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Supporting Factors for Recovery of Tuberculosis Suffers in Kalumpang Health Center Working Area, Ternate City

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ABSTRACT

Background: Tuberculosis is an infectious disease that is the main cause of disease and one of the leading causes of death worldwide and an infectious disease caused by Mycobacterium tuberculosis germs so that it can cause airway disorders. The aim of the study was to analyze supporting factors for recovery of Tb sufferers.
Methods: This type of study is observational analytic research with case control approach. The number of samples were 148 participants for case group of 74 people and control group of 74 people. So total sample was 148 people with ratio of 1:1. Analysis of relationship by considering the Odds Ratio (OR) and Confidence Interval (CI).
Results: There was statistically insignificant relationship between adherence to taking medication and recovery of Tb sufferers with OR 0.669 (95% CI: 0.240-1.863). There was statistically significant relationship between availability of PMO and recovery of Tb sufferers with OR 0.476 (95% CI: 0.243-0.931). There was statistically significant relationship between availability of PMO and recovery of Tb sufferers with OR 0.451 (95% CI: 0.231-0.882). There is simultaneous significant relationship between compliance level, availability of PMO, and family support on recovery of Tb sufferers with 95% CI: 0.000.
Conclusion: Recovery rate of Tb is not only treatment for Tb sufferers, but supporting factors for recovery of Tb sufferers are very important and necessary so that there is need for continuous and sustainable health promotion to all groups in community.

Keywords: *Supporting factors; Recovery; TB sufferers; Ternate*

INTRODUCTION

The World Health Organization (WHO) states that Tuberculosis (Tb) in 2021 globally will be 10.6 million cases or an increase of around 600,000 cases from 2020 which is estimated at 10 million cases of Tb. Of these 10.6 million cases, there are 6.4 million (60.3%) people who have been reported and are undergoing treatment and another 4.2 million (39.7%) people have not been found / diagnosed and reported[1]. Tb sufferes are found in almost all countries, in all age groups of men and women[2]. Indonesia itself in 2020 is in the SECOND

(2nd) position with the highest number of TB sufferers in the world after India, followed by China, Philippines, Pakistan, Nigeria, Bangladesh and the Democratic Republic of Congo in sequence. The death rate from TB in Indonesia reached 150,000 cases (one person every 4 minutes), up 60% from 2020 which was 93,000 cases of death from TB. With a mortality rate of 55 per 100,000 population (Yayasan KNCV Indonesia, 2022).

Tuberculosis is an infectious disease that is leading cause of illness and one of the leading causes of death worldwide. Before coronavirus (COVID-19) pandemic, Tb was leading cause of death from single infectious agent, ahead of HIV/AIDS (World Health Organization, 2022). Tuberculosis is an infectious disease caused by germ Mycobacterium tuberculosis, also known as Bacteria Resistant to Acid (BTA), group of bacteria that can cause airway disorders known as Mycobacterium Other Than Tuberculosis (MOTT) which can sometimes interfere with diagnosis and treatment of Tb (Kementerian Kesehatan, 2020).

Assessing Tb treatment outcomes and identifying predictors is an important part of treatment process. Globally, treatment success rates are reported to be 83% (Worku, et al., 2018). Tb treatment aims to cure patients and prevent the spread of Tb infection and emergence of new drug-resistant strains, goals that are not achieved in many parts of the world due to variety of contributing factors (Naidoo, et al., 2017). The success of Tb cure is certainly influenced by several supporting factors, such as medication adherence, PMO availability, and family support.

The long duration of anti-Tb treatment poses significant challenges for Tb sufferers, particularly treatment non-adherence. Treatment lapses mainly occur at the time of completion of their treatment (Iribarren, 2013). Failure to complete anti-Tb treatment can lead to an increased risk of relapse, drug-resistant Tb, treatment failure, disease progression leading to complications and death, and continued transmission of infection (Van, et al., 2020; World Health Organization, 2010). Supervised treatment means helping patients to take Tb medications regularly and complete Tb treatment to ensure that healthcare providers provide appropriate care and are able to detect treatment interruptions. One example of supervised treatment is recording each dose of anti-Tb medication on the patient's medication card (Xu, et al., 2009). Recovery of Tb disease is influenced by family support. Attitude of family members can influence the patient's decision to stop or continue treatment or recovery (Xu, et al., 2017).

