

FACTORS AFFECTING TUBERCULOSIS (TB) PATIENT ADHERENCE TO ANTI-TUBERCULOSIS DRUG THERAPY IN SURABAYA

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ABSTRACT

Tuberculosis is one of the infectious diseases that causes many deaths in the world. One of the successes in reducing the death rate due to TB is with anti-tuberculosis treatment efforts. However, adherence to treatment is a serious problem because the results are still far from what is expected. The purpose of this study was to determine the level of adherence and what factors affect TB patients in treatment during the pandemic. This research was a descriptive analysis study with a cross-sectional approach. The number of samples was as high as 261 people. The measuring instrument used was the Medication Adherence Rating Scale (MARS). The validity and reliability showed that all questions were valid with a correlation value of > 0.396 and a Cronbach coefficient of 0.803. The results of the bivariate analysis showed that the factors influencing adherence to taking OAT in TB patients were age, education level, employment status, marital status, location of residence, and income level. Multiple logistic regression analysis showed the dominant factor having the most influence on compliance was the level of education. Respondents with a high school education level have a tendency to have a good compliance level of 22,077 times compared to respondents with a lower level of education.

INTRODUCTION

The most important factor in the treatment procedure for people with TB

(tuberculosis) is compliance, which is also the toughest barrier. Adherence is crucial for the patient's rehabilitation while receiving OAT. Additionally, it lowers TB mortality and

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delays the development of treatment resistance. (Ravenscroft et al., 2020).

Worldwide, tuberculosis (TB) is the leading cause of death from infectious diseases, exceeding the number of cases of HIV/AIDS since 2015. Every year, there are more than 10 million new TB cases, of which 600,000 are caused by drug-resistant *Mycobacterium tuberculosis* and cause about 1.6 million deaths. (Garfein & Doshi, 2019).

According to WHO, (2021) anticipated that there were 843,000 TB infections in Indonesia in 2019. In 2020, however, there were 845,000 new cases of TB in Indonesia, and there were more than 98,000 deaths from the disease. The effectiveness rate of TB treatment in Indonesia had declined over the previous three years, according to a 2018 study from the Indonesian Ministry of Health. It was 85% in 2015, and it went up 1% in 2016. But in 2017, it dropped to 80%. This is still a long way from the necessary goal of 85%.(Kemenkes RI, 2018).

East Java province ranks second in Indonesia in the number of new cases of smear positive TB patients (below West Java). However, from the number of new smear positive cases (Case Detection Rate/CDR), East Java Province ranks eighth out of 33 provinces in Indonesia. The CDR in 2015 was 56%, with the number of positive smear TB cases as many as 23,456 patients (Dinas Kesehatan Jatim, 2017). Meanwhile, in Surabaya, the prevalence of TB incidence is

4,373 cases, with positive smear positive 2,330 cases (Dinas Kesehatan Kota Surabaya, 2017). The success rate of TB treatment nationally is 80%, and Surabaya is 79.21%.(Kemenkes RI, 2020).

One of the goals of treatment is to reduce mortality, where the annual number of deaths from TB is decreasing globally, but is still far from the first target (milestone) of the End TB strategy; namely a 35% reduction in TB deaths between 2015-2020. The fact globally is that the cumulative decline from 2015-2019 is only 14%, this shows that it is still less than half of the set target (Filardo et al., 2022).

The level of adherence in treatment in Surabaya, based on the results of the FGD (Forum Group Discussion) with the Puskesmas and PMO, it was explained that over the last 2 years, adherence to TB treatment has generally decreased due to pandemic conditions, this can be seen from the number of patient visits. both for regular check-ups and visits for treatment decreased. Several efforts have been made so far by maximizing the role of PMOs and families.

In a pandemic situation like this, it is indeed a challenge for services in the treatment process, and of course treatment adherence will be different from before the pandemic. However, this is different from the findings of the previous two years or before the pandemic, explained by Bobby et al., (2018) in his research that of 58 respondents

showed good compliance as many as 51 people (88%), meaning that TB patient compliance in treatment generally showed good adherence. Therefore, this study was conducted to determine the level of adherence of TB patients and what factors influence it during the pandemic.

