Research Article

FACTORS ASSOCIATED WITH THE RECOVERY OF PULMONARY TB PATIENTS IN THE TUBERCULOSIS PREVENTION AND CONTROL PROGRAM (P2P-TB PULMONARY) IN ACEH PROVINCE

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ABSTRACT

World Health Organization(WHO) has released a reportabouttuberculosis (TB)on a global scale in 2021, including a report on the state of TB in Indonesia in the Global Tuberculosis Report 2022 document. Healing of tuberculosis patients is the most expected outcome in treating this disease. The process of achieving recovery for tuberculosis patients is influenced by various factors, both originating from the characteristics of the patient himself and the quality of the health services provided. Factors that can influence the recovery of tuberculosis patients include the type of bacteriology patient (BTA positive or negative), completeness of the treatment regimen undertaken, patient access and compliance with treatment, as well as the quality of monitoring and evaluation carried out by health workers. This study aims to determine the factors associated with the recovery of pulmonary TB patients in the P2P pulmonary TB program in Aceh Province.This research is a further analysis of secondary data from the SITB (Tuberculosis Information System) application. This type of research is descriptive analytic with a cross-sectional designquantitative approach.

Data analysis was carried out through univariate and bivariate stages.There is no relationship between age group and gender with the recovery of pulmonary TB patients in the P2P-Pulmonary TB program at the district level in Aceh Province (p>0.05), there is a relationship between the type of diagnosis and the recovery of pulmonary TB patients in the P2P-Pulmonary TB program at the district level. districts in Aceh Province (p<0.05). The factor associated with the recovery of pulmonary TB patients in the P2P-Pulmonary TB program at the district level in Aceh Province is the type of diagnosis.

KEYWORDS

Healing of TB Patients, Gender, Diagnosis Type.

INTRODUCTION

Tuberculosis is an infectious disease caused by the bacterium Mycobacterium tuberculosis. These germs spread from TB sufferers through the air. TB germs usually attack the lung organs and can also be outside the lungs (extra pulmonary). Nearly a quarter of the world's population is infected with Mycobacterium tuberculosis, around 89% of TB is suffered by adults, and 11% is suffered by children. To date, TB is still the highest cause of death after HIV/AIDS, and is one of the 20 main causes of death worldwide. Indonesia is ranked 3rd with the highest number of TB sufferers in the world after India and China. Globally, an estimated 9.9 million people suffered from TB in 2020(WHO, 2021)

TB can be suffered by anyone, of the total 10.6 million cases in 2021, at least 6 million cases are adult men, then 3.4 million cases are adult women and the other TB cases are children, namely 1.2 million cases. Deaths due to TB as a whole are also considered very high, at least 1.6 million people died from TB, this figure is up from the previous year, namely around 1.3 million people. There were also 187,000 people who died from TB and HIV. However, several countries have succeeded in reducing the TB burden from year to year (>20%), including Bangladesh (2020), Lesotho (2020 and 2021), Myanmar (2020 and 2021), Mongolia (2021) and Vietnam in 2021(WHO, 2022)

Apart from that, until now, many countries are still facing an increase in pulmonary tuberculosis cases, including Indonesia and it is one of the top 10 causes of death worldwide. Based on the End TB Strategy, it is estimated that in 2020 it can reduce the number of deaths due to TB disease by 35% and reduce the average TB incidence by 20%, compared to the incidence of TB cases in 2015, so it is estimated that the TB incidence will be reduced by 80% and reduce the ratio of TB cases. TB deaths will reach 90% by 2030(Hadifah et al., 2019).

The results of basic health research from the Indonesian Ministry of Health in 2018 stated that the prevalence of clinical pulmonary tuberculosis spread throughout Indonesia was 1.0%. Several provinces which have prevalence rates above the national figure are: Aceh, DKI Jakarta, Special Region of Yogyakarta, West Sumatra, Riau Islands, West Nusa Tengara, Nusa Tengara, South Sulawesi, Central Sulawesi and Eastern Indonesia.(Balitbangkes, 2018).

