

## Analysis of Factors Associated with the Healing Status of Pulmonary Tuberculosis Patients at Puskesmas Perumnas 1 Pontianak in 2018

Christa Adelia Suvianto <sup>1\*</sup>, Hadiyanto <sup>2</sup>

<sup>1</sup>College. Faculty of Medicine and Health Sciences, Atma Jaya Catholic University of Indonesia, Jakarta, Indonesia

<sup>2</sup>Department of Public Health, Faculty of Medicine and Health Sciences, Atma Jaya Catholic University of Indonesia, Jakarta, Indonesia

E-mail : [christaadeliaa@gmail.com](mailto:christaadeliaa@gmail.com)

### Abstract

**Factors Related to the Healing Status of Patients with Pulmonary Tuberculosis in Puskesmas Perumnas 1 Pontianak 2018.** Tuberculosis (TB) is an infectious disease caused by *Mycobacterium tuberculosis* that is still a global health problem. The healing of patients from TB is important to note because it can harm public health such as providing opportunities for TB disease transmission to family members and the surrounding community, thereby increasing the spread of disease and deaths due to TB. The recovery of TB patients is influenced by several factors such as age, sex, level of education, knowledge, level of income, access to health services, the role of PMO and treatment compliance. This study aims to determine the factors associated with the healing status of TB sufferers. This type of research is analytic descriptive with a cross-sectional design. The instruments used were questionnaires and patient medical records. Data were obtained by interviewing 106 pulmonary TB patients at their home who had been treated with category 1 treatment for 6 months in Perumnas 1 Health Center in Pontianak City. The results of *Chi-square* test showed that gender ( $p=0.005$ ), level of education ( $p=0.002$ ), knowledge ( $p=0.008$ ), the role of PMO ( $p=0.001$ ) and medication adherence ( $p=0.000$ ) are related to the healing status of TB sufferers, while age ( $p=0.320$ ), income level ( $p=0.728$ ) and access to health services ( $p=0.141$ ) are not related to the healing status of TB sufferers. Counseling about factors related to TB recovery is expected to increase the cure rate of TB patients.

**Keywords:** *Healing Status, Tuberculosis, Factors*

## 1. Introduction

Tuberculosis (TB) is a chronic infectious disease that requires a long treatment time. In 2016, an estimated 10.4 million people had TB.<sup>1</sup> Over 95% of deaths from tuberculosis occurred in middle and low income countries.<sup>2</sup>

In Indonesia in 2016 it is estimated that the TB incidence is 391 cases / 100.000 population and the TB prevalence is 628 per 100.000 population.<sup>3</sup> The number of new cases of pulmonary TB in West Kalimantan in 2017 was 5.065 cases, of which 950 cases were from Pontianak.<sup>4</sup> In 2017 West Kalimantan was ranked 18<sup>th</sup> out of 34 provinces with the most TB cases, with Pontianak in the first position with the most TB cases in West Kalimantan.<sup>5</sup> The cure rate for pulmonary TB treatment in West Kalimantan in 2017 is 67.5%, while the minimum cure rate that must be achieved is 85%.<sup>4</sup>

The government has implemented the DOTS (*Directly Observed Treatment Short-course*) program since 1995, a strategy that has been recommended by the WHO (*World Health Organization*). TB treatment time is about 6 months under direct supervision by the Drug Administration (PMO). DOTS is tasked with detecting TB cases microscopically and has the aim of ensuring cure for sufferers, preventing transmission, preventing drug resistance which in turn can reduce TB morbidity and mortality.<sup>6</sup> Having not reached the minimum cure rate that must be achieved has a negative impact on public health because it still provides opportunities for transmission of pulmonary TB disease, thereby increasing the spread of TB disease, increasing morbidity and mortality from TB.<sup>7</sup> Several factors are associated with TB cure, such as age, gender, knowledge, treatment adherence, role of PMO, education level, income level, and access to health services.

