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ANALYSIS OF DIRECTLY OBSERVED TREATMENT SHORTCOURSE IMPLEMENTATION AS AN EFFORT TO CONTROL TUBERCULOSIS IN YOGYAKARTA

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ABSTRACT

Introduction: Globally, tuberculosis (TBC) continues to be a factor causing morbidity and death. During the COVID-19 epi**d**emic, case detection has decreased globally; Indonesia is one of the countries that sees this. For many years, the Directly Observed Treatment Shortcourse (DOTS) approach has been used as a TB control program. Based on case studies, the success rate for tuberculosis treatment in Yogyakarta is 86.4%, which does not meet the national target. **Aims:** To evaluate the Yogyakarta DOTS strategy in reducing TB. **Methods:** This research uses a qualitative case study design methodology. Six people participated in this research as respondents; two of them were drug swallowing supervisors, and four of them were TBC program participants. Theme analysis was applied to data analysis. **Results:** Yogyakarta successfully implemented DOTS which consists of five strategies. There are no gubernatorial regulations derived from presidential regulations regarding TB control; however, there was a decision by the governor to accelerate the eradication of TB, which later became a political commitment. Cases were identified through sputum examination using a rapid molecular test. Healthcare institutions have adequate access to medicines, which are monitored by the drug swallowing supervisors. Tuberculosis information system (SITB) is used in monitoring, recording and reporting systems. **Conclusion:** Implementing the five of Directly Observed Treatment Shortcourse strategies in controlling TBC in Yogyakarta has been done quite well. However, implementation is still hampered by a lack of human resources, computer infrastructure, and connections, all of which impact timely reporting.

Keywords: DOTS, tuberculosis, political commitment, drug swallowing supervisors, success rates

INTRODUCTION

One health burden still a health problem today is infectious diseases, some of which have increased each period. A prevalent infectious disease that affects more than a third of the world's population is tuberculosis (TBC). Tuberculosis is still a disease that increases morbidity and mortality worldwide (World Health Organization, 2017). TBC cases globally experienced a decline in case detection from 2015 to 2020 by 9%. The Covid-19 pandemic that occurred in 2019 had a global impact on reducing case detection and seeking care for people who had been diagnosed with tuberculosis. The number of reported tuberculosis cases decreased from 7.1 million in 2019 to 5.8 million in 2020. Sixteen countries, including India, Indonesia and the Philippines, contributed to a 93% decrease in cases, with India, Indonesia and the Philippines being the most affected countries compared to other countries (World Health Organization, 2021). There were 351,936 TB cases identified in Indonesia in 2020, with a TB treatment success rate of 82.7%; This is different from the target set by the Ministry of Health that the success of TB treatment is 90% (Ministry of Health of the Republic of Indonesia, 2021).

In Indonesia, TBC control uses the Directly Observed Treatment Short-course (DOTS) approach, which the WHO has recommended since 1995. DOTS is a TBC control method that seeks to prevent the spread of TBC disease, thereby reducing

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TBC morbidity and mortality in the community. Despite efforts to eliminate TBC in several countries since 1995, it remains a public health problem worldwide (Ministry of Health of the Republic of Indonesia, 2014). DOTS is a short-term TBC control strategy under direct supervision. The DOTS approach helps accelerate the healing phase of pulmonary tuberculosis. DOTS highlights the importance of closely monitoring pulmonary tuberculosis patients to ensure they take medication as prescribed until they are declared cured (Rosita & Suarni, 2014). Indonesia has achieved significant progress in efforts to control TBC. In line with technological advances, efforts to control TBC using the DOTS strategy in Indonesia began in 1995. Until now, the implementation of TBC control innovations has been increasingly improved, such as the use of rapid TBC diagnostic test kits. The high degree of treatment success is undoubtedly connected to TBC patient treatment compliance, since successful treatment is not only an important component of good patient care, but also a critical component in the public health response to TBC (Tesfahuneygn et al., 2015).

