

# *Effect of Duration Tuberculosis Treatment on Depression Symptoms Level of Tuberculosis Patients in Karang Bahagia Primary Health Care Bekasi*

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**Abstract**—Tuberculosis (TB) is an inflammatory pulmonary parenchymal disease caused by a bacterial infection of *Mycobacterium tuberculosis*, which requires a long period of treatment so that it can affect the onset of depression in patients with pulmonary TB. To find out whether there is a correlation between duration of pulmonary TB treatment to depressive symptoms level in patients with pulmonary tuberculosis aged 18 to 65 years at Karang Bahagia Primary Health Care. This research is analytic observational with cross sectional approach. Sampling as many as 55 respondents with data collected in December 2016. The sampling technique using non-probability sampling technique with consecutive sampling. Data were taken from the medical record to determine the duration of treatment and used the PHQ-9 questionnaire to determine the level depression. Data were analyzed using Chi Square. Chi square test showed that there was a significant correlation between duration of lung TB treatment with depressive symptom level with PValue = 0.003. There is a significant correlation between duration of tuberculosis (TB) treatment with depressive symptoms in pulmonary tuberculosis patients aged 18 to 65 years at Karang Bahagia Primary Health Care of Bekasi.

**Keywords**— *Tuberculosis; Length of Treatment; PHQ-9*

## I. INTRODUCTION

Tuberculosis infection can affect the various organs and tissues in the body but in the domicile by pulmonary tuberculosis as much as 80-85% [1]. Pulmonary tuberculosis (pulmonary TB) is a lung parenchymal inflammatory disease caused by *Mycobacterium tuberculosis* bacterial infection [2]. Pulmonary Tuberculosis is the most common infectious disease that is the leading cause of death in the worldwide [3]. Every year about eight million people suffer from this disease and three million of them die. More than 95% of people diagnosed with pulmonary tuberculosis originate in developing countries. According to World Health Organization (WHO) data, the highest number of cases of pulmonary tuberculosis originated from the African Continent (28% of all pulmonary TB cases) and half came from six Asian countries namely Bangladesh, China, India, Pakistan, Philippines and Indonesia [4].

Indonesia is currently in the second ranked with the highest pulmonary TB burden in the world based on a survey since 2013 in the WHO 2015 case report, which is up to 1 million new cases per year. In Indonesia, the number of deaths from pulmonary tuberculosis is estimated to be about 64,000 deaths per year [4]. The percentage of cases in Indonesia becomes 10 percent of all cases in the world, making it the second most common country after China. India is the first ranked with a percentage of cases of 23 percent [5]. Estimated prevalence of pulmonary tuberculosis in all cases is 660,000 and incidence estimates are 430,000 new cases per year. About 75% of TB patients are the most economically productive age group (15-50 years). There are an estimated 8.6 million cases of TB in 2012 where 1.1 million people (13%) of whom are HIV-positive TB patients. About 75% of these patients are in the African region [6].

The prevalence of Indonesia's population diagnosed with pulmonary tuberculosis by health personnel in 2013 is 0.4%, there is no different in 2007. Six provinces with the highest pulmonary TB were West Java (0.7%), Papua (0.6%), DKI Jakarta (0.6%), Gorontalo (0.5%), Banten (0.4%), and West Papua (0.4%). (7) In West Java province there has been an increase in prevalence from 0.56% 2007 to 0.70% in 2013 [7,8]. According to gender, the prevalence of pulmonary TB in males was higher at 0.4% than in women of 0.3%. Meanwhile, by type of area, the prevalence of pulmonary TB in urban population was 0.4%, higher than that of rural population of 0.3% [9].

The number of incidences of pulmonary tuberculosis disease in the world, especially Indonesia, there are problems such as long and complex therapy, expensive medical expenses, disease complications, poverty, lack of knowledge, increased HIV/AIDS cases and many other concerns that may lead to potential depression. Depression is a period of disruption of human function associated with sad feelings and symptoms, including changes in sleep patterns and appetite, psychomotor, concentration, anhedonia, fatigue, despair, helplessness and suicide [10].

Various studies have shown a high prevalence of depression among pulmonary TB patients [11,12]. It has been reported that the prevalence of depression in pulmonary tuberculosis patients was 13.5% to 72% [13,14]. This difference was due to the different of measurements that used, but most of the research showed that nearly half of pulmonary TB patients were depressed [15]. A survey of 100 patients with pulmonary tuberculosis in South Africa showed that 68% had symptoms of depression, of which 22 were mildly depressed, 38 had moderate depression, and 8 had high depression [11].

