Poltekita: Jurnal Ilmu Kesehatan
http://ojs.polkespalupress.id/index.php/JIK

Vol.18 No.2 August 2024: Hal. 123-131
p-ISSN: 1907-459X e-ISSN: 2527-7170

Original Article

Initiation of Increasing Tuberculosis Medication Supervisors Roles: An Action Research Approach

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ABSTRACT

Indonesia is ranked second in the number of Tuberculosis (TB) cases worldwide. TB patients and their families experience a complex burden. Hence, support and strengthening TB medication supervisors (Pengawas Minum Obat/ PMO) role is needed. The aim of this study was to enhance the Community Health Center (CHC)-based PMOs' role by improving their knowledge and strengthening peer group support. The method used was an action research cycle with four stages. The diagnosis stage was carried out by consensus decision making group with CHC to determine priority problems, namely the need to increase basic knowledge of TB and its treatment. Optimizing peer group was also necessary, as the Self Reporting Questionnaire-20 showed that more PMOs from patient families have psychological problems than cadres. The planning stage was conducted by preparing educational sessions and creating educational media. The action stage was a quasi-experimental (without control, non-randomization)—an educational talk show provided by the TB program manager, pulmonologist, and psychiatrist. Peer groups are also activated by triggering shared media education and discussion. At the evaluation stage, knowledge was measured by giving pre and post-tests (n= 21, total sampling). The results of the analysis using the Wilcoxon's Signed Ranks Test showed that participants' knowledge had increased significantly (p=0.000; r=0.59). In conclusion, education can increase PMO knowledge as an initial step to strengthen their role in supporting the success of TB treatment. Innovation, cross-sector assistance, and support are needed to enable the PMO to succeed in the TB program.

Keywords: *health promotion; medication supervisor; tuberculosis.*

https://doi.org/10.33860/jik.v18i2.2200

INTRODUCTION

Tuberculosis (TB) is infectious disease caused by Mycobacterium *tuberculosis*.[1] TB has become a health problem worldwide, where WHO mentions around 10 million people will experience TB in 2022, with death highest in the world.[2] The global prevalence of TB shows that Indonesia accounts for 8.5% of world TB cases, ranking second the most.[3]

Global TB treatment coverage in 2019 is still less than the target of 80%, namely 71%[4]. The prevalence of first-line TB drug resistance in the same year reached 24,000 cases, of which only 9,800 were diagnosed and 47% underwent treatment.[8] Treatment history previously also became a factor affecting resistance to treatment.[9,10] Lack of adherence of TB patients

against treatment causes treatment to become inadequate and enhances MDR-TB cases.[13]

In Indonesia, there are 1 million more people who have been diagnosed with TB, and only 66.2% of them have a PMO (Pengawas Minum Obat/ supervisor TB medication).[6] TB cases remain fluctuating, especially in the Special Region of Yogyakarta (DIY), where 2017 was found around 3,131 cases.[7] The same source also confirmed that as many as 1,323 people have smear sputum positive.

Medication supervisors/ PMOs have a crucial role in the success and adherence to treatment in TB patients.[17] Treatment compliance with existing standards is also influenced by the complex bio-psycho-socioeconomic burden experienced by patients and families.[16] The helpful role of PMO success TB treatment includes assisting patients in taking anti-TB drugs, providing health education, and motivating and supporting psychological and various help for patients.[18,19] PMO knowledge is significantly related to obedience to TB treatment, so patients and PMOs are necessary to increase knowledge related to TB.[20]

Tegalrejo Community Health Center (CHC) is one of the public health facilities in Yogyakarta City, Yogyakarta Special Region Province. This CHC has yet to achieve the target of 90% of the sub-indicator of Standards Service Minimal Medical in successful TB treatment for every patient. Hence, sensitive TB drug patients require attention to prevent them from becoming resistant. Based on preliminary study, TB medication supervisors also need to strengthen their role. Therefore, this study aimed to initiate and improve CHC-based PMOs' role by enhancing knowledge and strengthening peer groups for sustainable TB control.

METHODS

This study was conducted at the Tegalrejo Community Health Center, Yogyakarta City, in March 2023. The method used was one cycle of action research, which included diagnosing, planning, action, and evaluation.[21,22] Action research aims to find the most effective problem-solving methods according to the conditions with a systematic approach. CHC was the partner of this study with the level of involvement is co-learning, where researchers and research partners study problems and problem-solving together, but problem-solving is facilitated by researchers.[19] This study has also received ethical clearance from the Health Research Ethics Committee of the Faculty of Medicine and Health Sciences, Muhammadiyah University of Yogyakarta, No. 161/EC-KEPK FKIK UMY/III/2023.

