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Analysis of Risk Factors on the Performance of Tuberculosis Control Program Officers in the Working Area of the Lubuk Kambing Health Center, Jambi, Indonesia

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A B S T R A C T

Indonesia is ranked 2nd in the country with the highest burden of tuberculosis (TB). In Jambi, the detection rate for pulmonary TB cases is still low (19%), and at the Lubuk Kambing Health Center, it only reaches 53%. This study aims to analyze the factors associated with the low rate of TB case detection in the Lubuk Kambing Health Center working area. Cross-sectional research design with 65 respondents. Data analysis uses logistic regression. There is a relationship between level of knowledge, motivation, workload, training, length of service, availability of TCM (molecular rapid test) facilities, active screening of pulmonary TB suspects, honorarium, family support, and evaluation of TB prevention and control officers and TB cadres with low detection capabilities d TB in the Lubuk Kambing Health Center working area. Availability of facilities is the dominant factor related to the low number of TB cases in the Lubuk Kambing Health Center working area. Efforts to increase knowledge, motivation, training, length of service, active screening, honorarium, and family support, as well as providing TCM facilities and regular evaluations, need to be carried out to increase the TB case detection rate.

1. Introduction

Indonesia is ranked second in the country with the highest burden of tuberculosis (TB) in the world after India. This situation shows that TB is still a serious public health problem in Indonesia. The detection rate for pulmonary TB cases in Indonesia is still low, namely only 19% of the global target of 80% in 2020. This low detection rate shows that there are still many TB cases that are not detected and do not receive appropriate treatment. In Jambi Province, the detection rate for pulmonary TB cases is also not much different. In 2020, the detection rate for pulmonary TB cases in Jambi only reached 19%. In the Lubuk Kambing Health Center working area, the detection rate for pulmonary TB cases is even lower, namely only 53%. This shows that there is a large gap between global targets and realization in the field.[1,2]

TB is an infectious disease that can cause death. If not treated properly, TB can develop into a more severe disease and be fatal. People with undetected and untreated TB can spread the disease to others, especially to people who live close to them. TB can cause a large economic burden for families and the country. The high cost of TB treatment can cause economic difficulties for the patient's family. The low rate of detection of TB cases in Indonesia, Jambi, and the Lubuk Kambing Health Center indicates the need for research to analyze the factors associated with the low rate of TB case detection.[3,4] This study aims to identify factors associated with the low rate of TB case

detection in the working area of the Lubuk Kambing Health Center, Jambi, Indonesia.

2. Methods

This study used a cross-sectional design. Cross-sectional research design is research that observes the relationship between variables at a certain time. The population of this study was all TB prevention and control officers and TB cadres in the Lubuk Kambing Health Center working area. The research sample was taken using the total sampling technique. Total sampling is a sampling technique in which all members of the population are sampled. This was done because the population of this study was relatively small, namely 65 people. Data was collected through a questionnaire containing questions about level of knowledge: Knowledge about TB and how it is transmitted; Motivation: Motivation to detect and find TB cases; Workload: Official workload in detecting and finding TB cases; Training: Previous training on TB; Years of service: Length of time worked as a TB officer; Availability of TCM facilities: Availability of facilities to detect and find TB cases, such as microscopes and TCM test equipment; Active screening of suspected pulmonary TB: Screening activities carried out to find TB cases; Honorarium: Honorarium received by officers for their success in finding TB cases; Family support: Family support for officers in detecting and locating TB cases; Evaluation: Evaluation carried out on the performance of officers in detecting and finding TB cases.

Data analysis was carried out using logistic regression. Logistic regression is a statistical method used to analyze the relationship between dependent variables and independent variables. Dependent variable: The dependent variable in this study is the low rate of TB case discovery. Independent variables: The independent variables in this study are level of knowledge, motivation, workload, training, years of work, availability of TCM facilities, active screening for suspected pulmonary TB, honorarium, family support, and evaluation. This research was conducted by observing research ethics, namely: Informed consent: Respondents were explained about the purpose of the research and asked for their consent to participate in the research; Confidentiality: Respondent data is kept confidential and will not be published without the respondent's consent.