METHODS AND MATERIALS

This research is a quantitative study of descriptive analysis with a cross sectional approach. The number of samples was 261 people, consisting of five locations in Surabaya. The sampling technique used Cluster Random Sampling. The data collection process was assisted by 5 TB cadres, who previously had a briefing on research activities as well as respondent criteria and how to fill out the questionnaire correctly. The study was carried out in February-June 2022. The instrument was measured using the Medication Adherence Rating Scale (MARS). The validity and reliability showed that all questions were valid with a correlation value > 0.396 and a Cronbach coefficient of 0.803. The inclusion criteria in this study were patients suffering from TB, 0-2 months of treatment, willing to become respondents, residing in Surabaya while the exclusion criteria were MDR TB patients, dementia or

memory disorders. Data analysis includes three stages, first univariate, bivariate (Chi-Square) and multivariate (multiple logistic regression).

RESULTS AND DISCUSSION

Univariate Analysis

1. Characteristics of Respondents

Based on the characteristics of respondents in the age group, most of them are 46-55 years old as many as 83 people (31.8%). The gender of the respondents was dominated by female respondents as many as 156 people (59.8%). Meanwhile, based on the education level of the respondents, most of them had high school education, namely 81 people (31%). For employment status, it is dominated by respondents with self-employed employment status as many as 130 people (49.8%). Meanwhile, the marital status was mostly 106 people (40.6%). Based on the location of the respondents, most of them came from North Surabaya as many as 70 people (26.8%). While the income level of the respondents mostly income <Rp 1,500,000 as many as 137 people (52.5%).

2. Adherence Level

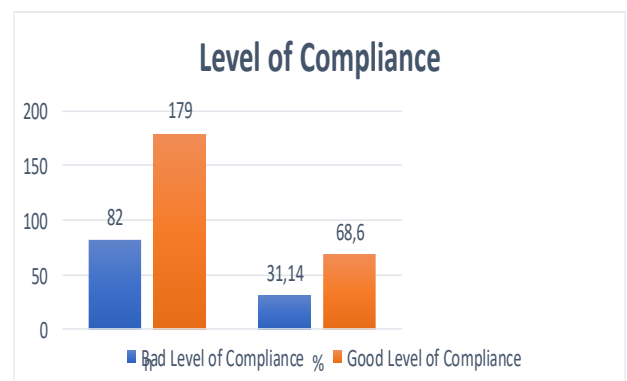


Diagram 1. Respondent compliance level

Based on the diagram above, it shows that out of 261 respondents, 179 people

(66.8%), who had a good level of compliance, were 82 people (31.4%).

Bivariate Analysis

Table 1. Age factor with TB patient adherence to OAT therapy

Age	High Adherence		Low Adherence		Total		P-Value
	n	%	n	%	n	%	
	17-25 years old	56	87,5	8	12,5	64	
26-35 years old	24	58,6	17	41,4	41	100	
36-45 years old	8	16,3	41	83,7	49	100	
46-55 years old	67	80,8	16	19,2	83	100	
56-65 years old	24	100	0	0	24	100	

The table above shows that respondents who have good compliance are mostly respondents in the 46-55 year age group as many as 76 people (80.8%). Meanwhile, poor adherence was mostly in the age group of 36-45 years as many as 41 people (83.7%). The results of the bivariate analysis showed that the age factor affected the adherence of TB patients to anti-tuberculosis drug therapy, as evidenced by the value ($p = 0.000 < = 0.05$). The results of this study are in accordance with the research conducted Xing et al., (2021) but it is different from the research conducted by Lewinsohn et al., (2017) that age has no effect on adherence to treatment.

Someone who is an adult will show maturity in thinking and making decisions. Including the decision to access treatment in health services, so that it will show good compliance. Based on research Bea et al., (2021) Age is an influential factor in preventing transmission and adherence to treatment in pulmonary TB. This happens because respondents who are older have a better experience because of previous illness, or experience gained from the environment, so that treatment adherence tends to be higher. As respondents in this study, most of them showed good adherence (83%) at the age of 46-55 years. Besides that, according to Harries et al., (2020) Old age is not busy with work so they can come for treatment regularly.

Table 2. Gender factor with TB patient adherence to OAT therapy

Gender	High Adherence		Low Adherence		Total		P-Value
	n	%	n	%	n	%	
	Man	65	61,9	40	38,1	105	
Woman	114	73,1	42	26,9	156	100	

The table above shows that some of the respondents who have good needs are

female, as many as 114 people (73.1%). While the respondents who have poor

compliance are mostly female as many as 42 people (26.9%). The results of the bivariate analysis showed that the gender factor had no effect on the adherence of TB patients to anti-tuberculosis drug therapy, as evidenced by the value ($p=0,057 > =0,05$).

