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Screening of Pulmonary Tuberculosis in Household Contacts With Acid Fastness Bacteria (AFB) Positive Pulmonary Tuberculosis Patients in Ciwangi Village, Balubur Limbangan Subdistrict, Garut District

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ABSTRACT

Background & Objective Tuberculosis is an infectious disease caused by acid-fast bacteria, namely *Mycobacterium tuberculosis*, which mainly attacks the lungs. Pulmonary tuberculosis is a global health problem with the second deadliest case after HIV/AIDS infection, and ranks third with the most TB cases after India and China. The main source of transmission is patients with active TB pulmonary tuberculosis who can transmit to people around them. This study aims to determine whether pulmonary TB transmission occurs in people who are in household contact with patients with acid-fast bacteria pulmonary TB active.
Method This study is descriptive, using the Ziehl neelsen examination method, with a total sampling technique, conducted on 34 people who are in household contact with pulmonary TB patients in Ciwangi Village, Balubur District, Limbangan.
Result Based on the examination results in people who are in contact with people with TB, the results are negative, the presence of the bacteria that cause TB.
Conclusion The results of Pulmonary Tuberculosis screening conducted on 34 people from 13 heads of families, it can be concluded that the results of TB microscopy with the Ziehl neelsen technique were negative.

Keywords Screening, Tuberculosis, *Mycobacterium tuberculosis*.

Introduction

Tuberculosis is an infectious disease caused by gram-positive acid-fast bacteria (AFB) *Mycobacterium tuberculosis* which mainly attacks the lungs (Buntuan, 2014). The main symptoms of pulmonary tuberculosis are cough with phlegm for more than two weeks with additional symptoms of sputum mixed with blood, weakness, shortness of breath, weight loss, decreased appetite and so on

(Fristanti, 2020). Tuberculosis is one of the 10 causes of death and the leading cause of infectious agents (Kemenkes, 2019). TB data in Indonesia in 2020 increased to 845,000 with more than 98,000 deaths (Valeska et al., 2022).

Active pulmonary TB patients are the main source of transmission where patients in their sputum contain Mycobacterium tuberculosis bacteria, and can spread to others when patients cough, sneeze in the form of sputum splashes (droplet nuclei), infection will occur when someone inhales the sputum splash. One cough and sneeze can produce about 3000 - 1,000,000 Mycobacterium tuberculosis (Minister of Health., 2016). Infection is greater in groups closer to the patient, especially in groups living in the same house (Bilqishti et al., 2020).

Pulmonary tuberculosis is a prominent infectious disease at the Balubur Limbangan Health Center in 2020, with 215 TB cases, and in 2021 TB cases have decreased by 0.37% with 132 positive TB cases. Because, Puskesmas Balubur Limbangan has an innovation Gak Bete "Movement to Eradicate Tuberculosis" to achieve the target of the Garut Regency Health Office for Balubur Limbangan District, which is 1,109 people suspected of TB and has only reached the findings of 986 AFB positive pulmonary TB. Ciwangi village is the village with the highest population density compared to other villages, totaling 7,146 people with 13 AFB (+) pulmonary TB patients. The TB case finding rate for Balubur Limbangan sub-district is still below the target. The factors causing the achievement are still low. This is due to the lack of coordination between the health center and the existing network in the health center's working area, and the lack of participation of the TB cadres that have been formed. Recording and reporting from TB cadres has not been maximized (Yudiana & Garna, 2022).

Risk factors that can trigger the incidence of tuberculosis include the environment, residential density, population density is also a risk factor for triggering TB (Budi et al., 2018). The main source of transmission is patients with AFB (+) pulmonary tuberculosis who can transmit it to people around them (Budi et al., 2018). Therefore, healthy people who live in the same house with patients with positive pulmonary tuberculosis are a group that is very vulnerable to transmission of the disease. Based on the home environment, length of contact, and preventive behavior greatly affects the process of transmission of Pulmonary TB disease (Fristanti, 2020).

Based on the description above, to find out whether pulmonary TB transmission occurs in people who are in close contact with people with AFB positive pulmonary TB, as well as for the discovery of new cases in an effort to meet target achievements. So, researchers are interested in conducting a study entitled Pulmonary Tuberculosis Screening in House Contact with Patients with acid-faste Positive Pulmonary TB in Ciwangi Village, Balubur Limbangan Subdistrict, Garut Regency. Families who live in the same house with people with pulmonary Tb are a group at great risk of contracting TB (Pangestika et al., 2019). Research (Firmansyah et al., 2021) states that household contacts must be screened. Because there is a relationship between the incidence of TB and household contacts of positive TB patients, Research (Sukarna et al., 2015) states that 55% of household contacts did not screen. 95% of adult house contacts had a positive mantoux test and 75% of toddler house contacts had a positive mantoux test.

