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Research

Risk Characterization of Treatment Histories and Comorbidities Regarding Tuberculosis Treatment Status in West Sumatra Province 2020-2021

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A B S T R A K

Background: Tuberculosis (TB) is known as the main killer among bacterial infectious diseases in the world and Indonesia ranks 2nd in the country with the highest TB burden. Treatment history and comorbidities of TB disease greatly determine the appropriateness of therapy and the duration of treatment that will be given to patients. The aim is to determine the factors associated with the incidence of first molar caries. This research is an analytic study with a case control design with a retrospective cohort method. Total samples were 161 RO TB patients and 161 SO TB patients. Statistical test of this study using R Software and R Studio. In this study there was a relationship between gender (p-value 0.006 and OR 1.89), contact investigation (p-value 0.001 OR 0.23), new TB (p-value 0.001 OR 0.05), TB recurrence (p-value 0.001 OR 19.0), TB failed treatment (p-value 0.007 OR 16.4) and pH-saliva (p-value 0.0001 POR 21.250) with TB patient treatment status. Meanwhile risk factors such as dropout, Diabetes Mellitus and HIV were not related to TB treatment status (p-value >0.05). Multivariate analysis of age, investigation of contacs TB recurrence were the dominant factors associated with TB treatment status. So it can be concluded that there are several factors that influence including gender, history of treatment (new TB, Relapsed TB, Failed TB) on TB treatment status in West Sumatra Province and these factors are important factors that must be considered and asked by TB officers at health facilities before the patient carries out an examination of suspected samples and information to provide appropriate medical therapy to TB patients in health facilities in the Province of West Sumatra

INTRODUCTION

Health issues, particularly in Indonesia, can result in extremely complex medical, social, economic, and cultural issues. To protect public health, reduce morbidity and mortality, halt transmission, and prevent OAT-resistance, the management of tuberculosis prioritizes promotive and preventative aspects over curative and rehabilitative ones (9). The treatment history of tuberculosis is also essential for determining the severity of TB disease in a person's body. There are multiple criteria for TB SO, including a history of treatment, TB relapse, TB drug failure, and discontinuation of TB treatment. In contrast, for TB RO patients, nine criteria have been established to determine which treatment regimen will be prescribed so that drug resistance does not develop beforehand. RO TB patients must also undergo an EKG, culture examination, LPA, and C-DST to determine drug sensitivity in the TB patient's body. This differs from SO TB patients, who only conduct fundamental examinations.

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Other risk factors, such as Diabetes Mellitus (DM), can also increase the likelihood of contracting tuberculosis and even influence treatment outcomes. Diabetes Mellitus resulting in immunosuppression is increasingly recognized as a risk factor for tuberculosis. DM increases the risk of developing tuberculosis by a factor of two to three, as well as the risk of treatment failure, recurrence, and mortality (4). The risk of developing tuberculosis depends on the concentration of inhaled bacteria, the length of time since infection, and the age of a person with a compromised immune system, such as HIV/AIDS, which facilitates the development of Active TB. 10% of those contaminated with HIV who are also infected with tuberculosis will develop tuberculosis. But in HIV-positive individuals, the incidence of tuberculosis will increase. Those infected with HIV are 20-37 times more likely to contract tuberculosis than those without HIV; consequently, TB transmission in the community will increase. Without treatment, 50 percent of TB patients will perish, and this risk increases for HIV-positive patients. Similarly, 25% of PLHIV fatalities are caused by tuberculosis (9)

According to WHO data, the estimated number of persons diagnosed with tuberculosis worldwide in 2021 is 10.6 million, an increase of approximately 600,000 cases from 2020's estimated 10 million cases. Of the 10.6 million cases, 6.4 million (60.3%) had been recorded and were receiving treatment, while 4.2 million (39.5%) had not been discovered/diagnosed and reported. According to the World Health Organization's (WHO) Global TB Report (7), Indonesia will be the second-largest contributor of tuberculosis (TB) patients after India in 2022, with 969,000 cases, or 350 per 100,000 population. (7) In 2019, West Sumatra Province recorded 11,115 TB cases (53%) while in 2020, there was a decrease of 6384 cases (27%), of which 5622 were in adults and 748 in children, with Padang City having the maximum number of cases with 1,662 (32%) cases. (3) Inadequate health services hinder the government's efforts to eradicate tuberculosis, which has become the focus of TB treatment. SDGS intends to eradicate tuberculosis by 2030 given current conditions Indonesia has surpassed India as the nation with the most TB cases. Therefore, Indonesia strives to provide optimal TB health services in multiple regions, even during a pandemic. Consequently, the purpose of this study was to assess the risk characterization of treatment history and comorbidities on tuberculosis (TB) treatment status in West Sumatra Province in 2020-2021.

