



The Effectiveness of Video Observed Therapy towards Compliance with Drug throughout Tuberculosis Patients

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Abstract

BACKGROUND: Treatment of tuberculosis is carried out every day in the long-term, causing boredom to take medication and reducing medication adherence. Taking medication that is not routine causes drug resistance which can cause tuberculosis treatment to take longer.

AIM: This study aims to review the effect of the application of drug-taking supervisors on drug adherence in tuberculosis patients.

METHODS: The research design uses the preferred reporting items for systemic review and meta-analysis Guidelines with an online literature search strategy using the Google chrome search engine Scopus, Science Direct, PubMed, CINAHL, and Proquest. The year of the literature source was taken from 2018 to 2022. From the articles searched, five articles were obtained and reviewed.

RESULTS: The results of a review of five articles showed that video observed therapy (VOT) technology was needed to improve medication adherence in tuberculosis patients.

CONCLUSION: This review shows the role of VOT technology to improve medication adherence in tuberculosis patients.

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Keywords: Video; Adherence; Tuberculosis

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Introduction

Tuberculosis is a medical condition that requires adherence to a treatment regimen. Treatment is very important because of the high rate of transmission of tuberculosis. Failing to take treatment will cause the patient to become resistant to certain types of drugs, so the treatment will be more complicated and longer [1]. Tuberculosis treatment has challenges in adherence, this is due to the long duration of treatment, the absence of benefits that are directly received by the patient, the time lag between administration and impact [2]. In addition, tuberculosis patients tend to come from groups with low education and low income which is associated with low adherence rates [3]. Non-compliance is often caused by forgetfulness, wrong perception of healing, side effects of drugs, stigma, long distances to health facilities, and long waiting times [4].

Based on [5] data in March 2021, 84 countries reported more than 80% of TB incidents and 90% of incidents in 2019 and 2020. Countries with the highest TB burden are India, Indonesia, Philippines, and South Africa. Geographically, most of the countries with the largest transmission in 2019 were in South-east Asia (44%), Africa (25%), and the Western Pacific (18%), Eastern Mediterranean (8.2%), America (2.9%), and Europe (2.5%). Eight countries account for two-thirds of

the global total, namely, India (26%), Indonesia (8.5%), China (8.4%), Philippines (6.0%), Pakistan (5.7%), Nigeria (4.4%), Bangladesh (3.6%), and South Africa (3.6%).

According to the KemenkesRI (2020) in 2019, the number of tuberculosis cases decreased from 566,623 cases (in 2018) to 543,874 cases. The highest number of cases were reported from provinces with large populations, namely, West Java, East Java, and Central Java. Tuberculosis cases in these three provinces almost reached half of the total tuberculosis cases in Indonesia (45%). Tuberculosis cases based on the Case Detection Rate were the most in West Java (96.2%), the second Gorontalo (94.6%), and the third DKI Jakarta (87.5%), East Java (68.3%) ranked sixth. The success rate of treatment of tuberculosis patients in Indonesia from 2017 was 85.7%, in 2018, it decreased to 84.6% and increased in 2019–86.6% [6].

The WHO recommends technology-based implementation with digital health [7]. Video observed therapy (VOT) is one of the information and communication technology products that can be used as digital health [8]. Video directly observed therapy (VDOT) allows patients to use smartphones to record videos of drugs consumed by patients without interaction with health professionals. VDOT can overcome the limitations of face-to-face treatment of patients with health workers,

treatment barriers such as distance can be removed [9]. VDOT therapy is considered to be able to reduce the cost of the tuberculosis treatment program and the patient burden [10]. Therefore, in this study, researchers conducted a scientific review to assess the effectiveness of VOT on medication adherence in tuberculosis patients. The novelty of this study is a review of the results of studies that assessed the effectiveness of VOT on medication adherence. The information obtained from this study is intended to be used as literature material and literature review for educational institutions related to drug compliance. The author hopes that this information can be a reference for nurses to improve drug adherence for tuberculosis patients so that patients can achieve maximum health status.

Methods

The research design used in this study is a systematic review. The literature search process was carried out in the past 5 years of research (2018–2022) in English selected from several indexed electronic databases such as CINAHL, PubMed, SAGE, Science Direct, and Scopus as well as writing article search results following appropriate protocols and rules using preferred reporting items for systematic review and meta-analysis (PRISMA) checklist and flow diagrams.