The implementation of the DOTS strategy in controlling TB in various regions in Indonesia has not been optimal (Dwiyovita et al., 2023). Based on the study's results, treatment with the DOTS strategy resulted in a more significant recovery than non-DOTS treatment in healthcare facilities (Santika Putri & Hisyam, 2014). The success of the DOTS program supervised by the drug swallowing supervisors was 86.2%, in line with the success rate of treatment, but because the drug swallowing supervisors cost component was not free, treatment with the DOTS strategy required higher funds (Fawzi et al., 2020). The funding required is also included in the element of political commitment; this is because some of the cost components do not include those provided by the health office alone but also across other sectors, so political commitment is urgently needed. Another difference was that the DOTS strategy's effectiveness at the Lasinrang Pinrang Regional General Hospital needed to be maximized. Because political commitment has yet to be carried out optimally by the government, they still rely on funds from the Global Fund and KNCV in addition to screening passive suspects, bacteriological examination with wrong sputum and drug swallowing supervisors who are not precisely and routinely trained (Yanti et al., 2021). The success of the DOTS program supervised by the drug swallowing supervisors was 86.2%, in line with the success rate of treatment, but because the drug swallowing supervisors cost component was not free, treatment with the DOTS strategy required higher funds (Fawzi et al., 2020). During the Covid-19 pandemic, the management of the TBC program with the three DOTS strategies was not maximized with sputum examination results in TCM of 64.7%, treatment with anti-tuberculosis drugs directly supervised by drug swallowing supervisors of 73.7% and availability of anti-tuberculosis drugs of 80% (Widiyana & Rambey, 2022).

Case finding and treatment success in Yogyakarta have fluctuated; the decline co-occurred with the Covid-19 pandemic. The treatment success rate in Yogyakarta in 2021 is 86.4%, an increase from the previous year, but this increase has yet to reach the national target. The recovery rate tends to have a gap with the treatment success rate, so the contribution of recovered patients to the treatment success rate has decreased compared to previous years (D.I Yogyakarta Health Service, 2019). This is supported by the facilities provided by the government to reduce TBC cases in the city of Yogyakarta which are already able to serve TBC patients according to the DOTS national standard. This study aims to evaluate the implementation of the DOTS strategy in

controlling tuberculosis in the city of Yogyakarta.

METHODS

This type of research is qualitative with a case study approach which aims to provide an overview of the implementation of the tuberculosis control program using the DOTS strategy in Yogyakarta. Research data collection was carried out from September to October 2022. Determining research subjects used a purposive sampling technique by taking into account predetermined criteria where the subjects were six people responsible for controlling tuberculosis, namely one person holding the TB program at the Daerah Istimewa Yogyakarta Health Service, one person holding the TBC program at the Yogyakarta City Health Service, two persons holding the TBC program holders at the primary health center, and two supervisors for swallowing medicine

The instrument used in collecting research data was an interview guide to dig deeper into the informants and explain their ideas in more detail regarding the implementation of the DOTS program in the City of Yogyakarta. Qualitative data analysis with thematic analysis is carried out simultaneously with the process of data collection and data interpretation, and a matrix is made to make it easier to view data more systematically. The data that have been collected will be discussed in depth in narrative form or described units. The research has gone through a review of the Ahmad Dahlan University Ethics Committee with registration number 012208121.

RESULT

Evaluation of implementing the DOTS strategy policy in TBC control in the City of Yogyakarta includes five strategies. Information regarding the implementation was obtained through interviews with respondents; the characteristics of the research subjects in the study are presented in Table 1.

