



The Relationship between Characteristics with Medication Adherence and Quality of Life among the Pulmonary Tuberculosis Patients at the Cirebon City Community Lung Health Center, Indonesia

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ABSTRACT

Background: Tuberculosis (TB) is one of the top ten causes of death worldwide, caused by the Mycobacterium tuberculosis germ. Adherence to medication is a key factor in successful treatment and efforts to improve the quality of life of TB patients.

Aims: Analyzing the relationship between characteristics with medication adherence and quality of life of pulmonary TB patients at the Cirebon City Community Lung Health Center.

Methods: This study used an analytic observation method with a Cross Sectional design. The measuring instruments used were medical records and questionnaires that had been tested for validity and reliability, with a total of 131 respondents of pulmonary TB patients at the Cirebon City Community Lung Health Center (BKPM).

Results : The most common characteristics were adult age 90.8%, female gender 56.5%, secondary education 50.4%, student 28.2%, length of treatment at the advanced stage 59.5%, adherent to taking medication 87.0%, good quality of life 54.2%. Based on the Chi-Square test, the relationship between characteristics and drug compliance from age p-value=0.189, gender p-value=0.320, education p-value=0.447, occupation p-value=0.594, length of treatment p-value=0.014. The relationship between characteristics and quality of life from age p-value=0.688, gender p-value=0.550, education p-value=0.838, occupation p-value=0.519, length of treatment p-value=0.604. Based on the logistic regression test, the relationship between characteristics and drug compliance from age p-value=0.058, length of treatment p-value=0.006.

Conclusion: There is no relationship between age, gender, education, and occupation with medication adherence ($p>0.05$). Whereas in the length of treatment there is a relationship with adherence to taking medication. There is no relationship between characteristics and quality of life of pulmonary TB patients ($p>0.05$). The characteristic most associated with adherence to taking medication is length of treatment ($p=0.006$). Future researchers are advised to explore other factors that may be related to medication adherence and quality of life in patients with pulmonary TB.

Keywords: *Characteristics; Medication adherence; Quality of life; Pulmonary tuberculosis patients.*

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1. Introduction

Tuberculosis (TB) is one of the 10 leading causes of death worldwide and the leading cause of death from infection. Tuberculosis is caused by the germ *Mycobacterium tuberculosis* (Kementrian Kesehatan RI, 2023). Worldwide, an estimated 10.6 million people will have TB in 2022. In 2022, the thirty countries with the highest TB cases accounted for 87% (WHO Global Tuberculosis Report, 2023). Indonesia alone is in second place with the total number of TB cases in 2022 increasing by 677,464 cases (Kementrian Kesehatan RI, 2023). TB cases in West Java in 2022 were reported as 160,661 cases out of a total of 656,154 suspected TB cases, a significant increase in cases (Dinas Kesehatan Provinsi Jawa Barat, 2022). Cirebon City is one of the cities with high pulmonary TB cases (Dinas Kesehatan Kota Cirebon, 2021). The number of pulmonary tuberculosis cases in Cirebon city in 2020 was 1,371 cases, there was an increase in 2021 of 1,902 cases, in 2022 there were 2,021 cases (SITB, 2022). The Community Lung Health Center is a Technical Implementation Unit of the West Java Provincial Office which carries out public health efforts aimed at improving the health status of the community through the provision of health services. According to the data in 2021 the number of tuberculosis cases was 976 cases, in 2022 it decreased by 757 cases, in 2023 it decreased again by 538 cases, and in 2024 it decreased by 235 cases (Laporan BKPM Kota Cirebon, 2024).

Based on the results of a study conducted by Arif et al (2022), it was found that males are more likely to be infected with TB than females. The results of the age characteristics show that people of productive age are more susceptible to TB infection than adults or the elderly, with productive age ranging from 15 to 35 years. People with higher education can also be infected with TB, although those with primary and secondary education are more susceptible to infection. In the study of elementary, middle, and high school education, students are more susceptible to tuberculosis due to a lack of knowledge and information about the spread of tuberculosis. The occupation of each patient does not guarantee immunity from TB infection, as workplace contaminants also have a significant influence, similar to the home environment (Arif et al, 2022).

