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Efforts to Control Pulmonary Tuberculosis (TB) in the Community through Tuberculosis Alert Health Cadre Training

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ABSTRACT

Tuberculosis (TB) alert health cadre training is an important thing that can be done to help control TB in the community. Tuberculosis control includes increasing early detection and adherence to treatment for TB patients. A synergy of roles is needed between health workers and the community To solve TB problems in the community, empowering health cadres by increasing their capacity. We conducted an interactive health education training program for TB control that aimed to improve the cadre's health knowledge, attitudes, and practice in early detection of TB and as an assistance for Drug Swallowing Supervisors/"*Pengawas Menelan Obat* (PMO)." The training was provided for one day using lectures, two-way discussions, and demonstrations by internal medicine specialists, assisted by multi-professional students from medical and nursing programs. A total of 36 health cadres from Sumberharjo Village participated in this training. Before and after the training, cadres took pre-tests and post-tests. The survey results were analyzed statistically using descriptive quantitative methods for the respondent's characteristics, whereas the scores of knowledge, attitude, and practice were analyzed using a nonparametric test. The median and the minimum-maximum of the pre-test score before training for knowledge was 10.5 (7-13), attitude score was 15 (11-15), and practice score was 15 (8-15). In addition, the median and the minimum-maximum post-test score after training for knowledge was 11 (8-14), attitude score was 15 (10-15), and practice score was 15 (10-15). The statistical test results were p=0.003 for knowledge, p=0.272 for attitude, and p=0.111 for practice. It showed a significant difference in the cadre's knowledge scores before and after training, but there were no significant differences in their attitudes and practice scores before and after training. Training for health cadres is recommended to increase the capacity of health cadres, especially the knowledge of health cadres controlling TB in the community.

Keywords: health cadres, tuberculosis, training, early detection, drug swallowing supervisor.
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BACKGROUND

Pulmonary Tuberculosis (TB) is an infectious disease caused by *Mycobacterium tuberculosis*. TB can be transmitted through droplet inhalation of a cough or sneeze from an infected person. This disease can affect several organ systems, including the lungs and other parts of the body, as well as the brain layer (meninges), lymph glands, liver, and skin. All age groups are at risk of tuberculosis, which varies from children to adults. In general, 1.7 billion of the world's population has been infected by *M. tuberculosis*[1], and this disease caused approximately 10 million people to have health problems in 2018.[2]

TB is a disease that occurs more often in people with HIV. According to WHO (2019), there were around 1.2 million HIV-negative TB-related deaths and 251,000 HIV-positive TB-related deaths in the world. Tuberculosis is still a highly endemic disease in Asia, especially in Southeast Asia. In 2018, TB was primarily found in people living in the Southeast Asian region (44%). Apart from Southeast Asia, several regions with relatively high TB cases include Africa (24%) and the Western Pacific (18%).[2]

TB is a contagious disease that has still acquired special attention from the Indonesian government. The incidence of TB in Indonesia is still relatively high. The TB incidence in Indonesia is 380,000 to 540,000 cases, with an estimated number of cases reaching 450,000 or 189 cases per 100,000 population. This high incidence rate places Indonesia with the fourth highest number of TB incident cases among other countries in 2011, following India (2,000,000 to 2,500,000 cases), China (900,000 to 1,100,000 cases), and South Africa (400,000 to 600,000 cases). Indonesia's TB prevalence is also quite high, with around 680,000 (ranging from 310,000 to 1,200,000) TB cases.[3] This figure is the same as the incidence of TB, which is approximately 289 cases per 100,000 population. The number of deaths (mortality) due to TB in Indonesia is 65,000 people (27 per 100,000 population), or more than 175 deaths every day.[3,4]

One of the significant challenges regarding reducing TB morbidity and mortality in Indonesia is how to deal with

TB cases that occur in the community properly. The countermeasures for TB in the community could be in the form of early detection of TB and supervision of TB treatment among people living in the community. Early detection of TB in the community is fundamental since it is an approach to finding active cases early. Thus, it can control disease transmission within the community and assist patients to take treatment early to prevent further complications related to delays in treatment[5]. Proper treatment supervision can prevent the escalation of TB-related morbidity and mortality as well as prevent the occurrence of Multi-Drug Resistance (MDR)-TB due to bacterial resistance as a consequence of non-adherence to treatment.

