Factors Affecting Discovery of Pulmonary TB Case through Molecular Quick Method (TCM) and Information System Treking for Transport Specimens (SITRUST) in Medan

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Abstract :   Globally (2016) there were 10.4 million incidents of pulmonary TB equivalent to 120 cases per 100,000 population. Medan City is sample area of the International KNCV NGO with TCM and SITRUST facilities. The aim of the study was to analyze the sociodemographic relationship, knowledge, attitudes, and behaviors of TB officers at the health centre with the discovery of pulmonary TB cases using the TCM and SITRUST methods. This research used cross sectional study. The population are TB officers in health centre and TB program managers in Medan City Health Office. Samples are 39 pulmonary TB officers in Medan City Health Center. Data collection is done by interview using a questionnaire that has been tested before and analyzed with the *Mann-Whitney* test. The results of this study were 53.8% of officers aged ≥45 years, female sex (97.4%), having an undergraduate education (46.2%), long time serving ≥ 8 years, had attended training (87.2%). There is no relationship between age, sex, education, length of service, training, knowledge, attitudes, and behaviors with pulmonary TB case finding (p> 0.05), which means that all characteristics can use the TCM and SITRUST methods in the context of TB case finding pulmonary.

1   INTRODUCTION

Globally in 2016 there were 10.4 million incidents of pulmonary TB equivalent to 120 cases per 100,000 population. The five countries with the highest incidence of pulmonary TB are India, Indonesia, China, the Philippines and Pakistan. The highest estimated incidence of pulmonary TB in 2016 occurred in Southeast Asia (45%). The number of new TB cases in Indonesia was 420,994 cases in 2017. The Case Notification Rate (CNR) per 100,000 population in Indonesia in 2017 was 161, an upward trend from the previous year. Indonesia's Case Detection Rate (CDR) coverage from 2008-2017 tended to be a significant increase in 2017's CDR of 43.4% (Ministry of Health RI, 2018).

The estimated burden of pulmonary TB in North Sumatra Province in 2017 TB incidence was 73,488 with a CDR of 50%. Sumatra's CNR in 2017 increased by 185 from the previous year and the 2016 Success Rate of 92.3. Based on Regency / City the highest CNR in 2017 was Medan City (369). In 2017 the North Sumatra Province CDR was 35.9%, the Medan City CDR was 58.7% and

Deli Serdang was 26.4%. Whereas in the 1-3 quarters of 2018, the North Sumatra Province CDR was 36%, the Medan City CDR was 65% and Deli Serdang was 27%. Pulmonary TB intervention is given evenly in all districts / cities but the results are significant differences in the discovery of new cases. Medan City and Deli Serdang are sample areas of international NGOs namely KNCV in accelerating the process of TB elimination by providing assistance and increasing human resources in both other regions and regions in North Sumatra Province. Facilities provided by the KNCV in case finding include TCM in all districts/cities. Specifically for Medan City and Deli Serdang, they were also given SITRUST.

Factors causing the low case finding of pulmonary tuberculosis in health center based on research Nugraini et al (2015) are influenced by the duties and responsibilities of the P2TB program holder, laboratory staff, and the head of the health center, funding, suspicion screening, diagnosis, and reporting.

To overcome the above problems related to the examination currently developed Rapid Molecular

Test (TCM) with Xpert MTB / RIF which is fast and can identify the presence of MTB and resistance to rifampicin simultaneously, so that early initiation of accurate therapy can be given and can reduce the incidence of TB by general. At present, TCM examination with Xpert MTB / RIF is the only molecular examination covering all required rebehavior elements including all reagents for the Polymerase Chain Rebehavior (PCR) process in one cartridge. Xpert MTB / RIF examination detects qualitative MTB complex DNA from direct specimens, both sputum, and no sputum. In addition to detecting complex MTB, Xpert MTB / RIF examination also detects mutations in the rpoB gene that cause resistance to rifampicin. Xpert MTB / RIF examination can diagnose TB and rifampicin resistance quickly and accurately.

In addition to TCM, a Treking Information System for Specimen Transport (SITRUST) was also developed, an information system to monitor the movement of shipments of test sample packages starting from the order process, pick-up by courier, confirmation of receipt, feedback related to the conditions of the test sample to the recapitulation of the test sample inspection results. SITRUST consists of a form of a web-based application for managing data and user accounts of SITRUST and an Android-based mobile application that is used to send and receive test samples. The main users of the information system are program management officers and laboratory analysts from the health facilities and correctional institutions, couriers, health services and the TB Sub-Directorate. In addition to functioning as a tracking device, SITRUST also supports the electronic recapitulation of recording and reporting of sample shipments.

