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The feasibility of increasing the success of tuberculosis programs through drug ingestion supervisors in remote areas

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ABSTRACT

The emergence of the Drug Swallowing Supervisor (in Indonesia is called PMO) program is a signal of novelty to increase the acceleration of the success of the tuberculosis eradication program. However, the certainty of its feasibility in remote areas is not yet known. The purpose of this study is to find out the feasibility of the PMO program in remote areas. This quantitative method research was conducted in Biak Numfor, Papua, with total respondents of 23. The primary data was obtained from instruments of a set of questionnaires which were distributed randomly to family members of TB patients. The inclusion criteria were family members of TB patients who were currently on treatment and lived in Yendidori district, Biak. The exclusion criteria were family members of TB patients outside Yendidori, and not taking TB drugs. Secondary data was obtained from reputable journals. Data analysis was carried out descriptively. The results of the study showed that the PMO program had great support from TB client families, and were willing to be part of the program. Found cases of multidrug-resistance (26%), ignorance of drug consistency (100%) considering that 5 out of 18 clients were toddlers. The other major challenges were infrastructure conditions and geography, and lack of means of communication. In conclusion, the PMO program was considered to provide benefits and was feasible to implement to support the increase in the success of TB eradication programs involving family members.

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INTRODUCTION

The role of tuberculosis drugs has gained a lot of recognition from experts around the world, but how effective of those drugs need to be questioned through supervision (Rodal, 2018). Therefore, in recent years there has been an explosion of research related to the need for volunteers to help monitor TB patients while taking medication (Gabriel & Juliana, 2021). It is known that the threat of tuberculosis bacterial infection according to WHO predictions are estimated to kill around 2 million people each year (World Health Organization, 2017). It is predicted that by 2020 around 1 billion people will be infected with Mycobacterium Tuberculosis, and the number of infections will increase

by more than 56 million each year (Tjekyan et al., 2018; WHO, 2020). WHO states that 22 countries with the highest burden of pulmonary tuberculosis in the world, 50% of which come from African and Asian countries and America (Brazil) (Umiasih & Handayani, 2018). Almost all descriptions of the spread of pulmonary tuberculosis in ASEAN countries fall into the category of the 22 countries, except for Singapore and Malaysia (Aryantiningsih et al., 2020). In the existence of all cases of pulmonary tuberculosis in the world in 2010, WHO ranked first in India, China, South Africa, Nigeria, and Indonesia (Ernawati et al., 2018; Umiasih & Handayani, 2018). The condition of pulmonary tuberculosis in Southeast Asia is estimated to have a prevalence rate of 4.88 million per year and an incidence rate of 3.17 million (Wikurendra et al., 2021). The spread of pulmonary tuberculosis cases in the population, most cases occur in the age group of 15-54 years, and men are more cases than women with a ratio of 2:1 (Ramadhan et al., 2021). Mortality and morbidity increase with age, and the ratio of prevalence and/or incidence in adults between males and females is higher in males (Fatmawati & Kusmiati, 2017).

The Ministry of Health (Kemenkes) reported that there were 351,936 cases of tuberculosis found in Indonesia in 2020 (Ministry of Health of Indonesia, 2020). According to profile data from the Biak Numfor Health Office in 2020, the Biak Public Hospital is one of the hospitals that has the largest handling of pulmonary tuberculosis with a total of 405 new cases out of a population of 246,852 residents, and in 2021 there has been an increase of 587 cases (Biak Health Office, 2021). The incidence of tuberculosis is in first place out of the 3 hospitals in Biak City. Based on Biak General Hospital data in 2020, there were 405 cases of pulmonary tuberculosis from January 2020 to December 2020. From January 2021 to December 2021 there were 587 cases of pulmonary tuberculosis, whereas in Quarter 1 there were 202 cases. In the second quarter, there were 122 cases, in the third quarter there were 150 cases, and in the fourth quarter there were 113 cases.