METHOD

This investigation is an analytic case-control study using the retrospective cohort method. This investigation was conducted in the province of West Sumatra. The sampling technique utilized in this study is a straightforward random sampling technique. This study's population consisted of all TB SO and RO TB patients diagnosed in 2020 and 2021, a total of 14795 individuals. This study's sample size was determined according to the Adequacy of sample size in Health Studies. In this investigation, 161 TB RO patients and 161 TB SO patients served as samples. This study utilized the sample formula for Adequacy of Sample size in health investigations. Inclusion criteria for the cases in this research were all patients who tested positive for TB RO in West Sumatra Province in 2020 and 2021, while exclusion criteria were incomplete TB data (no treatment history and comorbidities). Inclusion criteria for the controls in this analysis included TB SO patients who were recorded at SITB in 2020-2021, while exclusion criteria included incomplete TB data (no treatment history) and comorbidities. In January of 2023, this investigation was conducted in the province of West Sumatra. The instrument for research utilized secondary data obtained from the online TB information system. The analysis of data employed univariate, bivariate, and multivariate methods. This statistical research test employs R Software and R Studio.

RESULT DAN DISCUSSION

1. Characteristics of Risk Factors Based on TB Treatment Status in West Sumatra Province in 2020-2021

In this study, TB treatment status was the dependent variable, while the independent variables were age, sex, Investigation of Contacts, New TB, Relapsed TB, Failed TB, Dropped Out TB, Diabetes mellitus, and HIV. The distribution of these variables is shown in the following table.

Table 1. Characteristics of Risk Factors Based on TB Treatment Status in West Sumatra Province in 2020-2021

Variable	**TBC RO**, N = 161[1]	**TBC SO**, N = 161[1]
Gender		
Male	111 (69%)	87 (54%)
Female	50 (31%)	74 (46%)
Age		
Children	2 (1.2%)	20 (12%)
Adult	159 (99%)	141 (88%)
Investigation of contact		
Yes	64 (40%)	120 (75%)
No	97 (60%)	41 (25%)
The New TB		
Yes	76 (47%)	153 (95%)
No	85 (53%)	8 (5.0%)
Relapse TB		
Yes	61 (38%)	5 (3.1%)
No	100 (62%)	156 (97%)
Drug Failed TB		
Yes	15 (9.3%)	1 (0.6%)
No	146 (91%)	160 (99%)
TB Discontinued Medication		
Yes	9 (5.6%)	2 (1.2%)
No	152 (94%)	159 (99%)
Diabetes mellitus		
Positive	10 (6.2%)	10 (6.2%)
Negative	21 (13%)	43 (27%)
Unknow	130 (81%)	108 (67%)
HIV		
Positive	1 (0.6%)	1 (0.6%)
Negative	17 (11%)	31 (19%)
Unknow	143 (89%)	129 (80%)

[1]n (%); Median (IQR)

Table 2. Relationship between Age, Gender, Contact Investigations, Treatment History and Comorbidities on TB Treatment Status in West Sumatra Province in 2020-2021