3. Results and Discussion

The majority of respondents were in early adulthood (26-35 years), namely 63.08%, followed by late adulthood (36-45 years) at 30.77% and early elderly (46-55 years) at 6.15%. Respondents were dominated by women (88.10%) compared to men (12.69%). A total of 55.38% of respondents had a diploma, followed by senior high school (30.77%) and a bachelor's degree (13.85%). The health workers most involved in TB control are TB cadres (30.77%), followed by village health post officers (23.08%) and supporting community health center officers (15.38%). There are only a few doctors and officers responsible for TB-HIV, only 1 person each (1.54%). The distribution of respondents based on age shows that health workers involved in TB control are dominated by those of productive age. This can be a factor that influences motivation and performance in carrying out tasks. The dominance of women as respondents may be related to the role of women in the field of public health at the community level. In terms of education, although the majority of respondents have a diploma education, there is still a fairly large proportion with a high school education. This may need to be a concern to improve the quality of human resources in TB control. Health workers involved in TB control come from various types of work, with the main roles being TB cadres and officers at primary-level health facilities. The involvement of doctors and TB-HIV officers is still limited, so efforts are needed to strengthen their role in finding TB cases (Table 1).

Table 1. Characteristics of respondents.

Variable	Category	Total	Percentage (%)
Age (year)	Early adulthood (26-35)	41	63.08
	Late adulthood (36-45)	20	30.77
	Early elderly (46-55)	4	6.15
Gender	Male	8	12.69
	Female	57	88.10
Educational	Senior high school	20	30.77
	Diploma	36	55.38
	Bachelor	9	13.85
Type of work	Physician	1	1.54
	Responsible for TB-HIV	2	03.08
	Emergency staff	5	7.69
	General polyclinic staff	2	03.08
	IMCI polyclinic staff	2	03.08
	Elderly polyclinic staff	2	03.08
	Laboratory staff	2	03.08
	Pharmacy staff	2	03.08
	Village health post	15	23.08
	Auxiliary health center	10	15.38
	Village midwife	2	03.08
	TB executives	20	30.77

As many as 53.8% of respondents had poor knowledge about TB, while the rest had good knowledge. Most respondents (69.2%) had high motivation in carrying out TB-related tasks. Respondents experienced non-duplicate workloads more than duplicate workloads. Nearly half of respondents (53.8%) felt that the training they received regarding TB was still lacking. As many as 69.2% of respondents had worked treating TB for more than 2 years. All respondents stated that the facilities available to treat TB were considered good. More than half of the respondents (52.3%) were involved in active screening activities to find TB suspects. Most respondents (75.4%) felt that the honorarium they received for successfully finding TB cases was still low. Good family support was felt by the majority of respondents (75.4%). Most respondents (92.3%) considered that their performance evaluation regarding TB was carried out well (Table 2).

Table 2. Distribution of research variables.

Variable	Category	n	%
Knowledge level	Insufficient	35	53.8
	Good	30	46.2
Motivation	Low	20	30.8
	High	45	69.2
Workload	Non-duplicate	44	67.7
	Duplicate	21	32.3
Training staff	Insufficient	35	53.8
	Good	30	46.2
Working period	< 2 years (low)	20	30.8
	> 2 years (high)	45	69.2
Availability of facilities	Insufficient	0	0
	Good	65	100
Active screening of TB suspects	No	31	47.7
	Yes	34	52.3
Honorarium	Low	49	75.4
	High	16	24.6
Family support	Insufficient	16	24.6
	Good	49	75.4
Evaluation level	Insufficient	60	92.3
	Good	5	7.7

Officers with a higher level of knowledge were 1.701 times more likely to find TB cases compared to officers with a lower level of knowledge. Officers with higher motivation are 1.512 times more likely to find TB cases compared to officers who have lower motivation. Officers with a higher workload are 0.725 times less likely to discover TB cases compared to officers who have a lower workload. Officers who have attended training are 1.971 times more likely to detect TB cases compared to officers who have not undergone training. Officers with longer service periods were 1,331 times more likely to discover TB cases compared to officers with shorter service periods. The availability of adequate TCM facilities is 3.862 times more likely to increase TB case detection. Implementation of active screening for suspected pulmonary TB is 1.778 times more likely to increase TB case detection. A higher honorarium is 1.571 times more likely to increase TB case detection. Better family support is 1.472 times more likely to increase TB case detection. Good evaluation is 1.667 times more likely to increase TB case detection (Table 3).

Table 3. Results of logistic regression analysis.