As an archipelagic country, Indonesia has various geographical conditions in each region. Geographical conditions such as mountains, forests, and rivers, as well as the distance and inadequate transportation to health facilities, can prevent patients in the community from obtaining optimal laboratory examination and TB treatment. Moreover, the stigma of TB patients in the community also makes people reluctant and ashamed to examine themselves in health facilities.[6]

Posyandu (Integrated Healthcare Center) programs are already widely available in various regions in Indonesia to improve the health status of the community. Implementation of the *Posyandu* programs is assisted by the health cadres in the *Posyandu* for toddlers and pregnant women, *Posyandu* for geriatric people, and *Posbindu* for Non-Communicable Diseases. Trained health cadres become partners for *Puskesmas* (Public Health Center) to help maintain public health in the community.

Health workers who enter the community to find active TB cases are still minimal. Therefore, it requires health facilities (*Puskesmas*) to collaborate and partner with health cadres in the community to investigate active TB cases. Several regions in Indonesia still have not optimized the role of health cadres to assist health workers in detecting active TB cases in the community.

Increasing cadres' role and capacity in detecting active TB cases and providing assistance for *Pengawas Menelan Obat* (PMO) or drug-swing supervisors in the community is expected to increase the number of active TB cases found in the community. If the TB patient lives alone and there are no other family members at home, the role of monitoring treatment for TB patients in the community by cadres can be carried out. The active participation of cadres in finding active cases and in assisting PMOs is expected to reduce morbidity and mortality due to TB. Improving the involvement of cadres can be accomplished by providing health training to optimize the role of cadres in TB countermeasures in the community.

The researchers team chose the location of community research activities in the Sleman Regency area. The researcher's team chose this location because the prevalence of TB cases in Sleman Regency tends to increase yearly. TB cases were 47 per 100,000 population to 844 per 100,000 in 2017. This figure increased to 1016 cases per 100,0000 population until 2018. In 2018, the TB case detection rate was 31.1%.[7] In 2019, the TB case detection rate increased by 61.2%[8], but this figure is still below the national target for the TB case detection rate of 70%.[9]

Based on data from the Health and Demographic Surveillance System (HDSS) Sleman team, the working area of the Prambanan Health Center, namely the Prambanan District, has the highest prevalence of TB cases compared to all districts in Sleman.[10] In particular, the cure rate for TB treatment (cure rate) is 75%.[7] The cure rate for TB treatment in Sleman in the region in 2019 increased to 81.8%.[8] Although it has increased, this figure has not yet reached the national target of the cure rate for TB, which is 85%. The success rate for treatment in the Prambanan Health Center during 2018 was 83.3%.[7] This figure decreased in 2019 to 80%.[8] In addition, the TB success rate has not yet reached the national target for the success rate for TB is 90%.[11]

Community empowerment is one of the keys to the success of preventing and reducing undetected cases in TB control through education about TB symptoms for early detection and appropriate treatment. Community involvement in TB control includes community involvement in TB promotion, TB case finding, and support for TB treatment.[12,13] Success in case finding (early detection) and TB treatment can occur if health cadres receive appropriate training for case management for TB in the community.[14] In previous studies, the role of the *PMO* (delivered by the closest family member of a TB patient) in carrying out intensive monitoring of treatment for patients is related to medication adherence. The role of the family, including the *PMO*, is crucial in encouraging, supporting, and supervising TB patients in carrying out TB treatment.[15] The role of the *PMO* in direct supervision of the consumption of TB drugs can improve treatment compliance and increase the cure rate. The existence of health cadres who assist TB *PMOs* is expected to increase the capacity of TB *PMOs* to supervise the treatment of their family members suffering from TB.[16]

In community empowerment activities, cadres must have good knowledge regarding their health problems to run optimally. If the cadres have good knowledge related to health problems, they will also perform well in handling the work.[17] practice also plays a role in the ability of cadres to carry out their roles, to empower and deal with health problems that exist in the community, including the attitude of cadres.[18] Collecting data related to knowledge, attitudes, and practice using a questionnaire of knowledge, attitudes, and practice of cadres related to TB control has been tested for validity and reliability and used by previous researchers.[19]

There is not much research on the effect of training interventions with lecture and demonstration methods to health cadres on changes in knowledge about TB in the community, attitudes, and practice in preventing TB cases in the community through early detection and assistance to family *PMOs*. From previous research that has been done, this lack of knowledge about TB control is an obstacle to the process of preventing and controlling TB disease in the community.[20]

Based on the condition of the Prambanan sub-district, which has the highest prevalence of TB among other sub-districts in Sleman, with the TB case detection rate that has not reached the national standard and the decreasing

success rate in the Prambanan Community Health Center working area, the proposing team chose this location as the research location. The proposer wants to know the effect of training on early detection and assistance of *PMO* TB patients in the community on cadres' knowledge, attitudes, and practice in carrying out early detection and mentoring of *PMO* TB patients to assist public health centers in tackling TB cases.

