Factor analysis of the role of physicians and its associated factors for encompassing patients with suspected tuberculosis in Surabaya City

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Abstract

Background. Indonesia remains the highest tuberculosis morbidity rate, 9.6 million globally. Limited detection and surveillance of suspected tuberculosis need to be enhanced.

Objective. This study aims to investigate the factors that influence the role of Physicians in screening for suspected tuberculosis.

Materials and Methods. A case-control study with secondary datasets of 132 physicians. The analysis used is simple logistic regression and multiple logistic regressions.

Results. Out of 132, only 34 physicians (25.7%) have an active role; meanwhile, 98 physicians (74.3%) did not participate in assisting suspected tuberculosis. Almost 73% of physicians have not received additional training in tuberculosis management. The physicians contributed 19.1% to the total discovery of tuberculosis suspected in Surabaya. Age, years of working, and the number of patient visits were associated with the role of physicians in tuberculosis screening (OR of 3.809, 1.112, and 3.057).

Conclusions. Based on 5 variables that qualify for multivariate analysis, three factors greatly influence the physicians' role in screening tuberculosis suspected, including age, number of patient visits, and years of working.

Introduction

Tuberculosis (TB) remains a global public health problem, where an estimated 10.6 million people fell ill with TB globally, while morbidity rate reached 9.6 million and mortality rate estimated 1.4 million in 2021 and can increase every year.[1,2] Notifications of TB cases in Indonesia are around 565,869 cases, at the East Java Province level there are 71,791 cases, and TB suspected findings in the city of Surabaya are 68,733.[3,4]

This incident still exist, despite management efforts by the Directly Observed strategy Treatment Short-course (DOTS) which has been used in many countries.[5] WHO developed a Stop TB strategy, one component of the Stop TB strategy is to involve all service providers, government, private, non-governmental organizations (NGOs) in the implementation of quality DOTS through a Public-Private Mix (PPM) approach.[6,7]

The concept of PPM which is then applied in Indonesia based on District/City (DPPM) is expected to encourage all health facilities that handle TB to participate in the network.[8] The physicians' role can assist in reporting TB suspected case findings, therefore, TB patients can be found and treated according to standards and recorded in the National Tuberculosis Program (NPM) information system.[9,10]

On the number of TB cases, it was found that there was a decrease in 2019 compared to 2018 due to changes in data validation methods in screening TB cases, another reason was the decrease in the intensity of TB case sweeping activities in 2019.[11] The proportion of TB case notifications from private health facilities in 2016 until 2018 tends to increase with an average increase in TB cases of 14.6%.[10,12,13] This increase has not been able to meet the existing gap. Based on the 2017 inventory study result, reports of TB case finding in hospitals reached 62%, while in clinics, physicians, and others it reached 96%.[14] The coverage of networked private services in TB management according to standards is lowering, especially physicians.[15] Therefore, this study aims to

investigate the factors that influence the role of physicians in private practice for screening TB suspected through the PPM approach.

Materials and Methods

Participants and data collection

A case-control study has been conducted to analyze the factors that influence the role of physicians in screening TB suspected. Secondary data was obtained from the Ministry of Health, the Republic of Indonesia in collaboration with the Faculty of Public Health, Universitas Airlangga, Surabaya City Health Office, and the Center for Environmental Health Engineering and Disease Control (CEHEDC) in Surabaya. The data from these sources are physicians mapping and discovery of TB suspected patients by physicians from October to December 2017 in North and East Surabaya.

The sample total with 132 physicians were included a case sample of 34 physicians and a control sample of 98 physicians. The sample was secondary data. The inclusion criteria of this study are physicians who have legal Registration Certificate and Practice License, treating tuberculosis suspected in private practice. The inclusion criteria of the participants are 1) physicians with the qualifications of general practitioners, pediatricians, and pulmonologists, 2) have practiced in Surabaya for at least 1 one year, 3) have a valid Registration Certificate and Practice License, 4) treating the TB suspected who came in private practice, not in primary health care, hospitals, and others.

Measurement and statistical analysis

Physicians in screening TB suspected were categorized as to whether the physicians played a role in supporting the TB control program (0 = no role, 1 = role). The characteristics of Physicians studied included: Sex, age of physicians (categorized by mean), training in supporting the standardized TB management, the history of practice, the average number of patient visits categorized based on the mean value (≤15 person/day, >15 person/day), and the last is physicians participation status as primary health care in the health insurance system in Indonesia. The predisposing factor in this study was knowledge measured by the ability of physicians in answering questions about TB control. Supporting factors in this study include: Distance from referral health facilities (0 = 2.00 km; 1 = <2.00 km).