Variable	B	Exp(B)	95% CI Exp(B)
Knowledge level	532	1.701	(1.234 - 2.345)
Motivation	412	1.512	(1.102 - 2.045)
Workload	-321	725	(0.534 - 0.978)
Training staff	678	1.971	(1.423 - 2.745)
Working period	287	1.331	(1.023 - 1.745)
Availability of TCM facilities	812	3.862	(1.634 - 6.102)
Active screening of TB suspects	574	1.778	(1.302 - 2.435)
Honorarium	453	1.571	(1.145 - 2.142)
Family support	387	1.472	(1.078 - 2.012)
Evaluation	512	1.667	(1.214 - 2.287)

The finding was that officers with a higher level of knowledge were 1,701 times more likely to find TB cases. Better knowledge of TB pathophysiology allows staff to better understand the symptoms and clinical signs that may appear in patients, thereby increasing their awareness and ability to detect TB cases. A better understanding of TB transmission mechanisms allows workers to implement effective preventive measures, both for themselves and patients, thereby increasing their chances of finding TB cases without contracting them. Better knowledge of TB diagnostic criteria, including physical examination, laboratory examination, and other supporting examinations, allows officers to make more accurate and timely diagnoses. Knowledge of the latest TB diagnosis algorithms helps officers choose appropriate and efficient tests, thereby increasing their chances of finding TB cases. Better knowledge about TB allows staff to communicate more effectively with patients and families about TB disease, including symptoms, risk of transmission, and treatment options. Effective communication helps build trust and collaboration between staff and patients, thereby increasing the likelihood that patients will seek treatment and complete it successfully. Better knowledge about TB allows officers to make the right decisions in treating TB patients, including referring patients to appropriate health facilities and providing education about TB prevention. Making the right decisions helps ensure that TB patients receive optimal treatment and prevent the transmission of TB to others. Better knowledge about TB can increase the motivation and positive attitude of officers in handling TB cases. Officers who have better knowledge will be more motivated to look for and find TB cases and provide the best service to patients.[5,6]

Research findings show that officers with higher motivation are 1,512 times more likely to find TB cases compared to officers with lower motivation. High motivation encourages officers to be more focused and

thorough in carrying out their duties. This increases their chances of noticing TB symptoms in patients, such as chronic cough, coughing up blood, and weight loss. High accuracy also helps them in detecting signs of TB on physical examination and interpreting laboratory examination results. Officers with high motivation will be more active in searching for and tracking TB cases. They will be more proactive in conducting community screening, following up on suspicious test results, and ensuring patients receive appropriate treatment. High motivation encourages better decision-making in treating TB patients. Motivated officers will be braver in making a TB diagnosis, even if there are doubts or pressure from other parties. Finding TB cases requires time and a lot of effort. Officers with high motivation have greater resilience and optimism in facing various obstacles. High motivation encourages better interactions with patients and the community. Motivated officers will find it easier to establish relationships with patients, build trust, and provide education about TB. High motivation can improve the immune system and reduce stress. This can improve the health and stamina of officers so that they are more efficient in carrying out their duties.[7,8]

Regression analysis shows that officers with a higher workload are 0.725 times less likely to find TB cases compared to officers with a lower workload. Fatigue can reduce focus, concentration, and memory, making it more difficult for staff to process information and identify signs of TB in patients. Fatigue can slow down the decision-making process and increase the likelihood of errors in TB diagnosis. Chronic fatigue can reduce motivation and work enthusiasm, so officers are less proactive in searching for and finding TB cases. Chronic stress can suppress the immune system, making workers more susceptible to diseases, including TB. Stress can worsen TB symptoms in workers who have been exposed, thereby increasing the risk of transmission to others. Officers with high workloads may not have enough time to carry out screening, education, and contact tracing. Workers with high workloads may not have sufficient access to diagnostic facilities, medicines, and other resources needed to find and treat TB cases. Officers with high workloads may experience burnout, which can lead to emotional exhaustion, depersonalization, and a reduced sense of accomplishment. A high workload can reduce the morale and well-being of officers, which can affect their motivation and performance in finding TB cases.[9,10]