The literature search strategy was carried out in June 2022. The strategy used to search for articles used the PICOT framework (Table 1). Articles are identified with the keywords “video” AND “adherence” AND “tuberculosis” by restricting 2018-2021 in English and full text articles, so as to get relevant articles.

Table 1: PICOT framework

PICOT framework	Inclusion and exclusion criteria
Population	Tuberculosis patient
Intervention	Video observed therapy
Comparison	No comparison
Outcomes	Compliance with taking medication
Time	2018–2021
Study design	Randomized controlled trial, Quasi-Experimental Study
Language	English
Exclusion criteria	The article does not discuss video observed therapy in tuberculosis patients, articles without full text and abstract without intervention details, dated before 2018, and studies conducted other than English, as well as a study design Randomized controlled trial, Quasi-Experimental Study

The inclusion criteria of the article were the intervention of a medication reminder application that was given to improve medication adherence in tuberculosis patients (Table 1). The articles taken are the past 5 years using the Randomized Controlled Trial and Quasi-Experimental Study methods. The purpose of this study was to examine the effectiveness of VOT given to improve medication adherence in tuberculosis patients in detail, so that articles without full text and not explaining the effect of medication reminder applications to improve medication adherence in tuberculosis patients were

excluded from the study. The search results obtained four selected articles from the 841 articles found.

The study selection in this study used PRISMA (Figure 1). According to PRISMA guidelines, the first step is to search for articles that match the topic in the electronic database. After getting an article, it is selected and then the same article is deleted. After that, titles and abstracts were screened to meet the eligibility criteria. The entire text of each selected article that met the inclusion criteria was taken for further examination. A secondary search was performed from the article reference list to identify additional notes. The final stage includes articles that are relevant and meet all inclusion criteria in a systematic review. Three independent reviewers conducted the search and screening process.

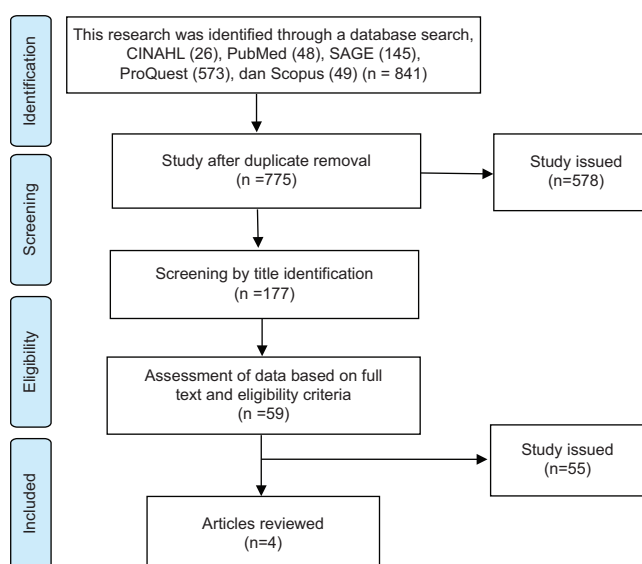


Figure 1: Flow chart of study selection
Keyword : video; adherence; tuberculosis

The risk assessment of bias in this study using the Joanna Brings Institute (JBI) critical appraisal checklist was used to assess the methodological quality of the articles included (Figure 2). Three independent reviewers assessed the risk of bias for each included study. Any disagreements are resolved by discussion.

Data extraction in this study using a structured form was used to extract information from the included articles starting from the author, year, country, method, sample, age, duration and frequency, intervention, results, and article results to evaluate the effect of the intervention. These data are summarized in Table 2.

Results

The total number of articles identified was 841 articles. Then, the duplicates were removed and