Adherence to taking medication is a key factor in the success of treatment and is one of the efforts to improve the recovery and quality of life of TB patients. Non-compliance of TB patients in taking OAT causes low recovery rates, high mortality rates and increased relapse and can occur bacterial resistance to some OAT so that it can cause the patient's condition to worsen and have to change drugs and repeat treatment. Some people may live longer, but with the burden of chronic disease or disability, so quality of life is a concern for health services. Decreased quality of life in TB patients can cause delays in treatment and have a negative impact on treatment continuity so that treatment becomes interrupted or incomplete (Kementrian Kesehatan RI, 2020).

Quality of life is a concept that aims to capture the well-being, either of a population or an individual, in both positive and negative terms in its entire existence at a given point in time. For example, common aspects of quality of life include personal health (physical, mental, and spiritual, relationships, educational status, work environment, social status, wealth, sense of security and safety, freedom, autonomy in decision-making, social belonging, and physical environment) (Pertwi, 2012).

The relationship between patient characteristics, medication adherence and quality of life is complex and interrelated. Patient characteristics affect medication adherence, which in turn affects quality of life. For example, patients with a high level of education tend to be more adherent to treatment, which can then improve their quality of life. However, this relationship can also be moderated by other factors, such as social support and access to healthcare (Kementrian Kesehatan RI, 2020).

Studies that comprehensively examine the relationship between patient characteristics, treatment adherence, and quality of life simultaneously are still very limited, especially in Cirebon. Most studies only focus on one or two variables, without considering the complex interactions between the three variables. This lack of research hinders efforts to design effective and targeted interventions to improve treatment adherence and quality of life of patients in Cirebon. This study aims to analyze the relationship between patient characteristics with medication adherence and quality of life in pulmonary TB patients. This study can also be a basic indicator to determine the level of medication adherence and quality of life of pulmonary TB patients, and can be an evaluation material for health workers and PMOs (Medication Swallowing Supervisors) to pay more attention to medication adherence of pulmonary TB patients.

2. Methods

2.1 Study design/ Research procedures

This study used an analytical observation method with a Cross Sectional design with a total of 131 respondents with pulmonary TB at the Cirebon City Community Lung Health Center. This study used a non-probability sampling technique with a consecutive sampling approach, namely sampling based on criteria in accordance with what has been made until the number of samples is met. The measuring instrument used is the medical records of Pulmonary TB patients at the Cirebon City Community Lung Health Center, then the drug compliance questionnaire taken from previous research entitled Psychology for Nursing which contains 20 questions with the results of 2 scales, namely obedient and non-compliant (Sunaryo, 2014), then the quality of life questionnaire taken from WHO contains 25 questions with the results of 5 scales, namely very bad, bad, moderate, good and very good (World Health Organization, 2012). The inclusion criteria in this study were patients who were willing to become respondents and had signed an informed consent sheet, pulmonary TB patients who were undergoing tuberculosis treatment for at least 2 months in the initial stage and in the advanced stage, and pulmonary TB patients aged > 17 years, Exclusion criteria in this study were patients who withdrew or died, patients with incomplete medical record data and treatment books, and pulmonary TB patients with complications or with comorbidities (example: pulmonary TB with HIV +, pleural effusion).

2.2 Measurements

The independent variables in this study are the characteristics of pulmonary TB patients and the dependent variables are drug compliance and quality of life of pulmonary TB patients. The data collection method in this study uses primary data, namely questionnaires that are in accordance with the research, the first questionnaire for drug compliance of pulmonary TB patients taken from previous research entitled Psychology for Nursing (Sunaryo, 2014) and the second quality of life questionnaire taken from WHO (World Health Organization, 2012), after which the questionnaire is tested for validity and reliability first using the first 30 respondents.

After that the researcher came to the Community Lung Health Center and explained asking for patient consent to take part in the study after filling out the informed consent sheet distributing questionnaires to Pulmonary TB patients who fit the criteria until the sample was met in the patient waiting room and in the waiting room for drug collection, after the questionnaire was filled in by the respondents, patient data was collected using secondary data, namely medical records to see the characteristics of respondents from age, gender, education, occupation and length of treatment. Primary and secondary data collection on respondents was carried out for one month, namely in June - July 2024. After the data is collected, data analysis is then carried out.