The first action research stage carried out was diagnosis. At this stage, researchers assessed by conducting a CDMG (consensus decision-making group) or discussion with TB programmers and general practitioners (GP) who manage TB at the Tegalrejo Community Health Center. The assessment aims to explore existing problems and potential problem solutions. In addition, prioritization of the issues to be resolved is also determined at this stage. Next, the planning stage involves planning activities to be carried out as problem-solving based on the results of the assessment that has been carried out. The planned activities were selected from several alternative problem solutions with the criteria that they can be implemented, have available resources, can overcome priority problems, and have the potential to be sustainable. Next, the action stage implements the plans that have been carried out. Lastly, the evaluation stage, where measurements are taken of the achievements of the specified indicators, namely TB knowledge scores. The subsequent measurement following this initiation was assessed by the CHC using TB program indicators, extending beyond the scope of this study.

The intervention was carried out in the action stage by educating the TB PMOs. The educational method was conducted as a quasi-experiment (no control, non-randomization) using talk show techniques for all participants (n=26). Participants were existing PMOs of the Tegalrejo CHC and determined as categories of patient families and TB cadres.

Data collection in this study used two questionnaire instruments at the evaluation stage. The knowledge questionnaire was used in the pre-test and educational post-test. Researchers adapted the Febriyanti (2020) questionnaire, which was declared valid and reliable[18]. The adaptation made from the original questionnaire was to select questions related to TB treatment and reduce question items that were outside the research objectives. Thus, in this study, only 20 questions were used with TRUE-FALSE answer choices. Face validity and construct validity of the

questionnaire used have also been reviewed by community TB experts before use.

The second questionnaire used is the SRQ-20 (Self Reporting Questionnaire-20). This questionnaire consists of 20 questions with choice YES-NO answers, and two descriptive questions are filled in according to the conditions experienced by the participant. The SRQ-20 questionnaire has been widely used as a routine screening tool for psychiatric disorders in various health facilities and has been declared valid and reliable.[21]

The data obtained from this study was subjected to descriptive analysis to determine the mean, frequency, and standard deviation. Furthermore, the normality test of the pre-test and post-test data was carried out using the Shapiro-Wilk test. Because the data was not normally distributed, data analysis was continued with the Wilcoxon Signed Ranks Test and effect size (r) calculation.

RESULTS

Study results are provided in 4 stages of action research that have been done as follows.

1. *Diagnosing* Stage

In this stage, we explored several problems in TB treatment, particularly from the perspectives of patients, families, and communities. Problem priorities that have been agreed upon related to low achievements and success in TB treatment include low PMO capacity due to inadequate knowledge. The public health center state still needs to enhance the general PMO knowledge structure. This matter follows the quote as follows:

"*Education patient and family usually given when they control or take medicine, but not yet been at a special event, particularly in pandemic situation yeah."* (TB programmer, female)

The agreed priority solutions appeared based on the discussion. This initiative covers the need for educational media related to TB disease and its treatment, session education for enhancing knowledge and the PMOs' role in treating TB patients, and optimization support groups as PMO assistance.

"*The most probable to continue is education for PMOs, namely cadres, former patients, and family. Because from there, information can later be disseminated to the public. We also have a WA group*." (GP, male)

2. *Planning* Stage

Drafting planning for this study was based on assessment from previous stages. Activities carried out in this stage include creating educational media related to TB disease and TB treatment, as well as designing educational activities.

The educational media created are pocketbooks and educational videos. The aim of making this media was to help increase knowledge of TB patients and PMO. The pocketbooks created are distributed to participants so they can be read repeatedly. Educational videos are also made to facilitate participants' understanding, improve their knowledge, and motivate them to accompany TB patients taking medication. The educational media prepared has been reviewed by community TB experts and practitioners.

Figure 1. Educational Video

Based on the diagnosing stage, it was found that TB patients already have a WhatsApp (WA) group, so it can be used as a place to communicate between patients, PMOs, and across sectors. Optimizing the use of Whatsapp groups is expected to increase the exchange of information for cross-sector evaluation in decision-making. This peer group will be strengthened by providing educational media and more frequently opening discussions in the WA group in the action stage. Apart from that, it is hoped that this activity will increase motivation or psychological support.

3. *Action* Stage

Educational interventions were carried out at the action stage using the talk show method. This activity invites 26 cadres and families of TB patients who become PMOs. The educational process includes ice breaking at the beginning of the activity to build participants' enthusiasm for participating. Next, participants took the pre-test and SRQ-20 with the assistance of the research team. They continued

delivering material from experts, namely pulmonologists and psychiatrists. Puskesmas TB programmers also provide material related to treatment and TB program aspects. A question-and-answer discussion was held after the material had been delivered. Finally, participants were asked to complete the post-test.