Objective

This study aims to provide scientific contributions by knowing tuberculosis screening in household contacts with patients with AFB positive pulmonary TB, providing information to patients and families with the dangers of pulmonary TB which is easily transmitted, especially to household contacts.

Method

This study is descriptive, to describe the results of screening in families of patients with positive pulmonary TB. The population used in this study were all family members who were in household contact with positive (+) AFB pulmonary TB patients. The sampling technique used was total sampling of all families of positive pulmonary TB patients who were in contact at home and recorded in the medical records of UPT Puskesmas Balubur Limbangan Garut Regency as many as 13 patients with positive acid-fastness bacteria pulmonary TB with all family members of 34 patients. Laboratory tests with acid-fastness bacterial staining using the Ziehl neelsen technique to determine the presence or absence of *Mycobacterium tuberculosis* in the sputum. This research was conducted in the laboratory of UPT Puskesmas Balubur Limbangan, March 2022 - April 2022.

Results

The results of research conducted in Ciwangi Village, Balubur Limbangan Subdistrict, Garut Regency, with the number of samples studied as many as 34 samples from a total of 13 heads of families. The following table shows the distribution of respondents based on age and gender:

TABLE 1 Distribution of Respondents by Age and Gender

No	Age	Gender Type		Total	Presentations
		Male	Female		
1	<30	7	5	12	35%
2	30 s/d 40	3	2	5	15%
3	40 s/d 50	2	3	5	15%
4	50 s/d 60	4	2	6	17%
5	60 s/d 70	2	3	5	15%
6	>70	1	0	1	3%
	Total	18	15	34	100 %

Based on table 1, the distribution of respondents based on age was 12 people aged <30 years, 5 people aged 30-40, 5 people aged 40-50, 6 people aged 50-60, 5 people aged 60-70, and 1 person aged >70 years. The results of microscopic examination of acid-resistant bacilli in people who are in household contact with patients with AFB positive pulmonary TB are as shown in the table below:

TABLE 2 Microscopic Results of Acid-Fastness Bacteria in People Who Direct Contacted in House With Patients with Positive AFB Pulmonary TB

No	Name of TB Patient	No	Family Members	Age	AFB		Results
					P	S	
1	Sdr. Rxxxl	1.	Tn. Jxxxi	59	No AFB found	No AFB found	No AFB found
						No AFB found	No AFB found
		2.	Ny. Dxxe	52	No AFB found	No AFB found	No AFB found
						No AFB found	No AFB found
		3.	Ny. Exxk	80	No AFB found	No AFB found	No AFB found
		4.	Sdr. Dxxxs	14	No AFB found		
		5.	Sdr. Sxxxi	12	No AFB found		
2	Tn. Ixxxl	6.	Tn. Dxxu	52	No AFB found	No AFB found	No AFB found
						No AFB found	No AFB found
		7.	Ny. Exi	39	No AFB found	No AFB found	No AFB found
		8.	Sdr. Rxxa	13	No AFB found		
3	Tn. Txxxxxn	9.	Ny. Cxxxh	64	No AFB found	No AFB found	No AFB found
						No AFB found	No AFB found
		10.	Tn. Yxxi	41	No AFB found	No AFB found	No AFB found
		11.	Tn. Hxxxxn	28	No AFB found		
4	Tn. Sxxxi	12.	Ny. Exxxg	66	No AFB found	No AFB found	No AFB found
5	An. Fxxxi	13.	Tn. Axxr	48	No AFB found	No AFB found	No AFB found
		14.	Ny. Kxxxxt	38	No AFB found	No AFB found	No AFB found
6	Tn. Hxxxl	15.	Tn. Axxxd	66	No AFB found	No AFB found	No AFB found
						No AFB found	No AFB found
		16.	Ny. Dxxxh	48	No AFB found	No AFB found	No AFB found
						No AFB found	No AFB found
		17.	Tn. Yxxxp	24	No AFB found	No AFB found	No AFB found
						No AFB found	No AFB found
		18.	Sdr. Dxxi	18	No AFB found		
		19.	Sdr. Nxxxxi	16	No AFB found		
7	Tn. Axxxd	20.	Ny. Lxxxs	39	No AFB found	No AFB found	No AFB found
		21.	Ny. Mxxxa	12	No AFB found	No AFB found	No AFB found
8	Ny. Exxxn	22.	Tn. Axxxg	59	No AFB found	No AFB found	No AFB found
		23.	Ny. Ixxs	21	No AFB found	No AFB found	No AFB found
9	Tn. Exxxxg	24.	Ny. Ux	63	No AFB found	No AFB found	No AFB found
		25.	Tn. Dxxxn	30	No AFB found	No AFB found	No AFB found
10	Ny. Ax	26.	Tn. Yxxo	51	No AFB found	No AFB found	No AFB found
						No AFB found	No AFB found
		27.	Tn. Axxi	22	No AFB found	No AFB found	No AFB found
		28.	Sdr. Hxxxxr	15	No AFB found		
11	Tn. Hxxxi	29.	Ny. Sxxi	46	No AFB found	No AFB found	No AFB found
		30.	Ny. Ixp	23	No AFB found	No AFB found	No AFB found