The drug adherence questionnaire consisted of one section with the aim to determine the drug adherence of Pulmonary TB patients which may or may not be related to the characteristics of Pulmonary TB patients. This questionnaire consists of 20 questions that have previously been tested for validity and reliability. The quality of life questionnaire is divided into four parts, the first is the physical health domain with the aim of seeing the respondent's physical health which can affect all activities carried out, the second is the psychological domain with the aim of knowing a person's mental state and how to deal with various conditions experienced, then the third is the social relationship domain with the aim of knowing the respondent's social relationships from social relationships, social support and sexual activity, then the last is the environmental domain which aims to find out the environment where the respondent lives and how the respondent socializes with others. This questionnaire consists of 25 questions which have previously been tested for validity and reliability.

The results of the validity test of the adherence and quality of treatment questionnaires have a value higher than the *r* table limit, which is 0.361, stating that the questionnaire is valid. Reliability testing was conducted using Cronbach Alpha. The reliability test results of the medication adherence and quality of life questionnaires showed that the variables had a value > 0.6, which stated that the questionnaire was reliable.

2.3 Statistical techniques

The analysis in this study used univariate analysis with the aim of knowing the frequency distribution of the characteristics of pulmonary TB patients, namely age, gender, education, occupation and length of treatment, as well as drug compliance and the quality of life of pulmonary TB patients. Then bivariate analysis using the Chi-Square test to determine the relationship between characteristics (age, gender, education, occupation, and length of treatment) with drug compliance and determine the relationship between characteristics (age, gender, education, occupation, and length of treatment) with the quality of life of patients with pulmonary TB. Multivariate analysis was then conducted using logistic regression test to determine which characteristics (age, gender, education, occupation, and duration of treatment) were most influential in drug adherence and quality of life of pulmonary TB patients. In this multivariate analysis, two variables were used, namely age characteristics and duration of treatment, because these two characteristics had been tested and found to be suitable for inclusion in the multivariate analysis.

2.4 Ethical Clearance

This study has been ethically approved by the Ethic Committee of Faculty of Medicine, Swadaya Gunung Jati University, following the seven WHO standards, with number No.25/EC/FKUGJ/IV/2024, on April 17th, 2024.

3. Results

Respondent characteristics

The following data are the results of a study on the characteristics of age, gender, education, occupation, duration of treatment, medication adherence, and quality of life of pulmonary TB patients at the Cirebon Community Lung Health Center, which were analyzed univariately and presented in frequency distribution tables and percentages. The results of the study in table 1 show that of the 131 respondents, most were adults (19-59 years) as many as 119 respondents (90.8%) while respondents in the elderly category (≥ 60 years) were 12 respondents (9.2%). Most of the respondents were female as many as 74 people (56.5%) and a small proportion were male as many as 57 people (43.5%). some of the respondents with secondary education categories (SMA / SMK) were 66 people (50.4%), while the low education category (SD / SMP) was 37 respondents (28.2%) and the higher education category was 28 people (21.4%).

Most of the respondents were students as many as 37 people (28.2%), respondents who worked as traders were 19 people (14.5%), respondents who did not work were 18 people (13.7%) while respondents who worked as farmers / livestock farmers and housewives were 14 people (10.7%), and respondents who worked as civil servants / TNI / POLRI were 12 people (9.2%). most of the respondents with advanced stage treatment duration were 78 people (59.5%) while respondents with early stage treatment were 53 people (40.5%). Almost all respondents were compliant in taking medication as many as 114 people (87.0%) while respondents who did not comply with taking medication were 17 people (13.0%). in the quality of life of TB patients, most respondents had a good quality of life as many as 71 respondents (54.2%), with a moderate quality of life as many as 55 respondents, and with a poor quality of life as many as 5 people (4.2%).

Bivariate analysis

Bivariate analysis was performed to determine the differences between the independent variables, namely age, gender, education, occupation, and duration of treatment, and the dependent variables, namely medication adherence and quality of life in patients with pulmonary TB. The statistical test used was the *Chi-Square* Test. Table 2 shows the distributions of patients based on age, gender, education, employment, and duration of treatment. The statistical analysis shows that only duration of treatment significantly contribute to medication adherence (p value = 0.014). Moreover, Table 3 shows the distributions of patients based on age, gender, education, employment, and duration of treatment. The statistical analysis shows that there is no factors significantly contribute to quality of life.