Arjana explained that long time a person suffering from pulmonary TB will affect the daily life of the sufferer. A person who has been diagnosed with pulmonary TB disease will directly and indirectly change his daily pattern. Various of health problems associated with pulmonary tuberculosis that will suffer, as well as the fact of consuming drugs throughout his life cause some of the patients with pulmonary TB will experience depression [10]. This is in accordance with research conducted by Sheila Nurkhalesa of 30 respondents in Puskesmas Sumbersari Jember which showed that more depression emerged at the beginning of suffering from pulmonary tuberculosis [16]. According to Pachi, et al, patients tend to experience shock when was first diagnosed with pulmonary TB. Furthermore, patients will experience severe phases in the following months. There is often a period of rejection, followed by resignation and depression, leading to a distorted perception of disease. The patient is shown to exhibit strong emotions such as fear, jealousy, anger, isolation, guilt, or embarrassment [17].

Therefore, depression in patients with pulmonary TB should still be treated so as not to reduce adherence to therapy and lead to longer treatment. This is in accordance with the results of research conducted by Eko Budhiarti (2014) to 60 samples indicating that there is a significant relationship between the level of symptoms of depression with adherence to medication patients with pulmonary tuberculosis and positive linear pattern that is the higher the level of depression it will the higher disobedience of taking medication TB patients [18]. Looking at this phenomenon and data above, the researcher is interested to do research about the effect of duration tuberculosis treatment (TB) to the level of depressive symptoms in pulmonary tuberculosis patients in Karang Bahagia Primary Health Care of Bekasi.

## II. METHODS

The research used was observational analytic research with cross sectional design because the measurement of independent variable (risk factor) and dependent (effect) was done at the same time [19]. This research was conducted at Karang Bahagia Primary Health Care in December 2016. Sampling was done by consecutive technique sampling with inclusion criteria in this study were patients who had been diagnosed with pulmonary tuberculosis by doctors at Karang Bahagia Primary Health Care, pulmonary tuberculosis patients who were in TB treatment at least one month and the maximum was at the end of the continuation phase, patients with pulmonary tuberculosis age  $\geq 18$  to 65 years and willing

be the respondent and follow the research procedure. Exclusion criteria in this research is patient in unconscious condition so it is not possible to become respondent. Patients take antidepressant drugs, and excessive alcohol consumption over a period of time up to the final stage.

The instrument used in this study was Patient Health Questionnaire-9 (PHQ-9), one of the standard questionnaires to determine the level of depression symptoms that have been translated into Indonesian. PHQ-9 will ask the symptoms of pulmonary tuberculosis patients in the last 2 weeks. Analysis of the relationship in this study using Chi Square test with a total sample of 55 people from 66 population.

## III. RESULT AND DISCUSSION

### A. Frequency Distribution of Depression Symptoms by Sex

Table I shows that respondents who suffer from Lung Tuberculosis are more depressed than female, 22 respondents have moderate depression symptoms (53.7%) from 41 people. While in women that is 11 people or amount (78.6%) from 14 people. These findings turned out to be different from Peterson's research which states that depression is more suffered by women than men. According to Sandra Witelson in her study found that Corpus Calosum in men is smaller than females, as well as components called the anterior Commisura. Both of these causes, men are not so influential on the emotions and stressors that happen to him. Men also prefer to spill problems and emotions with activities rather than hide away them and will feel ashamed if they cried if there was a problem [20]. Meanwhile, according to Patchi et al., men are also likely to experience depression at the time of Pulmonary Tuberculosis. The condition of depression is due to the decreased ability of individuals to work and connect with the community, especially when considering that men are heads in the household [17].

TABLE I. FREQUENCY DISTRIBUTION OF DEPRESSION SYMPTOMS BY SEX

Gender	Depression Symptoms					
	Yes		No		Total	
	N	%	N	%	N	%
Women	11	78.6	3	21.4	14	100
Men	22	53.7	19	46.3	41	100

### B. Frequency Distribution of Depression Symptoms by Age

Table II shows that most respondents who experienced symptoms of depression were respondents aged over 30 years, amounted to 28 people or amounted to (73.7%) of 38 people aged over 30 years, while respondents aged less than or equal to 30 Years of depression only amounted to 5 people (29.4%) of 17 people. The results of this study are consistent with Issa, et al., In 65 TB patients in Nigeria that older adults are more likely to be depressed (72.2%) than young adults (27.8%) [21]. This study also corresponding to Olusaju, Et al. In 88 patients with pulmonary tuberculosis in Nigeria, showed that

older adults were more likely to be depressed (66.6%) than young adults (33.4%)<sup>60</sup> However this study did not fit with Williams, et al, In 4351 adult patients in South Africa mentions that depression in young adult is 61% compared to older adult age is 39% [22].

