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TUBERCULOSIS CONTACT SCREENING AND INVESTIGATION WITH EARLY DETECTION TO IMPROVE CASE DISCOVERY

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Abstract

The TB patient discovery strategy is not only "passively and actively promotive" but also through "intensive and massive family- and community-based active discovery", while still paying attention to and maintaining quality services according to standards. One of the important activities to support the success of this active discovery strategy is through contact tracing and contact investigation. This study was carried out with a retrospective cohort study by obtaining data on TB patients with case indexs in the data registration of the Bojong Gede Health Center, Bogor Regency, tracing household contacts and close contacts by involving the community of health cadres, reported through a form. Data was collected through face-to-face interviews using structured questionnaires. Among the 734 contacts, 141 (19.2%) were children (under 15 years old), 398 (54.2%) were female, 152 (20.7%) were household contacts and 446 (60.8%) were close contacts who refused at screening 299 (40.71%), All contacts were interviewed regarding TB symptoms. having one or more symptoms of TB with the most frequent symptoms being cough 104 (14.2%), shortness of breath 24 (3.3%), night sweats 15 (2%), fever 21 (2.9%), from risk factors obtained 15 (2%) pregnant women, 63 (8.6%) elderly, 20 (2.7%) suffering from Diabetes Militus (DM) and 12 (16.5%) are smokers. From screening and contact investigation, only 138 (18.8%) were referred for examination, only 101 (13.8%), of the results of the sputum examination, 11 (1.5%) were positive for tuberculosis. The dependent variable was Refusal to be screened, Statistical test results with $\alpha = 0.05$ which showed that there was a relationship between Age (p=0.021), household contact (p=0.000), close contact (p=0.0051), Cough symptoms (p=0.000), Shortness of breath (p=0.000), night sweats (p=0.003), Fever (p=0.000), Pregnant women (p=0.003), Elderly (p=0.000), DM (p=0.000), Smokers (p=0.000), Referred (p=0.000), Examined (p=0.000), Examination results (p=0.004). And there are 2 variables that are not related: Gender (p=0.101) and Incomplete TB treatment (p=0.51). Early detection in TB contact investigations in case discovery through preventive and promotive education needs to be improved.

***Keywords*:** Early Detection, Screening, Contact Investigation, Case Discovery, Tuberculosis.

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INTRODUCTION

Tuberculosis is still a health in Indonesia, the community's commitment is very strong to achieve the elimination of Tuberculosis by 2030.Indonesia is currently still the second country with the largest contribution of TB cases, which is 10% of the total global patients in 2022. This value is estimated to be equivalent to 1.06 million cases [1], Tuberculosis (TB) control is one of the goals that must be achieved in the Substainable Development Goals (SDGs), with increased promotive and preventive efforts supported by innovation and the use of technology, through health improvement [2].

The TB patient discovery strategy is not only "passively and actively promotive" but also through "intensive and massive family- and community-based active discovery", while still paying attention to and maintaining quality services according to standards. One of the important activities to support the success of this active discovery strategy is through contact tracing and contact investigation. Contact investigation (IK) is a tracing and investigation activity aimed at people who have been in contact with TB patients (case index) to find suspected TB [3]. Increased tuberculosis screening and contact investigation strategies are recommended to ensure early diagnosis among household contacts of TB patients. There are difficulties in preventing transmission and tracking of pulmonary TB cases among household contacts, especially in crowded residential conditions [4].

Contact screening is a recommendation of the WHO to accelerate the discovery of suspected TB cases. Furthermore, it is immediately followed up with treatment and prevention of transmission. This is done as an effort of a national control strategy to end the world TB disease [5].

Screening is an effort made to identify a person at risk of TB in a target group that is determined by assessing TB symptoms and using tests, examinations or other procedures that can be applied quickly, such examinations for example examinations with thoracic photos/X-Ray. The screening can be carried out on target groups such as the general population in areas with high TB load, household contacts or close contacts, people at clinical risk such as people with HIV (ODHIV), people with diabetes mellitus (DM), children and the elderly aged >65 years, homeless, vulnerable and marginalized populations (slum-dense and slum-poor settlements) [6].