Optimization of peer groups in the form of WA groups that have been formed is also initiated at this stage. Researchers provide educational materials and materials to activate discussion and education. Researchers recommend that the CHC involve cadres and cross-sectors in the WA group to increase community participation in supporting TB treatment.

4.. *Evaluation* Stage

Table 1. Participants' Characteristics

Variables	Category	n	%
Gender	Man	4	19.0
	Woman	17	81.0
Age	< 30 years	2	9.5
	31 – 60 years	16	76.2
	> 61 years	3	14.3
Last education	Not Filling	1	4.8
	No school	1	4.8
	Elementary school	2	9.5
	Junior high school	2	9.5
	Senior high school	11	52.4
	Undergraduate	4	19.0
Work	Not filling	2	9.5
	Homemaker	12	57.1
	Health Traditional	1	4.8
	Laborer	1	4.8
	Self-employed	5	23.8

In the education session, the total number of participants who filled out the attendance list was 26. However, only 21 participants filled out the complete pre-test and post-test. Table 1 shows that most participants are women (81%), with most aged 31-60 (76.2%). Most of the highest education participants are senior high school (52.4%), with the majority being homemakers (57.1%).

Table 2. SRQ-20 Assessment Results

PMO Status	Mental Status	
	Normal	Emotional Mental Disorders/ Distress
Cadre	6	-
Family	2	3

PMO = Medication Supervisor * based on *Self Reporting Questionnaire-20* ; Cut off Point ≥6 [9] .

The SRQ-20 assessment was also conducted on PMO participants who were patients' families and cadres. Eleven participants were willing to complete this questionnaire (Table 2). From these results, it was found that 60% (n=3) of PMOs who came from patient families experienced emotional mental disorders/distress. Meanwhile, PMOs from the cadres category did not find any mental problems.

The Wilcoxon Signed Ranks Test (Table 4) was carried out because the results obtained from the data normality test were not normally distributed (Table 3). The Wilcoxon Signed Rank Test showed statistically significant in knowledge improvement p= 0.000 (confidence interval 99%) with large effect size (r=0.59). The mean score of knowledge improve from 14.52 to 17.33 (Table 4).

Table 3. Normality Test Results (Shapiro-Wilk)

	Statistics	df	Sig.
Pre-test Score	0.921	21	0.089
Post-test Score	0.848	21	0.004

Table 4. Results of Wilcoxon *Signed Ranks Test*

Variable	Mean	Standard Deviation	p	z
Pre-test Score	14.5	2,1	0,000	-3.844[a]
Post-test Score	17.3	1,5		

[a] based on negative ranks

DISCUSSION

This research has identified TB as an ongoing priority issue. The Tegalrejo Community Health Center (CHC) continues to face the challenge of achieving successful TB treatment. This issue is also relevant to national health priorities, as TB needs to be eradicated by 2030[22]. Hence, it is imperative to implement a range of measures following the Indonesia priority program for TB control. As demonstrated in this study, the National TB Control Strategy also advocates for the utilization of communication, dissemination of information, TB education, and enhancing the involvement of medication supervisors (PMOs).[20]

This study employs an action research methodology, wherein the engagement of partners in the research design contributes valuable insights, resulting in more focused activities and ensuring sustainability beyond

program implementation. The adopted approach enables the identification of high-priority issues and facilitates problem-solving by engaging partners, thereby enhancing their understanding of the diverse health challenges they face.[21,22] The study identified that the role of the PMOs needs greater attention. Hence, it is crucial to take proactive measures to enable the PMO to contribute with expertise in TB treatment and address the diverse challenges faced during patient care. According to multiple studies, the effectiveness of treatment in TB patients is heavily influenced by the role of the PMO.[11] One of the responsibilities of the PMO is to cooperate with the CHC in documenting patient treatment and ensuring proper adherence to medication for TB patients.[13] This source additionally elucidates that PMO's effective involvement has contributed significantly to the substantial recovery of tuberculosis patients. Previous research also showed that PMO can enhance motivation and offer technical support to ensure patients effectively adhere to medication.[20]

The primary focus of this study is on PMO knowledge as a priority concern, apart from peer support enhancement. Empowering the PMOs becomes essential by enhancing their capacity. In line with this study, Pratama *et al*. (2018) discovered a substantial correlation between PMOs' knowledge and the recovery of TB patients. Therefore, it is imperative to enhance knowledge not only among TB patients but also among PMOs.[15,25] Limited knowledge and misconceptions among PMOs and patients about TB can impede TB management.[27.29] It implies the need to conduct health promotion specifically per community needs continuously.