According to research by Dhewi et al. in Semarang in 2015, older age and irregular treatment slowed the recovery of TB sufferers.<sup>8</sup> Research by Tola et al. in Semarang in 2012 stated the close relationship between knowledge and cure of pulmonary

tuberculosis.<sup>9,10</sup> Another study by Astuti et al. in Kebumen in 2015 stated that the role of PMO and treatment adherence resulted in the cure of pulmonary tuberculosis, where PMO made patients more compliant with their treatment.<sup>11</sup> Research by Puspitasari et al. in Mojokerto in 2017 stated that high levels of education and income levels increase treatment compliance, as well as research by Sengul et al. in Turkey 2015.<sup>12,13</sup> Research by Tang et al. in China in 2015 stated that difficult access to health services was the cause of patient non-compliance in treatment.<sup>14</sup> Research by Zubaidah et al. in Banjar in 2013 stated that men were 1,167 times less likely to recover compared to women.<sup>7</sup>

## 2. Method

This research was descriptive analytic type and used a *cross sectional* design. The research was conducted at the Public Health Center of Perumnas 1 Pontianak. The time for data collection is November 2018 to March 2019. The sample of this study were pulmonary TB patients who were treated at the Puskesmas Perumnas 1 Pontianak who met the inclusion criteria, namely patients with pulmonary tuberculosis aged > 17 years who were treated with Category 1 OAT at Puskesmas Perumnas 1 Pontianak and had undergone treatment for 6 months. The minimum sample size was 106 TB patients who were selected by *consecutive sampling*. The data collected in this study are primary data and secondary data. Primary data were obtained through direct interviews conducted at the respondent's house to assess the variables studied, after secondary data were obtained from reports and medical records of respondents who saw the patient's identity and treatment results after undergoing treatment for 6 months. The data taken is data from 2017-2018. After the data were obtained, univariate and bivariate analysis were performed, namely the *chi-square test*.

## 3. Results

Researchers obtained 126 patient medical records from the Perumnas 1 Public Health

Center. Of the 126 patients, 106 patients met the inclusion and exclusion criteria. 3 respondents refused to become respondents for personal reasons, 5 respondents could not be contacted, and 12 respondents had moved from the home address listed.

**Table 1** shows that the majority of respondents at the Puskesmas Perumnas 1 Pontianak were 64 women (60.4%) with the greatest age being 40 young adults (37.7%). A total of 32 respondents with the latest education > S1 (30.2%). The income level of the majority of respondents was low, namely 57 people (53.8%). Knowledge was dominated by respondents with less knowledge, namely 60 people (56.6%). Most of the roles of medication supervisors (PMO) were supportive, namely 39 people (36.8%). 56 respondents' access to health services was easy (63.2%). The most adherence to treatment in this study was high adherence, namely 67 people (63.2%).

The healing status of TB patients is known from the medical records issued by the health center. Obtained from 106 respondents, 63 patients (59.4%) were declared cured, and 43 patients (40.6%) were declared not cured after undergoing treatment for 6 months.

The independent variables in the form of age, gender, income level, knowledge, role of PMO, access to health services and treatment compliance were cross tabulated with the respondent's recovery status. The results of the analysis are presented in the table as follows:

The results of statistical data analysis using *the chi-square* showed that gender had a significant relationship with the healing status of TB patients, with  $p$  value = 0.005, which means  $p < 0.05$ .

Based on the data obtained through statistical analysis using *chi-square*, it gives  $p$  value = 0.002 or  $p < 0.05$ , which indicates that the level of education has a relationship with the healing status of TB patients.

Based on the results obtained using the *chi-square* statistical analysis, the  $p$  value was 0.008 or  $p < 0.05$ , which indicates that knowledge has a significant relationship with the patient's recovery status.

**Table 6** shows that with the *chi-square* analysis, the presence of PMO was associated with TB patient recovery with a  $p$  value of 0.001 or  $p < 0.05$ . So the presence of PMO is a factor related to the recovery of TB sufferers.

With *chi-square* analysis, it was found that  $p$  value = 0.000 or  $p < 0.05$ . This shows that there is a relationship between treatment adherence and recovery of TB patients.