Table 1. Characteristics of research subjects

Code	Position
R1	Infectious disease analyst - Tuberculosis
R2	Tuberculosis program holder at the Yogyakarta City Health Office
R3	Tuberculosis program holder at the health center
R4	Tuberculosis program holder at the health center
R5	Drug swallowing supervisors
R6	Drug swallowing supervisors

The implementation of the five DOTS strategies in Yogyakarta is as follows:

There is political commitment to tackling TBC: policy determination, resource mobilization and program implementation (first strategy)

The policy to prevent tuberculosis in Indonesia uses Presidential Regulation 67 of 2021. The prevention of tuberculosis requires collaboration across sectors, both government and private. This is related to the many factors that influence the occurrence of tuberculosis, so overcoming it requires many parties who can be adjusted to the factors that cause tuberculosis so that cross-sectoral participation and commitment are needed. The legal form for cross-sector cooperation requires regulations from the central and regional governments to strengthen the performance of each sector.

> *"We also use the national guidelines using the minister of health regulation and presidential regulation number 67 of 2021, which we then use as a reference. The derivatives below should be government regulations, then there are regent/mayor regulations, but until now, there are no government*

regulations, only SK the governor regarding the team for accelerating TBC control in Daerah Istimewa Yogyakarta (DIY); we have also involved all agencies in the local government of DIY, we have included it in the team decree until now it is still valid." (R1)

The implementation of the TBC acceleration program went smoothly. However, there still needs to be a misconception that health problems are the health sector's responsibility. Currently, in the Special Region of Yogyakarta, as a reference for controlling and accelerating TBC control, we are using the Governor's Decree of D.I. Yogyakarta as a commitment to accelerating TBC elimination efforts by 2030. This is the basis for stipulating the Yogyakarta Mayor's Regulation on the TBC control action plan in the region since 2017. With the Presidential regulation, Governor's Decree and the Yogyakarta Mayor's Regulation, the TBC Control Regional Action Plan has been realized, which is the basis and guideline for regional apparatus and local government apparatus, as well as community groups in the City of Yogyakarta in implementing TBC control efforts. Cross-sectoral cooperation has been carried out in the City of Yogyakarta, with parties involved from the prevention level to control. Coordination in TBC control is still limited to meetings that are held and are not routine in their implementation; so far, it has yet to be maximized because there has been no monitoring and evaluation. As conveyed by the respondents, as follows:

"Yes, if only one party is involved in government, the leading sector is healthcare." Apart from the health office, we have brought together all of the agencies as a team to expedite TBC eradication in DIY, including the chairman, the regional secretary, and DIY; coordination can take the shape of face-to-face meetings or online meetings through Zoom. Networking meetings are typically held once every six months, with some gatherings occurring once or twice a year. If the formal network meeting occurs only once or twice a year, no evaluation is performed." (R1 and R4)

TBC control via the DOTS program necessitates human resources (HR) with a high level of dedication and expertise. The SDM team, also called the DOTS team, is at the primary healthcare level and comprises 15 to 20 individuals. The team's makeup is tailored to the regulations and requirements of each health service institution, and the TBC program manager serves as the team's leader.

"Yes, TBC teams exist in all healthcare facilities, including hospitals and basic care clinics. Each member can change the team's name; some are referred to as DOTS teams and others as TBC control teams, but the team must exist in some shape, or at the least, the head must have selected health professionals to serve as TBC program managers. The number of individuals who return to medical institutions varies on the size of the medical facility. Depending on each hospital, some have considerable money accessible while others have medium or small amounts. Doctors, nurses, midwives, analysts, pharmacists, nutritionists, psychologists, the environment, and health promotion are typically included." (R1 and R4)

The DOTS team, comprised of TBC program managers and other health professionals, demonstrates the competencies required for TBC control during its work. Based on the research's findings, it was discovered that not all of the DOTS team's human resources had received training; these hurdles included transferring units or having to hire replacement employees who were unfamiliar and untrained.