The Ministry of Health noted that the trend of successful TB patient treatment rates has been decreasing since 2016 (Asriati et al., 2019; Pradani & Kundarto, 2018). Most recently, the TB patient treatment success rate was 82.7% in 2020, lower than the previous year which reached 82.9% (Adyaningrum et al., 2019; Samhatul & Bambang, 2018). In addition, the treatment of TB disease has not reached the national target set in the strategic planning of the Ministry of Health of 90% (Aryantiningsih et al., 2020; Fitriya & Artanti, 2020). This shows the government needs to improve health services for TB treatment. One form of service is through the Drug Swallowing Supervisor (PMO) program. A PMO is someone close to a TB patient who voluntarily wants to be involved in the treatment of a TB patient until they are declared cured by a health worker (Rosiska et al., 2019). The task of the PMO is to support and promote the success of TB treatment. Several studies in Indonesia explored the role of PMO and its effectiveness (Samhatul & Bambang, 2018).

This quantitative method research with a descriptive design was part of community service that explores increasing the success of the tuberculosis eradication program through the Drug Swallowing Supervisor (PMO) at a Community Health Center in Biak, Papua. The aim was to know the feasibility of the PMO program in remote areas by identifying concrete steps for PMO involvement. It was hoped that this will have implications for national TB eradication programs, be used as input in eradication practices, and provide added value for TB health services and research both at the national and global levels.

RESEARCH METHOD

This study used a quantitative method with a descriptive design. The population was 18 people as family members of TB patients in the Yendidori district, Biak Numfor Regency, Papua Province. The inclusion criteria were family members of Pulmonary Tuberculosis patients, currently under treatment, and living in the Yendidori District area. The exclusion criteria were family members of TB patients, not residents of Yendidori, and who were not under treatment. The research began with distributing questionnaires, explaining the respondent's rights. The research was conducted from March 14 to May 24, 2022. Primary data was obtained from direct respondents via a questionnaire.

The questionnaire was divided into three parts, namely demographic data, family data concerning partnership elements, and data on the activities of drug-swallowing supervisors (PMO). Family data related to the partnership element contains information about PMO activities, informed, encouraged, invited, advised, reprimanded, escorted, prepared, and assisted TB patients. While the data on the activities of PMO includes taking medicine and the need to take medicine, delivering or calling health workers for injections if they get a treatment program by giving injections, and reporting if there are indications of poisoning or resistance. The secondary data were obtained from official documents from the Ministry of Health, the Health Office, the World Health Organization, and reputable Indonesian or English language journals. Data processing consists of editing, coding, and data entry as stated in the Results and Discussion section of this article. The data were analyzed descriptively.

RESULTS AND DISCUSSIONS

Demographic Data

Demographic data shows that the most common age group of pulmonary TB clients is between 21-59 years old with a classification based on sex: n = 8 women (44.4%), n = 6 men (27.8%), children and adolescents n = 4 (22.2%), followed by toddlers (0-5 years) 3 boys (16.6%) and 2 girls (11.1%). Total respondents n=23.

Treatment program category

There are four categories of TB treatment namely category 1 (n=13 or 56.5%), category 2 (n=1 or 4.3%), children category (n=3 or 13.0%), and MDR (multidrug-resistant) category (n= 6 or 26.1%).

Willingness to Join the Program

All respondents were willing to take part in the PMO debriefing training (n=23 or 100%). The training attendees were 18 people (n-18 or 78.3%). The quantitative indicators are called good if family members participating in the training are between 13 and 18 attendees. Quantitative indicators are moderate if family members participating in the training are present between 7–12 people. Quantitative indicators are lacking if family members participating in the training are present between 1–6 people.

Activities as Drug Swallowing Supervisor

The activities consist of reminding, informing, advising, inviting, advising, reprimanding, accompanying, preparing, and assisting TB patients.

Table 1. Willingness to do Activities as Supervisor of Drug Swallowing

No	Activities of PMO	Willingness		
		Yes	No	Not sure
1	Reminding	18	0	0
2	Informing	18	0	0
3	Advising	18	0	0
4	Inviting	18	0	0
5	Rebuking	13	0	5
6	Transporting	10	0	8
7	Preparing	18	0	0
8	Helping patients	8	0	10

The table above shows that the majority of respondents are willing to be involved in PMO activities especially on the activities of reminding, informing, advising, inviting, and preparing. Only 5 respondents (27.7%) were hesitant to rebuking, 8 (44.4%) were hesitant to transporting and 10 (55.5%) were hesitant to help TB patients.

