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The Role of Drug Swallowing Supervisors (PMO) in Improving Tuberculosis Treatment Adherence: A Literature Review

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Abstract

Tuberculosis (TB) is an infectious disease caused by the bacterium Mycobacterium tuberculosis, which can attack all organs, especially the lungs. Tuberculosis remains the world's deadliest infectious disease, with more than 9 million infections and 1.7 million deaths per year. If not treated or managed correctly, this disease can lead to serious consequences and even death. The purpose of this literature review is to obtain an overview of the relationship between drug-taking supervisors (PMO) and the level of adherence to treatment visits in pulmonary TB patients from various perspectives and various similar studies. The research method used in this study is a literature review, which includes an analysis of 8 articles obtained from three databases: ProQuest, Science Direct, and Google Scholar. The search keywords used for article retrieval included "drug-taking supervisors or drug swallowing supervisor or PMO," "Tuberculosis or TB or TBC," and "drug adherence," using "AND" and "OR" as Boolean operators. Treatment monitoring is the main focus in supporting the success of pulmonary TB patients in the recovery period. Based on the findings of a review of 8 literature journals, there was an increase in recovery when supervisors took medication because the risk of forgetting during treatment visits was reduced, and the fear of PMO was reduced, causing pulmonary TB patients/patients to more regularly visit the nearest health facility that has been approved for treatment provided. Therefore, the drug-taking supervisor (PMO) on adherence to treatment visits is very important in breaking the cycle of pulmonary TB in the community.

Keywords: Drug swallowing supervisor, Family, Tuberculosis

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1. BACKGROUND

Tuberculosis (TB) is an infectious disease caused by Mycobacterium Tuberculosis, which can attack various organs, especially the lungs. This disease, if left untreated or incompletely treated, can cause dangerous complications and even death (Rawat et al, 2023).

The success of TB treatment is supported by compliance with taking anti-tuberculosis drugs at the prescribed dose. Patients who are repeatedly treated in

hospitals are caused by non-compliance with taking anti-tuberculosis drugs (OAT) regularly (Sembiring & Fitria, 2024). In family nursing, successful supervision of taking medication for pulmonary tuberculosis patients indicates that the family understands how to care for their sick family members (Ariyanti et al., 2023). This will undoubtedly result in dropout, which is one of the triggers for healing failure and has the potential to increase the formation of drug resistance or what we call Multi Drugs Resistant (MDR) TB. If there is resistance to drugs, the costs incurred for treatment will be more significant, and the time required for treatment will be longer (Sukartini et al, 2020).

Based on data from the World Health Organization (WHO) in 2017, Indonesia was ranked 2nd with a population infected with tuberculosis, namely 1.50 million people. The total population infected with TB in 2017 was 12.5 million in Indonesia (Kemenkes RI, 2023). With such a large population, Indonesia consists of many islands, including East Java. In East Java, 40,560 people were infected with TB in 2017. Meanwhile, in Pasuruan City in 2017, 140 people were infected with TB, with a population of 4256 people, so the percentage of the population infected with TB was 3.3%. If this problem is left untreated, the consequences that will arise if sufferers stop taking medication are the emergence of drug-resistant TB bacteria. If this continues to happen and the bacteria spread, TB drug control will be increasingly difficult to implement and result in an increasing death rate due to TB disease (Chakaya et al, 2021).

The main indication of pulmonary TB sufferers is a cough with mucus for 2 weeks or more. Coughing can be accompanied by additional indications, namely mucus mixed with blood, coughing up blood, shortness of breath, weakness, decreased appetite, weight loss, malaise (feeling unwell), night sweats without physical activity, fever for more than one month (Richard et al, 2022). The factors that cause someone to get TB are when the immune system decreases and other supporting factors such as age, education level, smoking, alcohol, poor nutrition, diabetes, and compliance with treatment (Etim et al, 2024). Efforts to overcome the problem of TB in Indonesia TOSS TB (Find Medicine Until Cured) is a movement to find as many sufferers as possible and treat them until cured so that the chain of transmission in the community can be stopped. The TB TOSS movement is an

effort to prevent and control TB (Indonesian Ministry of Health, 2018).