Table 1. Distribution of Respondent Characteristics

Variable	Frequency	Percentage
Age		
Adults (19-59 years)	119	90.8
Elderly (≥ 60 years old)	12	9.2
Gender		
Male	57	43.5
Female	74	56.5
Education		
Low Education (elementary/middle school)	37	28.2
Secondary Education (SMA/SMK)	66	50.4
Higher Education (Bachelor's degree)	28	21.4
Employment		
Not Working	18	13.7
PNS/TNI/POLRI	12	9.2
Private Employee/Laborer	17	13.0
Housewife	14	10.7
Student	37	28.2
Farmer/Rancher	14	10.7
Trader	19	14.5
Duration of Treatment		
Initial Stage (2 Months)	53	40.5
Advanced Stage (>2 Months)	78	59.5
Medication Adherence		
Not Compliant	17	13.0
Compliant	114	87.0
Quality of Life		
Poor	5	3.8%
Moderate	55	42.0%
Good	71	54.2%

Multivariate analysis

Table 4 shows the results of multivariate analysis in this study, which aims to answer the hypotheses and research objectives regarding the relationship between characteristics and medication adherence and quality of life in patients with pulmonary TB, tested using multiple logistic regression analysis. Variables included in the multivariate analysis are those with a p-value < 0.25 in the bivariate analysis. Treatment duration is a variable or factor associated with medication adherence among pulmonary TB patients at the Cirebon City Community Lung Health Center ($p\ 0.006 < \alpha\ 0.05$), while age is not the most significant variable or factor associated with medication adherence among pulmonary TB patients ($p\ 0.058 > \alpha\ 0.05$). Treatment duration, specifically respondents in the initial treatment phase, is the most significant variable or factor associated with medication adherence among pulmonary TB patients at the Cirebon City Community Lung Health Center, where respondents in the initial treatment phase are 5.619 times more likely to be non-adherent in taking their TB medication.

Table 2. Patients' characteristics to Medication Adherence

Variables	Medication Adherence				Total N (%)	P-Value
	Compliant		Non-Compliant			
	N	%	N	%		
Age						
Adults (19-59 years old)	105	88.2%	14	11.8%	119 (100%)	0.189
Elderly (≥60 years old)	9	75.0%	3	25.0%	12 (100%)	
Gender						
Male	52	91.2%	5	8.8%	57 (100%)	0.320
Female	62	83.8%	12	16.2%	74 (100%)	
Education						
Lower Education (Elementary/Middle School)	30	81.1%	7	18.9%	37 (100%)	0.447
Secondary Education (SMA/SMK)	59	89.4%	7	10.6%	66 (100%)	
Higher Education (Bachelor Degree)	25	89.3%	3	10.7%	28 (100%)	
Employment						
Not Working	14	77.8%	4	22.2%	18 (100%)	0.703
Civil Servant/TNI/Police	11	91.7%	1	8.3%	12 (100%)	
Private Employee/Laborer	17	100%	0	0%	17 (100%)	
Housewife	12	85.7%	2	14.3%	14 (100%)	
Student	31	83.3%	6	16.2%	37 (100%)	
Farmer/Rancher	12	85.7%	2	14.3%	14 (100%)	
Trader	17	89.5%	2	10.5%	19 (100%)	
Duration of Treatment						
Initial Stage (2 months)	41	77.4%	12	22.6%	53 (100%)	0.014
Advanced Stage (>2 months)	73	93.6%	5	6.4%	78 (100%)	

Table 3. Patients' characteristics to Quality of Life

Variables	Quality of Life						Total N (%)	P- Value
	Good		Moderate		Poor			
	N	%	N	%	N	%		
Age								
Adults (15-59 years old)	65	38%	49	29%	55	33%	169 (100%)	0.688
Elderly (≥60 years old)	6	50%	6	50%	0	0%	12 (100%)	
Gender								
Male	32	56%	24	42%	1	2%	57 (100%)	0.550
Female	39	52%	31	42%	4	6%	74 (100%)	
Education								
Lower Education (Elementary/Middle School)	20	54%	16	43%	1	3%	37 (100%)	0.838
Secondary Education (SMA/SMK)	35	53%	29	44%	2	3%	66 (100%)	
Higher Education (Bachelor Degree)	16	57%	10	36%	2	7%	28 (100%)	
Employment								
Not Working	10	55%	7	39%	1	6%	18 (100%)	0.519
Civil Servant/TNI/Police	7	58%	5	42%	0	0%	12 (100%)	
Private Employee/Laborer	12	71%	5	29%	0	0%	17 (100%)	
Housewife	8	57%	5	36%	1	7%	14 (100%)	
Student	15	41%	21	57%	1	2%	37 (100%)	
Farmer/Rancher	7	50%	7	50%	0	0%	14 (100%)	
Trader	12	63%	5	26%	2	11%	19 (100%)	
Duration of Treatment								
Initial Stage (2 months)	27	51%	23	43%	3	6%	53 (100%)	0.604
Advanced Stage (>2 months)	44	56%	32	41%	2	3%	78 (100%)	