"In general, we have trained all hospitals and health centers, but the issue is that frequently, the officers we

train then resign or move jobs, and there is a vacancy of people who have been trained because, in the private sector, they are not too bound, if at the public health center, civil servants stay there longer until they are moved, but when the TBC program manager changes to new personnel, many of them have not received training." (R1, R3, R4)

The Covid-19 epidemic presents a challenge to the annual pattern of training that is conducted to meet competencies. The D.I. Yogyakarta Health Office undertakes an eight-week routine updating of TBC knowledge in partnership with health professional organizations in the province and district/city to maintain competence. Human resources are still a barrier to completing DOTS activities since there are no cross-professional investigators for contact investigations, just programmers for TBC, and no nutritionists, environmentalists, or psychiatrists.

TBC control must also be supported by the facilities available in each health agency and health center, and this is a health factor that influences change for TBC patients, a reciprocal relationship that is interrelated. The facilities provided by the government for tuberculosis have been very helpful in the service process. If the facilities the patient provides are good, changes in the patient's behavior will be even better. In other words, TBC patients will diligently go to health services if the health facilities and services are better. However, there is still a lack of TCM tools for treating TBC, so the primary healthcare must refer to hospitals or health centers that already have TCM, as respondents stated:

"The facilities for DOTS already exist and are complete at the primary healthcare, it is just that for diagnostics using TCM is not available in every primary healthcare yet, but we can refer to Pratama Hospital for the results after three days due to congestion and queuing tested." (R2, R3, and R4)

Funding will affect the targets and objectives of the program to be achieved. In tackling TBC, funds come from various sources, as stated by respondents as follows:

"At the level of healthcare facilities and primary healthcare, there are Regional Revenue and Expenditure Budget (APBD) funds, then health service funds from the State Revenue and Expenditure Budget (APBN), funds from donors, donor funds are like funds from The Global Fun called KNCV. It also helps in tackling TBC. In fact, from the management and control side of TBC at the health office, it might be sufficient, but what is not yet is from other Regional Device Organizations (OPD), For example, health cadres who are tasked with assisting TB patients are currently still limited. This will hinder the control of tuberculosis if donations from The Global Fund or another funding are not extended further." (R1 and R2)

Funding for TBC control sourced from the government can be considered sufficient in terms of program implementation, but it has limitations because the funds available are not only to fund the DOTS program, but other OPDs have contributed to the DOTS TBC program, which must also be funded. Funds needed by patients who require patients to pay for treatment themselves are usually X-rays; the rest, if the examination is through a health service such as a primary healthcare, is free of charge.

Case finding by rapid molecular tests (strategy 2)

The goal of the DOTS-based TBC control program is to reduce the mortality and morbidity of the disease. Increase the identification rate of patients with TBC case finding to stop the transmission of TBC to reduce the disease rate. Examination of cases has used the TCM tool; with TCM, it can correctly detect

whether a person is truly infected with TBC disease. Then microscopic examination will monitor the treatment progress and determine the treatment outcome.

> *"Diagnosis for examination using the TCM tool is carried out at the first examination (intensive phase) and shows clinical symptoms. Then it is called the follow-up phase conducting follow-up again in the fifth and sixth months using microscopy. The personnel for microscopic examination are at the health center, some are trained, and some are not trained." (R3 and R4)*

The strategy for implementing the functions and objectives of the program that will be carried out is human resource management. In order for TB treatment to be successful, adequate human resources include having competence in TB management, not having double jobs, this will facilitate the process of implementing the TB control program. The TBC program has been implemented and has been running for a long time, but according to the facts in the field, several programs have not run optimally; as said by the informant, the limited tools for treatment require health facilities to first refer patient samples to units that have TCM. According to the results of interviews that have been conducted, there are still some difficulties in implementing the TBC program, so treatment cannot be done quickly because of the limited tools that are owned. This is a challenge both in terms of HR behavior and facilities. Examination by confirming a diagnosis of TBC at the health center has followed the path of diagnosis, then examined in the morning and during. The examination is also carried out consecutively in the morning and during (SPS). By following the diagnostic path, the DOTS program provides convenience in finding TBC cases that health workers have experienced at the primary healthcare. However, the enforcement of the diagnosis is already with TCM.