No	Name of TB Patient	No	Family Members	Age	AFB		Results
					P	S	
12	Tn.	31.	Ny. Exa	70	No AFB found	No AFB found	No AFB found
	Gxxxm	32.	Nn. Qxxxxa	30	No AFB found	No AFB found	No AFB found
13	Tn. Axxp	33.	Ny. Ixxa	28	No AFB found	No AFB found	No AFB found
		34.	Sdr. Nxxxa	8	No AFB found	No AFB found	No AFB found

Based on table 2, the results of the above study show that family members who have household contact are not infected or exposed to *Mycobacterium tuberculosis* bacteria from patients with acid-fastness (+) pulmonary TB.

From the results of the acid-fatness microscopic examination of the patient's family in the same house, the examination results were obtained as presented in table 2, with confirmation based on the controls in figures 1 and 2. The control function is to ensure the validity and reliability of the results of this study, also including AFB positive microscopic control.

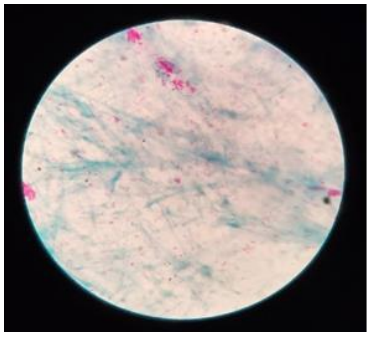

FIGURE 1 Positive Control (+)

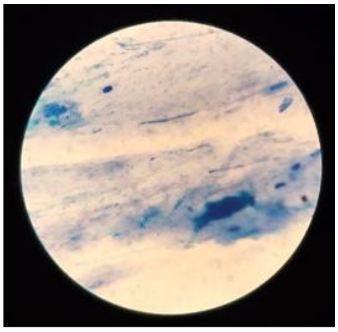

FIGURE 2 Negative Control (-)

Discussion

Based on table 1, the results of pulmonary TB screening conducted in Ciwangi Village on the patient's family in contact with the number of respondents as many as 34 people obtained negative AFB results or in their sputum no TB bacteria were found, these results indicate that positive patients with pulmonary tuberculosis do not transmit or spread TB disease to people who are in contact with their homes or families. This can also be seen in the results of the TB screening questionnaire, where approximately 95% of the patient's family's understanding of what TB disease is; how it is transmitted; symptoms to healthy behaviors, is known, understood and practiced. Pulmonary TB transmission in the family is very risky, therefore the role of the family in preventing pulmonary TB transmission is very important because one of the tasks of the family is to provide care for sick family members and prevent transmission for healthy family members (Pungky, 2017).

The results of pulmonary TB screening conducted on the families of patients who were in contact with the same house with a total of 34 respondents obtained negative AFB results or in the sputum were not found *Mycobacterium tuberculosis* bacteria. This is related to several positive behaviors of family members, among others, each of them has

carried out several preventive measures for pulmonary TB, namely by keeping family members away from TB patients when sneezing and coughing, opening house windows in the morning to prevent transmission of pulmonary TB to family members, taking medicine and routine control to the puskesmas, eating nutritious food, drying the mattress of TB patients to prevent transmission of pulmonary TB in the family, reminding patients with pulmonary TB to cover their mouths when coughing, and BCG (Bacillus Calmette Guerin) immunization for toddlers at home to prevent pulmonary TB.

Microscopic examination of acid-fastness bacteria positive sputum has a high diagnostic value as a support for the diagnosis of clinical patients with pulmonary tuberculosis. The high specificity value of acid-fastness bacteria microscopic examination is the reason that examination is still the best method to help confirm the laboratory diagnosis of tuberculosis. The sensitivity value of acid-fastness microscopic examination in this study is relatively low because to get a positive acid-fastestness microscopic examination value requires the presence of as many as 5000-10,000 bacteria/ml sputum (Ramadhan et al., 2017). A negative acid-fastness bacteria test result cannot rule out a diagnosis of pulmonary TB. This can occur if the patient is unable to remove the sputum properly and can also be due to the development of TB bacteria less than 5000/ml, making it difficult to detect with a microscope directly.

Conclusion

The results of Pulmonary Tuberculosis screening conducted on 34 people from 13 heads of families, can be concluded that the results of AFB microscopy with the Ziehl neelsen technique obtained negative results. This study can be continued by using a method that is more specific and sensitive to the discovery of TB bacteria, namely with the X-pert TCM (Molecular Rapid Test) tool.

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