Variabel	TBC RO	TBC SO	Total	OR	95% CI	P Value
Umur						
Anak-anak (0-14 Thn)	2 (1,2%)	20 (20%)	22 (21.2%)			
Dewasa (< 15 Thn)	159 (99%)	141 (88%)	300 (187%)	0,09	0.01 – 0.31 –	0.001
Jenis Kelamin						
Laki-laki	111 (34%)	87 (27%)	198 (61%)	1,89	1.20 – 2.99	0.006
Perempuan	50 (16%)	74 (23%)	124 (39%)			
Investigasi Kontak						
Tidak	64 (20%)	120 (27%)	184 (57%)	0,23	0. 14 – 0.36	< 0.001
Ya	97 (16%)	41 (13%)	138 (43%)			
TB Baru						
Ya	76 (24%)	153 (48%)	229 (71%)	0,05	0. 02 – 0.10	< 0.001
Tidak	85 (26%)	8 (2.5%)	93 (29%)			
TB Kambuh						
Ya	61 (19%)	5 (1.6%)	66 (20%)	19.0	8.11 – 55.9	< 0.001
Tidak	100 (31%)	156 (48%)	256 (80%)			
Gagal Pengobatan						
Ya	61 (19%)	5 (1.6%)	66 (20%)	16.4	8.11 – 55.9	< 0.007
Tidak	100 (31%)	156 (48%)	256 (80%)			
Putus Pengobatan						
Ya	9 (3%)	2 (1%)	11 (3.4%)	4.71	1.19 – 31.2	0.050
Tidak	152 (47%)	159 (49%)	311 (97%)			
Diabetes Melitus						
Positif	10 (3%)	10 (3%)	20 (6%)	2.05	0.73 – 5.76	0.2

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Negatif	21 (7%)	43 (13%)	64 (20%)			
Tidak Diketahui	130 (50%)	108 (34%)	238 (74%)			
HIV						
Positif	10 (0.3%)	1 (0.3%)	2 (0.6%)	1,82	0,07-48,1	0,7
Negatif	17 (5.3%)	31 (9.6%)	48 (15%)			
Tidak Diketahui	143 (44%)	129 (40%)	272 (84%)			

Table 3. Final Models

		Bivariate			Multivariate		
Variabel	**N**	**OR**[1]	**95% CI**[1]	**p-value**	**AOR**[1]	**95% CI**[1]	**p-value**
Investigasi Kontak							
Tidak	322	0.23	0.14, 0.36	<0.001	0.33	0.19, 0.56	<0.001
Ya							
TB Baru							
Ya	322	0.05	0.02, 0.10	<0.001	0.06	0.03, 0.13	<0.001
Tidak							
Umur Katagori	322	0.09	0.01, 0.31	0.001	0.16	0.02, 0.61	0.020
Anak-Anak							
Dewasa							

[1]OR = Odds Ratio, CI = Confidence Interval

2. Characterization of Respondents' Risk of Tuberculosis Treatment Status in the Province of West Sumatra in 2020-2021

a. Gender

Gender is the difference in form, nature, and biological function between men and women, which determines the difference in their roles in preserving the lineage. This difference occurs as a result of their reproductive organs, which enable them to produce unique progeny. This factor significantly affects the treatment status of tuberculosis patients (4). On the basis of the results of the univariate study, it was determined that, out of a total sample of 161 TB RO patients and 161 TB SO patients, 111 RO TB patients (89%) were male, followed by 50 patients (31%) who were female. Compared to the 161 TB SO patients, 54% of the 87 SO TB patients were male and 46% were female. Based on the research conducted, it was determined that more than half of the male TB RO patients were comparable to the female TB SO patients studied, more than half of the female TB SO patients.

b. Age

Age is the duration of a person's existence and can be measured using units of time in terms of chronology. Normal individuals display the same level of anatomical and physiological development regardless of age. Age is also the duration of a person's life or existence. Age also requires and effects the status of tuberculosis treatment because it determines TB patients' susceptibility, particularly in the elderly.

On the basis of the results of the univariate study, it was determined that, out of a total sample of 161 TB RO patients and 161 TB SO patients, almost all of them were adults (99%), followed by only two minors (1.2%). Similarly, TB SO affects nearly all adults 141 (88%) and children up to 12 (12%). Based on the results of the conducted research, it was determined that almost all TB patients, both RO and SO TB, infect adults rather than children; therefore, it can be stated that TB disease is more prevalent and dominant in adults due to their greater mobility and exposure to a greater number of people than children.

c. Investigation of contact

The objective of contact investigation (IK) is to increase the detection of tuberculosis cases through the early and systematic identification of individuals who have had contact with the source of TB infection. This contact investigation activity has a significant impact on the reduction of tuberculosis incidence because it can decrease transmission rates among at-risk populations, particularly families. The investigation of these contacts is conducted

on household contacts and close contacts of TB patients, especially if the TB RO patient is extremely dangerous, the severity of the disease, and especially if the infected are minors.