**Table 8** shows that the age of the respondent has no relationship with the cure for TB sufferers. The results of data analysis using the *chi-square* showed the  $p$  value obtained was 0.320, which means  $p > 0.05$ . Young adults, middle adults and late adults do not affect the patient's chances of recovery

**Table 9** shows that the level of income is not related to the cure status of TB patients. This can be seen from the data analysis using *chi-square* with the result  $p$  value = 0.728 or  $p > 0.05$ . Low or high respondent income does not affect the patient's likelihood of achieving a cure.

**Table 10** shows that access to health services has no relationship with the cure status of TB sufferers. This can be seen from the test results using *chi-square* with  $p$  value = 0.141, or  $p > 0.05$ . These results indicate that easy or difficult access to health services will not prevent sufferers from achieving recovery.

**Table 1. Distribution of Respondents Based on Patient Demographics**

Patient Demographics	Total	
	N	%
<b>Age</b>		
Young adults	40	37.7
Middle adult	39	36.8
Late adulthood	27	25.5
<b>Gender</b>		
Male	42	39.6
Female	64	60.4
<b>Level of Education</b>		
Primary School	27	25.5
Junior High School	23	21.7
Senior High School	24	22.6
> S1	32	30.2
<b>Income level</b>		
Low	57	53.8
Patient Demographics	Total	
	N	%
Higher	49	46.2
<b>Knowledge</b>		
Deficient	60	56.6
Good	46	43.4
<b>The Role of PMO</b>		
Less Support	39	36.8
Sufficiently Supportive	35	33.0
Very Supportive	32	30.2
<b>Access to health services</b>		
Easy	56	63.2
Difficult	50	36.8
<b>Treatment Adherence</b>		
High	67	63.2
Low	39	36.8
Total	106	100

**Table 2. Patient's Recovery Status**

Status	Total	
	N	%
Well	63	59,4
Unwell	43	40,6

**Table 3. Relationship between Gender and Treatment of Pulmonary TB**

Gender	Status of Pulmonary TB				Total		P Value
	Well		Unwell		N	%	
	N	%	N	%			
Male	18	52.2	24	47.8	42	100	0.005
Female	45	71.8	19	28.2	64	100	
Total	63	59.4	43	40.6	106	100	

**Table 4. Relationship between Education Level and Treatment of Pulmonary TB**

Education level	Status of Pulmonary TB				Total		P value
	Well		Unwell		n	%	
	n	%	N	%			
Primary School	9	33.3	18	66.7	27	100	0.002
Junior High School	12	52.2	11	47.8	23	100	
Senior High School	16	66.7	8	33.3	24	100	
> S1	26	81.3	6	18.8	32	100	
Total	63	59.4	43	40.6	106	100	

**Table 5. Relationship between Knowledge and Treatment of Pulmonary TB**

Knowledge	Status of Pulmonary TB				Total		P value
	Well		Unwell		n	%	
	n	%	N	%			
Less	29	48.3	31	51.7	60	100	0.008
Good	34	73.9	12	26.1	46	100	
Total	63	59.4	43	40.6	106	100	

**Table 6. The relationship between the presence of PMO and the cure for pulmonary tuberculosis**

The Presence of PMO	Status of Pulmonary TB				Total		P Value
	Well		Unwell		N	%	
	N	%	N	%			
Less	11	34.4	21	65.6	32	100	0.001
Enough	22	62.9	13	37.1	35	100	
Support	30	76.9	9	23.1	39	100	
Total	63	59.4	43	40.6	106	100	

**Table 7. Relationship between Treatment Adherence and Treatment of Pulmonary TB**

Treatment Adherence	Status of Pulmonary TB				Total		P value
	Well		Unwell		n	%	
	n	%	N	%			
High	61	91.0	6	9.0	67	100	0.000
Low	2	5.1	37	94.9	39	100	
Total	63	59.4	43	40.6	106	100	