Family members, especially spouses, play very important role in encouraging, supporting, and supervising patients' treatment for recovery (World Health Organization, 2019). Tb treatment coverage is one of ten priority indicators to achieve the End Tb Strategy goals, and has increased from 51% in 2013 to 70% in 2017 (World Health Organization, 2015; Torres, et al., 2019). This situation may be related to limited evaluation of treatment outcomes in resource-limited countries and presence of factors that influence Tb treatment outcomes. Complete Tb treatment outcome estimates are needed to improve Tb program management (Ministry of Health, 2023). The cure rate in terms of Treatment Coverage (TC) describes how many Tb cases are found and reached by Tuberculosis Control program compared to estimated Tb cases. Based on reported data, there was a decrease in TC in 2020 and 2021 but began to increase in 2022. In 2022 it was 52% of the 90% target (Ranganathan and Aggarwal, 2019).

In Ternate City, the number of pulmonary Tb cases is increasing every year. Although Health Center has a good community health program infrastructure, it cannot guarantee risk supporting factors recovery of Tb patients which greatly affect increase in prevalence rate of pulmonary Tb which is not optimal in Ternate City Government. One of strategic goals for reducing Tb is to increase the success rate of anti-Tb treatment in region, which can be improved through identification of factors that influence good outcomes, to guide implementation of preventive health measures in the population. Therefore, the aim of this study was to identify factors that influence successful anti-Tb treatment outcomes in patients at Kalumpang Health Center Working Area of Ternate City.

Problem of this study is lack of support for recovery of Tb sufferers, cause of this study is lack of family support for adherence to taking medication for patients with Tb. Judging from the title, this is the first time it has been studied in Kalumpang Health Center working area, so researcher feels curious about problem of Tb in Ternate City and is interested and explores further to improve the recovery of Tb sufferers, as far as this research is expected to support recovery of Tb sufferers, so that prevalence rate of Tb in coming year tends to decrease Tb cases compared to previous years and cause death.

MATERIALS AND METHODS

This type of study is observational analytic study with case control approach. In analytic observational study, researchers try to establish relationship between exposure and outcome. analytic observations are usually used to test hypotheses or theories that have been formulated by researchers. The study uses primary data which aims to obtain information about relationship between family support factors and recovery of Tb patients. This study begins by identifying families with Tb patients. Then population in this study were all families suffering from Tb recorded in Kalumpang Health Center working area in Ternate City. From the results of calculation, sample size were 148 participants in Kalumpang Health Center working area in Ternate City. Analysis of relationship by considering the Odds Ratio (OR) and Confidence Interval (CI). From the results of calculation it is known that sample size in the study was for case group of 74 people and control group of 74 people. So the total sample was 148 people with a ratio of 1: 1.

RESULTS

Characteristics of participants

The characteristics of participants in this study were seen from age, gender, education level and occupation, drug compliance, availability of medication supervisors (MS), husband support, recovery and family of TB sufferers, husband support that always provides recovery level, and family of TB sufferers Table 1.

Table 1. Distribution of Participant Characteristics

Variable	Frequency	Persentage (%)
Age		
10-20 years	31	20,9

Variable	Frequency	Persentage (%)
21-30 years	35	23,6
31-40 years	23	15,5
41-50 years	22	14,9
≥ 60 years	37	25,0
Gender		
Male	103	69,6
Female	45	30,4
Education		
No school	62	41,8
Elementary school	47	31,8
Junior high school	2	1,4
Senior high school	37	25,0
Work		
Civil servant	34	23,0
Retirement	6	4,1
Privat enterpreneur	80	54,1
Housewive	28	18,9
Medication adherence		
No-compliant	131	88,5
Compliant	17	11,5
Available of medication supervisor		
Unavailable	89	60,1
Available	59	39,9
Family support		
Not good	88	59,5
Good	60	40,5
Recovery		
No-recovery	129	87,2
Recovery	19	12,8

Data Primer, in 2023

Based on Table 1, it is known that the age of participants is mostly at ≥ 60 years by 25.0%, and the most age is 10-20 years by 14.9%. Majority of participants were male (69.6%) and female (30.4%). Education level of participants was mostly out of school at 41.9%, followed by elementary school at 31.8%, high school at 25.0%, and junior high school at 1.4%. participants were mostly self-employed at 54.1%, followed by civil servants at 23.0%, unemployed at 18.9%, and retired at 4.1%.