METHOD

This TB community empowerment exercise uses training for health cadres in Sumberharjo, Prambanan, Sleman, Yogyakarta. Besides doing community service, the researchers collected data and did the research. Health education and research were implemented on July 14th, 2022, after ethical clearance (number: KE/FK/0816/EC/2022). We provide informed consent to participants before the start of this program.

Our research design is a quasi-experimental one-group pre-test and post-test design. This training and research are followed by 36 specially selected health cadres with stratified consecutive sampling. Two health cadres from each *padukuhan* of Sumberharjo Village (Sumberharjo Village consists of eighteen *padukuhan*) were joined in this training and research. The criteria for inclusion in this study are the health cadres in the Sumberharjo, District of Prambanan, Yogyakarta, and those above 18 years old. The exclusion criteria are not following the research until it has finished. Before the training began, researchers explained this training and research and got informed consent from the respondents/participants. After that, a pre-test assessed participants' knowledge, attitude, and practice scores before training.

We use a previous study's questionnaire about health cadres' knowledge, skill, attitude, and practice to control tuberculosis in the community. The questionnaire comprises fifteen questions for each part (knowledge, attitude, and practice). The minimum score is 0, and the maximum score for each part is fifteen. The questionnaire also has been validated[19]. We trained the cadre with interactive training methods, starting with PowerPoint and simulation videos, followed by the role-playing activities played by each participant, and ending with a discussion/question-and-answer session. Training is performed in two sessions; the first session was the role of the cadre in conducting early detection of TB in the community and providing education to suspect TB to check with the nearest healthcare facilities. The second session is the training on the role of the cadre in administering the *PMO* family with TB in the community. After the training is complete, a post-test will follow. Data analysis was then conducted using SPSS 21's software.

RESULT

The respondents involved in this study are 36 health cadres from the 18 *padukuhan* in the Sumberharjo Village, District of Prambanan, Sleman. Surveys showed that most respondents are 25 to 40 years of age, as many as 20 respondents (55.6%). Most respondents have a high school education level of 21 (58.3%). The respondents in the study mainly worked as housewives, that is, as many as 33 (91.6%). Overview of the demographic characteristics of the training participants is depicted in the following chart:

Knowledge, Attitude, and Practice Score Before and After Training

Before being given the training, the knowledge score of health cadres gave a median result of 10.50 with a minimum value of 6 and a maximum of 13. After the training, there was an increase in the knowledge score, which had a median of 11.00, a minimum value of 8, and a maximum of 14. After the Wilcoxon test was carried out, p = 0.003 was obtained. After the training, the attitude score of health cadres, which previously had a median value of 15, a minimum value of 11, and a maximum of 15, became 15 for the median value, a minimum value of 10, and a maximum value of 15. After the Wilcoxon test was carried out on the

Table 1. Overview of the demographic characteristics of the trainee

Characteristics	N(%)
Age	
18-25 years old	0
26-45 years old	29 (80,6)
46-65 years old	7 (19,4)
>65 years old	0
Average, year (Mean ± SD)	40,67 ± 6,88
Education	
Not completed elementary school	1 (2,8)
Completed elementary school	1 (2,8)
Completed junior high school	8 (22,2)
Completed senior high school	21 (58,3)
Completed Diploma degree	2 (5,6)
Completed Bachelor degree	3 (8,3)
Profession	
Housewife	33 (91,6)
Early childhood teacher	2 (5,6)
Not mention	1 (2,8)

Table 2. Knowledge, Attitude, and Practice Score Before and After Training

No	Time	Knowledge Score		Attitude Score		Practice Score	
		Median	(Min-Max)	Median	(Min-Max)	Median	(Min-Max)
1	Before training	10.50	(7-13)	15	(11-15)	15	(8-15)
2	After training	11.00	(8-14)	15	(10-15)	15	(10-15)
	p-value on the Wilcoxon test	P = 0,003		P=0,272		P = 0,111	

Figure 1. The opening session of TB alert health cadre training activities (a), the activity of filling out the pre-test questionnaire by the respondent (b), the activity of filling out the post-test questionnaire by the respondent (c) first session of TB Alert Health Cadre training (d) second session of TB Alert Health Cadre training (e) the role play/simulation of TB alert health cadre training (f).

attitude score before and after the training, the p-value = 0.272. This study also assessed the practice scores of cadres before and after the training. Before the training, the median practice score of cadres was 15, a minimum score of 8, and a maximum of 15. After the training, the median practice score of cadres became 15, with a minimum score of 10 and a maximum of 15. The Wilcoxon test was then carried out to find differences in practice scores before and after the training, and a p-value of 0.111 was obtained. The description of knowledge, attitude, and practice scores before and after training can be seen in the following table:

These pictures show our activity giving health education about Pulmonary Tuberculosis (TB) to the health cadres.