In 2018, the number of positive tuberculosis cases found in Indonesia was 431,876 cases, an increase compared to all tuberculosis cases found in 2017 in

Indonesia, which was 6,787 cases. The highest number of cases reported were in the provinces of DI Yogyakarta, DKI Jakarta and Central Java, North Sumatra and West Java. Tuberculosis cases in this province are around 43% of the total number of tuberculosis cases in Indonesia (Indonesian Health Profile, 2018).In 2021 the number of tuberculosis cases found was 397,377 cases, an increase compared to all tuberculosis cases found in 2020, namely 351,936 cases. The highest number of cases was reported from provinces with large populations, namely West Java, East Java and Central Java.

Tuberculosis cases in these three provinces account for 44% of the total number of tuberculosis cases in Indonesia. When compared by gender, the number of cases in men is higher than in women both nationally and provincially. Nationally, the number of cases in men is 57.5% and 42.5% in women(Ministry of Health, 2021).

Based on 2021 Aceh Health Profile data, the percentage of people suspected of tuberculosis receiving standard tuberculosis services in Aceh is 35.64%, with the number of suspected tuberculosis cases being 85,945 cases. The highest number of suspected Tuberculosis was North Aceh Regency with 4292 people, while the lowest was Sabang City with 35 people. The higher the number of suspected cases of tuberculosis, the greater the number of people diagnosed with tuberculosis, thereby reducing the spread of tuberculosis in the community. The regions with the highest CNR of all tuberculosis cases (per 100,000 population) are Bireuen Regency with 729 cases, Pidie 718 cases, North Aceh 671 cases, while the lowest district is Sabang City with only 18 cases. South Aceh Regency is ranked 8th with a total of 294 cases(Aceh Health Office, 2021).

The number of deaths during tuberculosis treatment was 257 cases (3.7%). The highest cases occurred in

Bireuen Regency with 49 cases and North Aceh Regency with 22 cases. Based on data, the number of pulmonary TB cases registered and treated in South Aceh Regency was 319 cases, of which there were 136 positive cases with a success rate of pulmonary TB. 12 people with a percentage of 8.8% and 258 people who carried out complete treatment with a percentage of 80.9% with the number of deaths during treatment being 13 people with a percentage of 4.1%(Aceh Health Office, 2021).

Based on the results of research conducted by Herryanto, et al, the history of treatment of pulmonary TB sufferers who died in Bandung Regency. Of the 132 pulmonary TB sufferers who died, 109 cases (82.5%) were stated to have received pulmonary TB treatment. Generally, the treatment that sufferers underwent was not completed, 90.1% (101 people) only 9.9% completed treatment. Most sufferers (50.4%) received treatment for 3-5 months before drug withdrawal occurred (Herryanto et al, 2003). Dropping out of treatment for Tuberculosis can be a health problem for individuals and society. This is because incomplete treatment of Tuberculosis can cause increased transmission, drug resistance, and even mortality(Merzistya & Rahayu, 2019).

Tuberculosis mostly attacks adults in the productive age range. But all age groups are at risk of developing pulmonary TB. In developing countries, more than 95% of cases and deaths occur. People with HIV have 18 times the risk of developing active TB. This risk is also greater in people with low immunity. People with malnutrition are 3 times more at risk. Globally in 2020 there were 1.9 million new TB cases caused by malnutrition (Baker, et.al., 2020). Alcohol use and tobacco smoking increase the risk of TB disease by factors of 3.3 and 1.6, respectively. In 2020, 0.74 million new TB cases worldwide were caused by alcohol use

disorders and 0.73 million were caused by smoking(Korzeniewska-Koseła, 2020).

One effort to control tuberculosis is through treatment. The indicator used to evaluate tuberculosis treatment is the success rate of treatment (Success Rate). Success rate is the number of all cured tuberculosis cases and complete treatment among all treated and reported tuberculosis cases. This treatment success rate illustrates the quality of tuberculosis treatment. Even though the cure rate has been achieved, other treatment outcomes still need to be considered, including cases of death, failure, dropping out of treatment (lost to follow up), and not being evaluated.(Adane et al., 2020).

