

Original Research



Implementation National Guidelines for Tuberculosis Control in Surabaya Public Health Centers

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Abstract:

Background: Tuberculosis is still endemic in Indonesia with 316 cases per 100,000 population in 2018 and Indonesia has the 3rd highest TB case in the world [1]. The leading causes of the burden of TB in Indonesia include the implementation of the TB program is not by the standards, cross-sector involvement is not optimal, the increase of Multi-Drug Resistant TB cases, and other factors. Suspected case findings and diagnosis are basic things in TB control programs that must be implemented optimally.

Purpose: Knowing the implementation of TB control programs in public health centers that focus on screening and diagnosis based on the National Guidelines for TB Control 2014.

Methods: This type of research is observational descriptive. Data was collected using a combined closed and open questionnaire and medical record data for public health centers patients from January to December 2019. Informants were selected by purposive sampling.

Results: The results showed that 4 public health centers reached the target for finding suspected pulmonary TB cases, but only 2 reached the target proportion of finding new pulmonary TB cases. Inconsistencies in program implementation and obstacles were also found in the field.

Conclusion: The success of finding suspected pulmonary TB that is not accompanied by a diagnosis occurs in public health centers that do not implement programs according to national guidelines and some obstacles arise in the field. Evaluation and innovation of TB control programs need to be carried out continuously to achieve the target.

Keywords: Implementation; National Guidelines; Tuberculosis

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Introduction:

Tuberculosis (TB) is an infectious disease caused by *Mycobacterium tuberculosis*. TB infection may exhibit different clinical manifestations depending on the host's immunity. In immunocompetent individuals, the bacteria will stop replicating so that it becomes a latent infection. In immunocompromised individuals, the bacteria will actively replicate so that it can cause clinical symptoms known as active TB. Research says that 5-10% of all cases of TB infection will develop into active TB. About 23% of the world's population or 1.7 billion people are estimated to have a latent TB infection and are thus at risk of developing active TB disease during their lifetime [1].

TB disease is still endemic in Indonesia with the number of TB cases in 2018 at 319 per 100,000 population and the death rate of TB sufferers of 40 per 100,000 population. This figure places Indonesia's TB cases in the 3rd highest position in the world with a case percentage of 8% of global cases [1].

The discovery of new TB cases in East Java Province occupies the second highest national position after West Java, with 65,448 cases [22]. The city of Surabaya is known to have found 7.950 TB cases from target 10.885, with the Case Detection Rate (CDR) of 73.04% and Case Notification Rate (CNR) of 274 per 100,000 population, but this figure has not met the national target [3].

The leading causes of the increase in the burden of TB in Indonesia namely the implementation of the TB program is not by the standards, TB case management of cross-sectoral involvement is not optimal, the increase in the number of Multi-Drug Resistant (MDR) TB cases which increases the funding of the TB program, as well as social factors [4].

The implementation of the TB program that does not meet the standards consists of finding suspected cases, diagnosis, classification, and treatment. The TB case finding strategy is carried out by active promotion or health education, active TB suspect finding in high-risk groups, and passively at the public health center with the application of integrated management in diagnosis. Implementation of the diagnosis is the collection of sputum and examination of sputum cultures. Then patients who have been diagnosed will be classified and given appropriate treatment [4].

Suspected case finding and diagnosis are basic things in TB control programs that must be carried out optimally so that the better the implementation of the suspect discovery and the accuracy of the diagnostic examination will further increase the chances of discovery and treatment of active TB and the chain of TB transmission can be suppressed. Therefore, this study was conducted to determine the implementation of TB control programs in public health centers that focus on the implementation of screening and diagnosis based on the National Guidelines for TB Control 2014.

Methods:

This research was conducted with a descriptive observational approach. Data was collected qualitatively with a combined closed and open questionnaire as well as quantitative data from patient medical records at the public health center in January-December 2019. The instrument used was a questionnaire based on the National Guidelines for TB Control 2014.