In addition, efforts to overcome the problem of ineffective airway clearance in TB patients are using postural drainage or effective coughing, impaired gas exchange by positioning the patient to maximize ventilation, hyperthermia by monitoring the amount of nutrients and calorie content, and the risk of infection by monitoring signs and symptoms of systemic and local infections (NANDA, 2018).

Based on the description above, knowing the level of compliance of pulmonary TB patients in undergoing treatment is one of the dominant factors that can be a parameter for the success of TB treatment. If tuberculosis patients do not comply with therapy, Mycobacterium tuberculosis will have resistance to the drugs given. Evaluation of the level of compliance with the use of tuberculosis drugs is one of the efforts to determine the extent of patient compliance with the treatment carried out and the factors that can affect the compliance of tuberculosis patients. If someone has been confirmed positive for pulmonary TB, a supervisor should be prepared to take their medication so that it can run well and correctly during the treatment process. The reality of this problem is that many health facilities still have not used the PMO (Drug Swallowing Supervisor) for the treatment of pulmonary TB patients.

2. METHODS

The research method used in this final assignment report is the literature review method. This literature review research design is one of the methods of collecting library data, reading and recording, and managing and analyzing relevant writing materials for further identification, evaluation, and synthesis of existing works to conclude (Ulhaq & Rahmayanti, 2020).

The data collection process was carried out using database search tools such as Pubmed, ScienceDirect, and Google Scholar with stages of literature review searches using the PRISMA (Preferred Reporting Items for Systematic Review and Meta-Analysis) method to obtain criteria for articles to be studied with stages of identification, screening, eligibility, and selected articles.

The data analysis used in this study is Thematic Analysis. Thematic Analysis, also known as thematic Analysis, is one way to analyze data using data collection by researchers to recognize patterns or create themes through the information that has

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been collected (Heriyanto, 2018). Moreover, Freeday and Muir-Cochrane (2020) said that this method is very effective for a study that intends to examine in detail and detail the data obtained and then create a relationship between patterns in a phenomenon that is concluded (Heriyanto, 2018).

In this study, using the systematic review method, researchers need a more rigorous and well-defined approach and a more comprehensive one in selecting the literature to be used. The systematic review method is carried out according to systematic stages by following the article writing process that avoids the subjective understanding of researchers (Nursalam et al., 2020).