TABLE II. FREQUENCY DISTRIBUTION OF DEPRESSION SYMPTOMS BY AGE

Ages	Depression Symptoms					
	Yes		No		Total	
	N	%	N	%	N	%
≤30	5	29.4	12	70.6	17	100
>30	28	73.7	10	26.3	38	100

**C. Frequency Contribution of Depression Symptoms by Education**

Table III shows that symptoms of depression appear more in subjects with lower education than in higher education. This study is consistent with Bereket Duko, et al. Research, in 417 respondents in Ethiopia that the level of primary school education is more depressed 30.9%, followed by junior high school education is 28.1%, then the high school level is 22.3% And the last one does not have an education of 18.7%. According to Y. B quoted by Notoatmodjo (2003, page 57) education affects a person as well as one's person's behavior of lifestyle especially in motivating to behave, play a role in health development. The higher a person's education the more easily receive information, so that more knowledge is owned.

However, this study was not in accordance with the research of Masumoto et al in 561 respondents in Philippines mentioned that depression in pulmonary tuberculosis patients with high school education was 45.6%, junior high school education (32.1%), education level of with education (21.4%), and no education (0.9%). In this study, symptoms of depression were more prevalent in the higher education group because the study was conducted in urban areas where the majority of the population had high education and they were easy to find out information about pulmonary tuberculosis. Consequently making this group feel anxious overload because of the information without ensuring the truth to the doctor [20].

TABLE III. FREQUENCY DISTRIBUTION OF DEPRESSION SYMPTOMS BY EDUCATION

Education level	Depression Symptoms					
	Yes		No		Total	
	N	%	N	%	N	%
-	12	100	0	0	12	100
Elementary school	17	60.7	11	39.3	28	100
Junior High School	1	12.5	7	87.5	8	100
Senior High School	2	33.3	4	66.7	6	100
Diploma	1	100	0	0	1	100

**D. Relation of Duration Pulmonary TB Treatment with Levels of Depression Symptoms**

To determine the relationship between duration of pulmonary tuberculosis treatment with depression level experienced on pulmonary tuberculosis patients, Chi Square test was done at  $\alpha = 0.05$ . The results show that  $p = 0.040$  ( $p < \alpha, \alpha = 0.05$ ) which means the hypothesis is accepted so it can be concluded that there is a relationship between the duration of pulmonary tuberculosis treatment in patients with pulmonary tuberculosis depression experienced by pulmonary tuberculosis patients, where patients with long term follow up treatment has a tendency to experience lighter depression levels compared with intensive phase (Table IV). Pulmonary TB patients will be very susceptible to depression, there are many theories that discuss it. First, biological theory, in chronic infectious diseases such as pulmonary TB in response to bacterial infection of *Mycobacterium tuberculosis*, the innate immune system will produce pro-inflammatory cytokines such as interleukin-1 $\alpha$  and  $\beta$  (IL-1 $\alpha$  and IL-1  $\beta$ ), factor- $\alpha$  tumor necrosis (TNF  $\alpha$ ) and interleukin-6 (IL-6). These mediators coordinate not only in response to localized and systemic inflammation against pathogenic bacteria but are also responsible for causing various clinical aspects by disturbing the balance of tryptophan in the plasma. Tryptophan is an important amino acid that is actively transported to the brain for serotonin synthesis.

This level of serotonin precursors in plasma determines the amount of serotonin synthesis in the brain. If the inflammatory process in the body continues it will cause a decrease in the number of tryptophan in the plasma so that serotonin synthesis will also decrease. Serotonin is one of the neurotransmitters that play a role in controlling affects, aggressiveness, sleep, and appetite. The decrease in neurotransmitters in the brain is what makes pulmonary TB patients particularly vulnerable to depression because they do not trigger new action potentials in post-synaptic neurons in the synaptic cleft that will cause changes in certain areas of the Central Nervous System (CNS). This change is shown to cause symptoms associated with depression according to the function of the neurotransmitter [25].

