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Knowledge Level of Multidrug Resistants Tuberculosis (MDR-TB) among Commuter Train Users

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Abstract

Introduction: Multidrug Resistants Tuberculosis (MDR-TB) is the biggest problem of preventive and elimination Tuberculosis (TB) Programmed globally, including in Indonesia. It is more difficult when new *Mycobacterium tuberculosis* strains are resistant to Anti Tuberculosis Therapy (ATT). **Objective**: This study aims to describe knowledge about MDR-TB on commuter train users in 2020 and its risk factors. **Method**: This research is an observational study that uses a Cross-sectional design study. The sample is 100 commuter train users who are≥18 years old and use commuter train routines. The analysis was done in the Chi-square test. **Results**: The result is 55%, or 55 participants have insufficient knowledge about MDR-TB which the question that has less correct answers is the meaning of MDR-TB (31%), diagnosis method of MDR-TB (33%), and the causes of MDR-TB (36%). It also showed there is the relation of profession status (p-value: 0.019) and educational status (p-value: 0.044) with MDR-TB knowledge, and there is no relation of age (p-value: 0.0227) and gender (p-value: 0.096) with MDR-TB knowledge. So, more than half of the participants have insufficient knowledge of MDR-TB, and the risk factors of MDR-TB knowledge are professional status and educational status. **Recommendation**: To increase knowledge, it can do socialization of MDR-TB using short video and poster in each railway coach

Keyword: MDR-TB, knowledge, commuter train users

INTRODUCTION

Tuberculosis (TB) is one of the leading infectious disease problems in the world, including in Indonesia. Tuberculosis intervention is more difficult to do after a new strain of *Mycobacterium tuberculosis* resistance to Anti Tuberculosis Therapy (ATT) appears. The frequency of that resistants is increasing every year (1).

Multidrug-Resistant Tuberculosis (MDR-TB) is a term that is used to describe a strain of Mycobacterium tuberculosis which is having resistant to Isoniazid (INH) or Rifampicin (Rif). Both are the primary medicine to kill Mycobacterium tuberculosis effectively (2).

MDR-TB is the main problem of TB preventive and eradication activities in the World and Indonesia. Global Tuberculosis Report of World Health Organization (WHO) showed that MDR-TB estimation is 3.3% from new cases. In cases that had been treated, MDR-TB estimation is 20%. In the report, Indonesia is in fourth which is had the most significant cases in the world, after India, China, and Russia(1).

WHO estimated 23,000 cases of MDR-TB in Indonesia. In Indonesia, Tuberculosis cases about 442,000 cases in 2017, which was estimated about 8,600-15,000 cases are MDR-TB. It was estimated that 2.4% of cases are new cases of MDR-TB, and 13% are from that which had been treated (3). Transmission of MDR-TB in Indonesia is increasing due to lax TB control activities, having less in the budget, not having adequate isolation, and delay of diagnosis of MDR-TB case (4).

The resistents can lessen chemotherapy effectiveness. It makes the recovery rate is about 59-70%, so the rate of success program decreases for MDR-TB patients. The patients who had been treated had risk estimation about four times to having resistance, and the MDR-TB patient had roughly ten times more than patients who had been treated (5).

People mainly spread MDR-TB to people transmission (2). It infected after droplets inhaled to the respiratory tract. After that, Mycobacterium tuberculosis spread to other organs through the bloodstream, lymphatic, respiratory, or directly to other organs(6).

Density is a prerequisite in disease transmission. Dense areas increase contact rates of people. In the transmission of Mycobacterium tuberculosis, density has a vital role in spreading the bacteria. It makes the disease spread easier because of close contact with other people(7,8).

Patients of MDR-TB can spread MDR-TB to other people. People who had an infection of MDR-TB will develop MDR-TB patients, not TB patients. It caused by in their body is unusual Mycobacterium tuberculosis, but Mycobacterium tuberculosis had resistance to ATT(9).

The commuter train is a public transportation used in Jakarta, Bogor, Depok, Tangerang, and Bekasi (Jabodetabek). It has many users. In 2019, the average number of users was more than 900.000 people (10). The high density of commuter train users in trains will make transmission of MDR-TB easier. Tuberculosis infection was found in 8.7-55% of buses and trains (11). Commuter train users who MDR-TB infects will be MDR-TB patients. Increasing the MDR-TB knowledge in commuter train users is needed to prevent it.

Knowledge is the result of knowing something. It happens after sensing an object. Sensing is passed through the eyes, ears, skin, nose, and tongue. Most knowledge comes from eyes and ears (12).

Knowledge is a predisposing factor of behavior (12). If people have good knowledge about health, it will increase the probability of healthier behavior. Health knowledge is what people know about the way to maintain health. It includes knowledge of disease and the risk factors (13).

Knowledge can be influenced by age, education, profession, and socioeconomic. Usually, the elderly had degradation of intellect which was caused by aging. So, they couldn't absorb new information as young and adult people. Education could make people easier to absorb information. Unemployment usually had more time to search for further details and visit health care

than workers. They exposed information easier so their knowledge could increase (14).