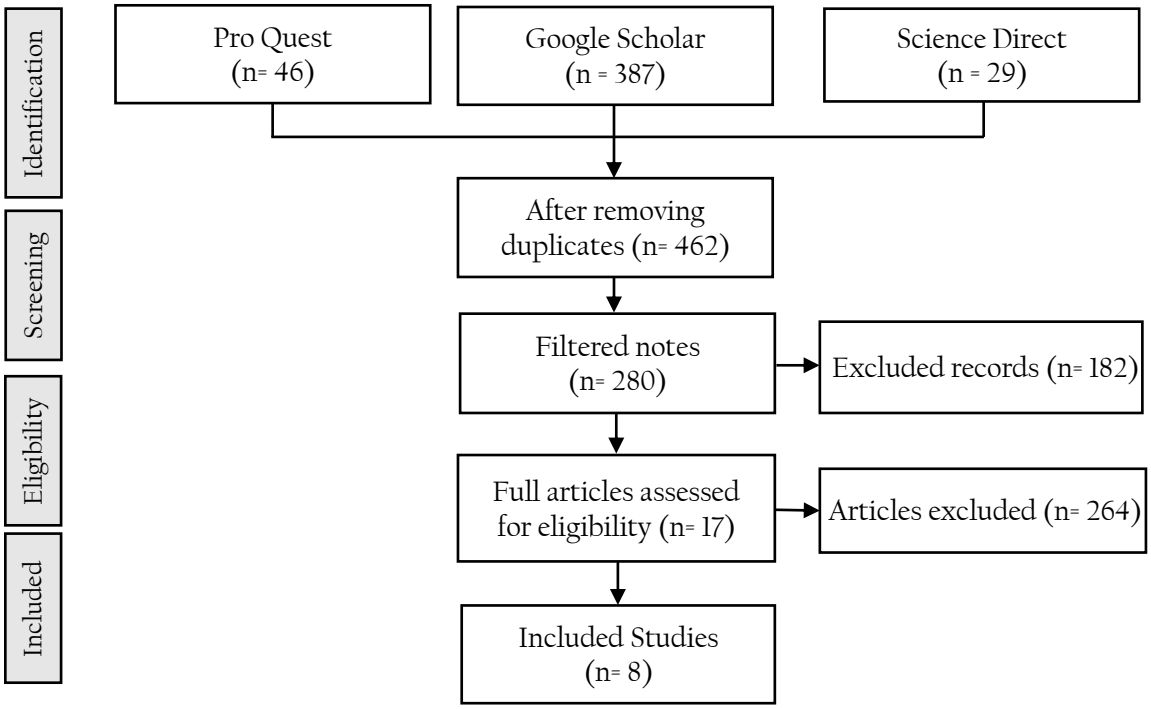

Figure 1. Flow chart of literature searches and screening results

3. RESULTS

The results of 8 journal articles discussing the relationship between drug supervisors (PMO) and drug adherence. Critical assessment was conducted using Critical Appraisal, and 8 articles met the inclusion criteria. The discussion of each article can be seen in Table 1.

Table 1. Articles results

No	Title & Author	Method/design	Population & Sample	Results
1	The Relationship Between the Role of Medication Supervisors (PMO) and Compliance with Visits for Pulmonary Tuberculosis (Pulmonary TB) Patients at the Nogosari Health Center, Boyolali Prabowo et al (2014)	Cross-sectional study	All TB patients registered at the Nogosari Health Center, Boyolali Regency who have PMO	The results of the study showed that 1) The role of the Medication Supervisor (PMO) in Pulmonary Tuberculosis (TB) patients at the Nogosari Boyolali Health Center was included in the good category; 2) Visits of Pulmonary Tuberculosis (TB) patients at the Nogosari Boyolali Health Center were included in the complaint category; and 3) There was a relationship between the role of the Medication Supervisor (PMO).
2	Analysis of The Role of Medicine Supervisors in The Healing of tb Patients at Bitung Barat Public Health Center, Bitung City in 2020 Tindatu et al (2020)	Qualitative research methods through observation, document review and in-depth interviews	9 PMO informants at the Bitung Barat health center were selected based on the principles of appropriateness and adequacy.	The role of PMO in Bitung Barat Health Center in supervising TB patients taking medication, encouraging patients will take medication regularly, and helping or accompanying TB patients in taking medication at the health center is good, but its role in educating patients and families is not optimal, this is due to the lack of information obtained about TB
3	Relationship between Knowledge and Attitude with Compliance in Taking Anti-Tuberculosis Drugs in Pulmonary TB Patients at Teladan Public Health Center, Medan in 2019 Saragih & Siralit (2019)	Cross-sectional study	The population is tuberculosis sufferers, recorded in 2019 at the Teladan Medan Health Center, totaling 35 people. The sample in this study is the total population, namely 35 respondents.	There is a relationship between knowledge and compliance with taking anti-tuberculosis drugs. There is a relationship between attitude and compliance with taking anti-tuberculosis drugs.
4	Improvement Cadre Ability TB Health In Active Case Finding To support Case Detection Rate Pratiwi & Dian, 2017)	Quasi-Experimental Study. One group post-test study design	The respondents were 181 TB health cadres in Wonosobo Regency,	Cadres with an elementary school have an education level of 34.81%. There was an increase in knowledge in 10 knowledge items between before and after intervention with a p-value of <0.001. Long-term evaluation from trimesters 2 to 4 found 385 suspects (21.56%) and six smear cases (+)
5	Relationship Between Characteristics Of Supervisory With Tuberculosis's Patient Compliance In Puskesmas Pragaan 2016 Fadlilah (2017)	Analytic study using the case-control method	The study population was all PMOs from pulmonary TB patients seeking treatment at the PHC of Pragaan from January to December 2016, totaling 106 patients. The sample of this study was 60 people, 20 PMO cases, and 40 PMO controls	The results of the chi-square statistical test found that there was no relationship between sex (p = 0.855), age (p = 0.106), occupation (p = 0.325), last education (p = 0.656), and the closeness relationship between PMO and patients (p = 0.112) with compliance with pulmonary TB patient treatment, however, there is a relationship between knowledge (p = 0.004) and attitude (p = 0.003) with compliance with TB patient treatment