Based on the results of the univariate study, an overall picture was derived indicating that, out of a total sample of 161 TB RO patients and 161 TB SO patients, 97 RO TB patients (60%) underwent contact investigations only and 64 patients (40%) did not undergo contact investigations. Unlike the 161 TB SO patients, 120 TB SO patients (75%) did not undertake contact investigations, followed by 41 patients (25%) who underwent contact investigations only. This study revealed a relatively high number of TB RO and TB SO patients who did not conduct contact investigations, posing a problem that needed to be addressed by identifying the factors that led to the lack of contact investigations in TB RO and SO patients. Based on the findings of the conducted research, it was determined that more than half of the TB RO patients who underwent contact investigations were inversely proportional to the TB SO patients studied, more than half of the TB SO patients who did not conduct contact investigations. The results of this study are supported by research conducted by Fitriani (2013), which found that more than half of the study sample did not conduct contact investigations regarding the contact history of these TB patients.

d. Risk Characteristics of Previous TB Treatment

Patients who have never received TB treatment or have taken anti-tuberculosis medications for less than one month (of 28 doses) are considered new TB patients. This TB patient has never been exposed to TB before, but is now afflicted due to unknowingly coming into contact with a TB patient. In addition, this new TB case has a close relationship with the status of TB treatment in order to assess and analyze the dissemination of TB cases in the community, including both RO TB and SO TB.

The majority of the 161 cases of RO TB, or 53%, were not new patients, according to this study, whereas 47% of RO TB patients were newly diagnosed. In contrast to the 161 TB SO patients, the majority of the 153 SO TB patients (95%) were new TB patients, while only eight patients (5%) were not new TB patients. According to research conducted by Lilia Damayanti in 2022 (2), 32 out of 48 respondents were newly diagnosed TB patients. In addition, according to a study conducted by Manggasa (2022), 81.2% of TB SO patients were newly diagnosed TB patients.

The treatment history of tuberculosis (TB) patients plays a significant role in determining the regimen to be administered to patients, as TB drugs vary and there are numerous types, particularly if a TB patient who is already resistant requires a more in-depth examination to determine the drug sensitivity of the TB patient.

Relapsed patients are tuberculosis patients who have been declared cured or who have completed treatment and who are currently diagnosed with tuberculosis based on the findings of a bacteriological or clinical examination (either due to a true relapse or reinfection).

In this study, of the 161 cases of RO TB, 100 patients (62%) did not have a history of TB relapse, compared to 61 (38%) TB RO patients who had a history of TB relapse; this was similar to the 161 TB SO patients, the majority of whom did not have a history of TB relapse, 156 (97%) compared to 5 (31%) TB SO patients who had a history of TB relapse. This is consistent with research conducted by Lilia Damayanti in 2022 (2), which indicates that in the Productive Age, where the status of relapse TB treatment is not too dominant, new TB patients are new TB patients because they are infected by individuals with resistant or sensitive TB pathogens. The level of patient communication and candor can also influence the treatment status of tuberculosis (TB) patients, as the information extracted or the patient's RM will reveal whether this TB patient is newly afflicted or has been previously treated.

Patients who are being treated again after failing are TB patients who have previously been treated and whose last treatment was deemed unsuccessful. This is also influenced by the level of medication adherence of TB patients and the function of the PMO. If the medication is not taken regularly or at all, the results will be visible in the monitoring of TB patients' treatment.

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The results of this study revealed that the majority of the 161 cases of TB RO did not have a history of drug failure, as 146 patients (91%) did not, compared to 15 patients (9.3%) with a history of failed treatment.

This research is consistent with the findings of manggasa 2020 (12) and Lilia Damayanti 2022 (2), who discovered that the majority of TB patients who did not have a history of drug failure were new TB patients. This contradicts the results of a study conducted by Nurmala 2020 (15) in Kupang, which found that more TB patients had failed treatment. TB patients who had failed treatment based on the results of smear tests or cultures did not experience conversion after the intensive stage of treatment.

Patients who were treated again after treatment discontinuation (lost to follow-up) were previously treated patients who were declared lost to follow-up. (This classification was previously known as treatment of patients after default). This treatment history determines which treatment regimen will be administered and which examinations must be performed, as patients with tuberculosis who cease taking these medications require special care.