A study by Sandha and Sari showed more than half of people had terrible knowledge of tuberculosis. More than half didn't know about the causes of TB and its risk factor (84.7%), preventive actions (70.4%), symptoms and diagnosis (54.1%), and TB complications (51,0%) (15). Until now, there is no research about knowledge of MDR-TB in commuter train users and its factors in Indonesia.

The initial survey held in March 2020 in 20 commuter line users showed that 70% (14 people) had inadequate knowledge of MDR-TB. Many people had false answers in MDR-TB diagnosis (80%), MDR-TB caused (70%), and the effect of irregular ATT consumption (7-%).

Having insufficient knowledge could make people have a bad attitude and bad behavior about their health. Health Belief Model said their perception about the disease made behavior and attitude about health. It would influence people to change their behavior to prevent illness. To make a good perception of illness, people had to increase their knowledge (12).

OBJECTIVE

The study aimed to describe Multidrug Resistants Tuberculosis (MDR-TB) among the Commuter Train User and its risk factors.

METHOD

Design

The research used a Cross-sectional design study. It was conducted from April-December 2020. The location is in Jakarta, Bogor, Depok, Tangerang, and Bekasi (Jabodetabek).

Sample Size and sampling technique

The samples of this study were people who used the commuter line train in DKI Jakarta. One hundred participants were recruited and selected using the purposive sampling technique. The inclusion criteria are using the commuter train five days a week. The exclusion criteria are age <18 years old.

The instrument for data collection

The knowledge of the Tuberculosis questionnaire was used in this study. The questionnaire consisted of 10 MDR-TB knowledge, age, gender, worker status, and education. Before data was collected, a validity and reliability test was conducted.

A validity and reliability test was conducted in September 2020. Twenty participants were recruited in Jakarta. Ten questions of MDR-TB knowledge were tested. Data were analyzed, and the result showed that the r invalidity test is >0.444 (Table 1). The reliability test showed that r counted in Cronbach's alpha is 0.773>0.6. So, all of the questions are valid and reliable for data collection.

Table 1. The result of the validity test

Questions	r counted	r table	Results
Number 1	0.845	0.444	Valid
Number 2	0.667	0.444	Valid
Number 3	0.787	0.444	Valid
Number 4	0.696	0.444	Valid
Number 5	0.696	0.444	Valid
Number 6	0.854	0.444	Valid
Number 7	0.636	0.444	Valid
Number 8	0.580	0.444	Valid
Number 9	0.696	0.444	Valid
Number 10	0.841	0.444	Valid

Data collection process

Collecting data was in October-November 2020 in DKI Jakarta by the research team. Data was collected using a questionnaire which is used in the google form. The data collected are MDR-TB knowledge, age, gender, professional status, and education status. Google form link was spread to the community by social media.

Research teams consist of a team leader and two research assistants. The team leader is in charge lead research. All research assistants are charged with data collection and management.

Data analysis

Data were analyzed in descriptive and associative statistics using a software computer. Data were analyzed in descriptive

to describe commuter train users' knowledge about MDR-TB. To know the risk factors of MDR-TB, associative statistics were done by Chi-square test because all of the data were categorical. If the result show p-value <0.05, it means the independent variable (age, gender, professional status, or education status_ related in a systematic way with the dependent variable (MDR-TB knowledge).

Ethical consideration

This research has passed the ethics review number 0357-20.346/DPKE-KEP/FINAL-EA/UEU/X/2020.

RESULTS

Ten questions are asked to users' commuter train about MDR-TB knowledge. The user's commuter line mostly had correct answers in preventive of MDR-TB (79%), kind of tuberculosis (75%), and MDR-TB's symptom (60%). The user's commuter line had the least correct answers in the definition of MDR-TB (31%), MDR-TB diagnosis (33%), and the effect of irregular ATT consumption (36%). (Table 2)

The result of MDR-TB knowledge in table 2 will be grouped into two categories, had good knowledge of MDR-TB and had insufficient knowledge of MDR-TB. Before that, authors would see a distribution of data. The data would compared by Kolmogorov-Smirnov normality test. It showed that MDR-TB knowledge was not normally distributed, so that that grouping will use median. The median is 4. If the user had a score ≥4, they would have good knowledge of the MDR-TB group, but if the user had a score <4, they would have insufficient knowledge of the MDR-TB group. The analysis showed that more than half of respondents had inadequate knowledge of MDR-TB (55%) (Table 3).