Directly supervised drug administration (strategy 3)

The success of tuberculosis treatment is important in supporting the elimination of tuberculosis by 2030 through direct supervised administration of drugs. Direct supervision of patients taking tuberculosis drugs by assigning a drug swallowing supervisor (in Indonesia it is called "Pengawas Menelan Obat/PMO). Supervised of taking medication, the aim is to ensure the regularity of therapy and control of drug use. The DOTS technique ensures that the patient consumes the complete dose prescribed according to the condition and duration of each type of treatment. Typically, treatment supervisors include skilled health workers, dasawisma cadres, non-governmental organization (NGO) cadres such as the Indonesian Tuberculosis Eradication Association (PPTI), patients' families, recovered patients, community members, and community leaders. Health facilities appoint patients' relatives and cadres to monitor drug consumption to serve as drug swallowing supervisors. As stated in the following quote, which mentions the existence of drug swallowing supervisors as follows:

> *"Those who become drug swallowing supervisors can be family members because these family members are in the same house with the patient every day so that they can carry out direct supervision; it can be health workers or cadres if the patient does not have a family such as students who live in boarding houses or sufferers who have relapses. If the* drug swallowing supervisor *is a health worker, surveillance can be done by telephone." (R1, R2, R3, and R4)*

The existence of drug swallowing supervisors is very helpful in minimizing the occurrence of treatment dropout and further impacts such as drug-resistant

tuberculosis. Most respondents said that the drug swallowing supervisors carried out its functions, namely always reminding or accompanying them when taking medication, supervising and reminding patients. Drug swallowing supervisors monitor patients when they take their medication, remind them of treatment schedules at healthcare facilities, and provide recovery support. However, this does not mean drug swallowing supervisors can replace the patient's obligation to take medication according to the health facility because patients must visit health facilities as often as possible to monitor their progress and set benchmarks for their treatment adherence. Even when the patient feels well, the drug swallowing supervisors must remember and encourage him to take his anti-tuberculosis medication as directed. Patients taking medication for TBC must understand how the different stages of therapy are connected. In other words, if the patient follows the intensive phase and is not followed by adherence to the advanced phase, it will result in the patient experiencing treatment failure.

> *"The role of the drug swallowing supervisors is to supervise, remind the rules for taking drugs and control schedules to the primary healthcare and can even take patients if they cannot independently go to the primary healthcare, provide support for patients taking medication on time and determine to re-examine the controls to the primary healthcare. So far, the existing drug swallowing supervisors have carried out their roles and duties properly." (R1, R2, R3, R4, R5, and R6)*

Good information and communication from health workers and doctors during patient care can impact how often patients receive treatment. In addition, health workers must communicate with patients to monitor regularity and provide care. In addition, support and motivation for patients are also needed to improve the patient's quality of life to be better than the role of the drug swallowing supervisors as the person closest to the patient. If the drug swallowing supervisors is active and works according to its role, it can support a high treatment success rate.

> *"The drug swallowing supervisors' role is very important, but it is undeniable that several factors cause the low cure rate for TBC patients. Another obstacle faced is the lack of drug swallowing supervisors roles and personnel. If the drug has side effects, the drug swallowing supervisors must be able to provide correct information about the disease. The drug swallowing supervisors must be able to remind them to take the medicine immediately. The most common obstacle experienced so that the lack of adherence to taking medication is the side effects of drugs that are very disturbing. This is also a major factor in patients often stopping their medication." (R1, R2, R3, and R4)*

Based on the results of the interview with the drug swallowing supervisors, who is a family of the sufferer, they said that while accompanying some, some had and some had not been given an explanation regarding their duties as a drug swallowing supervisors and education about tuberculosis. So far, the duties carried out as drug swallowing supervisors are to supervise, assist, take medication, assist during drug collection at the primary healthcare, remind patients to check for recurrent phlegm, provide recovery support, and provide education on clean and healthy living.