Informants in this study were determined by purposive sampling, namely seeing certain considerations because they are capable of providing complete data or information. There were 12 selected informants consisting of 6 officers holding the pulmonary TB program and 6 laboratory officers at six public health centers in Surabaya. The location of this research is a public health centers in the city of Surabaya. The research was conducted from November 2019 to October 2020.

This study analyzes two main things, namely screening for pulmonary TB suspects which include the implementation of promotive activities (counseling), passive and active screening efforts, and integrated management in the diagnosis and diagnosis of active TB which includes the process of collecting sputum samples as well as health facilities and infrastructure. for diagnostic testing. Data analysis was carried out by describing the actual situation descriptively and compared with indicators of the achievement of the TB program targets at the public health center and the National Guidelines for TB Control 2014. This research has received ethical approval from Health Research Ethics Committee Universitas Airlangga School of Medicine number 146/EC/KEPK/FKUA/2020.

Results and Discussion:

Case Finding Suspected Pulmonary TB

One indicator of the success of screening suspected pulmonary TB is the achievement of the case-finding target. The target for finding suspected pulmonary TB is determined by the city health office and varies in each public health centers. Achievement of the suspect's discovery target pulmonary TB plays a vital role in determining the chances of finding active TB patients; the greater the number of suspects obtained and examined, the greater the chances of finding active TB sufferers among the suspects.

Table 1: Finding Cases of Suspected Pulmonary TB

Achievement of Targets for Finding Suspected Pulmonary TB	n	%
Achieved	4	66.7
Not achieved	2	33.3

In this study, it was found that the target of finding suspected pulmonary TB cases was achieved in four public health centers and not achieved in two public health centers (Table 1), so it is necessary to explore factors that can influence such as the implementation of promotive activities (counseling), passive and active screening efforts, also the application of integrated management in diagnosis.

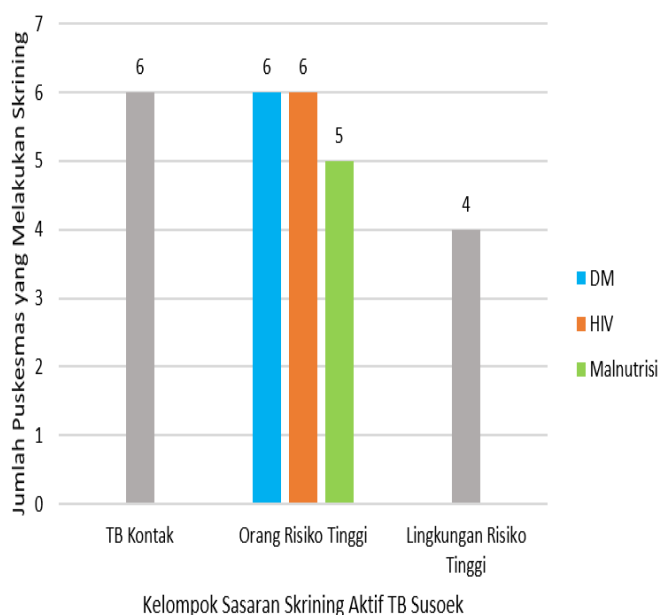
Counseling is a place for education and persuasion that is carried out to increase public understanding of TB symptom complaints. This activity is important as an initial milestone in the success of the program so that curative and rehabilitative health efforts can be reduced, as stated in the study, namely that public ignorance makes a tendency not to seek treatment because the early symptoms of TB disease are symptoms that occur like a common disease in winter that does not require treatment [5]. This lack of knowledge can complicate the success of the TB program because it makes transmitting TB infection easier. Fulfillment of health education and information regarding tuberculosis is essential to ensure the effectiveness of the implementation of the TB control program.