PMO willingness when the patient wants to swallow the drug

Table 2. PMO willingness when the patient wants to swallow the drug

No	Activities of PMO	Willingness		
		Yes	No	Not sure
1	Taking medicine	18	0	0
2	Watching when the medicine is swallowed	18	0	0
3	Taking notes	18	0	0
4	Calling health officer if necessary	18	0	0
5	Report	18	0	0

The table above shows that all respondents are willing to be involved in PMO activities (n=18 or 100%).

PMO Challenges

Table 3. Challenges of PMO activities

No	Challenges	Availability		
		Yes	No	Not sure
1	TB patients under five	5	0	0
2	Routine home visits by health workers	10	0	8
3	Drugs in solid packaging and/or injections	0	0	18
4	Community participation has not been maximized	8	5	5
5	Multidrug-resistant patients	0	0	18
6	Infrastructure and geography	5	13	0
7	Communication	4	14	0

The table above indicates that of the 7 types of challenges that exist, the majority of respondents stated that the biggest challenges were infrastructure and geographical conditions (n=13 or 72.2%), existing communication facilities (n=14 or 77.7%), uncertainty about whether health workers could visit routinely (n=8 or 44.4%), and did not know whether the drug was solid or liquid (n=18 or 100%). Other challenges such as TB under 5 year old, routine home visit, drugs in solid packaging and/or injections, and multidrug-resistant patients are not treated as major challenges.

Analysis

From the six groups of data found in the study regarding the feasibility of increasing the success of the tuberculosis program through PMO in the Yendidori area, Biak Numfor above, in general, the PMO program has received major support from TB client families, and the families are willing to be part of the program. The quantitative indicator is based on attendance at training (n=18 or 72.3%). The main problem is that there are cases of multidrug resistance, and ignorance of drug consistency considering that 5 out of 18 clients are children under five (27.7%), the infrastructure and geographic conditions, as well as communication facilities.

Study Limitations

The limitation of this qualitative research is the number of 23 respondents which does not represent all TB patients in Biak Numfor Regency Biak Numfor Regency consists of 19 districts, 14 sub-districts, and 254 villages with a population of 140,631 people. This study also did not involve health workers or other related agencies in the TB eradication program. Moreover, geographically, Biak is remote and separated from the mainland province of Papua. Limited funds and personnel were other obstacles that prevented the achievement of the results of this research from being maximized, considering that the research was being carried out at the end of a pandemic. Beginning of 2022 the contact restriction rules in connection with Covid-19 were still in effect. Those limitations make the results of this study are not universally applicable.

Discussion

This community service-base research has identified the potential feasibility of holding a PMO program for TB clients in Yendidori, Biak Numfor of Papua. The potential that families have is their support and willingness to take part in training (Tables 1 and 2). While the biggest challenge is in Table 3 which mentions infrastructure and geographical conditions (n=13 or 72.2%), lack of means of communication (n=4 or 22.2%), uncertainty whether health workers can visit (n=8 or 44.4%), and the families did not know whether the drug was solid or liquid (n=18 or 100%).

Many studies have revealed the importance of community involvement and support in every health program (Muhammad & Fadli, 2019; N. Rahmi et al., 2017; Sianturi & CB, 2020). This is following WHO recommendations and the Ministry of Health, where community movements need to be empowered (Aberese-Ako et al., 2019). Community involvement that is guided by them, made by them, and for them will help increase public awareness, and increase their knowledge and responsibilities as citizens. Communities involved in health programs will also accelerate the rate at which program success is achieved. Moreover, the TB eradication program has been going on for a long time (Caren et al., 2022). The Yendidori people are classified as people in remote areas, who still adhere to traditional principles and are still conservative (Tukayo et al., 2021).