Table 4. Multivariate Analysis

	Coefficient B	P value	Exp (B)	95% C.I.for EXP (B)	
				Minimum	Maximum
Age	-1.564	0.058	0.209	0.042	1.053
Length of Treatment	1.726	0.006	5.169	1.660	19.017
Constant	-1.468	0.042	0.230		

4. Discussion

Based on age characteristics, the majority of respondents were at an adult age (19-59 years) as many as 119 people or around (90.8%). Followed by respondents in the elderly category (≥ 60 years) as many as 12 people or around (9.2%). This is in accordance with data from the Indonesian Ministry of Health that 75% of tuberculosis attacks in the productive age group, namely 15-59 years old, which is a group that is quite high in germ infection where at this age a person with high activity and on average has worked so that immunity easily decreases due to stress and high workload. This condition allows a person to be easily attacked by *Mycobacterium tuberculosis* germs (Kemenkes RI, 2022).

Based on gender characteristics, it was found that the majority of respondents had female gender with 74 people or around (56.5%). Followed by male respondents with 57 people or around (43.5%). Based on this data, it can be concluded that the number of women is greater than men. The results of this study are in line with the previous research which the majority of tuberculosis respondents were female patients as many as 82 people (52.2%) and fewer men as many as 75 people (47.8%) (Juliasih et al, 2020). Women report more symptoms of the disease and consult a doctor so that the data obtained where people with Pulmonary TB are more in women (Mientarini et al, 2018).

Based on educational characteristics, it was found that the majority of respondents had secondary education with 66 people or around (50.4%). Followed by respondents who have low education with 37 people or around (28.2%). The lowest percentage is respondents with higher education with 28 people or around (21.4%). Based on this data, it can be concluded that the education of respondents in this study is at the secondary education level. The results of this study are in line with the previous research where respondents with tuberculosis patients mostly have secondary education, which education may describe a person's behavior in terms of health, the lower the education, the less knowledge in the health sector, both directly and indirectly can affect physical, biological and social which is detrimental to health and ultimately affects the high incidence of tuberculosis (Azalla et al, 2020).

Based on job characteristics, it was found that the majority of respondents were students as many as 37 people (28.2%), respondents who worked as traders were 19 people (14.5%), respondents who did not work were 18 people (13.7%) while respondents who worked as farmers / livestock farmers and housewives were 14 people (10.7%), and respondents who worked as civil servants / TNI / POLRI were 12 people (9.2%). The results of this study are in line with the previous research which found that the research respondents with TB more in the private category, where TB disease transmission is closely related to the type of work that allows exposure to diseases related to the work environment and socio-economic. One of the factors that support a person can be infected with TB disease is the work environment that is indoors with less sunlight and a poor ventilation system (Arisandi et al, 2023).

Based on the characteristics of the length of treatment, it is known that respondents with advanced treatment dominated as many as 78 people (59.5%) while respondents with early stage treatment were 53 people (40.5%). The results of this study are in line with the previous research which found the majority of respondents underwent treatment for 3-6 months as many as 23 people (50.0%) and respondents who underwent treatment for 1-2 months as many as 20 people (43.5%) (Muflihatin et al, 2022).

Based on drug compliance, it is known that respondents with adherence to taking medication in the obedient category dominated as many as 114 people (87.0%), while adherence to taking medication in the non-compliant category was 55 (42.0%) and poor quality of life was 17 people (13.0%). The results of this study are in line with the previous research which found that the compliance of tuberculosis patients in taking OAT during treatment is in the obedient category, compliance in treatment can reflect the patient's behavior in obeying the

advice and instructions given by health workers regarding everything that must be done to achieve optimal treatment (Syafiyatul et al, 2020).