Rye, et al (2007) stated that there was a significant correlation between TB suspicion screening (OR = 8.92; 95% CI 2.36-38.65), IEC services on TB (OR = 8.85; 95% CI = 2.16 -36.97), and DOTS training (OR = 5.84; 95% CI = 1.54-26.77) for the discovery of new cases in Palu City. Research Saomi et al (2013) states there is a relationship between educational background (p = 0.027; OR = 8.0) and knowledge (p = 0.023; OR = 9.75) to the discovery of cases of pulmonary TB in the Ex-Pati Pati.

2 METHODS

This research model is quantitative. Quantitative to see the relationship between the independent variables and the proportion of case finding targets in both study sites. *Mann-Whitney* test is used to see the relationship between dependent and independent variables.

3 RESULTS

3.1 Respondent Characteristic

Characteristics of respondents can be seen by using a questionnaire through interviews which include sociodemography (age, gender, last education, long on duty and training experience). Respondents in this study were 39 TB officers in Medan City Health Center. The proportion of respondents based on characteristics can be seen in the Table 1.

Table 1: Distribution of characteristics based on sociodemography (age, sex, recent education, long on duty, and training experience) of TB officers in Medan city health center.

Characteristic	n	%
Age		
<45 years old	18	46,2
≥45 years old	21	53,8
Total	39	100
Sex		
Male	1	2,6
Female	38	97,4
Total	39	100
Recent Education		
Senior High School	4	10,3
Diploma	17	43,6
Bachelor	18	46,2
Total	39	100
Long on duty		
<8 years	18	46,2
≥ 8 years	21	53,8
Total	39	100
Training experience		
Has never been	5	12,8
Ever	34	87,2
Total	**39**	**100**

Based on the Table 1, the results show that the proportion of the age group of TB workers in Medan majority is ≥45 years (53.8%), female (97.4%), having a bachelor degree (46.2%), the majority have been an officer in the pulmonary TB program for ≥8 years (53.8%), and the majority of staff had attended pulmonary TB training (87.2%).

Based on Maryun's research (2007) that the majority of TB workers are> 40 years old (42.3%). In the Nuraisya study (2018), the same results were

obtained with the majority of TB workers being aged 46-55 years (48.8%).

This is in line with the results of Rye's research (2009) which shows that the majority of TB workers are female (78.6%). This is in line with the results of Widjanarko's research (2006) which shows that the majority of TB workers have D3 and above education (57.7%). This is different from Maryun's research (2007) that the majority of TB workers have D3 education (69.2%) with the lowest proportion of S1 education (3.8%). The majority of staff have D3 education and above, this meets the minimum qualification standard for health workers to have a minimum D3 education. Based on the research results of Ratnasari (2015) in Rembang Regency, it shows that the level of education has no relationship with the achievement of officers on the case detection rate (CDR) in the pulmonary TB program. From these results it can be concluded that having a high education is no guarantee to produce satisfactory performance.

The results of Nuraisya's study (2018) also showed that the majority of officers had 12 years of service. Maryun's research (2007) also shows a consistent result that the majority of officers have a working period of 11-20 years (34.6%). The results of Husein's research (2012) showed that the majority of officers had lama3 years of service (65%) with p> 0.05, ie the length of work had no relationship with the performance of TB officers in the discovery of pulmonary TB cases.

Table 2: Relationship between age of pulmonarytb program officers and pulmonary TB case finding through TCM and SITRUST methods in Medan city health center.

No	Age	TB Case Finding		
		n	SD	Mean
1	<45 years old	18	4,754	37,39
2	≥45 years old	21	3,948	51,76

Based on the Table 2, it can be seen that there are 18 TB case findings aged <45 years with a standard deviation of 4.754 and as many as 21 TB case findings aged ≥45 years with a standard deviation of 3,948.

Based on the Mann-Whitney test p value <0.05 (p = 0,703), which means there is no significant difference between age and the discovery of pulmonary TB cases in Medan City Health Center.

This is in line with the study of Widjanarko (2006) which shows that age and sex have no relationship with pulmonary TB case finding. Based on the results of this study, it cannot be said that holders of pulmonary TB programs at the older age will produce better case findings than younger

officers. This can be proven by the existence of some younger officers with high TB cases.

Table 3: Relationship between the sex of the pulmonary TB program officer with pulmonary TB case finding through the TCM and SITRUST method in Medan city health center.

No	Sex	TB Case Finding		
		n	SD	Mean
1	Male	1	-	1,00
2	Female	38	0,001	2,00

Based on the Table 3, it can be seen that there is 1 male case finding of TB. There is only 1 male case so no standard deviation is obtained. There are as many as 38 TB cases that are female with a standard deviation of 0.001.