Data were summarized in the form of demographic characteristics, predisposing factors, and supporting factors were analyzed using a frequency distribution table. The bivariate analysis to find out a variable qualified for multivariable analysis with a simple logistic regression test. A p-value of less than 0.25 was used for the results of the bivariate analysis which continued into the multivariate analysis. Multivariable analysis aims to analysis the relationship of physicians' role in screening TB suspected through 3 steps independent variables simultaneously with multiple logistic regressions. A p-value of less than 0.05 was used for multivariate analysis results.

The association of independent variables (i.e. sex, age, number of patient visits, training, physician participation, knowledge about TB management, distance, and years of working) with the role were assessed by the contingency coefficient. The Odds Ratio
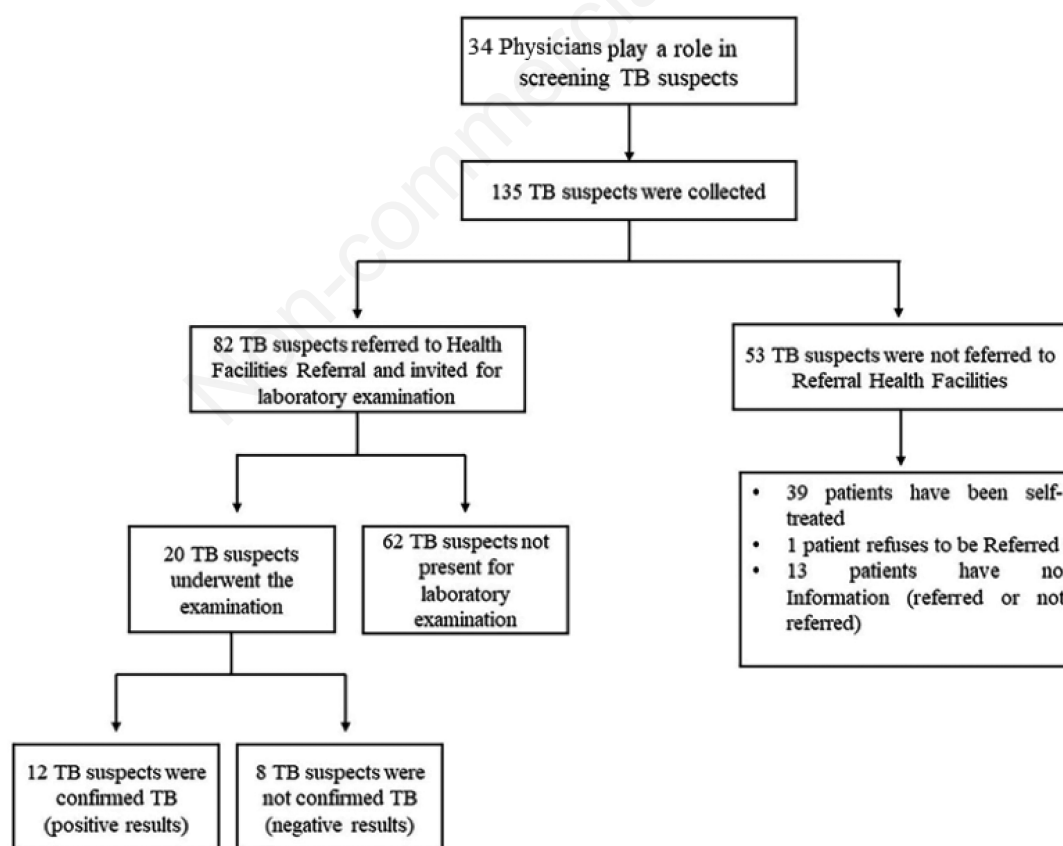

Figure 1. Tubercolosis suspected screening scheme accompanied by physicians until the results of laboratory examinations at the Surabaya City referral health facilities in 2017.

(OR) value is used to determine whether a variable is a risk factor that affects the role of DPM in screening TB suspected along with a 95% Confidence Interval (CI).

Ethical considerations

The study was approved by Health Research Ethics Committee, Faculty of Public Health, Airlangga University (date: 18.10.2016, decision no: 540-KEPK).