Table 2: Implementation of TB Extension Activities

Aspect	n	%
Location		
public health centers only	1	16.7
Society only	2	33.3
Both of them	3	50
Frequency		
1-2x/year	1	16.7
12-24x/year	5	83.3
Total	6	100

The implementation of TB counseling activities has been carried out regularly routinely by all public health centers (Table 2) with counseling materials delivered on cough etiquette and TB transmission methods. One out of six public health centers provide limited counseling only at the public health center with less frequency, namely 1-2 times per year; this is mentioned because of the limited number of officers so direct counseling in the community cannot be carried out. A study found that there was no significant relationship between the frequency of counseling implementation and the discovery of pulmonary TB cases, but there were other factors that could influence such as the selection of methods, materials, media, and extension officers [6].

This study shows the results that the use of counseling media in five public health centers is quite diverse, namely posters, banners, leaflets, educational videos, and banners, while at one public health center only uses one type of counseling media. Variations in the use of extension media can be one of the success factors for extension activities because of the interest and ability of each individual's understand the presentation of information. In addition, the effectiveness of using media also depends on the explanation of health workers. The influence of educational media variations against acceptance information is known to have meaningful results, namely $p = 0.001$ [7]. The more senses are used to receive messages and information, the higher or clearer the understanding of the message received, hence, it needs to be used various kinds of media [8].

Figure 1: Targets for Active Screening of Pulmonary TB Suspects

Screening for suspected pulmonary TB can be carried out in health facilities passively by examining sputum in patients with TB symptoms, however this must still be supported by active promotion from the health workers together with the community. The discovery of suspected active pulmonary TB can be done in TB contacts, high risk groups, and high risk environments [4].

In Figure 1, it is known that active screening for pulmonary TB suspects has been carried out by all public health centers for TB contacts and people who are at high risk (diabetic patients, Human Immunodeficiency Virus (HIV), and malnutrition). There is one public health center that does not screen children with malnutrition, this shows that there are screening activities that are not in accordance with national guidelines. A person with malnutrition will experience a weakened immune system that can manifest into active tuberculosis infection. A study found that the relationship between the incidence of pulmonary TB and nutritional status was significant with the risk of tuberculosis transmission being 7.583 times greater [7]. Other studies have also stated that malnutrition can increase the risk of developing active tuberculosis by 6 to 10 times [10].

The implementation of active screening in high-risk environments (schools, flats, or areas with a high number of TB cases) was not carried out by the two public health centers due to limited health personnel, even though high-risk environments or densely populated areas have the potential to be a source of the rapid spread of TB germs. Based on a

study, it is known that there are 7.6% of TB patients out of 513 flat occupants [11], if the flat occupants are not properly educated and detection is late, there will be a rapid spread, especially if the flat environment is unhealthy (humid and little sunlight). Screening in the school environment has been carried out by one public health center, this is a good step because TB infection often occurs in childhood as data from the World Health Organization (WHO) in 2020 states that the percentage of TB in children reaches 12% of the total TB cases and TB infection in children that is not treated immediately causes miliary TB and meningitis which can be life-threatening [12].

The implementation of passive and active screening in all public health centers of this study refers to the criteria for establishing the diagnosis of suspected pulmonary TB, namely clinical symptoms of chronic cough for two weeks with or without accompanying symptoms. Clinical symptoms in TB patients can vary, this depends on the condition of each individual's immunity so that the provisions of the diagnostic criteria for suspected pulmonary TB are good so that underdiagnoses do not occur and patients can be detected and receive anti-tuberculosis drug therapy (OAT) from an early age if TB test positive.

Table 3: Integrated Management of New TB Case Screening

Implementation of TB Screening with Integrated Management	n	%
MTBS only	2	33.3
PAL only	-	-
MTBS and PAL	3	50
Are not done	1	16.7

The application of integrated management for patients with the same symptoms and signs as TB will increase TB case finding in health facilities, reduce missed opportunities, as well as improve service quality [4].