Guarantee the availability of drugs on a regular, comprehensive, and timely basis (strategy 4)

The availability of tuberculosis drugs in healthcare facilities, both primary healthcare, and hospitals, determines the success of the DOTS program. Centralized tuberculosis drugs from the Ministry of Health of the Republic of Indonesia are then distributed to primary-level health

facilities according to the plan. So far, the availability of drugs in the city of Yogyakarta is guaranteed regularly, thoroughly, and on time so that no patients do not receive treatment. This is following what was conveyed by the tuberculosis program manager at the primary healthcare as follows:

"The anti-tuberculosis drugs are always available and fulfilled by the health ministry. In drug distribution, it is seen from the number of sufferers, according to the estimated number of TBC cases. If it is lacking, we immediately confirm it to the health office. So there is no problem with drug availability." (R1, R2, R3, and R4)

A shortage in drug availability can occur; in practice, if it occurs, it will be reported to the Yogyakarta City Health Office so that a strategy can be determined to overcome it. This has ever happened to one of the primary healthcare in the working area of the Yogyakarta City Health Office, according to what was conveyed by the research respondents as follows:

"Drug shortages rarely happened; maybe there were some types of drugs at that time there were vacancies everywhere, but yes, then we coordinated with other districts/cities, but if they are not available in other districts/cities, then report them to the center so they can be sent from the province others then exchanged drugs between other provinces, and then the problem was overcome." (R1, R2, R3, and R4)

Planning for drug availability is based on estimates of tuberculosis cases in each healthcare facility; in practice, it has been going well. Several obstacles have occurred, namely the unavailability of children's tuberculosis drugs, but they can be fulfilled from other districts in the Special Region of Yogyakarta so that a rapid reporting system can be a solution to solving the problem. Based on the results of the study, the availability of drugs in the work area of the Yogyakarta City Health Office has been running well and is fulfilling.

Good monitoring and recording, and reporting system (strategy 5)

The recording and reporting of TBC cases in the City of Yogyakarta have used the Ministry of Health's information system, the Tuberculosis Information System (SITB). The TBC program manager, as the person in charge of the health service facility, can input TBC data online and in real-time so that the health office in either the Regency/City or Province can view and monitor the data that have been input.

"Monitoring, recording, and reporting of TBC cases is done online using the tuberculosis information system (SITB) from the Ministry of Health." (R1, R2, R3, and R4)

In carrying out this task, the TBC program manager is assisted by people who are included in the DOTS team at healthcare facilities, who are included in the DOTS team among TBC program managers, medical record departments, laboratory assistants, and pharmacy departments.

"Each health facility has appointed a TBC management officer, including input data. Those who do it are the TBC programmers in each health center. Actually, not only one person can access or be responsible for data input; it could be the DOTS team at the primary healthcare. For people in the DOTS team according to the policies of each health center, but usually are programmers, nurses, medical records and pharmacists." (R1, R2, R3, and R4)

Some of the obstacles encountered in recording and reporting include available human resources (HR), including many TBC program holders in healthcare facilities who are old and do not understand information systems, so in practice, they work with younger teams, but many of them have other main tasks

(double job) so that the recording and reporting do not match the predetermined time. Other constraints are the facilities in supporting the operation of SITB, such as poor connection when accessing SITB, in addition to the limited availability of devices such as computers and laptops, which causes their use to alternate with one another. The statements of the research respondents are as follows:

> *"Because now the system is online based on information technology, even though many of the officers at the puskesmas are old and many of them have not updated their information systems, so it is difficult to make real-time input and requires assistance from the authorities. Younger generation health workers have other work responsibilities, so they cannot complete the recording and reporting of TB cases, cannot be done on time, and so on. The obstacles include aspects of human resources, facilities such as laptops and internet networks, so sometimes only one computer at the Puskesmas is used at the same time, so they have to take turns." (R1, R2, R3, and R4)*

Some of these conditions can cause monitoring, recording and reporting of TB cases to not be carried out in real time. Efforts made to ensure timely reporting are carried out in stages according to mutual agreement between the Community Health Center, Hospital and the Yogyakarta City Health Service, which is then sent to the Yogyakarta Special Region Health Service to then be sent to the center. With an online reporting system, the Health Service can directly monitor and evaluate input provided by community health centers/hospitals. If it is found to be incomplete, it will be returned and re-completed.