**Table 8. Relationship between Age and Treatment of Pulmonary TB**

Age	Status of Pulmonary TB				Total		P Value
	Well		Unwell		N	%	
	N	%	N	%			
Young Adults	24	60.0	16	40.0	40	100	0.320
Middle Adult	26	66.7	13	33.3	39	100	
Late Adulthood	13	48.1	14	51.9	27	100	
Total	63	59.4	43	40.6	106	100	

**Table 9. Relationship between Income Level and Treatment of Pulmonary TB**

Income level	Status of Pulmonary TB				Total		P Value
	Well		Unwell		N	%	
	N	%	N	%			
Low	33	57.9	24	42.1	57	100	0.728
High	30	61.2	19	38.8	49	100	
Total	63	59.4	43	40.6	106	100	

**Table 10. Relationship between Access to Health Services and Treatment of Pulmonary TB**

Access to Health Services	Status of Pulmonary TB				Total		P Value
	Well		Unwell		N	%	
	N	%	N	%			
Easy	37	57.9	19	42.1	56	100	0.141
Difficult	26	61.2	24	38.8	50	100	
Total	63	59.4	43	40.6	106	100	

#### 4. Discussion

Puskesmas Perumnas 1 Pontianak is located in West Kalimantan, with a working area of 29 RW and 156 RT. The location of the puskesmas is in a fairly busy area, which is close to traditional markets, supermarkets, and mosques. The road leading to the puskesmas is about 6 meters wide with 2 lanes of traffic and is easy to reach.

Most of the respondents in this study were women, namely 64 people. According to the Indonesian Ministry of Health in 2018, the proportion of TB sufferers in men is 1.4 times more than women because they have a history of smoking and work more outside the home so that the possibility of being exposed to TB germs is higher, although in this study it was found that more female respondents. This is because some female respondents also work outside the home so they have the same risk of exposure as men.<sup>15</sup> The results of data analysis show that there is a relationship between sex and the healing status of TB sufferers, this is in accordance with my research where it was found that a cure Most are female respondents, because female respondents are more obedient, obedient in taking medication, and diligently control according to the time prescribed by the doctor. Male respondents who had a history of smoking after recovering from TB disease still smoke, so they are prone to be recurring TB infections. This is consistent with research in Manado which states that men have a history of smoking so that it is

difficult to achieve a cure.<sup>16</sup> Research in Mongondow states that women have more awareness of their disease and tend to be more diligent than men.<sup>17</sup>

Age is not related to recovery of pulmonary TB sufferers. In this study the most respondents were young adults, and this is in accordance with the 2013 Riskesdas which states that the highest number of TB incidents occurs at productive age (15-49 years) because they have higher motility.<sup>18</sup> Based on the results of this study, both young adults, middle adults and late adults alike have an awareness that taking medication regularly can accelerate TB recovery, but this is also influenced by other factors such as knowledge and the average level of education is S1. This is different from research in Bangladesh which states that young people have a higher awareness of their disease because they have better knowledge,<sup>19</sup> while the Manado study stated that there was no relationship between age and medication adherence because respondents of all ages had awareness of their disease and want to recover.<sup>20</sup>

The education level is divided into primary school, junior high school, Senior high school, and S1. The results show that patients with an education level > S1 have a greater chance of achieving a cure. Respondents with primary and junior secondary education tended to be more passive in answering questions about knowledge about TB disease. Respondents with a high school or

undergraduate education level tend to be more likely to try to think of answers to what is given and give reasonable answers. Based on the results of research in the city of Manado, patients who have low levels of education, namely SD and SMP have less knowledge of pulmonary TB disease, so that respondents with higher levels of education, namely SMA and D3 / S1 / S2 / S3 are more obedient to treatment than respondents with low education.<sup>20</sup> Respondents who have a higher level of education understand better about the dangers of pulmonary tuberculosis so they tend to be more compliant with treatment to cure their disease.<sup>17</sup>