This study demonstrates a significant advancement in knowledge following the provision of education. The findings of this study align with previous research, indicating that training PMOs on TB treatment can enhance their knowledge and skills.[28] While it may not be the final answer to all health program issues, enhancing knowledge is crucial as an initial step in building the ability to cultivate favorable perceptions. This community empowerment can assist the PMO in formulating and implementing health practices aligned with the established principles of TB treatment as determined by healthcare professionals.[29] Moreover, it is necessary to carefully examine the generalization or transferability of the improvement in participants' knowledge in this study, considering various contextual factors that may impact it, including educational media factors, methods of delivering materials, health educators skiils, availability question and answer sessions, and participant characteristics.[30–32]

The study findings revealed that family category PMOs exhibited symptoms indicative of psychological disorders, as determined by the SRQ-20 assessment. Hence, this action research also provided health education from a psychiatrist and peer group support. This discovery aligns with the findings of previous studies indicating that PMOs encounter various challenges when providing care for TB patients, such as the prevailing cultural norms, as well as physical and psychological stressors.[25] TB policymakers and health proffessionals must acknowledge the psychological well-being of both families and TB patients.[30] The primary social catalysts of psychological stress that impact the mental well-being of individuals with TB include stigma, economic fragility, depression, anxiety, and inadequate social support.[33,36] Furthermore, decreased family stress levels correlate positively with improved patient adherence to the tuberculosis treatment regimen.[32] Moreover, it is imperative to incorporate mental health interventions as a cohesive endeavor in the treatment of individuals with TB.[33]

In addition to receiving educational materials from psychiatrists, the peer group through the WA group was also reintroduced with a focus on education and discussion. Community involvement and various sectors must bolster the strategy to eliminate TB. Multiple studies indicate that the effectiveness of the community, particularly TB cadres, can be enhanced by providing them with sufficient knowledge and understanding, effective communication and coordination, and organized recording and reporting systems.[34] Moreover, it is essential to broaden the scope of society's involvement, particularly regarding providing social and economic assistance to individuals suffering from TB and their caretakers.[36,38]

This study findings realized that the initiation of community empowerment still need key stakeholders roles. The Directly Observed Therapy Shortcourse (DOTS) consists of five specific components: political dedication, microscopy services, medication

provisions, surveillance and monitoring systems, and the utilization of highly effective treatment regimens, along with direct supervision of treatment.[39] However, numerous stakeholders perceive DOTS as solely the act of closely supervising treatment administration.[40] DOTS's primary objectives are twofold: to guarantee the patient's adherence to the TB treatment regimen for a complete recovery and to avert the emergence of drug resistance within the community.[40]

This study demonstrates thorough stakeholder engagement throughout the process, from problem identification to implementing actions. Nevertheless, this study has several limitations, such as the limited indicators and brief duration of the observation period for assessing the outcomes of changes. Engaging in activities that increase knowledge is essential to empowerment and self-management support. However, it is not always directly linked to sustained changes in behavior.[41] Hence, it is important to monitor peer group action and consistently offer direction to PMOs and health cadres by healthcare professionals specifically about TB medication administration and its problems. Furthermore, to address the multifaceted challenges faced by TB patients and their caregivers, it is required to foster extensive collaboration across different sectors of society.

CONCLUSIONS

The research findings have identified that the primary issues to address are enhancing PMO knowledge and fostering peer support. Implementing a comprehensive educational initiative, including creating educational media and using talk show-style interventions, can significantly improve PMO knowledge. Further sustainable CHC innovation in health education about TB is required to enhance the capacity and role of the PMOs. Moreover, additional research is required to investigate the advanced impact of TB education on patients and communities and explore the factors that influence it.

In addition, the SRQ-20 assessment indicates that PMOs are also susceptible to psychological disorders. Despite educational support and peer groups, comprehensive mental health interventions are expected to be smoothly integrated into TB programs. This integration should involve the active participation of TB policymakers and multisectors to provide holistic support that addresses the biological, psychological, and socio-economic needs of TB patients and PMOs.

ACKNOWLEDGEMENT

We would like to express our thanks to the Tegalrejo Community Health Center and students of the UMY MARS Study Program (Aditya Edo Mulyono, Darsino, Corina Lisa, Ellya Yudhianti, Andriani Dhaniaputri, and Rani Meidawati) for their assistance in carrying out research and collecting data.

CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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