The second theory of depression is the theory of psychology, this theory asserts that depression tends to occur in early patients diagnosed with tuberculosis. Patients of pulmonary tuberculosis tend to experience shock when first diagnosed with Pulmonary Tuberculosis. This is because the patient will have difficulty adapting to this situation, such as in taking drugs, disturbed sleep patterns and changing diet. Changes in sleep patterns experienced by people with pulmonary tuberculosis is caused by coughing symptoms that are felt more severe at night, making the patient often wake up the night and disturb sleep patterns usually. Then, the obligation of pulmonary TB patients to consume OAT every day in a timely manner is a burden for people with pulmonary TB.

TABLE IV. RELATIONSHIP OF LUNG TB TREATMENT WITH LEVELS OF DEPRESSION SYMPTOMS

Treatment (month)	Depression Symptoms												P value
	yes								No		Total		
	Mild		Moderate		Moderate-Heavy		Heavy		No	Total			
	N	%	N	%	N	%	N	%	N	%	N	%	
≤2	8	29.7	8	29.7	4	14.8	3	11.1	4	14.7	27	100	0,040
3-4	2	36.4	1	9	0	0	1	63.6	7	63.6	11	100	
>4	3	17.6	2	11.8	0	0	1	64.8	11	64.8	17	100	

Early rejection in TB patients in this study is in accordance with the theory Kubler explained, there are 5 stages associated with the process of sadness experienced by humans. The five stages are rejection, anger, negotiation, depression, and acceptance.

The third theory is environmental theory. This theory explains that the environment will affect the onset of symptoms of depression in a person experiencing physical pain such as information about pulmonary TB is not infrequently make the newly diagnosed sufferers of pulmonary tuberculosis assume bad about himself. The negative stigma of the environment against TB patients also influences the emergence of symptoms of depression. Beruket Duko, et al., Explained that patients with pulmonary tuberculosis who have negative stigma about their condition might be 11 times greater indicate depressive symptoms [22]. Patients often consider themselves a burden to others, especially families should remind them to consume OAT. All of these things that ultimately make the participants become depressed. If the above factors experienced by the respondents more and more, it's made the higher level of depression experienced by respondents [26].

But evidently that the longer the lung tuberculosis is treated and the response is good then it is still depressed but the symptoms of depression are lower. This is due to the pulmonary TB patients who have been treated and the response is good then the number of Mycobacterium tuberculosis bacteria will decrease so that serotonin synthesis will begin to take place normally and can do its job to activate post synapse neurons hence depression symptoms will disappear with balanced serotonin level in synapse [25]. It turns out to be one of the first line of anti tuberculosis drugs (OAT) that isoniazid has an anti depressant role. This is in line with Max Lurite's theory, et al., which states that of 86 patients, two-thirds had a positive response to isoniazid to treat depression [27,28]. Similarly, Jean Delay reported that there was a positive effect of isoniazid as a treatment for depressed patients.

The second theory of depression, the theory of psychology, at the stage of acceptance is often referred to as the final stage of healing, in which the patient will learn to be able to continue his life. The longer the tuberculosis, the patient will be able to adapt and get used to situations such as taking drugs, sleeping patterns, eating patterns, and already socializing with family and society along with clinical improvement due to good OAT response [29].

In the last theory, environmental theory, due to good OAT response so as to reduce the symptoms of pulmonary tuberculosis such as cough, the patient has started to dare to interact with the family and not aloof anymore. Support and motivation from the family and the surrounding community will greatly help how patients can adapt and reduce their depression.

IV. CONCLUSION

Based on the results of the above study can be concluded, there is a significant relationship between the duration of tuberculosis treatment (pulmonary TB) with the level of depressive symptoms in patients with pulmonary TB in Karang Bahagia Primary Health Care Bekasi with  $p = 0.040$  ( $p < 0.05$ ) and the longer treatment of pulmonary TB and a good OAT response, the lower symptoms of depression appear in pulmonary TB patients.

In the early phase of pulmonary tuberculosis treatment, the intensive phase requires special examination or evaluation of depressive symptoms. It is necessary to monitor compliance with OAT to avoid dropping the drug. To the next researcher is expected to conduct further research on the effect of duration of pulmonary TB treatment to the level of depressive symptoms by considering other aspects such as patient smoking habits, medication adherence to family support. After the text edit has been completed, the paper is ready for the template. Duplicate the template file by using the Save As command, and use the naming convention prescribed by your conference for the name of your paper. In this newly created file, highlight all of the contents and import your prepared text file. You are now ready to style your paper; use the scroll down window on the left of the MS Word Formatting toolbar.

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