Results

We collected 132 physicians that willing to participate in this study. Out of 132, 34 (25.7%) participants are physicians who have an active role in assisting the TB suspected, meanwhile, 98 participants are passive role. We also record patients who were TB suspected accompanied by 34 physicians in private practice. One-hundred-thirty-five TB suspected were accompanied and screened. About 135 TB suspected, 82 TB suspected were referred to referral health facilities, 39 TB suspected underwent outpatient treatment, one TB suspect refused to be referred, and the remaining 13 TB suspected have no further information whether it has been referred or not. On this occasion, we encouraged the physicians to monitor those TB suspected, to find out whether the treatment of the TB suspect has been completed or not. Out of them, 12 TB suspected who came to run the laboratory test were tested positive for TB, which made by them became the confirmed cases (Figure 1).

The characteristics of participants are reported in Table 1. About 56.1% physician in our study was male and 54.5% in lower than 40 years old. Approximately 57.6% of patient visits lower 15 person/day, 27.3% of physicians have attended training on TB management, and 72.7% of physician no participation as primary health care. The knowledge about TB management was average (65.2%), and distance private practice to referral health facilities lower than 2 km (56.8%). Based on medical history, physicians have been working for an average of 6.58 ± 6.53 years with the smallest period being one year (Table 1). Bivariate analyses were determined to find out the variables qualified for multivariable analysis towards the physicians' role for detection of TB suspected. We show five independent variables that had a significant p-value <0.25 for the further multivariate test included age, number of patient visits, knowledge about TB management,

Table 1. Physician's characteristics.

Variables	n (%)
Sex	
Male	74 (56.1)
Female	58 (43.9)
Age (years old)	
>40	60 (45.5)
≤40	72 (54.5)
Average Number of Patient Visits (person/day)	
≤15	76 (57.6)
>15	56 (42.4)
Training regarding TB management	
No	96 (72.7)
Yes	36 (27.3)
Physician participation status as primary health care	
No	96 (72.7)
Yes	36 (27.3)
Knowledge regarding TB Management, n (%)	
Weak	24 (18.2)
Average	86 (65.2)
High	22 (16.7)
Distance from private practice to referral health facilities (km)	
≥2.00	57 (43.2)
<2.00	75 (56.8)
Years of working as a physician	6.58 ± 6.53

Data were used Cross Tabulation test. Data were presented as number (percentage), mean ± SD.

Table 2. Bivariate analysis of factors associated with the role of physicians.

Variables	The Physician's role for TB suspected No Role n (%)	Role n (%)	P value	OR	95% CI (lower – upper)
Sex					
Male	54 (55.1)	20 (58.8)	0.706	1.164	0.528 – 2.566
Female	44 (44.9)	14 (41.2)			
Age (years old)					
>40	48 (49.0)	23 (67.6)	0.170*	1.760	0.785 – 3.945
≤40	50 (51.0)	11 (32.4)			
Average Number of Patient Visits (person/day)					
≤15	63 (64.3)	12 (35.3)	0.009*	2.908	1.299 – 6.508
>15	35 (35.7)	22 (64.7)			
Training regarding TB management					
No	73 (74.5)	23 (67.6)	0.441	1.397	0.597 – 3.267
Yes	25 (25.5)	11 (32.4)			
Physician participation status as primary health care					
No	72 (73.5)	24 (70.6)	0.745	1.154	0.487 – 2.736
Yes	26 (26.5)	10 (29.4)			
Knowledge regarding TB Management, n (%)					
Weak	21 (21.4)	3 (8.8)	0.068*	4.000	0.902 – 17.736
Average	63 (64.3)	23 (67.6)			
High	14 (14.3)	8 (25.5)			
Distance from private practice to referral health facilities (km)					
≥2.00	38 (38.8)	19 (55.9)	0.085*	0.500	0.227 - 1.101
<2.00	60 (61.2)	15 (44.1)			
Years of working as a physician	98 (74.2)	34 (25.8)	0.144*	1.043	0.986 - 1.105

Data were used Simple Logistic Regression test. *a p-value < 0.25 was statistically significant.

Table 3. Multivariate analysis of factors associated with the role of physicians.