Screening for TB starts with a home visit in contact investigation. Contacts were interviewed regarding TB symptoms and those who coughed were given two pots of phlegm (to collect random phlegm and morning phlegm) and were advised to participate in TB evaluation at PHC. Contact with other symptoms or no symptoms is also advised to visit PHC for further screening and evaluation. Evaluation for TB at PHC follows the guidelines of the National TB Program. Adult contacts were evaluated using sputum examination (microscopic, Gene X-pert, culture) for bacteriological confirmation and signs, screening symptoms, and chest X-ray examination for clinical confirmation [7].

Based on the initial survey in 2023, data from the West Java Provincial Health Office in 2023 is 175,255 cases, treatment success is 80%, pediatric TB cases are 26,832 cases, and case findings are 60%. Meanwhile, 20 cases of TB RO (TB Drug Resistance) were obtained and 161 cases of TB SO (TB Drug Sensitivity) were found with 134 cases. At the Bojong Gede Health Center, the target is 868 and 740 case findings, for the target of pediatric TB as many as 6 cases and 26 case findings. Meanwhile, the TB SO target of 161 cases was found 134 cases.

This study aims for early detection of TB in contact investigation, its results, and its contribution in improving the discovery of TB cases. This is one of the efforts to prevent tuberculosis in the Bojong Gede Health Center area, Bogor Regency..

METHODS

A. Study design

This research was carried out through preventive and promotive efforts. with a retrospective cohort study by obtaining data on TB patients with case indexs and TB Resistance (TB RO) in the data registration of the Bojong Gede Health Center, Bogor Regency., then tracing household contacts and close contacts by involving the community, health cadres assisted by health center officers to find TB cases by detecting early in household contacts or close contacts then recorded and reported through a form. Data was collected through face-to-face interviews using structured questionnaires.

This research was conducted for 3 months, from July to September 2024 at the Bojong Gede Health Center, Bogor Regency, West Java Province, Indonesia. data on TB patients with indexs and TB Resistance (TB RO) cases obtained from the data registration of the Bojong Gede Health Center, Bogor Regency., then traced household contacts and close contacts by involving the community, health cadres assisted by health center officers to detect TB cases by early detection in household contacts or close contacts then recorded and reported through the TB 16 K form, household contact investigation form.

B. Population and samples

The study population is household contacts of index cases diagnosed in the third quarter of 2024 at the Health Center in Bojong Gede District. Household contacts are people who live in the same house, share enclosed spaces (bedroom, living room, dining room, kitchen, and other rooms in the same house), and often interact with the index case for 3 months and have not been diagnosed with TB before. Household contacts are identified through interviews with index cases during home visits in contact investigations.

C. Study instruments

We collected data on the sociodemographic characteristics of household contacts (age, gender,), index case data obtained from health centers in search through the household contact investigation form (TBC16K form) through contact identification, and screening results. Data was collected through face-to-face interviews using structured forms and questionnaires. Contact participation for TB screening, evaluation, and results are obtained from TB register books and collected using checklists by

trained census officers.

D. Data collection

Screening for TB starts with a home visit in contact investigation. Contacts were interviewed regarding TB symptoms and those who coughed were given two pots of phlegm (to collect random phlegm and morning phlegm).

Contact with other symptoms or no symptoms is also advised to visit PHC for further screening and evaluation. Evaluation for TB at PHC follows the guidelines of the National TB Program. Adult contacts were evaluated using sputum examination (microscopic, Gene X-pert, culture) for bacteriological confirmation and signs, screening symptoms, and chest X-ray examination for clinical confirmation. Meanwhile, evaluations among children are carried out using an assessment system. Adult contacts were evaluated using sputum examination (microscopic, Gene X-pert, culture) for bacteriological confirmation and signs, screening symptoms, and chest X-ray examination for clinical confirmation. Meanwhile, evaluations among children are carried out using an assessment system.

We performed double data entry using SPSS version 21. The implementation of early detection in contact investigations is assessed using contact investigation performance indicators.

The way the contact with the child is carried out with their parents. Contact participation for TB screening, evaluation, and results are obtained from TB register books and collected using checklists by trained census officers.

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E. Data Analysis

Quantitative Analysis: Quantitative data from Contact Investigation through TB Form 16 K, were analyzed using descriptive statistics.