These results are inline with research conducted by Zhang et al., (2020) which

explains that sociodemographic factors (gender) are not significantly associated with adherence. This is also in line with research conducted by (Mirsaeidi et al., 2015 ; Pribadi et al., 2020) stated that the socio-demographic factors of gender did not have a relationship with adherence

. Table 3. Education level factor with TB patient adherence to OAT therapy

Education	High Adherence		Low Adherence		Total		P-Value
	n	%	n	%	n	%	
	Elementary School	17	29,3	41	70,7	58	
Junior High School	41	55,4	33	44,6	74	100	
Senior High School	73	90,1	8	9,9	81	100	
Bachelor	48	100	0	0	48	100	

The table above shows that most of the respondents who have good compliance are respondents with high school education, as many as 73 people (90.1%). Meanwhile, respondents who have poor compliance are mostly primary school education levels as many as 41 people (70.7%). The results of the bivariate analysis showed that the education level factor affected the adherence of TB patients to anti-tuberculosis drug therapy, as evidenced by the value ($p = 0.000 < = 0.05$). Where the higher the education level of the respondent, the better the compliance. These results are supported by other studies Naumov et al., (2022) Education will indirectly relate to

knowledge where the higher a person's education, the higher the level of knowledge possessed (Kohler et al., 2021).

This shows that most of the respondents who have sufficient knowledge about pulmonary TB are obedient to taking medication. This result is in accordance with the theory put forward by Anggraini et al., (2020) that one's actions towards health problems will basically be influenced by one's knowledge about the problem. In this case, the higher the level of knowledge the patient has about his disease, the more obedient to treatment. Good knowledge about pulmonary TB is obtained by respondents through information from people around such as

counseling delivered by health workers or advertisements about pulmonary TB

delivered through print media and electronic media.

Table 4. Occupational status factors with TB patient adherence to OAT therapy

Occupational	High Adherence		Low Adherence		Total		P-Value
	n	%	n	%	n	%	
	Unemployment	40	83,3	8	16,7	48	
Housewife	34	57,7	25	42,3	59	100	
Privat	81	62,3	49	37,7	130	100	
Government employees	24	100	0	0	24	100	

The table above shows that most of the respondents who have good compliance are mostly respondents who have private employment status, namely 81 people (62.3%). While respondents who have poor compliance are mostly respondents with private employment status, namely 49 people (37.7%). The results of the bivariate analysis showed that the work status factor affected the adherence of TB patients to anti-tuberculosis drug therapy, as evidenced by the value ($p=0.000 < =0.05$).

This research is in line with research Bawonte et al., (2021) dengan adanya pekerjaan ini akan mempengaruhi pemanfaatan pelayanan kesehatan yang ada. Pekerjaan seseorang dapat mencerminkan banyak sedikitnya informasi yang diterima dengan adanya

informasi tersebut membantu seseorang untuk memutuskan atau mengambil suatu keputusan untuk memanfaatkan pelayanan kesehatan untuk dirinya. Hal sesuai dengan pernyataan Notoatmodjo yang mengatakan lingkungan pekerjaan dapat menjadikan seseorang memperoleh pengalaman dan pengetahuan baik secara langsung maupun secara tidak langsung.

In general, it is certainly different from usual, where when someone is not working they should have a lot of free time to come to health services, but what happens is the opposite. This cannot be separated from other factors, namely related to finance, where when an individual has a job, of course, he will get income that can be used for daily living needs. (Kumwihar et al., 2021).

Table 5. Factors of marital status with TB patient adherence to OAT therapy

Maternal Status	High Adherence		Low Adherence		Total		P-Value
	n	%	n	%	n	%	
	single	81	76,4	25	23,6	106	
Widow/ Widower	41	71,9	16	28,1	57	100	
Married	57	58,2	41	41,8	98	100	

The table above shows that most of the respondents who have good compliance are mostly single respondents, namely 81 people (76.4%). While respondents who have poor compliance are mostly respondents who are married as many as 41 people (41.8%). The results of the bivariate analysis showed that the marital status factor affected the adherence of TB patients to anti-tuberculosis drug therapy, as evidenced by the value ($p=0.016 < =0.05$).

Marital status in the study Kamilah et al., (2020) shows tend to be good in the group of research subjects with unmarried status when compared to married status. These findings explain that relative marital status does not function as a form of social

support for medication adherence. This is consistent with the finding that marital status is not the only predictor of health behavior

The results of this study are generally different from the results of previous studies, where married respondents actually showed better compliance. This is because after marriage there are many other factors that mediate in compliance, namely family support, one of which is the husband. As research Fang et al., (2019) that of 339 patients, 33.63% missed treatment. Divorced and widowed patients were more likely to miss treatment than those who were married or unmarried ($P<0.01$).