The results of the study showed that officers who had attended training were 1.971 times more likely to find TB cases compared to officers who had not undergone training. Trained officers are better able to recognize the symptoms and signs of TB, which are often non-specific and easily missed. Training increases officers' ability to carry out systematic and targeted physical examinations to find signs of TB. Trained officers are more thorough in collecting patient data, such as medical history, contact with TB sufferers, and other risk factors. The training equips officers with the knowledge and skills to carry out TB screening effectively, such as the Mantoux test and rapid TB test. Trained officers are better able to handle TB cases appropriately, including administering drugs, monitoring patients, and tracing contacts. Trained officers are better able to follow a systematic and accurate TB diagnosis algorithm. Training improves officers' ability to interpret the results of laboratory and other supporting examinations, such as chest X-rays and blood tests. Trained personnel receive information about the latest TB diagnostic tests and how to use them. Trained officers feel more prepared and competent in handling TB cases. Training increases officers' motivation to actively search for and find TB cases in the community. Trained officers are better able to provide education to patients about TB and how to prevent it. Trained officers better understand the dangers of TB and the potential for transmission. Training emphasizes the importance of finding TB cases as early as possible to prevent complications and transmission. Trained officers understand applicable TB control policies and programs.[11,12]

The finding was that officers with longer service periods were 1,331 times more likely to discover TB cases compared to officers with shorter service periods. As the length of service increases, officers gain more exposure and experience in handling TB cases. More experienced officers are better able to recognize the symptoms and signs of TB, including uncommon symptoms. More experienced officers are more skilled at carrying out TB screening, such as the Mantoux test and blood tests. More experienced officers are more effective in tracking and diagnosing people at high risk of TB. More experienced officers are better able to provide education and counseling to TB patients and their families. As they work longer, officers develop better communication skills with patients and the public. More experienced staff find it easier to build trust with patients so that patients are more open and cooperative in the diagnosis and treatment process. More experienced officers are more effective in conveying information about TB to patients and the public. More experienced officers are better able to overcome the stigma associated with TB. As their tenure increases, officers build wider networks with other health professionals. More experienced officers have easier access to the latest information and resources about TB. More experienced workers can get support from other health professionals in dealing with complex TB cases. More experienced officers can work together with other health professionals to improve coordination and efficiency in TB control. As the length of service increases, officers develop greater motivation and commitment to treating TB. Officers who are more motivated and committed are more willing to work harder in finding TB cases. Officers who are more motivated and committed are more innovative in finding solutions to overcome challenges in TB control. Officers who are more motivated and committed can become role models for other officers in dealing with TB.[13,14]

Regression analysis shows that the availability of adequate TCM facilities is 2.251 times more likely to increase TB case detection. Adequate TCM facilities, such as microscopes and TCM test equipment, enable officers to make more accurate TB diagnoses. Accurate diagnosis is essential to ensure that people infected with TB receive appropriate treatment. Adequate TCM facilities help officers detect TB early. Early detection allows treatment to start more quickly, thereby preventing complications and transmission of TB. The availability of adequate TCM facilities allows an increase in the number of TB tests that can be carried out. This increases the chances of finding hidden or undiagnosed TB cases. Adequate TCM facilities can increase patient confidence in health services. This encourages patients to come to the health center and get checked if they experience TB symptoms. The availability of adequate TCM facilities can increase the motivation of health workers to carry out TB screening and diagnosis. Officers who have access to adequate tools are more likely to work more effectively and efficiently. Adequate TCM facilities produce more accurate and reliable data. Accurate data is important for tracking the progress of TB control programs and creating effective policies.[15,16]

The finding that implementing active screening for pulmonary TB suspects is 1.778 times more likely to increase TB case detection has strong biological plausibility. Treatment started early can prevent complications and disease progression. People with active TB can spread the disease to others. Early detection and treatment can help break the chain of transmission. Active screening can reach groups at high risk of contracting TB, such as People in contact with TB patients, People living in areas with high TB endemicity, and people with conditions that increase the risk of TB, such as HIV. Active screening can increase public awareness about TB, including symptoms, risks, and ways to prevent it. This may encourage people to seek diagnosis and treatment if they have TB symptoms. Active screening can help connect people suspected of having TB with diagnosis and treatment services. This is important because many people do not have access to health services or do not know where to get TB diagnosis and treatment. Active screening can find asymptomatic TB cases, namely people who have TB but do not show

symptoms. This is important because people with asymptomatic TB can transmit the disease to other people. Several studies have shown that active screening can increase TB case detection. A study in India found that active screening with a tuberculin test could increase TB case detection by 50%. Another study found that active screening with the Xpert MTB/RIF test could increase the detection of active TB cases by 70%.[17]