Achievements of the Tuberculosis Program in the City of Yogyakarta

The output of the tuberculosis program through DOTS consists of case detection and treatment success rates. Based on the findings, the coverage of tuberculosis for three years is presented in Table 2. The results of the CNR in Yogyakarta City have decreased from 2019 and 2020 and increased again in 2021 to 115.73 per 100,000 population, a decrease in the previous year due to the Covid-19 pandemic. The same thing happened to the indicator for the success rate of tuberculosis treatment in the City of Yogyakarta in 2019 and 2020, which decreased in 2019 and 2020, and increased again in 2021 by 86.4%.

Table 2. Tuberculosis Achievements in the City of Yogyakarta

Indicator	Achievements by Year		
	2019	2020	2021
Case Notification Rate (CNR) per 100,000 residents	145.18	103.45	115.73
Number of cases	1.048	780	853
Number of RO TBC cases	38	48	48
Success rate	83%	79.38%	86.4%

DISCUSSION

The Ministry of Health strongly supports TBC preventive measures, as evidenced by the existence of a written policy for the prevention and eradication of the disease in the form of Regulation of the Minister of Health No. 67 of 2016. This is particularly beneficial since, in the absence of government backing for the DOTS plan policy, the community would be taxed and under pressure from medical expenses that may total millions before the condition was deemed fully curable (Kumalasari & Prabawati, 2020).

Since many of the health professionals who make up the DOTS team have several responsibilities, the availability of adequate human resources in

each health service institution also impacts how well the program is implemented (Sanjaya, 2021). The DOTS program's implementation has received enough funding. Financing concerns are technical aspects that directly affect the DOTS program. Due to funding issues, the DOTS method's ability to treat TBC successfully is limited (Fawzi et al., 2020). The DOTS program's support of health cadres is one of several activities contributing to the need for more operational money to operate DOTS (Sanjaya, 2021). Political will, especially among decision-makers, work together across linked industries and ensure that financing is sufficient to implement the best DOTS program (Suci & Restipa, 2021).

Obstacles were found that not all healthcare facilities purchased a tool for sputum examination with TCM, so sputum samples had to be sent to a reference hospital. Puskemas without TCM examination equipment should then send sputum samples to the hospital (Widya & Maharani, 2022). Sputum examination by TCM is linked to the success of DOTS strategies in implementing tuberculosis (Widiyana & Rambey, 2022). TCM is better at detecting patients infected with Mycobacterium tuberculosis and its ability to identify whether a person is infected or not correctly (Widya & Maharani, 2022).

Sputum testing with TCM has better capabilities than the BTA microscope examination. Both tests are gold standard, but the TCM results are more sensitive and specific than the BTA microscopic examination results (Zuraida et al., 2021). The microscopic technique has a sensitivity of 75%, whereas the TCM method has a 100% sensibility, with TCM having a higher quality as it can identify 1 TBC Mycobacterium DNA in 1 ml of sputum (Wicaksana et al., 2022).

Treatment of tuberculosis takes a long time, for six months, so the patient feels saturated and bored, which is where the function of drug swallowing supervisors is very important to remind the patient to adhere to the rules of treatment to avoid resistance (Yuliani et al., 2019). The availability of drug swallowing supervisors possessed by each patient from family and TBC cadres can help patients take medication through surveillance monitored by the drug swallowing supervisors (Mellania & Zainafree, 2022).