No	Title & Author	Method/design	Population & Sample	Results
6	Relationship between Family Support and Pulmonary TB Patient Control Compliance Nastiti & Candra (2020)	Analytic cross-sectional correlational approach	The population was all patients with pulmonary tuberculosis at the health center visit as many as 41 respondents. Samples colected by concecutive sampling.	The results showed that 18 respondents who have poor family support, there are 18 respondents who are not obedient to followed treatment control. While the 15 respondents who have good family support there are 11 respondents who are obedient to serve treatment control. Based on the data from the contingency coefficient test results, the results showed ρ = 0.022, α = 0.05, so that ρ < α, then H0 was rejected and H1 was accepted, so there is a relationship between family support and compliance with pulmonary TB treatment control at the Kedundung Health Center.
7	Risk factors analysis of non-compliance of Tuberculosis (TB) patients taking medicine in Puskesmas Polonia, Medan, 2021. Asriwati et al (2021)	A Case Control	The population was all patients who visited the working region of the Polonia Public Health Center. The research subjects were 138 samples consisting of 68 cases and 68 controls	It was found that there was an influence on the role of health workers OR = 8,933 (95% CI: 1,085-73.525), side effects of drugs with OR = 6,873 (95% CI; 2,435-19,398), felt healthy OR = 4,643 (95% CI; 1,247-17,287), and knowledge OR = 2,700 (95% CI; 1,083-6,731)
8	Medication Compliance in Pulmonary Tuberculosis Patients Fitri et al (2018)	A Cross-sectional study	The population taken is the whole of Pulmonary Tuberculosis patients in the working area of Sadabuan Health Center of Padangsidimpuan city as many as 106 people, with the number of samples of 51 people	There is a relationship of knowledge (0,000), attitude (0,000), education (0,000), occupation (0.001), and family support (0,000) to medication adherence. Knowledge is the dominant factor affecting the compliance of taking medicinal treatment of Pulmonary TB patients with OR (Exp B = 29.169).

4. DISCUSSION

The issue of medication compliance in pulmonary tuberculosis (TB) patients has been widely studied, as it plays a crucial role in treatment success and preventing drug resistance. Pratiwi and Dian (2017) examined the relationship between the role of medication supervisors (PMO) and compliance with treatment visits in pulmonary TB patients at the Nogosari Health Center, Boyolali. Their findings emphasize that a decisive supervisory role positively influences patient adherence, ensuring that medications are consumed consistently and reducing treatment interruptions. Effective medication supervisors act as facilitators in treatment completion, providing motivation and accountability for patients.

Similarly, Tindatu, Maramis, and Wowor (2019) analyzed the role of swallowing supervisors in recovering internal medicine patients with TB in the West Bitung Health Center. Their study highlights that swallowing supervisors

play a key role in monitoring medication intake and providing emotional support to ensure patient recovery. This suggests that the interpersonal relationship between patients and supervisors can significantly enhance compliance, indicating that personal involvement in patient care is a critical determinant of adherence.

In addition to supervision, Saragih and Siralit (2019) explored the connection between knowledge, attitude, and compliance with anti-TB medication at Teladan Medan Herlina Health Center. They found that patient knowledge about TB and a positive attitude toward treatment is closely linked to compliance. Patients who understood the importance of consistent medication intake and non-compliance consequences showed higher adherence rates. This underscores the need for continuous patient education and awareness programs to reinforce positive health behaviors.