In this study, out of 161 cases of TB RO, the majority did not discontinue TB treatment as much as 152 (94%) versus 9 (5.6%) TB RO patients who stopped taking their medications.

This is in contrast to research conducted by Nurmala 2020 and Nugi 2020 (15), which found that only 12.5% and 17.1% of respondents did not experience treatment discontinuation and more confirmed new TB cases.

e. Characterization of Comorbidity Risk on Tuberculosis Treatment Status in the Province of West Sumatra in 2020-2021

Diabetes mellitus is a risk factor for tuberculosis and can affect the disease's presence and response to treatment. TB can also induce glucose intolerance and worsen diabetics' glycemic control. The convergence of the two epidemics is most likely to occur in regions where health resources are scarce and the incidence of diabetes is rising globally, particularly in developing nations where tuberculosis is most prevalent and where health resources are scarcest. Diabetes is an independent risk factor for all infections of the lower respiratory tract. It is estimated that diabetes multiplies the risk of tuberculosis by 1.5-7.8. DM also has a significant impact on the treatment status of tuberculosis patients, as DM patients require a significantly longer recuperation period than other TB patients.

In this study it was found that there were 130 (81%) cases of TB RO, most of them had no known history of diabetes mellitus (dm), namely by distribution, compared to tuberculosis patients with a known history of diabetes mellitus (dm) 31 (19.2%), whereas of the 161 cases of tuberculosis, most also had no known history of diabetes mellitus (dm), namely with a frequency distribution of 108 (67%) than TB patients with known history of diabetes mellitus (DM). This is consistent with the findings of Manggasa 2022 (12) and Nurwanti 2016 (16), who discovered that the majority of respondents had a diabetes history that was unknown both before and during treatment because many refused to be examined or have their blood extracted.

HIV infection facilitates the progression of latent TB infection to active TB disease. This situation unquestionably raises a number of new issues that require greater and more serious consideration from multiple parties. Regarding the diagnosis and treatment of TB-HIV co-infection, attention must be paid to the distinctions in clinical manifestations and drug administration guidelines. Better coordination is required to control cases of TB-HIV co-infection; the TB-HIV program must be coordinated to prevent HIV in TB patients, prevent TB in HIV patients, examine patients and contacts (TB and HIV), coordinate treatment and drug supply, and manage the resulting impacts.

In this study, out of 161 cases of RO TB, the majority of patients with unknown HIV status were 143 (89%) versus 18 TB RO patients who knew their HIV status. Similarly, the majority of TB SO patients with unknown HIV status were 129 (80%) versus 32 TB SO patients who knew their HIV status.

This is consistent with research conducted by Ni'mal 2019 which found that more than half of respondents, or 93.3%, were unaware of their TB treatment history or HIV status. HIV infection influences the incidence of tuberculosis. This is due to the fact that HIV-positive individuals have inadequate or diminished immunity, making them susceptible to other diseases, including tuberculosis.

3. Relationship between Age, Gender, and Characterization of Contact Investigation Risk on Tuberculosis Treatment Status in the Province of West Sumatra in 2020-2021

a. Relationship between Gender and Status of TB Treatment

The p-value from the bivariate analysis was 0.00006, indicating that there is a correlation between gender and TB treatment status in the West Sumatra Province. Based on the OR value of 1.89, it was determined that males were 1.89 times more likely to be treated for tuberculosis.

The results of this study are consistent with Jyothi's 2018 research, which demonstrates, with a p-value of 0.001, that gender is associated with the risk of developing pulmonary tuberculosis. Manik Parmelia 2019 (16) found, however, that there is no correlation between gender and the incidence of drug cessation among pulmonary TB patients at the Denpasar City Health Center. In the bivariate analysis, however, men had a 3.4 times greater risk of discontinuing TB treatment than women (OR=3.4, p=0.034).

Gender is the characteristic that distinguishes between men and women in a population where some individuals are at risk and others are not. This variable is also highly influential in a number of studies examining the relationship between a disease and tuberculosis; moreover, TB disease is readily transmitted via air or droplets alone.

b. Relationship between TB Treatment Status and Contact Investigation

The p-value from the bivariate analysis was 0.001, indicating that there is a correlation between contact investigations and TB treatment status in West Sumatra Province. Based on the OR value of 0.14, it was determined that the risk of TB treatment status was 0.14 times greater for contact investigations.