Table 6. Factors of residence location with TB patient adherence to OAT therapy

Resident Location	High Adherence		Low Adherence		Total		P-Value
	n	%	n	%	n	%	
west surabaya	40	71,42	16	28,57	56	100	0,000
east surabaya	17	40,47	25	59,52	42	100	
north surabaya	55	78,57	15	21,42	70	100	
south surabaya	33	67,34	16	32,65	49	100	
Central Surabaya	34	77,27	10	22,72	44	100	

The table above shows that the majority of respondents who have good compliance are mostly respondents who live in northern Surabaya as many as 55 people (78.57%). Meanwhile, respondents who have poor compliance levels, most of the respondents who live in East Surabaya are 25 people (59.52%). The results of the bivariate analysis showed that the factor of residence had an effect on the adherence of TB patients to anti-tuberculosis drug therapy, as evidenced by the value ($p = 0.000 < = 0.05$).

Where respondents who live in areas with a clean environment and close to access to health services, show better compliance. This is supported by research conducted by Wang et al., (2019) revealed that respondents who live in urban areas will show better medication adherence compared to patients who live in rural areas.

Closer access to TB treatment and better infrastructure make it easier to administer treatment and enable TB patients to become more compliant with treatment.

This is also explained in the study of Ambarwati & Perwitasari, 2021) that TB patients in the Yogyakarta Region showed a better level of adherence, which was 60.82%.

The respondents in this study were mostly located in North Surabaya as many as 70 people (26.8%). Where geographically, health facilities are easily accessible and

located in the middle so that it allows people to always use health services for treatment, besides that it cannot be separated from the role of PMOs who always play an active role in motivating patients, so that patients become more obedient to treatment. As explained by the puskesmas officer, North Surabaya did not show a significant decrease in the number of visits during the pandemic.

Table 7. Income level factor with TB patient adherence to OAT therapy

Income Level	High Adherence		Low Adherence		Total		P-Value
	n	%	n	%	n	%	
< Rp 1.500.000	106	77,4	31	22,6	137	100	0,000
Rp 1.500.000 – Rp 3.500.000	65	71,4	26	28,6	91	100	
> Rp. 3.500.000	8	24,2	25	75,8	33	100	

From the table above shows that most of the respondents who have good compliance are mostly respondents who earn <Rp 1,500,000 as many as 106 people (77.4%). While respondents who have a poor level of compliance are mostly respondents who earn <Rp 1,500,000 as many as 31 people (22.6%). The results of the bivariate analysis showed that the income level factor affected the adherence of TB patients to anti-tuberculosis drug therapy, as evidenced by the value (p =

0.000 < = 0.05). Where the higher the income level of the respondent, the better the compliance.

This research is in line with research Garfein & Doshi, (2019) which states that income level is related to a person's level of adherence to taking medication regularly. This proves that when a person has an income, it means that they can meet their needs, including costs for treatment and so on (Morris et al., 2016 ; Tsui et al., 2021)

.Multivariate Analysis

Tabel 8. Final modeling of multivariate analysis

Variable	P-Value	OR	(95% CI)
Education	0,000	22,077	8,742-55,405

Based on the results of the final multivariate modeling analysis using multiple logistic regression, it was found that the most influential dominant factor was education level with OR = 22,077 and sig. 0.00<0.05. This means that respondents who have a high school education level have a tendency to have a good compliance level of 22,077 times compared to respondents with a lower education level.

The results are inline with the research Harries et al., (2020) Education is the dominant factor in TB patient compliance. Therefore, education is a very important factor in the success of treatment, where

CONCLUSIONS AND SUGGESTIONS

In general, based on the results of the study, the level of compliance of respondents was mostly good as many as 179 people (68.6%), while low compliance was 82 people (31.4%). The results of the bivariate analysis showed that the factors that influenced the adherence of TB patients to OAT therapy were age, education level, employment status, marital status, location of residence and income level of respondents. The level of education as the dominant factor that has the most influence on compliance with OR = 22,077. This means that respondents who have a high school education level have a tendency to have a good compliance level

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the education level of respondents in this study is mostly high school as many as 81 people (31%) and is directly proportional to the level of compliance of the majority of respondents showing good compliance 179 people (68.6%).

Respondents with high school and undergraduate education levels will be easier to receive information, so that it will affect behavior towards a healthier direction, including compliance in the treatment process for the disease they are experiencing. Thus, the higher a person's education level, the better treatment adherence.

of 22,077 times compared to respondents with a lower level of education.

Health services are very important to continue to increase the knowledge of TB patients, not to give negative stigma to patients so that positive support is needed both from family and health services.

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