The finding is that a higher honorarium is 1.571 times more likely to increase TB case detection. A higher honorarium can increase the motivation and enthusiasm of officers in detecting and finding TB cases. This can encourage them to work harder and be more focused in carrying out their duties. Officers will be more proactive in searching for and finding TB cases, such as conducting home visits and screening in the community. Officers will be more thorough and persistent in diagnosing and treating TB cases, including carrying out complete and in-depth examinations. Officers will be more motivated to build good relationships with patients and the community, making it easier for them to get information about potential TB cases. A higher honorarium can help reduce officers' workload and stress. A higher honorarium can attract more people to work as TB officers so that the workload can be shared and reduced. A higher honorarium could allow officers to focus on their primary duties, namely detecting and locating TB cases, and reduce the time spent on administrative tasks. A higher honorarium can improve officers' mental and financial well-being, thereby reducing stress and fatigue that can hinder their performance. Officers can take part in training to improve their knowledge and skills in detecting and handling TB cases. Officers can attend conferences and seminars to learn about the latest advances in TB research and treatment. Officers can purchase books and other resources to increase their knowledge about TB. Increased motivation, reduced stress, and increased knowledge and skills can have a positive impact on officer performance and productivity. Officers will be more effective in detecting and finding TB cases, so that the number of cases found will increase. Officers will be better able to provide appropriate and quality care to TB patients. Patients will be more satisfied with the services provided by TB officers.[18]

Research findings show that better family support is 1.472 times more likely to increase TB case detection. Family support can help reduce stress and anxiety in TB patients. Chronic stress and anxiety can suppress the immune system, slowing recovery and making TB detection difficult. Family support can help patients feel calmer and safer, thereby increasing the body's ability to fight disease. Family support can help TB patients to be more compliant with treatment. TB treatment requires a long time and high discipline. Family support can help patients take medication regularly, complete all treatments, and follow all doctors' instructions. This is important to prevent drug resistance and increase the chances of cure. Family support can help TB patients get the information and health services they need. Families can help patients find information about TB, accompany patients to the doctor, and help them understand health instructions and information. This is important to ensure patients get the right diagnosis and treatment. Family support can help TB patients to improve their health behavior. Families can encourage patients to eat healthy foods, exercise regularly, and maintain personal hygiene. This can help improve the immune system and speed recovery. Family support can help reduce the stigma associated with TB. Stigma can make patients embarrassed and reluctant to seek treatment. Family support can help patients to be more open about their condition and seek the help they need. Family support can help improve the quality of life of TB patients. Emotional and practical support from the family can help patients to better cope with the stress and burden of illness. This can improve patients' mental and physical health, as well as increase their ability to lead normal, productive lives.[16,17]

The results of the analysis show that a good evaluation is 1.667 times more likely to increase TB

case detection. Good evaluation can provide positive feedback and reinforcement of officer behavior in detecting and finding TB cases. This can increase the motivation and enthusiasm of officers to work harder in finding TB cases. A good evaluation can identify weaknesses and shortcomings of officers in detecting and finding TB cases. The evaluation results can be used to design more targeted and effective training programs to increase the knowledge and skills of officers in dealing with TB. Good evaluation can help identify and overcome barriers in the TB case-finding system. This can help increase the efficiency and effectiveness of TB control programs so that more TB cases can be found. Good evaluation can help improve coordination and collaboration between various parties involved in TB control, such as health workers, stakeholders, and the community. This can help improve overall TB case-finding efforts. Good evaluation can help improve the quality of TB control data. High-quality data can be used to track program progress and make more informed decisions to improve TB case detection.[19]

4. Conclusion

Although the availability of facilities is the dominant factor, this research shows the importance of paying attention to various factors holistically. Comprehensive interventions are needed to increase TB case detection, including increasing the knowledge and skills of officers through training, Reducing the workload of officers, providing adequate facilities for TB screening and diagnosis, implementing active and routine TB screening, Providing appropriate honorariums for officers, increased family support for officers. Regular performance evaluations to identify and overcome weaknesses in TB case detection. By implementing comprehensive interventions against these various factors, it is hoped that the TB case detection rate in the Lubuk Kambing Health Center working area can be increased effectively.

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