Globally, the DOTS method has a success rate of 85% from 194 UN member countries that have used the same method to cure TB sufferers (WHO, 2018). In this study, the success rate of the DOTS method was 86.2%. This percentage is the same as the percentage of successful treatment using Dom TS in Indonesia, which is 86%(WHO, 2018).

In research conducted by Alem et al in 2017 whereof 6178 patients, 3151(51%) were male and 3027(49.0%) is a woman. The average age of the research subjects was 32.07 ± 14.0. Smearing 1670 (27%) were positive for pulmonary tuberculosis, negative for pulmonary tuberculosis tuberculosis as many as 2,242 people (36.3%) and extra pulmonary tuberculosis as many as 2,262 people (36.6%). Treatment results were successful in 4919(79.6%), treatment failure in 42(0.7%), The success rate of treatment has continued to increase over the years from 76.2% in 2006 to 83.6% in 2010. Female tuberculosis patients have a higher treatment success rate, namely 81.3%, while males have a success rate of 78%. (p=0.001). Patients in the 25-35 year age group had a very low treatment success rate compared to other age groups (p<0.001). The success

rate of pulmonary and extra pulmonary treatment for tuberculosis sufferers treated at the 3 health centers was 79.6%. lower than the WHO target of 85%(Alem & Gebre-Selassie, 2017).

The results of Minshore et al's 2019 research on 1236 TB patients, around 59.8% were male. Overall treatment success rate among patients was 92.5%. In this study, the female gender had a body weight before treatment of 20 – 29 kg, does not have HIV comorbidities and has just become a TB patient related to recovery or successful treatment. On the other hand age group 54 – 64 years (AOR = 10.41, 95% CI: 1.86 - 58.30) and age over 65 years are associated with TB treatment failure(Tola et al., 2019).

In the results of Tesema et al's 2020 study of 281 patients evaluated, 90 (32%) recovered, 137 (48.8%) had completed treatment, 4 (1.4%) failed treatment, 36 (12.8%) were lost to follow-up, and 14 (5%) died. The overall treatment success rate was 80.8%. Age Group 15–24 years is also related to the recovery of TB patients (Tesema et al., 2020).

Based on the results of the initial data survey conducted by researchers on SI TB data and the results of interviews with officers, there were TB patients who had no further treatment, there were also patients who did not receive treatment according to TB treatment standards and the patients did not complete the treatment.Therefore, based on the description stated above, the author is interested in conducting research whose aim is to see what factors are related to the recovery rate of pulmonary TB patients in the prevention and control program for pulmonary tuberculosis (P2P-TB) in Aceh Province in 2020 -2022.

METHOD

This research is a further analysis of secondary data from the SITB (Tuberculosis Information System) application. This type of research is descriptive analytic with a cross-sectional designquantitative approach.The location of this research is Aceh Province by taking secondary data from 23 districts/cities in Aceh Province. This research location was chosen because in Aceh Province there were many cases of pulmonary TB. The time for data collection was March 2024.The population in this study isAll data on pulmonary TB patients in the SI-TB application recap for the period January to December 2020-2022 in Aceh Province, the total population is 24,857. The purposive sampling technique was chosen when the researcher wanted to get a representative sample according to the specified criteria, so a sample of 3,441 complete data was selected.

RESULTS

Table 1. Frequency Distribution of Independent and Dependent Variables.

Variables	N	(%)
Independent Variable		
Gender		
Man	2131	62.4
Woman	1282	37.6
Diagnosis Type		
Clinical	104	3.1
Bacteriological	3309	96.9
Dependent Variable		
Healing of TB Patients		
Fail	19	0.56
Healed	3394	99.44

Based on Table 1, it is known that of the total 3413 respondents, 3394 people or 99.44% were declared cured of TB disease. Meanwhile, 19 people or 0.56% failed treatment. This shows that the cure rate for TB patients in Aceh Province during the 2020-2022 period is very high, with the percentage of patients successfully cured reaching 99.44%.