Respondents with poor knowledge tend not to understand how TB is transmitted, so they can contract and suffer from TB disease.<sup>20</sup> Respondents who have good knowledge have a greater chance of achieving a cure. This is in accordance with the education level of the respondents, who are mostly S1, where people who have a higher level of education have a better level of knowledge, such as the main causes and symptoms of TB, so they will seek treatment to achieve a cure and prevent re-transmission. Those who do not recover do not know what are the symptoms of TB so they do not go to health facilities, assuming that the disease they are experiencing is just an ordinary disease that can heal on its own, so they don't seek treatment. The results of this study are in accordance with research in Lampung which states that the higher the knowledge of the disease, the more obedient the patient is.<sup>21</sup> Patients with poor knowledge tend to fail in implementing treatment.<sup>22</sup>

The level of patient income is not related to the recovery of TB sufferers because most of the respondents have BPJS for examinations while drugs are obtained for free because TB is a national program where the drugs are given free of charge,<sup>23</sup> while access to the puskesmas does not require expensive costs because they live in the working area of the puskesmas. This is supported by research conducted in Manado where medicines are provided free of charge by health authorities, but this is different from

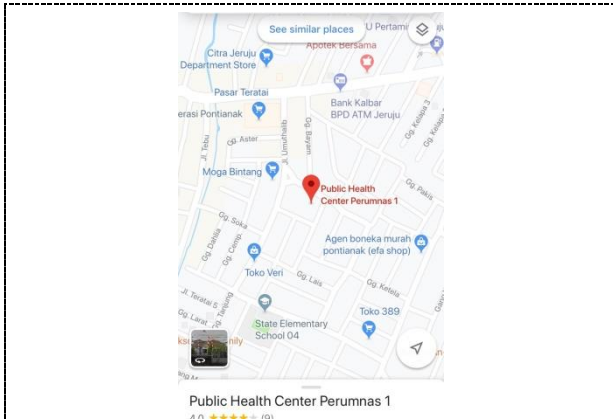
research in Medan which states that low income levels make treatment difficult because the research is carried out in a private doctor's practice, so that treatment and examinations are not provided free of charge.<sup>24</sup>

The role of PMO, most of the respondents who recovered, received support in achieving recovery, such as reminding patients to take medication and regular control at the puskesmas, encouraging them to recover, providing nutritious food and cleaning the house properly. Respondents who did not recover tended not to be reminded by PMO to take medication every day because they did not live with the patient. Research in Malang states that the role of a good PMO can affect treatment compliance for pulmonary TB patients. The better the role of PMO, the more successful treatment will be and vice versa<sup>23</sup> Most of the PMOs in this study came from families and lived in the same house with the patients, so they could monitor their medication at any time and have emotional bonds. This is in accordance with Gendhis's research which states that PMOs originating from families have greater emotional ties and responsibility to sufferers so that sufferers find it easier to achieve healing.<sup>25</sup>

Access to health services is not related to the patient's recovery, but if viewed from the field conditions it is found that the Perumnas 1 puskesmas is strategic enough so that it is easily accessible by existing transportation facilities. Transportation facilities are not an obstacle for respondents to seek treatment. Research in Semarang stated that both respondents who found it easy and difficult to reach health service places were equally obedient to treatment. They will still come for treatment even though the distance is far away because of the illness and the treatment that has been taking a long time.<sup>26</sup>

Patients who recover are patients who are obedient, sufferers who do not recover are sufferers who are not obedient to treatment. Research in Semarang states that all sufferers can theoretically be cured, if you are diligent in taking medication until it is finished, and it is

difficult to achieve a cure if you are not regularly taking medication or the medication is too short.<sup>27</sup> Good adherence will give positive results to treatment and reduce the burden caused by spread TB.



**Figure 1. Figure of Work Area of Puskesmas Perumnas 1 Pontianak**

## 5. Conclusion

The factors that have a relationship with the recovery of pulmonary tuberculosis patients at the Puskesmas Perumnas 1 Pontianak City are gender, level of education, level of knowledge, the role of the Superintendent of Drug Administration (PMO), and treatment compliance. Age, income level, access to health services are not related to the recovery of pulmonary TB sufferers in Puskesmas Perumnas 1 Pontianak City.

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