Distribution of medication adherence was mostly non-compliant at 88.5% compared to those who were compliant with medication at 11.5%. Availability of MS was greater at 60.1% compared to having MS at 39.9%. The majority of family support was unfavorable at 59.5% compared to unfavorable at 40.5%. Majority of TB sufferers did not recover by 87.2% compared to those who recovered by 12.8%.

Table 2 Recovery Rate of TB Sufferers

Variable	TB Sufferers
No-recovery	62
Recovery	12

Data Primer, in 2023

Table 2 shows that participants who suffer from TB who do not recover from TB disease (62 participants) are more than participants who recover from TB disease (12 participants). Relationship between Supporting Factors and the Recovery of TB Sufferers.

Supporting Factors for the Recovery of TB Sufferers

The analysis in this study tested with the chi square test can be seen in Table 3.

Table 3. Relationship between Supporting Factors for TB Sufferers

Variable	Tb Sufferers		Total	*P*	OR 95% CI
	Suffering TB	No.-suffering TB			
Medication adherence	64	67	131	0,607	0,669
No-adherence	10	7	17		0,240-1,863
adherence					
Available MS					
No-available	38	51	89	0,044*	0,476
available	36	23	59		0,243-0,931
Family support					
Not good	37	51	88	0,029	0,451
good	37	23	60		0,231-0,882

***Significant probability value (p < 0.05) from Chi Square test

Data Primer, in 2023

The results of analysis of Table 3 show that: a) there is statistically insignificant relationship between adherence to taking medication on recovery of Tb sufferers with p value of 0.607 and OR 0.669 (95% CI: 0.240-1.863) meaning that there is no relationship between adherence to taking medication 66.9 times greater to recovery of Tb sufferers. In participants who Tb suffered, majority were not compliant with taking medication (64 participants) compared to participants who were compliant with taking medication (7 participants). Not much different from participants who did not Tb suffer, which was more likely to choose not to adhere to taking medicine (67 participants) than those who chose to adhere to taking medicine (7 participants); b) there was statistically significant relationship between availability of MS and recovery of Tb sufferers with p value of 0.044 * and OR 0.476 (95% CI: 0.243-0.931), meaning that there was 47.6 times greater relationship between

availability of MS and the recovery of Tb sufferers. In participants who Tb suffered, there were no MS (38 participants) slightly more than participants who had MS (7 participants). However, it was much different with participants who did not Tb suffer, namely more preferring no MS (51 participants) than those who chose MS (23 participants); c) there is statistically significant relationship between availability of MS and recovery of Tb sufferers with p value of 0.029 * and OR 0.451 (95% CI: 0.231-0.882) meaning that there is 45.1 times greater relationship between family support and recovery of Tb sufferers. In participants who Tb suffered lacking good family support (37 participants) was the same as participants who had good family support (37 participants). But it is much different from participants who do not Tb suffer, namely more family support that is less good (51 participants) than those who have good family support (23 participants).

Supporting Factors for the Simultaneous Recovery of TB Suffers

Analysis used is binary logistic regression which aims to determine the relationship between recovery of TB sufferers who always provide MS availability, family support, and recovery rate. Results of analysis can be seen in Table 4.

Table 3 Logistic Regression Analysis Model of Supporting Factors Recovery of TB Sufferers

Variable	B	S.E	Wald	df	P value	Exp(B)	95% CI
Medication adherence level	-20.772	40192.876	0,000	1	1,000*	0,000	0,000
Available MS	21.582	40192.876	0,000	1	1,000*	2360037588	0,000
Family Support	21.582	28420.737	0,000	1	0.999*	2360037527	0,000

*= p < 0.05; ***= p < 0.001

Data Primer, in 2023

Based on table 4, it shows that there is a significant relationship simultaneously, namely compliance level, the MS availability, and family support for the recovery of TB sufferers with 95% CI: 0.000.

DISCUSSION

Study that has been conducted on 148 participants in families of TB sufferers and families not Tb sufferer with ratio of 1: 1 in Kalumpang Health Center Working Area of Ternate City. This study shows supporting factors for recovery of Tb sufferers in Kalumpang Health Center Working Area of Ternate City. The supporting factors studied were compliance with taking medication, MS availability, family support, and recovery rate.