The case finding of suspected pulmonary TB with a collaborative approach to PAL and MTBS services is very good to be applied so that all sick toddlers and adults can be monitored so that if there are symptoms that lead to suspected pulmonary TB, they can be diagnosed. since the early stage. Efforts to approach collaborative PAL and MTBS services did not work in one public health center (Table 3), this was due to limited

health personnel even though the implementation of MTBS in Egypt was proven to reduce 84% of under-five mortality in health facilities in the period 1999 to 2007 [13].

Active TB Diagnosis

The implementation of the diagnosis of active TB is influenced by the process of collecting sputum samples and competent health infrastructure to carry out diagnostic examinations [4].

Patients who have been diagnosed with suspected pulmonary TB will immediately undergo a sputum culture examination to confirm the diagnosis of bacteriologically active TB. The process of collecting sputum samples that are applied in all public health centers is the collection of 2 sputum pots in the morning and at any time and should not be delayed. This is a good step because it complies with the latest national regulations. Delay in sputum collection also has the potential to reduce sample quality, as stated in a study that the viscosity of sputum can change after being stored for 24 hours at room temperature (25°C) so that it becomes watery. This can happen because the room temperature tends to be warm causing the granules to burst in the sputum so that the liquid will come out of the granules and the sputum becomes watery [14].

On microscopic examination, the ideal sputum preparation must meet 6 criteria, namely thick specimens (purulent or mucopurulent), good staining, clean, no debris, good thickness, size 2x3 cm, and smear flatness >80% [15]. Sputum quality greatly determines the results of reading AFB preparations, false negative results can lead to low treatment so that it becomes a source of transmission in the community [14].

Table 4: Sputum Sample Collection

Sputum Sample Collection Process	n	%
Independent	1	16.7
Helped by cadre	5	83.3

The process of collecting sputum samples in the field has several obstacles that can reduce the number of TB diagnoses. Sputum sample collection was only carried out independently at one public health center (Table 4) due to the lack of active cadres in the densely populated public health center area coverage. This study also found that patients with suspected pulmonary TB often did not return to the public health center for further

examination due to their busy schedules and high stigma in society. In this case, cadres have an important role in controlling TB transmission, namely as part of the community who have more time and can interact directly in the field. A study in China revealed that patients aged 20 to 40 years experienced 3,369 times delays in examinations ($P<0.05$) due to busy work [1616], besides that stigma was still experienced by many TB patients at various levels due to a lack of knowledge of TB in the community [17]. This requires the motivation of cadres who are awakened from awareness to help the community find suspects based on humanity [18], as well as increasing public insight through counseling so that stigma can be removed.

Another obstacle is the non-ideal quality of sputum samples (often in the form of saliva) that occurs in all public health centers. A significant relationship was found between the quality of sputum specimens and the gradation of the results of AFB examination and a study stated that there were differences in the results of the calculation of AFB in sputum samples that were not ideal (too dilute). This has the potential to cause a false negative diagnosis on the smear microscopic examination [14,19]. Steps that have been taken by the public health center in dealing with this are to educate on how to effectively phlegm and or provide expectorant drugs.

Lack of inventory sputum pot also became an obstacle in one public health center, this was due to an increase in the target for finding suspected pulmonary TB to more than twice as much as before, but logistical management could not fulfill it. The guarantee of the availability of tools and materials is carried out by the city health office so that there is no delay in diagnosis as stated in the National Guidelines for TB Control 2014 that *“Non OAT logistics planning is carried out by the National TB Control Program together with the Provincial and District/City Health Offices. taking into account the target of case finding and development of program coverage”*.

One indicator of the success of establishing a diagnosis of active TB is the achievement of the proportion of new pulmonary TB patients, that is if the value is below 5%, it indicates a non-ideal achievement and a value of 5-10% indicates an ideal achievement.

