, No. 1, 118-122, 2019. DOI: 10.1016/j.ijtb.2018.07.002
- [31] A. N. Siddiqui, K. U. Khayyam, N. Siddiqui, R. Sarin, M. Sharm. Diabetes prevalence and its impact on health-related quality of life in tuberculosis patients. *Tropical Medicine & International Health*. Vol. 22, No. 11, 1394-1404, 2017. DOI: 10.1111/tmi.12968
- [32] A. A. Touré, A. S. Magassouba, G. Camara, A. Doumbouya, D. Cissé, I. Barry, L. M. Camara LM, A. H. Bédougui, A. Delamou, V. Veronese, C. S. Merle. Health-related quality of life of tuberculosis patients during the COVID-19 pandemic in Conakry, Guinea: a mixed methods study. *Tropical Medicine and Infectious Disease*. Vol. 7, No. 9, 224, 2022. DOI: 10.3390/tropicalmed7090224
- [33] W. S. Chung, Y. L. Lan, M. C. Yang. Psychometric testing of the short version of the world health organization quality of life (WHOQOL-BREF) questionnaire among pulmonary tuberculosis patients in Taiwan. *BMC public health*, Vol. 12, No. 1, 1-10, 2012. DOI: 10.1186/1471-2458-12-630
- [34] R. Rubeen, N. Zareen, S. Zameer, A. G. Rasool, S. S. Naqvi, J. Iqbal. Anxiety and depression in tuberculosis can create impact on quality of life of patient. *Acta Med Int*. Vol. 1, No. 2, 93-98, 2014. <https://pesquisa.bvsalud.org/portal/resource/pt/sea-162049>
- [35] L. Qiu, Y. Tong, Z. Lu, Y. Gong, X. Yin. Depressive symptoms mediate the associations of stigma with medication adherence and quality of life in tuberculosis patients in China. *The American Journal of Tropical Medicine and Hygiene*. Vol. 100, No. 1, 31, 2019. DOI: 10.4269/ajtmh.18-0324
- [36] G. P. Maguire, N. M. Anstey, M. Ardian, G. Waramori, E. Tjitra, E. Kenangalem, T. Handojo, P. M. Kelly. Pulmonary tuberculosis, impaired lung function, disability and quality of life in a high-burden setting. *The International Journal of Tuberculosis and Lung Disease*. Vol. 13, No. 12, 1500-1506, 2009. <https://www.ingentaconnect.com/content/iatld/ijtlid/2009/00000013/00000012/art00010>