In this study, medication adherence did not have significant relationship with Tb sufferers. However, results of the study are not in line with several other studies showing that

there is relationship between medication compliance and recovery in pulmonary tuberculosis patients (Apriliyasari, Wulandar, and Purnanto, 2014; Syafakamila and Purbowati, 2022; Yoni, Juniarti, and Lukman, 2022). In fact, patient medication compliance is strongly influenced by several factors of public dissatisfaction with health services provided, such as: inconsistent service hours, discriminatory services, unclean facilities and environment, and lack of in-depth information about TB (Probandari, 2010). Patients who are not adherent to treatment will stop treatment by themselves. This will increase the prevalence of bacterial resistance to MTB, which is high and requires a longer cost and duration of treatment (Munro, et al., 2007; Ivers and Cullen, 2011). Poor treatment adherence means that people with Tb will continue to suffer from TB for longer and will be more likely to relapse and even die. It also results in Mycobacterium tuberculosis becoming drug-resistant (Kassim, et al., 2021).

This study shows that MS availability has significant relationship with recovery of TB sufferers. This study supports previous research which shows that majority of medication swallowing supervisors perform their role well and have significant correlation with recovery of TB patients (Selasa, et al., 2022). Other studies have also shown that TB medication swallowing supervisors (MS) by conducting home visits have positive correlation in monitoring and evaluating patient treatment so as to increase recovery of TB patients. And this study also illustrates that frequent visits by TB cadres have positive impact on high recovery rate of TB patients. This is evidenced by the high number of negative BTA results (Boy, 2015). Another study also showed that adherence to taking medication had significant relationship with recovery of TB patients (Khairunnisa, 2019). Home visits to conduct supervised medication swallowing interventions that are carried out regularly to patients visited, they will have positive motivation to take complete medication and improve their adherence to treatment. Direct supervision of TB medication swallowing aims to ensure TB patients take anti-tuberculosis drugs without missing any (Santika and Hisyam, 2014).

This study also shows that family support has significant relationship with recovery of TB sufferers. This study supports previous research which shows that collaboration model between family support and health workers has an impact on clean living behavior that supports recovery (Stang, et al., 2023). TB patients generally have psychological burden in the form of fear of treatment failure and lack of confidence to recover from their illness, which hinders their compliance in undergoing treatment for recovery (Theron, et al., 2015). However, constant encouragement and attention from family can boost patient's self-confidence, and thus, influence patient's treatment adherence. During illness, family members who will help solve problems in their lives have no effect on adherence. Some experts believe that when intervening in patient adherence, what matters is whether the patient feels supported by family (Liu, et al., 2015). Researchers believe that family is the closest and most understanding person to patient, when family member is sick, other family members will definitely provide positive support for patient to recover. Sense of empathy that families have for fellow family members is very high compared to other people, this causes the sense of empathy to encourage families to provide full support to sufferers, especially because drug-resistant TB requires long treatment.

Supporting factors for recovery of TB sufferers, namely compliance level, MS availability, and family support simultaneously have significant relationship to recovery of Tb

sufferers. Recovery rate of TB sufferers in this study was very low compared to Tb sufferers who recovered. This shows that several supporting factors for recovery for Tb sufferers are very important and mutually sustainable. This study shows that more than 50 percent of Tb sufferers do not recover. North Maluku itself in 2022 the success rate of TB treatment (83.6%) is still below the national target (90%). Indonesian Ministry of Health has developed an Elimination Roadmap in accordance with global target in 2030 with incidence falling 80% to 65 per 100,000 population and mortality falling to 6 per 100,000 population with efforts to increase the coverage of tuberculosis discovery and treatment ≥ 90, tuberculosis treatment success rate ≥ 90% and tuberculosis prevention therapy (TPT) ≥ 80% (Kementerian Kesehatan, 2023).

CONCLUSION

The cure rate of TB is not only treatment for TB sufferers, but support for recovery of TB sufferers is very important and necessary so that there is need for continuous and sustainable health promotion. Health promotion is not only targeting TB sufferers, but also must target family and surrounding community. Health promotion related to TB prevention needs to be improved again considering that recovery rate of Tb sufferers is still low.

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CONFLICT OF INTEREST

This study did have conflict of interest.

ETHICAL CLEARANCE

This study was approved by the Health Research Ethics Committee Dr. Moewardi General Hospital RSUD Dr. Moewardi. (Num. 2.103/XI/HREC/2023).

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