Family and community support plays an important role in improving treatment compliance, with a drug swallowing supervisors trusted by the patient in overseeing medication swallowing, greatly helping patients in good behavior in supporting the healing process. Treatment strategies involving drug swallowing supervisors, one of the DOTS strategies, can improve treatment success and healing rates (Rosita & Suarni, 2014). The existence of a drug swallowing supervisors as an accompanying TBC patient has the competence to be able to perform a role as a drug swallowing supervisors well through the training or education provided by primary healthcare. The drug swallowing supervisors who do not receive routine training from TBC programmers will have an impact on not having commitments, not being able to cooperate with TBC officers, and accepting a Lack of sputum collection education; the rules of drinking drugs will affect the implementation of DOTS control strategies (Yanti et al., 2021).

During the implementation of the DOTS strategy, the availability of drugs in the working area of the City of Yogyakarta was available and running well, an out-of-stock event had occurred, but it could be resolved immediately through coordination between the primary healthcare and the health office for the immediate availability of anti-tuberculosis drugs. The DOTS technique considers the drug supply. A planning mechanism for purchasing tuberculosis medications is available to ensure the supply of anti-TBC medications. Anti-tuberculosis medications are provided to each health centre with a mechanism taken by TBC officers, then

they are regulated directly by the pharmacy department of the health centre to patients in line with requests from the planning of each health centre (Faizah & Raharjo, 2019).

A robust system for distributing anti-tuberculosis medications begins with a letter of request from the primary healthcare, followed by approval from the Health Service. The primary healthcare will then fill out a Google Form to request anti-tuberculosis medications from the Health Service, which will then be given to patients via prescription in the primary healthcare pharmacy room, ensuring the availability of anti-tuberculosis medications at primary healthcare (Widya & Maharani, 2022). The cause of the unavailability of anti-tuberculosis drugs could be due to not being well-organized in planning the availability of anti-tuberculosis drugs according to the estimated TB cases. There is a shortage of anti-tuberculosis drugs for children in health services because no cases of TB in children have been detected before, so good planning can be a strategy to ensure sufficient stock of anti-tuberculosis drugs (Widiyana & Rambey, 2022).

With SITB, recording and reporting will be more effective and efficient, which means that sound recording and reporting are related to the quality of DOTS officers with good competence. Recording and reporting are currently supported by an electronic system carried out online to reduce the incidence of missing reports caused by documents in complex file form (Noveyani & Martini, 2014). Various tasks allocated to the DOTS team, officers who have been taught but still have multiple responsibilities, and difficulties in documenting and reporting these factors might cause reporting performance to fall short of the permitted time (Inayah & Wahyono, 2019). Using manual systems to record TBC case data, such as treatment cards and register books, might result in incomplete documentation, which can lead to reporting that is not done in compliance with the standard operating procedures for TBC/DOTS services (Suarni et al., 2013).

Whether a region has a high or low CNR level depends on case discovery, the effectiveness of the recording and reporting system, the number of healthcare facilities offering DOTS services, and the percentage of TBC patients who are not reported by health service institutions (Ministry of Health of the Republic of Indonesia, 2015). The adverse effects experienced by the patient may prevent them from completing the whole course of therapy, which lowers the success rate of the treatment and falls short of the national objective (Widya & Maharani, 2022). Where there is no program review and improvement, there is a lack of political commitment, which affects the achievement of recovery rate, conversion, and complete treatment indicators (Prameswari, 2018). The success rate for tuberculosis has increased along with the increasing role of cadres as providers of education and screening for TB suspects, as well as monitoring the swallowing of medicine for sufferers while undergoing treatment (Yani et al., 2018).

CONCLUSIONS

Implementing the DOTS strategy is constrained by the lack of human resources, computer infrastructure, and connections, which impact timely reporting. With the limitations of the existing input, the output of treatment success has increased, which indicates that the human resources involved in the tuberculosis control team are carrying out the DOTS strategy process well.

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