Based on the Mann-Whitney test p values <0.05 (p = 0, 109), which means there is no significant difference between the sexes and the discovery of pulmonary TB cases in Medan City Health Center.

This is in line with Widayat's (2006) research which shows that there is no relationship between the sex of TB workers and the role of health workers in TB case finding. Some male health workers at the health center perform their roles in TB case finding well and some perform their roles unfavorably. Likewise, with female health workers, some carry out their roles well and some don't. This shows that there are similarities between male and female officers. Thus the TB case finding results do not have a relationship with sex.

Table 4: Relationship between the recent education of pulmonary tb program officers and pulmonary tb case finding through TCM and SITRUST methods in Medan city health center.

No	Recent Education	TB Case Finding		
		n	SD	Mean
1	Senior High School	4	0,001	1,00
2	Diploma	17	0,001	2,00
3	Bachelor	18	0,001	3,00

Based on the Table 4 it can be seen that the most TB case finding is done by officers with a bachelor's education, namely 18 cases, with a standard deviation of 0.001.

Based on the *Mann-Whitney* test p values <0.05 (p = 0, 945), which means that there is no significant difference between the recent education and the discovery of pulmonary TB cases in Medan City Health Center.

This is not in line with Maryani's (2015) study which found that the majority of TB workers had Diploma education (66%). Education is an effort in

providing knowledge to individuals. The higher the level of one's education, the higher the level of knowledge. In this study, it was found that the majority of TB workers had an undergraduate level of education (46.2%), but in interviews conducted relating to staff knowledge, there were still officers who did not know/were wrong in answering questions about TB or TB case finding with TCM.

Table 5: Relationship between the long on duty of pulmonary TB program officers and pulmonary TB case finding through TCM and SITRUST methods in Medan city health center.

No	Long on duty	Case Finding TB		
		n	SD	Mean
1	<8 years	18	1,96	3,08
2	≥8 years	21	8,17	18,80

Based on the Table 5, it can be seen that TB case finding is mostly done by officers with a duty of ≥8 years with 21 cases, with a standard deviation of 8,17.

Based on the Mann-Whitney test, p-value <0.05 (p = 0, 945), which means that there is no significant difference between the long on duty with TB case finding in Medan City Health Center.

Husein's research (2012) shows that there is no relationship between the length of work and the discovery of pulmonary TB cases. The study also shows a consistent result, namely the length of time the officer has no relationship to the case detection rate in the Pulmonary TB program. In the results of this study also showed the same thing because some of the officers who had kerja8 years of work had a case-finding rate that was below average and vice versa with officers who had a length of work <8 years.

Table 6: Relationship between training experience of pulmonary TB program officers and pulmonary TB case finding through TCM and SITRUST methods in Medan city health center.

No	Training Experience	TB Case Finding		
		n	SD	Mean
1	Has never been	5	0,001	1,00
2	Ever	34	0,001	2,00

Based on the Table 6, it can be seen that the TB case finding is more in the officers who have done training compared to those who have never been done, namely the discovery of 34 cases in the officers who have done training with a standard deviation of 0.001.

Based on the *Mann-Whitney* test, p-value <0.05, which means there is no significant difference between the experience of TB staff training and the case finding of pulmonary TB cases in Medan City Health Center.

This is different from the research results of Ratnasari (2015) which shows that there is a relationship between training conducted by officers and the discovery of pulmonary TB cases. In the results of this study, the majority of officers had attended training (87.2%), but there was still low pulmonary TB case finding rates. According to the results of research Rye (2009) states that there is a relationship between DOTS training with the discovery of pulmonary TB cases because the training of someone aims to look for the expected capacity improvement. It is expected that the increased ability will be directly proportional to the results of improved performance which ultimately results in the discovery of good cases of pulmonary TB. Also, the training aims to improve the effectiveness of officers in achieving work results by specified and specific work implementation techniques. In connection with TCM training, there are still officers who are found not to know about TCM, even though the existence of TCM is expected to provide better results in TB case finding in the community.

Table 7: Relationship between knowledge of pulmonary TB program officers and pulmonary TB case finding through TCM and SITRUST methods in Medan city health center.

No	Knowledge	TB Case Finding		
		n	SD	Mean
1	Low	19	3,36	16.26
2	High	20	4,26	26,5

Based on the Table 7, it can be seen that TB case finding is more in officers who have high knowledge compared to officers who have low knowledge, namely the discovery of 20 cases in officers who have higher education with a standard deviation of 4.26.

Based on the Mann-Whitney test, p-value <0.05, which means there is no significant difference between the knowledge of TB officers and the discovery of pulmonary TB cases in Medan City Health Center.