Therefore the involvement of citizens is needed, in addition to the need for a cross-sectoral approach, not just from health workers. Given the condition of infrastructure, geography, and the lack of means of transportation and communication. The availability of communication facilities, both software, and hardware, is needed for the continuity of the program. Many health studies have explored the close relationship between communication and program success (Rizkyansah & Rahayu, 2021). Programs that are implemented in an integrated manner will encourage the effectiveness and efficiency of the TB eradication program.

The following biggest challenge as a finding in this community service research is the respondent's doubts about regular and consistent health worker visits (Table 3). Many studies discuss the importance of visits in boosting clients' enthusiasm to participate in TB treatment. Research proves a close relationship between visits and accelerated patient recovery (Caren et al., 2022; Ruschel et al., 2018). Each client has a different character with a different level of awareness of complying with treatment regimens. Therefore in some cases, a visit by a health worker is necessary. Visits of health workers can be seen as encouragement, concern, attention, and program evaluation (U. Rahmi & Ramadhanti, 2017).

In some cases the client's family feels unable to explain the disease, the evaluation includes progress where they expect regular health worker visits. The problem is that health workers sometimes also face problems that are not fully understood by the client's family, such as a lack of resources, geographical conditions, no means of transportation, and other technical problems (Fitriya & Artanti, 2020). For that reason, a clear and structured agenda is needed which contains schedules for meetings, both individual and group, including training.

The third problem is regarding TB drugs that are not known by the general public, whether tablets or syrup. In general, the treatment of active TB requires several combinations of drugs. The most commonly used drugs include isoniazid, rifampicin, ethambutol, and pyrazinamide (Pradani & Kundarto, 2018). In cases of drug-resistant TB, a combination of fluoroquinolone antibiotics and injectable drugs is usually used for 20 to 30 months (Widyasrini & Probandari, Ari N., 2017). TB treatment usually uses a combination of at least 4 kinds of drugs (Pradani & Kundarto, 2018). This is done to prevent resistance, which is a condition when bacteria no longer respond to antibiotics and live in the body. Category 1 TB treatment includes 2 months of the intensive phase by taking 4 types of drugs (rifampicin, isoniazid, pyrazinamide, ethambutol) every day, and 4 months of the continuation phase by consuming 2 types of drugs (rifampicin, isoniazid) 3 times a week (Tama et al., 2016).

There are several types of category 2 treatment, one of which is a combination regimen of fixed combination drugs containing anti-tuberculosis drugs, a combination of rifampicin, isoniazid, ethambutol, and pyrazinamide, and injections of streptomycin for two consecutive months, followed by 1 month of administration of anti-tuberculosis drugs, a combination of rifampicin, isoniazid, ethambutol, and pyrazinamide, and continued with a combination of isoniazid, rifampicin, and ethambutol for 5 months (Tama et al., 2016). Category 3 is a group of patients who have the following criteria: New TB patients with negative smear test results and positive X-rays are mildly ill. Mild extrapulmonary TB patient (Sari et al., 2020). TB drugs are generally in tablet form except for TB Vit B6 syrup which is a lung antituberculosis drug used as a tuberculosis therapy that can be given alone or in combination with other drugs (lifepack.id, 2020). Each 5 ml of TB Vit B6 syrup contains 100 mg of isoniazid and 10 mg of pyridoxine (vitamin B6). In therapy using TB Vit B6 syrup it cannot be interrupted, it must be routine and taken until it runs out according to the doctor's instructions.

CONCLUSION

This research is part of a community service activity regarding PMO in the working area of the Yendidori Health Center where the level of participation of TB PMO families is relatively good. The findings of the study sought to explore the feasibility of the PMO program in increasing the success of TB eradication programs. Regardless of the various limitations that exist, the results of this study can be used as input in the PMO program, especially in remote areas. However, Yendidori is only a small part of Biak in the province of Papua. Therefore, in the future, it is recommended that further studies be carried out related to the similar topic, for example regarding the needs of PMO officers in overcoming communication difficulties or about the transmission of technology information in remote areas among TB drug ingestion supervisors. Given that communication has a very large role in the success of all programs without exception. Likewise, the role of cross-sector cooperation, including health education institutions which are mostly involved in TB eradication program research. That step will help accelerate the establishment of a comprehensive partnership process in this digital transformation era.

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