Based on gender in Aceh Province in 2020-2022, it is known that the majority of respondents were male, namely 2,131 people or 62.4% of the total respondents. Meanwhile, female respondents numbered 1,282 people or 37.6% of the total respondents. This shows that men's participation in various activities in this area tends to be higher than women's. However, the proportion of female respondents is also quite significant, reaching almost 40% of the total respondents.

Based on the type of diagnosis in Aceh Province in 2020-2022, it is known that the majority of respondents were diagnosed bacteriologically, namely 3,309 people or 96.9% of the total respondents. Meanwhile, only 104 respondents were clinically diagnosed or 3.1% of the total respondents. The total number of respondents recorded was 3,413 people

Table 2.Relationship between gender group and type of diagnosis with recovery of TB patients in Aceh Province

Variable	Recovery				Total	P value	OR
	Fail		Healed			(χ2)a	95% CI
	n	%	n	%			
Gender							
Man	11	0.52	2120	99.5	2131	0.566	1.21
Woman	8	0.62	1274	99.4	1282		(0.71-2.88)

Diagnosis Type							
Clinical	7	6.73	97	93.27	104	0.00	8.50
Bacteriological	12	0.36	3297	99.64	3309		(3.88 - 14.55)

Based on Table 2. Which shows the relationship between age group, gender, and type of diagnosis and patient recovery77female77is (TB) in Aceh Province in 2020-2022, several findings were obtained as follows in terms of age group, adult patients had77He has a higher chance of healing than elderly patients. Only 0.29% of adult patients experienced failure to recover, while in the elderly group, the percentage of failure to recover reached 3.08%. Nevertheless, the test results77women indicated that this difference was not significantly significant77women (p=0.611). In terms of gender, no significant differences were found between male and female patients78women in terms of healing. Male patients had a percentage of failure to cure of 0.52%, whereas in patients78women by 0.62%. Test78Women also indicated that this difference was not significant (p=0.566).

Meanwhile, the type of diagnosis shows significant differences. Patients with a clinical diagnosis had a much higher percentage of failure to cure, namely 6.73%, compared to patients diagnosed bacteriologically, namely only 0.24%. Test results78women showed a significant difference (p=0.000), with an odds ratio (OR) value of 8.50, which means that patients with a clinical diagnosis had an 8.5 times greater chance of experiencing failure to cure than patients with a bacteriological diagnosis. Overall, these data suggest that this type of diagnosis is78eremp has the most influence on the recovery of TB patients in Aceh Province, where patients with a clinical diagnosis have a worse prognosis. Meanwhile, age and gender groups did not show significant differences in terms of recovery.

DISCUSSION

Relationship between Gender and Recovery of TB Patients in Aceh Province

The research results showed that the majority of respondents were male, namely 2,131 people or 62.4% of the total respondents. Meanwhile, the respondents are gender78There were 1,282 women or 37.6% of the total respondents. Test78Women also showed that this difference was not significant (p=0.566), gender and recovery of TB patients in Aceh Province.

Equal access, adequate facilities, and competent medical personnel can ensure that the diagnosis, treatment, and monitoring process is effective regardless of the patient's gender differences. Besides that,78he factor of good treatment adherence among TB patients in the province could also be78it's really important. Education, counseling and support provided by officers78Women may have been able to encourage high compliance in patients, both men and women78female. This can neutralize the effect of gender differences on treatment outcomes.

Another factor that needs to be considered is the prevalence and treatment of comorbidities (comorbidities) which may not differ significantly between male and female TB patients in Aceh Province. Comprehensive management of comorbid conditions can minimize the impact of gender on the process and outcomes of TB treatment. The characteristics of the TB patient population in this province can also be an explanation, for example the similarity in sociodemographic profiles and access to health services between men and women. This condition can cause significant disparities in the

process and outcome of treatment based on gender. Finally, the good TB case surveillance and reporting system in Aceh Province also likely supports these findings. Comprehensive recording and reporting can provide a more representative picture of patient recovery patterns based on gender characteristics.

Several previous studies have found a significant relationship between gender and the success of TB treatment. Like research conducted by Wulandari et al. (2021) in East Java Province, which shows that male TB patients have a higher risk of failing to recover than women.