RESULTS AND DISCUSSION

1. Research Results

Based on the index case interviews, we identified 734 contacts, the results of the contact investigation obtained in the Bojong Gede District health center area through the modified TB 16 K form by adding close contacts and refusing to be investigated, the data are as follows:

Among the 734 contacts, 141 (19.2%) were children (under 15 years old), 398 (54.2%) were female, 152 (20.7%) were household contacts and 446 (60.8%) were close contacts who refused at screening 299 (40.71%), All contacts were interviewed regarding TB symptoms. have one or more symptoms of TB with the most frequent symptoms being cough (14.2%), shortness of breath (3.3%), night sweats (2%), fever (2.9%), from risk factors obtained 2% of pregnant women, 8.6% of the elderly, 2.7% suffer from Diabetes Militus (DM) and there are 16.5% are smokers.

Table 1 Distribution of respondent frequencies based on Referrals and examination results

Variable	N= 734
Referred	138(18.8%)
Checked	101 (13.8%)
Tuberculosis sickness	11 (1.5%)

From screening and contact investigation, only 18.8% were referred for TCM examination, only 13.8% of the sputum examination was carried out, and 1.5% of the sputum examination results were positive for tuberculosis

Table 2 Contact characteristics and symptoms of tuberculosis based on home visit interviews

Variable	N=734
Age (years) Mean± Elementary School	
<15 years old (children)	141 (19.2)
≥15 years old (adult)	593 (80.8)
Gender	
Woman	398 (54.2%)
Man	336 (45.8%)
Housekeeping contacts	
Yes	152 (20.7%)
No	582(79.3%)
Close Contact	
Yes	446 (60.8 %)
No	288(39.2 %)

Variable	N=734
Refuse	
Yes	299 (40.71 %)
No	435 (59.3%)
Confirmed that they were experiencing symptoms of tuberculosis during a home visit	
Cough	104 (14.2%)
Shortness of breath	24 (3.3%)
Sweating at night	15 (2 %)
Feve	21 (2.9%)
Risk Factors	
Pregnant Women	15(2%)
Elderly	63 (8.6%)
DM	20 (2.7%)
Smokers	121 (16.5%)

Table 3 Factors related to the refusal to do Skinning

	Refuse		P Value
Variable	**No Refusal**	**Refuse**	
Aged			
≤ 15 years	71(50.4%)	70 (49.6)	
> 15 years	364(61.4%)	229 (38.6)	0.021
Gender			
Woman	225 (56.5%)	173 (43.5%)	0.101
Man	210 (62.5%)	126 (37.5%	
Home Contact			
No	325 (55.8%)	257 (44.2%)	<0.001
Yes	110 (72.4%)	42 (27.6%)	
Close Contact			
No	158 (54.9%)	130 (45.1%)	0.051
Yes	277 (62.1 %)	165 (37.9%)	
Cough			
No	332 (52.7%)	298 (47.3%)	<0.001
Yes	103 (99.0%)	1 (1.0)	
Shortness of breath			
No			
Yes	411(57.9%)	299 (42.1%)	<0.001
	24 (100%)	0(0%)	
Sweating at night			
No			
Yes	420 (58.4%)	299 (41.6%)	0.003
	15 (100)	0 (0.0%)	
Fever			
No	414 (58.1%)	299 (41.9%)	
Yes	21 (100)	0(0%)	<0.001
Pregnant women			
No	420 (58.4%)	299 (41.6%)	
Yes	15 (100)	0 (0%)	0.003
Elderly			
No	378 (56.3%)	293 (43.7%)	<0.001
Ye	57 (90.5%)	6 (9.5%)	
DM			
No	415 (58.1%)	299 (41.9%	<0.001
Yes	0 (100%)	0 (0%)	
Smoker			
No	323 (52.7%)	290 (47.3%)	<0.001
Yes	112 (92.6%)	9 (7.4%)	
Have been treated for TB			

No			
Yes	433 (59.2%	229 (40.8%)	0.517
	2 (100%)	0 (0.0%)	
Referred			
No	297 (49.8%)	299 (47.2%)	
Yes	138 (100%)	0 (0.0%)	<0.001
Checked			
No	334 (52.8%)	299 (47.2%)	
Yes	101 (100%)	0 (0.0%)	<0.001
TCM Results			
Not sick with tuberculosis			
Yes. tuberculosis is sick			
	424 (58.6%)	299 (41.4%)	0.004
	11 (100)	0 (0.0%)	

Discussion

This study found contacts to index cases showed that most of the identified contacts were nuclear families of index cases. Contact identification must be optimized because most people in the Bojong Gede health center area of Bogor Regency live with extended family.