This study's findings are consistent with those of Fitriani's 2013 study (6), Risk Factors Associated with the incidence of pulmonary tuberculosis (a case study at the Keuntungan Health Center, Brebes Regency, 2013), which found that a history of contact with tuberculosis patients increased the risk of developing the disease by a factor of 5,429 times. This research is also consistent with FKM UI research regarding risk factors associated with the incidence of tuberculosis in Indonesia Fitriani, 2020 (6). This is also consistent with a study conducted by Begna (2014) (1) in South East Ethiopia, where contact with active TB patients was associated with a 2.40-fold increased risk of developing tuberculosis (Hogan et al., 2020).

The objective of contact investigation (IK) is to increase tuberculosis case detection through the early and systematic detection of individuals in contact with the source of TB infection.

c. Medical history and TB treatment status correlation

The p-value of the bivariate analysis was 0.001, indicating that there is a correlation between novel TB and TB treatment status in West Sumatra Province. Based on the OR value of 0.05, it was determined that new TB cases were at a risk of TB treatment status that was 0.05 times greater.

The results of this study are consistent with research conducted by Lilia Damayanti in 2022 (2) regarding the status of Treatment Associated with the Incidence of Drug-Resistant Tuberculosis in Productive Age where the dominant status of RO TB treatment is new TB patients, indicating that the spread of RO TB cases is increasing and the majority of RO TB patients are primary (patients who have never taken TB drugs) (2). TB is reduced through the air and sputum splashes of coughing TB patients who do not conceal their mouths. If the air containing TB bacteria is inhaled, there is a chance that those nearby will contract tuberculosis; if the immune system is compromised, transmission will be facilitated. In addition, this study is consistent with research conducted by Manggasa 2022 (12)

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regarding the History of Treatment and Comorbid Diabetes Mellitus Associated with the Incidence of Drug-Resistant Tuberculosis, which states that TB disease can be contracted even if there is no history of prior treatment.

The p-value from the bivariate analysis was 0.001, indicating that there is a correlation between recurrent TB cases and TB treatment status in West Sumatra Province. Based on the OR value of 19.0, it was determined that having no history of tuberculosis recurrence increased the risk of TB treatment status by 19.0 times.

The findings of this investigation are consistent with previous research. This study is consistent with Damayanti's 2022 study (2) regarding the status of Treatment Associated with the Incidence of Drug-resistant Tuberculosis at a Productive Age, where the status of relapsed TB treatment is not too predominate and the highest number of patients is new TB patients infected by resistant or sensitive TB germs. This indicates that the spread of tuberculosis (TB) is increasing among the general population, especially among those who are in close contact with the disease at home and in close quarters, notably through the air and droplets (sputum splashes). (2)

The bivariate analysis yielded a p-value of 0.007, indicating that there was a correlation between TB cases that did not respond to treatment and TB treatment status in West Sumatra Province. Based on the OR value of 16.4, it was determined that not having a history of drug failure increased the risk of TB treatment status by 16.4 times.

The findings of this investigation are consistent with previous research. This research is also consistent with the research conducted by Manggasa 2022 (12) and regarding the History of Treatment and Comorbid Diabetes Mellitus Associated with the Incidence of Drug-Resistant Tuberculosis, which states that a person has contracted TB disease despite having no prior treatment history. Possibilities include a history of intimate contact with TB-related organisms and TB patients, as well as dishonesty on the part of TB patients in providing information regarding previous treatment (12). Similarly, research conducted by Lilia Damayanti 2022(2) regarding the status of Treatment Associated with the Incidence of Drug-Resistant Tuberculosis in Productive Age, which concluded the same thing, supports this conclusion.

This study, however, differs from research conducted by Nurmala 2020 (15) regarding the relationship between history of tuberculosis treatment and incidence of multidrug-resistant tuberculosis (MDR TB), which states that more TB patients have failed treatment because TB patients have failed treatment based on the results of smear smears or cultures that have not converted after the intensive stage of treatment, but there are also some patients who require more time so that treatment can be completed.

In West Sumatra Province, the bivariate analysis yielded a p-value of 0.059, indicating that there was no correlation between TB cases opting out of treatment and TB treatment status. Based on the OR value of 4.71, it was determined that the risk of TB treatment status was 4.71 times greater for individuals with no history of TB treatment discontinuation.