This is in line with research Rye (2009) which shows that there is no relationship between the knowledge of officers with the discovery of pulmonary TB sufferers in the city of Palu. It means that TB officers with good knowledge or lack the

same opportunity to find patients with pulmonary TB. In this study, it was obtained that some officers who had high knowledge resulted in a case-finding rate that was below average. Also, it was found that officers who still lacked knowledge of TCM and SITRUST due to the program that had just been enacted and training that was lacking by officers.

In contrast to the results of Maryani's study (2015) at the Kartasura Community Health Center which found that there was a relationship between the level of knowledge of health workers and the role of TB suspects discovery, with the Spearman test that obtained a significance value of 0.00 (p-value <0.05). The results of the study found that the majority of health workers had insufficient knowledge (46%).

Table 8: Relationship between attitudes of pulmonarytb program officers and pulmonary tb case finding through tcm and sitrust methods in medan city health center.

No	Attitude	TB case finding		
		n	SD	Mean
1	Not good	19	1,98	29,42
2	Good	20	2,38	36,30

Based on the Table 8, it can be seen that TB case finding is more in officers who have a good attitude compared with officers who have less attitude, which is found 20 cases in officers who have good attitude with a standard deviation of 2,38.

Based on the *Mann-Whitney* test, p-value <0.05, which means that there is no significant difference between the attitudes of TB workers and the discovery of pulmonary TB cases in Medan City Health Center.

This is different from the results of Widjanarko's research (2006) which shows that there is a relationship between the attitude of TB workers with the discovery of suspected pulmonary TB. Ratnasari's research (2015) also shows the same results that there is a relationship between the attitudes of the officers and the achievement of the officers towards the case detection rate in the Pulmonary TB program in Rembang Regency. From the results of this study obtained an overview of officers who have attitude scores above average but have low case finding results.

Based on the Table 9, it can be seen that the discovery of more TB cases in officers who have good behavior compared with officers who have bad behavior, namely the discovery of 25 cases in officers who have good behavior with a standard deviation of 0.66.

Table 9: Relationship between behavior of pulmonary TB program officers and pulmonary TB case finding through TCM and SITRUST methods in Medan city health center.

No	Behavior	TB Case Finding		
		n	SD	Mean
1	Not good	14	0,49	3,64
2	Good	25	0,66	5,76

Based on the *Mann-Whitney* test, p-value <0.05, which means that there is no significant difference between the behavior of TB officers and the discovery of pulmonary TB cases in Medan City Health Center.

The behavior illustrates the process of finding pulmonary TB cases using the TCM method and the SITRUST application, which includes TB officers conducting the TCM method in sputum examination, providing information to TB suspects regarding the TCM method, and using the SITRUST application in the process of sputum delivery until receiving the results of the examination using the TCM method . Research by Boehme, et al (2010) on rapid molecular tests of tuberculosis and rifampicin resistance conducted at five trial sites namely Peru, Azerbaijan, Cape Town, South Africa, and India with the conclusion that the MTB / RIF test provides sensitive detection of tuberculosis resistance and rifampicin directly from sputum in less than 2 hours. Research conducted by Lawn, et al (2011) states that the MTB/RIF Expert Test greatly accelerates the time for diagnosis, with approximately 2 hours compared to 1 day for smear microscopy, 16 days using liquid culture and 20 days using solid culture. This study also demonstrated the ability to quickly and reliably detect 90% of TB cases including almost 77% of smear-negative cases. So the faster the detection time, the faster the TB sufferers get treatment.

According to the TB program holders in Medan City Health Center, the implementation of SITRUST has run quite well. With SITRUST, the process of sending sputum specimens from the health center to the hospital where the TCM examination is made is easier and benefits patients in terms of time and money. Besides the benefits provided, there are obstacles in its implementation. In Medan, there are only 3 hospitals which serve as TCM examinations from all health center in Medan. In the process, checking with TCM only takes about 2 hours to get results, but every specimen that is taken for TCM examination must queue up before the inspection process is carried out. The queuing process is the obstacle so that the patient receives phlegm examination results longer. Because of these

constraints, several health centers have implemented regulations that patients suspected of having special conditions such as those suspected of having MDR as well as patients with complications whose sputum examination will be sent to use TCM examination. If the patient still shows symptoms of regular TB, then the examination is only done with a conventional TB examination at the health center.

4 CONCLUSION

The majority of TB workers in Medan are in the age category ≥45 years (53.8%), female sex (97.4%), last education S1 (46.2%), length of service ≥8 years (53.8%), and had attended training (87.2%).

There is no relationship between age, sex, last education, length of service, experience in training, knowledge, attitudes, and behaviors of TB officers with TB case finding using the TCM and SITRUST methods in Medan City.

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