Regulation of the Indonesian Minister of Health No. 67 of 2016. where contact investigations must identify 10-15 contacts from one index case (8). based on a review of the TB register. Technically the number of rows to list contact search results is limited. Only five lines are provided for close contacts and refusals. are not available in the available form. so they need to be modified. and this causes the officer to only provide a maximum of five identified contacts. although there are more contacts that can be found. Problems also arise from the index case. They experience fear of infection. loneliness. and isolation from society. which delays them from seeking health services.

The stigma experienced by index cases prevents them from reporting their close and household contacts during the investigation. In line with Harjadi's research. where most of the negative public stigma towards TB disease in Bengkulu City is 59.3%. Most of the coverage of positive TB BTA cases is still low in Bengkulu City at 95%. There is a relationship between community stigma against TB disease and the discovery of positive cases of TB BTA in Bengkulu City with P value = 0.073. (9) .

A cross-sectional prospective study was conducted in which 443 caregivers. out of 508 children with active TB who received treatment. were interviewed using a structured questionnaire. With the current contact screening system for TB. only 9.3% of all HHCs are screened. The low level of screening contacts may be a result of the passive nature of the program. which mainly depends on the typical clinical symptoms experienced by the contact. Strategies are needed to ensure adherence to contact screening among children with active TB and to critically consider the factors responsible for TB transmission. (10).

Among the 778 TB cases. contact tracing was carried out in 455 cases (58.5%). Compared to cases without contact tracing (n=323). cases with contact tracing (n=455) had higher rates of treatment success (92.5% vs 79.3%) and cure rates (57.1% vs 39.9%) as well as lower rates of follow-up loss (3.5% vs 9.3%). treatment failure (0.4% vs 1.6%) and death (3.5% vs 9.9%) (P<0.001). Contact tracing was associated with a higher likelihood of treatment success (adjusted likelihood ratio (aOR) 3.00. 95%CI 1.92–4.70. P<0.001) and cure (aOR 3.11. 95% CI 1.97–4.90. P<0.001). and a lower likelihood of non-follow-up (aOR 0.33. (0.13–0.83). P=0.018) and death (aOR 0.38. (0.20–0.72). P=0.003). (11)

The stigma experienced in an index case prevents reporting close contacts and household contacts during investigation.(12). TB officers at PHCs should be trained to increase capacity in providing education about TB. as well as building trust. and interviewing people with TB to trace more contacts..

In early detection in Screening and contact investigation there are two missed points of opportunity. which leads to low participation. The participation of contacts who refused in the investigation was 299 (40.71%). the second was the participation of contacts to complete the TB evaluation as many as 101 (13.8%). A previous study on barriers to compliance with TB contact investigations found that knowledge. attitudes. and practices were associated with contact participation (13). Other studies found a barrier between index cases and contacts in contact investigations were a lack of public knowledge about TB. the perception of TB stigma and fear of TB diagnosis (12). Both studies show that the challenge to early detection of TB is behavioral health (14). individually adapted physical activity at the primary health care level has emerged as a novel method of engaging people and delivering positive outcomes; (15).

Findings on contact screening and investigation may imply the importance of health education for contacts. which can be provided during home visits. Factors associated with health-seeking behavior about TB include knowledge. perceptions about TB. stigma associated with TB. fear of TB diagnosis. and their previous experience visiting health facilities. Therefore. health education materials and methods must comprehensively address the cognitive and psychological aspects of contact (16).

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contacts. which can be provided during home visits. Factors associated with health-seeking behavior about TB include knowledge. perceptions about TB. stigma associated with TB. fear of TB diagnosis. and their previous experience visiting health facilities. Therefore. health education materials and methods should comprehensively address the cognitive and psychological aspects Higher positivity rates among contacts with at least one TB symptom suggest that they should be made a priority in screening. results of 11 (1.5%) TB positive among contacts with similar symptoms with positive rates among suspected TB in the general population of 101 (13.8%). This shows that early detection of TB shows between contacts is an efficient and effective strategy. (16)

CONCLUSION

Screening and contact investigation in early detection can be carried out continuously by according to the reported case indexs. This strategy has proven to be effective and efficient in finding new TB cases. especially in at-risk and children. thus contributing to the increase in TB case discovery. The main obstacle faced is the low participation of TB contacts to undergo TB screening. Comprehensive education that includes cognitive and psychological aspects is needed to encourage contacts to participate in TB screening until their diagnosis is confirmed. and the need for a design of an educational model to be used by TB cadres in the region when conducting contact investigations if it is found that there are participants who refuse to be screened.

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