Table 2. Knowledge on MDR-TB

MDR-TB Knowledge	n	%
Kind of Tuberculosis	75	75
The effect of irregular ATT consumption	36	36
People at risk of MDR-TB infection	53	53
Definition of MDR-TB	31	31
MDR-TB's Symptom	60	60
The cause of MDR-TB	54	54
MDR-TB's Diagnosis	33	33
Transmission of MDR-TB	56	56
Preventive of MDR-TB	79	79
Treatment of MDR-TB	48	48

Table 3. Knowledge level of commuter train users regarding MDR-TB in users

Knowledge of MDR-TB	n	%
Good knowledge	45	45
Bad knowledge	55	55

The Chi-square test showed no relationship between age (p-value: 0.0227) and gender (p-value: 0.096) with the knowledge of MDR-TB in the user's commuter train. It also showed professional status (p-value: 0.019) and educational status (p-value: 0.044) had a relationship with MDR-TB knowledge in the user's commuter train. Users who are workers had a higher risk to had an insufficient understanding of MDR-TB than those who are unemployed. Users with high school or lower educational status had a higher chance of inadequate knowledge of MDR-TB than those with a higher education level. (Table 4)

Table 4. Risk factors of MDR-TB knowledge in user's commuter train

Variables	Bad Knowledge	Good Knowledge	p-value	PR (95% CI)
Age				
≥45 y.o.	9 (42.9%)	12 (57.1%)	0.227	0.736
<45 y.o	46 (58.2%)	33 (41.8%)		(0.434-1.248)
Gender				
Man	24 (66.7%)	12 (33.3%)	0.096	1.376
Woman	31 (48.4%)	33 (51.6%)		(0.977-1.938)
Profession				
Status	43 (63.2%)	25 (36.8%)	0.019	1.686
Worker	12 (37.5%)	20 (62.5%)		(1.041-2.732)
Unemployed				
Educational				
Status	33 (66.0%)	17 (34.0%)	0,044	1.500
≤High school	22 (44.0%)	28 (56.0%)		(1.035-2.173)
>High school				

DISCUSSION

Table 2 showed that the user's commuter line had the least correct answers in the definition of MDR-TB (31%), MDR-TB diagnosis (33%), and the effect of irregular ATT consumption (36%). Yuni's research showed that more than half of respondents had insufficient knowledge of MDR-TB, MDR-TB's diagnosis, and the effect of irregular ATT consumption (16).

Multidrug-resistant TB (MDR-TB) is TB that does not respond to isoniazid and rifampicin, the two most potent anti-TB drugs. MDR-TB's diagnosis can be detected by using a laboratory test that tests the bacteria for sensitivity to the drug or detects a resistance pattern (2).

MDR-TB can continue to emerge and spread because of mismanagement of TB treatment and person-to-person transmission. Mismanagement of TB treatment is the inappropriate or incorrect use of antimicrobial drugs, ineffective formulations of drugs, and premature treatment interruption (2). Person-to-person transmission can be transmitted easier in crowded settings (7,17).

Table 3 showed that more than half of users' commuter trains had insufficient knowledge of MDR-TB. Some research shows the same result: more than half of respondents had insufficient knowledge of MDR-TB (18,19).

Knowledge is the consciousness, identification, and application for the development of humankind. It is created in the human mind and increases when people are involved in its acquisition and dissemination (20). Knowledge comes from the sensory perception of an object, including knowledge of sickness and health, the transmission of disease, and the prevention of illness. Knowledge is an important domain to form action or behavior (12).

The information can cause insufficient knowledge of MDR-TB to spread more slowly in the user's commuter train. Usually, it spread faster in people who visit health care, have TB or MDR-TB, or people who intentionally look for MDR-TB information. This research had criteria that use the commuter train in 5 days in a week and age ≥18 years old. So, there is the possibility that more than half of the samples are students or workers, which usually visit health care infrequently because most health care opens at the same time as they have activities. It can make them have limitations to get information of MDR-TB.

The Chi-square test shows that professional status and educational status had a relationship with knowledge. Some studies also show that professional and academic status had a relationship with knowledge (21,22).

Users who are workers had a higher risk to had inadequate knowledge of MDR-TB than those who are unemployed. The worker usually had less time to visit health care or search for information about MDR-TB because of their work time and job. So, it will increase their chance to had insufficient knowledge of MDR-TB.

Users who had high school or lower educational status had a higher risk of insufficient knowledge of MDR-TB than those who had a higher level of education. The higher-level education, they can absorb information of MDR-TB better (12). So, it could support MDR-TB control efforts and decrease MDR-TB cases.

Knowledge can be obtained from experience from many sources (12). One of them is socialization. Socialization can be done directly and indirectly. Indirectly socialization can use posters, brochures, videos, etc. (14). Many research shows that media socialization can increase knowledge (23–25).

The commuter train had many facilities. Two of them had mini television and poster media in every railway coach. This facility usually shows advertisements or general information. To increase the knowledge of MDR-TB in users' commuter trains, we suggest having socialization of MDR-TB using short videos and posters in each railway coach.

CONCLUSION

The conclusion is more than half of users' commuter trains had insufficient knowledge of MDR-TB. The Chi-square test showed no relationship between age (p-value: 0.0227) and gender (p-value: 0.096) with the understanding of MDR-TB in the user's commuter train. It also showed professional status (p-value: 0.019) and educational status (p-value: 0.044) had a relationship with MDR-TB knowledge in the user's commuter train. So, the risk factor of knowledge of MDR-TB in users' commuter train is professional status and educational status. We suggest having MDR-TB socialization to users' commuter train in the parade by using facilities in commuter trains like posters and a short video.

STRENGTH AND LIMITATION

There are two limitations of this research. First, this research used a Cross-sectional design study. It means the information only describes the variables at one time. Second, this research used purposive sampling. It means the result can't be generalized in society, only in this research respondent.

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