DISCUSSION

Early detection of TB by health cadres is still essential to combat TB in communities, especially in developing countries. The role of health cadres is vital to reach residents living in the countryside far from healthcare facilities.[21] Therefore, training on early detection of TB is crucial for the health cadres to enhance their capacity, especially in early detection of TB and mentoring of drug swallowing supervisors for TB sufferers in communities.

The result of this study shows that the median value of the cadres' knowledge score before participating in the training is 10.50, with a minimum value of 7 and a maximum of 13. After the training, the median value of the cadres' knowledge related to TB control in terms of early detection of TB and mentoring of Drug Swallowing Supervisor for TB sufferers is 11, with a minimum of 8 and a maximum of 14. The Wilcoxon Test shows that the score difference before and after the training is p value=0.003. It proves a significant difference between the knowledge scores of the cadres before and after the training. It corresponds to the previous research by Rowe (2018), which shows that the training given to health cadres with simulation and hands-on methods will increase the early detection of cases found in communities by the cadres.[22] This ability is formed by increasing knowledge, which will later be embedded and turned into habits that influence practice.[23]

The result of this study shows that the median value of the cadres' attitude score before participating in the training is 15, with a minimum value of 11 and a maximum of 15. After the training, the median value of the cadres' attitude remains 15, with a minimum value of 10 and a maximum of 15. The Wilcoxon Test shows that the score difference before and after the training is p value=0.272. It proves that there is no significant difference between the attitude scores of the cadres before and after the training. It corresponds to the former research by Mohamadi (2018), where knowledge has nothing to do with attitude and practice. A study in Iran states that health training or education requires seeing a population's cultural aspects and beliefs regarding the material delivery to enhance and result in a positive attitude.[24]

According to this research, the median score of the cadres' practice before the training is 15, with a minimum score of 8

and a maximum of 15. After the training, the median value of the cadres' practice score remains 15, with a minimum score of 10 and a maximum score of 15. The Wilcoxon Test shows that the score difference before and after the training is p value=0.111. It indicates no significant difference between the cadres' practice scores before and after the training. This corresponds to the previous research by Siti (2019), stating that there was no notable difference in practice after health education related to TB was conducted. Culture can influence practice through its influence on values, beliefs, and customary law. Therefore, it has a significant role in determining one's practice.[25]

Some studies revealed that knowledge has nothing to do with attitude and practice, as evidenced by the remarkable difference between knowledge scores before and after participating in training related to TB, but not with attitude and practice. It corresponds to the previous research by Shatat (2005), which highlights a remarkable difference in participants' knowledge before and after the health training in the form of a lecture and a two-way discussion related to TB.[26] Another research by Panaligan (2012) also discovered a notable difference in the participants' knowledge before and after the implementation of health education related to TB.[27]

This research's respondents, consisting of two health cadres from each *padukuhan* in Sumberharjo Village, Prambanan Subdistrict, and Sleman Regency, are selected representatively. The limitation of this study is the lack of time for conducting follow-up research results, which prevents the researchers from seeing the long-term effect of the training related to TB control for health cadres. Another limitation is related to the sex of the training's participants, who are all female, which makes this research not representative of all sexes.

This research and community empowerment research uses multiple methods to give health education to the health cadre community, with a lecturer and two-way discussion using a PowerPoint presentation, educational video, and demonstration in the training session. Longer and multiple follow-ups can be done in future research to accurately analyze the effect of health education about TB on health cadres' knowledge, attitude, and practice. Health education by other methods like Focus Group Education, more demonstration, and simulation can be used in future research to compare the effectiveness of one health education method and the other. A culturally based health education can be done to increase the effectiveness of health education for improving attitudes and practice about TB control by health cadres.

CONCLUSION

The study results show that the training for health cadres is effective in increasing their knowledge but not so effective in improving their attitudes and practice toward TB control. Training for health cadres needs to be carried out continuously to increase the capacity of health cadres in TB control for future community empowerment.

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CONFLICT OF INTEREST

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