Pratiwi and Dian (2017) also investigated the role of TB cadres in improving active case findings to support case detection rates. Their study reveals that well-trained cadres significantly contribute to identifying new cases, which is crucial to enhancing treatment outcomes and compliance. Cadres act as community-based advocates, bridging the gap between healthcare providers and patients, fostering trust, and encouraging compliance.

The role of drug-swallowing supervisors and family characteristics has also been explored by Fadlilah (2017) at the Pragaan Health Center. The research highlights that supervisors with close familial relationships effectively ensure treatment adherence. Family support systems that include supervisors are pivotal in creating a supportive environment for TB patients, ensuring consistent medication intake, and providing emotional assistance throughout the treatment period.

Nastiti and Candra (2020) further emphasize the importance of family support in influencing treatment compliance among pulmonary TB patients. Their study found a significant positive relationship between strong family support and control visit compliance. Similarly, Asriwati et al. (2021) identified key risk factors contributing to non-compliance, such as low socioeconomic status, lack of education, and limited family support. Lastly, Fitri (2018) concluded that medication compliance is multifactorial, involving supervision, knowledge, and emotional support. These findings suggest a holistic approach involving patient education, intense supervision, and family

engagement, which are essential to improving TB treatment adherence.

Furthermore, studies have highlighted that socioeconomic and cultural factors can act as barriers to compliance. Asriwati et al. (2021) found that financial constraints, stigma, and lack of accessibility to healthcare services significantly reduce patient compliance with medication schedules. Addressing these factors requires a multidisciplinary approach, including community support programs and affordable healthcare access, to minimize patient burden and improve adherence.

Another critical element is the role of healthcare workers in ensuring continuous follow-up and education. Fitri (2018) emphasized that nurses and healthcare professionals play a central role in promoting adherence by providing clear instructions, regular follow-ups, and motivational support. Effective communication and trust-building between healthcare providers and patients can significantly influence patient compliance with treatment regimens.

Additionally, integrating technology into TB treatment programs may offer innovative solutions to monitor and improve medication adherence. Mobile health (mHealth) applications, SMS reminders, and telemedicine have proven effective in ensuring consistent medication intake by providing timely reminders and enabling remote consultations. Implementing these technologies can enhance patient engagement and address challenges related to geographical barriers and resource limitations.

The role of psychosocial support must be considered in TB treatment compliance. Nastiti and Candra (2020) highlighted that family encouragement and emotional assistance help mitigate feelings of isolation and distress in TB patients. This support system and effective healthcare interventions contribute to better treatment adherence and outcomes.

5. CONCLUSION

Medication compliance among pulmonary tuberculosis patients is influenced by multiple interconnected factors, including the role of medication supervisors, family support, patient knowledge, and socioeconomic conditions. Effective supervision, whether by healthcare professionals, family members, or community cadres, plays a pivotal role in ensuring adherence to treatment regimens. Additionally, patient education and awareness significantly impact compliance, as informed patients are more likely to understand the importance of consistent medication intake.

Family support systems and psychosocial assistance further enhance treatment adherence by providing emotional and practical support to TB patients. However, challenges such as financial constraints, stigma, and limited healthcare access remain barriers that need to be addressed through collaborative, multidisciplinary approaches. Nurses and healthcare workers play a crucial role in promoting compliance through education, technological interventions, and patient-centered care.

By addressing these factors and implementing holistic strategies, healthcare providers can significantly improve treatment adherence, leading to better patient outcomes and reducing the risk of drug-resistant TB. Future interventions should focus on integrating technology, enhancing community-based support, and addressing socioeconomic barriers to create a comprehensive and sustainable approach to TB management.

AUTHOR CONTRIBUTIONS

The primary author was responsible for the planning, and writing of this research report. The co authors contributed to the data collection and analysis of the results.

CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest in this research. All research activities were carried out without any external influence that could affect the objectivity of the results.

DATA AVAILABILITY STATEMENT

The data are available from the corresponding author upon reasonable request.

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