Based on quality of life, it is known that respondents with good quality of life dominate as many as 71 people (54.2%), while moderate quality of life is 55 (42.0%) and poor quality of life is 5 people (3.8%). Quality of life is described as a perception or subjective view of pulmonary TB respondents towards satisfaction and acceptance of their condition. The results of this study are in line with the previous research which found that the quality of life of most pulmonary TB patients is a good quality of life, the quality of life of pulmonary TB patients is very important to pay attention to because this infectious disease is chronic and progressive so that it has a broad impact on all aspects of life both physical, social, psychological, and environmental. Poor quality of life in patients with pulmonary TB is due to physical health problems that cause disruption of aspects of life, disruption of physical health and long treatment in patients with pulmonary TB (Jasmianti et al, 2017).

Based on the results of statistical tests that age does not have a significant relationship with adherence to taking medication in respondents in the Cirebon City Community Lung Health Center area obtained a p-value = 0.189, which means that there is no significant relationship. The results of the research that have been carried out are in line with the previous research which found that there is no relationship, there are several reasons people become less compliant with taking medication as they age, these factors involve physical, psychological, and social changes associated with aging. As people age, they tend to experience an increase in the number of medications they must take for various health conditions, the more complex and numerous medications they take, the more difficult it is to adhere to the correct schedule and dosage (Bakhtiar et al, 2021).

Based on the results of statistical tests that gender does not have a significant relationship with drug compliance among respondents in the Cirebon City Community Lung Health Center area, the p-value = 0.209 means that there is no significant relationship. The results of the research conducted are in line with the previous research which found that there is no relationship between the two variables (Salsabila, Susanti, & Bhakti, 2022). According to Notoatmodjo, women pay more attention to their health than men. The level of compliance in the female gender group has more compliance with taking medication than men. Men and workers have twice the risk of abandoning treatment, because it is difficult to leave their jobs and difficult to visit health facilities (Dewanty et al, 2016).

Based on the results of statistical tests that education does not have a significant relationship with adherence to taking medication on respondents in the Cirebon City Community Lung Health Center area obtained a p-value = 0.447, which means that there is no significant relationship. The results of the research that has been done are in line with the previous research which found that there is no relationship among the variables variables. The level of education of TB patients will affect their level of knowledge and absorption in terms of prevention of transmission and treatment of TB. Patients who have a poor level of knowledge will tend not to take treatment because for them, taking treatment and not taking treatment will have the same results. The lower the knowledge and education, the lower the patient's awareness of the dangers of the disease to himself and his environment, and the lower his awareness of complete treatment (Azalla et al, 2020).

Based on the results of statistical tests that work does not have a significant relationship with adherence to taking medication on respondents in the Cirebon City Community Lung Health Center area obtained a p-value = 0.594, which means that there is no significant relationship. The results of the research conducted are in line with the previous research which found that there is no relationship between the two variables (Wulandari et al, 2020). Certain workers are vulnerable to the incidence of pulmonary TB. This is due to the continuous busyness every day so that they do not have time to seek treatment at health facilities. Employment does not always identify a person's behavior to be compliant or non-compliant in taking medication, because it can be caused by their own assumptions that treatment requires money, for transportation purposes or their own needs that must be considered more than the importance of treatment (Issusilaningtyas et al, 2019).

Based on the results of statistical tests that the length of treatment has a significant relationship with adherence to taking medication in respondents in the Cirebon City Community Lung Health Center area obtained a p -value = 0.014, which means that there is a significant relationship. The results of the research that has been done are in line with the previous research which found that there is a relationship between the respondent characteristics with the medication adherence. There are several things that cause pulmonary TB patients not to consume drugs, namely pulmonary TB drugs must be consumed for a long period of time, the patient will feel cured because of the reduction in disease symptoms after undergoing treatment so that the patient is lazy to continue treatment again, and the side effects caused by the TB drug (Dwiningrum *et al.*, 2021).

Based on the results of statistical tests that age does not have a significant relationship with quality of life in respondents in the Cirebon City Community Lung Health Center area, the p value = 0.688 means that there is no significant relationship, which in line with the previous research (Noviati *et al.*, 2023). Productive age still has a sense of motivation to recover, and has high hopes for improving their quality of life, in contrast to sufferers of old age or the elderly who are getting older, of course not a few of them often feel tired and not motivated to recover anymore, so that the increasing age and conditions that are no longer motivated will greatly affect the degree of health which will directly affect the quality of life of these sufferers (Djua *et al.*, 2024).

Based on the results of statistical tests that gender does not have a meaningful relationship with quality of life in respondents in the Cirebon City Community Lung Health Center area obtained a p -value = 0.550, which means that there is no significant relationship, which in line with the previous research (Juliasih NN, 2020). Tuberculosis often occurs in men, said to be much higher than women, this is because men are more often found to have smoking habits, drink alcohol, and are often associated with work, so that it can reduce the immune system and tend to have a poor quality of life compared to women (Jamayanti, 2014).