This study differs from the research conducted by Nurmala in 2020 (15) and Nugi in 2020 (analysis of individual risk factors for multidrug-resistant tuberculosis) in South Sumatra Province, which concluded that TB patients who had discontinued treatment were 13.8 times more likely to develop RO. Therefore, health workers at puskesmas administering TB programs must always obtain comprehensive information from TB patients seeking treatment at health facilities. (14)

d. Relationship between TB Treatment Status and Comorbidity

In West Sumatra Province, the bivariate analysis yielded a p-value of 0.2, indicating that there was no correlation between Diabetes Mellitus and TB treatment status. Based on the OR value of 2.05, it was determined that males with Diabetes Mellitus are 2,05 times more likely to be treated for tuberculosis.

The findings of this investigation are consistent with previous research. This study is consistent with the research conducted by Manggasa 2022 (12) regarding the History of Treatment and Comorbid Diabetes Mellitus

Associated with the Incidence of Drug-Resistant Tuberculosis and Nurwanti's Research 2016 (16), which found that the majority of both cases and controls did not have diabetes mellitus after being declared cured. Diabetes mellitus is an independent risk factor for all lower respiratory tract infections, according to research conducted by Rosdiana (2017) (17) on drug-resistant pulmonary tuberculosis in patients with diabetes mellitus. DM also increases the risk of tuberculosis by 1.5 to 7.8 times compared to those without DM. In addition, the increased prevalence of diabetes is a challenge in TB control, as is the difficulty in controlling blood sugar levels in patients with both diabetes and tuberculosis (16).

The p-value from the bivariate analysis was 0.t, indicating that there was no correlation between HIV and TB treatment status in the West Sumatra Province. Based on the POR value of 1.82, it was determined that not knowing HIV status increased the risk of TB treatment by 1.82 times.

This research is consistent with Trivialto 2021 regarding Risk Factors Affecting Multidrug-Resistant Tuberculosis (MDR TB), which states that HIV infection status is a factor that influences the occurrence of TB.

This study is consistent with research conducted by Muna 2019 (13) on the Determinants of Tuberculosis Occurrence in People with HIV/AIDS, which states that the relationship between these two diseases is related to the immune system, which is responsible for combatting infection. HIV is a virus that can weaken the immune system, which makes it easier for other infections to infiltrate the body. In addition, HIV causes injury to the immune system, particularly in those with opportunistic TB infections (13).

4. Final Risk Characterization Model of Treatment History and Comorbidity on TB Treatment Status

Logistic regression analysis was used to conduct a multivariate analysis. The purpose of this analysis is to elucidate the effect of multiple independent variables on the dependent variable. Multivariate analysis begins with the selection of variables for inclusion in the analysis, specifically variables with a p value 0.25.

The analysis results demonstrate a comprehensive multivariate analysis model. Age, Contact Investigation, and Recurrence of TB emerged as the most influential variables on TB treatment status in West Sumatra Province after analyzing the candidate variables. Risk of influencing TB treatment status is 0.09 times higher for adult age, 0.23 times higher for contact investigations, and 0.05 times higher for a history of recent TB treatment.

CONCLUSION

Based on the findings of a study involving 161 TB RO patients and 161 SO TB patients, the following conclusions were drawn about the Characterization of Risk of Treatment History and Comorbidities on TB Treatment Status in West Sumatra Province in 2020-2021: Based on the findings of a study conducted on 322 TB patients in the province of West Sumatra, the majority of respondents were adult males. The majority of contact investigation activities do not involve TB patients. Risk factors based on treatment history revealed that the majority of TB RO treatment status were not new patients, relapsed TB cases, drug failure TB cases, or drug withdrawal TB cases, and that the majority of patients were unaware of their comorbid DM and HIV status. Statistical evaluations revealed a correlation between age, gender, Contact Investigation, and tuberculosis treatment status in West Sumatra Province in 2020-2021. History of treatment (new TB, relapsed TB, TB drug failure and treatment discontinuation) is related to TB treatment status in West Sumatra Province in 2020-2021, but comorbidities (diabetes and HIV) are not. Age, contact investigations, and new TB cases are the most influential independent variables influencing the status of TB treatment in West Sumatra Province in 2020-2021.

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