Similarly, a systematic review by Anggraeni et al. (2019) covering various countries, also concluded that male gender is a consistent risk factor for failure of sputum conversion and TB cure. Sociocultural factors, late diagnosis, and lower treatment compliance in male patients are thought to be the causes.

Interestingly, the findings from Aceh Province are actually different from the general pattern found in previous studies. The absence of significant differences between men and women in terms of TB recovery in this region indicates that gender may not be a relevant predictor in the local context. One possible explanation is that Aceh Province has population characteristics, access to health services, and TB case management systems that are different from other regions that were the focus of previous research. The specific conditions in Aceh appear to be able to neutralize the effect of gender on TB treatment outcomes.

Relationship between Type of Diagnosis and Recovery of TB Patients in Aceh Province

The research results showed that the majority of respondents were male, namely 2,131 people or 62.4%

of the total respondents. Meanwhile, female respondents numbered 1,282 people or 37.6% of the total respondents. The statistical test results showed a significant difference (p=0.000), with an odds ratio (OR) value of 8.50, which means that patients with a clinical diagnosis had an 8.5 times greater chance of experiencing failure to recover than patients with a bacteriological diagnosis.

Patients diagnosed with BTA-positive pulmonary TB tend to have a higher cure rate compared to other types of diagnosis. One possible explanation is that patients with smear-positive pulmonary TB have a clearer clinical picture and can be detected earlier. Microscopic examination of sputum allows for a more accurate diagnosis and facilitates the process of monitoring and monitoring treatment. Apart from that, treatment management for smear positive pulmonary TB patients also tends to be more intensive and standardized. Treatment protocols for laboratory-confirmed cases are usually more stringent and closely monitored by health workers. This can increase patient compliance and optimize treatment outcomes.

This is different from patients with extrapulmonary TB or smear negative pulmonary TB, where diagnosis is often more difficult and requires more complex supporting examinations. Delays in diagnosis and difficulties in monitoring treatment response can result in lower cure rates. Another factor to consider is the possibility of differences in patient profiles based on diagnosis type. For example, smear positive pulmonary TB patients may have better nutritional status, clearer contact history, or better controlled comorbidities than other types of diagnosis.

This may affect the prognosis of treatment. In addition, better treatment compliance in smear positive pulmonary TB patients may also be an important factor. Education, counseling and support provided by

health workers may be more intensive for cases with clear laboratory confirmation. The type of TB diagnosis is one of the predictor factors that needs to be considered in efforts to increase the success of treatment in Aceh Province.

Early identification and treatment of TB cases as well as optimizing case management based on diagnosis type need more attention from the relevant parties. Several previous studies have also identified differences in TB treatment outcomes based on the type of diagnosis assigned. A study in Ethiopia by Gebrezgabiher et al. (2018) found that patients with smear-positive pulmonary TB had a higher sputum conversion rate than cases of smear-negative pulmonary TB and extrapulmonary TB.

Similar findings were also reported in a systematic review by Senkoro et al. (2015), which covers various countries in Africa. The study concluded that patients with smear-positive pulmonary TB tend to have better treatment outcomes, with higher cure rates and lower treatment failure rates.

Research in India by Muniyandi et al. (2020) also confirmed that patients with smear-positive pulmonary TB have a greater probability of treatment success than other types of diagnosis. They emphasize the importance of early diagnosis and close monitoring in this group of patients to maximize treatment outcomes.

Conceptually, these findings are in line with the results of the analysis in Aceh Province. Clearer diagnostic characteristics in smear-positive pulmonary TB cases, along with more intensive case management, appear to be important factors driving higher cure rates in this group of patients.

CONCLUSION

Based on the results of the analysis, there is no relationship between gender and the recovery of pulmonary TB patients in the P2P-Pulmonary TB program at the district level in Aceh Province (p>0.05) and there is a relationship between the type of diagnosis and the recovery of pulmonary TB patients in the P2P program -Pulmonary TB at district level in Aceh Province (p<0.05).

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