Based on the results of statistical tests that education does not have a meaningful relationship with quality of life in respondents in the Cirebon City Community Lung Health Center area obtained a p -value = 0.838, which means that there is no significant relationship, which in line with the previous study (Djua *et al.*, 2024). According to Notoatmodjo's opinion that a person's level of education runs symmetrically with a person's level of knowledge. A person's level of knowledge itself is a process of learning and observing a certain object systematically and gradually. If pulmonary TB patients know the benefits of taking OAT regularly and completely can improve recovery and quality of life, then these patients will have a good level of compliance, so that it will further improve their quality of life (Nugroho *et al.*, 2023).

Based on the results of statistical tests that work does not have a significant relationship with quality of life in respondents in the Cirebon City Community Lung Health Center area obtained a p -value = 0.519, which means that there is no significant relationship. The results of the research conducted are in line with the research of Namuwali D, that there is no relationship. Employment and social status are important factors for tuberculosis treatment adherence, patients with better economic status are able to pay for transportation and other costs, thus increasing treatment adherence. Work is part of and has a greater opportunity to socialize with others, so that they do not think too much about the disease suffered (Namuwali, 2019).

Based on the results of statistical tests that the length of treatment does not have a significant relationship with the quality of life of respondents in the Cirebon City Community Lung Health Center area obtained a p -value = 0.604, which means that there is no significant relationship, which in line with the previous study (Hidayati *et al.*, 2023). Poor quality of life in the initial stage of treatment is due to the fact that the initial stage of treatment is carried out for 1-2 months by taking OAT every day, so patients sometimes feel bored with the drugs taken and stop the treatment carried out, this can worsen the quality of life of pulmonary TB patients, besides that it can also cause immunity to the drug (Pawenrusi *et al.*, 2020).

Based on the results of statistical tests obtained that the length of treatment is a variable or factor associated with adherence to taking medication in Pulmonary TB patients at the Cirebon City Community Lung Health Center p value = 0.006. Length of treatment, namely respondents with early stage treatment, is the variable or factor most associated with adherence to taking medication in Pulmonary TB patients at the Cirebon City Community Lung Health Center, where respondents in the early stage of treatment have a 5.619 times greater chance of not being compliant in taking TB medication. The main cause of this is that patients do not comply with the provisions and length of treatment regularly to achieve recovery as a result of the low level of public knowledge. Health worker support is another factor that can influence the implementation of compliance

behavior. The role of drug administration, collaboration of health workers with families who are appointed to accompany when patients take medicine (Dwiningrum *et al*, 2021).

Interventions that can be carried out are to provide useful information related to pulmonary TB in Cirebon City and to increase health promotion about TB in patient waiting rooms, as well as in community groups using appropriate information media.

5. Conclusion

This study aims to analyze the relationship between patient characteristics with medication adherence and quality of life of pulmonary TB patients. Based on the results of the research that has been carried out, the results of the description of age characteristics in pulmonary TB patients are mostly at adulthood (19-59 years), gender characteristics in pulmonary TB patients are mostly female, educational characteristics in pulmonary TB patients are mostly in secondary education (SMA / SMK), occupational characteristics in pulmonary TB patients are mostly as students, traders, not working and employees / private laborers, characteristics of the length of treatment in pulmonary TB patients are mostly in advanced stage treatment (>2 months), compliance with taking medication in pulmonary TB patients is mostly compliant with treatment, and quality of life in pulmonary TB patients has a good quality of life.

Then there is no relationship between the characteristics of age, gender, education, and occupation with adherence to taking medication, while in the characteristics of length of treatment there is a relationship with adherence to taking medication in pulmonary TB patients. Furthermore, there is no relationship between the characteristics of age, gender, education, occupation, and length of treatment with the quality of life of pulmonary TB patients. Then the characteristics of the length of treatment are the characteristics that are most associated with adherence to taking medication in pulmonary TB patients with a p value = 0.006. These findings suggest that interventions to improve adherence should focus on patients in the early stages of treatment. Future researchers are advised to explore other factors that may be related to medication adherence and quality of life in patients with pulmonary TB.

Conflict of Interest

The authors declare no conflicts of interest for the result.

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