Table 5: Achievement of Proportion of New Pulmonary TB Patients to Total Lung TB Suspects

The proportion of Patients with Bacteriologically Confirmed Pulmonary TB	n	%	Information
<5%	4	66.7	Not ideal
5-10%	2	33.3	Ideal

In this study, it was found that only two public health centers reached the target proportion of finding new pulmonary TB patients with ideal values, while the other four public health centers were not ideal (Table 5). This could be due to the slack in the screening process for suspected pulmonary TB and or obstacles in the process of examining samples in the laboratory [4]. As previously discussed, the impediment that has been discussed is that sputum collection with non-ideal quality, which is often in the form of saliva, occurs in all public health centers.

Obstacles in the sample examination process can occur due to incompetent health facilities and infrastructure in conducting the examination. The main modalities used in establishing the diagnosis of active TB can affect the sample examination process. This study found that one public health center that used GeneExpert MTB/RIF as the main diagnostic modality succeeded in achieving the target of finding pulmonary TB suspects and getting an ideal score for the proportion of finding new pulmonary TB patients, while the public health center using microscopic AFB as the main modality of TB diagnosis unable to achieve the ideal score for proportion of finding new pulmonary TB patients.

GeneExpert MTB/RIF examination has several advantages compared to microscopic AFB, namely a higher sensitivity than a microscope, which is 97.83%. GeneExpert MTB/RIF also only takes a short time to examine the sample, which is 2 hours compared to microscopic AFB which takes 2-4 days. Sputum examination with microscopic BTA is also very dependent on the quality of the sputum, this is due to the low sensitivity of the microscope, which is 68.48%, thus increasing the possibility of false *negative results* [2020]. False-negative results that occur due to incorrect sputum

culture readings will accelerate the transmission of TB infection in the community.

The use of GeneExpert MTB/RIF can also improve MDR TB case findings. Based on data WHO report, the number of MDR TB cases in Indonesia is lower than the estimated number of cases [1]. MDR TB cases that are not found and treated can cause an increase in the financing burden of TB programs because the transmission of cases will increase and the therapy required is more complex and takes a long time. This explanation further strengthens that the selection of GeneExpert MTB/RIF which can simultaneously detect MDR TB cases is important.

Another obstacle found was the absence of a replacement diagnostic tool supply in case of damage, this happened in one public health center for 2-3 weeks thus hampering the diagnosis process and affecting the number of new TB cases. If there is a delay in the examination, sputum samples stored for 24 hours or more at a temperature of 25 °C can be overgrown by fungi that can affect the results of the examination. Sputum to be examined for more than 24 hours should be stored at 4 - 8°C [14], so sample storage facilities are needed to produce an accurate diagnosis.

Limited human resources occur in three public health centers because there is only 1 laboratory worker, this is not by the Regulation of the Minister of Health of the Republic of Indonesia Number 37 of 2012 which states that the number of laboratory personnel in public health centers consists of 1 technical staff and 1 non-technical staff.

In addition, it was also found that the routine training of officers who played a role in the implementation of TB diagnosis was only carried out by three public health centers. This is certainly an obstacle because of limited human resources and lack of training accompanied by a high workload that has the potential to reduce the quality of work so regular and continuous training activities are important to maintain the quality of service. This is in line with research that states that officers with good knowledge will have an impact on good suspect discovery behavior (72.3%), and conversely, officers with fewer knowledge levels will behave less in suspect discovery (4.0%) [18]. Another study also stated that the chance of finding a TB suspect in officers who attended or received

training was 5.222 times higher than in officers who did not attend or received training [21].

Conclusions:

The success of achieving the target of finding suspected pulmonary TB that is not accompanied by a good diagnosis will certainly be very detrimental. It can reduce the number of new TB cases. The discrepancy in implementing the TB control program with the national guidelines was found in public health center which did not reach the target proportion of finding new pulmonary TB patients, due to various obstacles found in the field. Evaluation and innovation of TB control programs in the field need to be carried out on an ongoing basis to archive the target. The entire implementation of screening for suspected pulmonary TB and establishing a diagnosis of active TB also requires the synergy of the roles and commitments of medical personnel, communities, organizations, and government so that TB control programs can run optimally.

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