Variables	P value	OR	95% CI (lower – upper)
Age (years old)			
>40	0.018*	3.809	1.255 – 11.561
≤40			
Years of working as a physician	0.020*	1.112	1.017 – 1.217
Average number of patient visits (person/day)			
≤15	0.009*	3.057	1.315 – 7.107
>15			

Data were used with multiple logistic regression test with simultaneously (3 steps); *a P value <0.05 was statistically significant.

distance, and years of working (Table 2). About five independent variables multivariate analysis with three steps resulting in three factors that significantly associated the physicians' role for detection of TB suspected. Three factors included age, years of working, and number of patient visits associated the physicians for TB screening with a p-value of 0.018, 0.020, and 0.009 respectively (Table 3).

Discussion

Maintaining TB control in a limited resources setting is indeed tough especially in a high burden country like Indonesia, we found low cases detections.[16] Several things may be the cause of the low screening of TB suspected in physicians. The first is that there are not many TB suspected who come, so there are also a few TB suspected who are referred. The second possibility is that physicians have sent the TB suspected they found to the Primary health care or laboratory for microscopic examination of sputum, but the patient is absent or does not do the examination, where the patient comes to one or more other physicians for re-examination. The more popular term for the phenomenon of TB suspected visiting several physicians to confirm the disease is called a shopping physician. An effective referral system must be established between health service units.[17] Appropriate local referral processes and resources to monitor referrals and ensure TB suspected after being referred and diagnosed with confirmed TB for not dropping out of the treatment.

Our study shows that years of working as physicians affect the role of physicians screening in TB suspected. One of the things that affect a person's productivity is long working hours. The longer the working period of physicians, the more skills and abilities to do work may increase. Several things determine whether a physician is experienced or not and at the same time an indicator of work experience, level of knowledge and skills, and mastery of work and equipment.[18,19] Several studies showed that 59% of private practitioners studied were able to understand the symptoms of TB correctly. Many private practitioners do not have good knowledge of TB case management which is demonstrated in other settings.[20–23] Insufficient training on TB management in the medical curriculum and lack of opportunities to continue medical education are likely contributing factors.[24]

The number of patient visits per day also has a significant influence on the role of physicians in assisting TB suspected. A large number of visits by TB patients provides a great opportunity to screen TB suspected.[25] In Indonesia, TB treatment is funded by the government and is not charged to the patient. Patients diagnosed with TB get free treatment, so economic constraints are not a barrier to complete treatment. Public awareness can be an obstacle because the stigma in Indonesian society for TB patients is very large. Many of the TB suspected are hiding their disease and this makes it difficult for health workers to control it. However, physicians are also a strategy to strengthen TB care and control at the regional level, but there is still much need for improvement,[26] especially inpatient control and collaboration with referral health facilities in screening, detecting, controlling patients, adherence the TB guideline,[27] and surveillance data for evaluation.[28] The age of physician in this study is in productive age range. This was in line with another study which states that age range was 26-69 years with an average of 43.7 years.[29] In this study there is an associated of physicians' years of working in screening TB suspected, where the longer the physician's practice experience, the more likely it is to have a greater opportunity to carry out the role of screening TB suspected. This was in line with another study which states that majority physicians had worked for more than 15 years.[30] The low number of TB patients and the lack of involvement of doctors in TB diagnosis can hinder the influence between practical experience and performance effectiveness. This is linear with other research that training needs to be combined with the application of collaborative care guidelines on physician behavior.[31] Lack of awareness, as well as the limited number of TB training courses or workshops available, may be the reason why few doctors attend TB courses.[32]

This study has several limitations, including the data used in this study is secondary data, there is still a lack of information in this study related to the reasons for referring, not referring, or self-medicating TB suspected. The limitations of supporting data to describe the behavioral factors of physicians in carrying out the role of screening TB suspected in the field and data on TB suspected who did not come to the referral health facility could not be confirmed and followed up by physicians.

Conclusions

Factors that affect the role of physicians in screening TB suspected in Surabaya were age, years of working as a physician, and the average number of patient visits. The capacity and skill development activities such as training of trainers, workshops, symposiums on TB DOTS management, and International Standard for Tuberculosis Care (ISTC) for physicians need to be mended in collaboration with the City Branch of the Indonesian Physicians Association and Healthcare and Social Security Agency. Involving all physicians in screening and detecting TB cases through reporting to the Primary Health Care regularly. Surabaya Health Official needs to monitor the adherence of physicians following the report's progress on screening TB suspected to prevent the data loss on TB suspected. Provide rewards and punishments to motivate physicians increasing the coverage of TB suspected and TB cases in Surabaya.

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