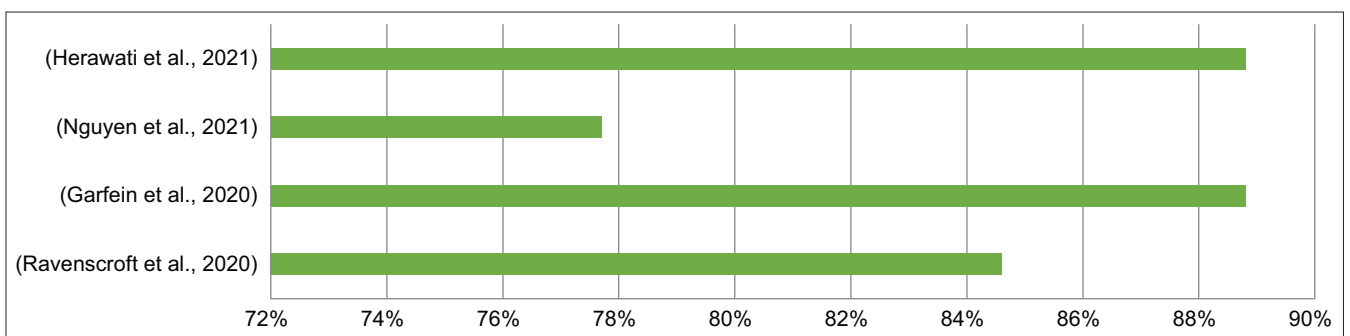


Figure 2: Risk of bias

Table 2: Literature review

Author, Year, Title	Design	Sample	Intervention	Output	Results
Luke Ravenscroft, Stewart Kettle, Ruth Persian, Simon Ruda, Lilian Severin, Svetlana Doltu, Benjamin Schenck, George Loewenstein 2020 Video observed therapy (VOT) and medication adherence for TB patients: RCT in Moldova	Randomized controlled trial	197 patients 99 control group 98 intervention groups	1. The intervention group received Video Observed Therapy (VOT) 2. The control group received DOT treatment as usual	1. Treatment adherence 2. Effectiveness of Video Observed Therapy (VOT)	Adherence to taking medication increases after it is given Observed Therapy Videos (VOT) (Ravenscroft et al., 2020)
Garfein, L. Liu, J. Cuevas-Mota, K. Collins, D. G. Catanzaro, F. Munoz, K. Moser, C. Chuck, J. Higashi, M. A. Bulterys, F. Raab, P. Rios 2020 Evaluation of recorded video-observed therapy for antituberculosis Treatment	Quasi experimental	149 patients Divided into 3 places (52 in San Diego, 49 in San Francisco, and 48 in New York City)	1. Recorded Video Observed Therapy 2. The control group received DOT treatment as usual	1. Kepatuhan pengobatan 2. Efektifitas rekaman video terapi yang diamati (Recorded Video Observed Therapy)	The effectiveness of the observed video recording therapy (Recorded Video Observed Therapy) is considered effective in increasing medication adherence, cost effectiveness and easy acceptance by patients [10]
Lan Huu Nguyen, Phuong Thi Minh Tran, Thu Anh Dam, Rachel Jeanette Forse, Andrew James Codlin, Huy Ba Huynh, Thuy Thi Thu Dong, Giang Hoai Nguyen, Vinh 2021 Assessing private provider perceptions and the acceptability of video observed treatment technology for tuberculosis treatment adherence in three cities across Viet Nam	Quasi experimental	79 patients	1. Treatment technology-based video intervention 2. The control group received DOT treatment as usual	1. Treatment adherence 2. The effectiveness of video-based treatment technology	Video observed treatment is considered effective in improving medication adherence in tuberculosis patients (Nguyen et al., 2021)
Fauna Herawati, Yuni Megawati, Aslichah, Retnosari Andrajati, Rika Yulia 2021 The Effect of Javanese Language Videos with a Community Based Interactive Approach Method as an Educational Instrument for Knowledge, Perception, and Adherence among Tuberculosis Patients	Quasi experimental	122 patients 60 control group 62 intervention groups	1. Java language video intervention with community-based interactive approach method 2. The control group received treatment as usual	1. Treatment adherence 2. The effectiveness of Javanese video with community-based interactive approach method	The use of videos using the Javanese language (Ngoko) as an effective educational tool to increase knowledge about tuberculosis, drug administration for tuberculosis and the incidence of OAT resistance, understanding and implications of changing negative perceptions about timelines, personal control, disease coherence and emotional representation into positive and positive perceptions. improve adherence to taking tuberculosis drugs (Herawati et al., 2021)

the remaining 775 articles were for feasibility review. Articles screened based on title identification obtained 177 articles. The full text article feasibility test left 59 research articles and four articles for review. After identifying all the articles using randomized controlled trial and quasi-experimental study. The following table of search results from each database includes CINAHL, PubMed, SAGE, Science Direct, and Scopus. Based on the search results from each database, which include CINAHL with 26 articles, PubMed with 48 articles, SAGE with 145 articles, ProQuest 573 articles, and Scopus with 49 articles. The articles reviewed were four articles. From the results of the review, it was found

that the role of technology, namely, VOT, was needed to improve drug adherence in tuberculosis patients.

Assessment of risk of bias, from the measurement results using JBI obtained a risk value of 77.7–88.8% of all articles reviewed. Almost all studies that have analyzed the risk of bias using JBI with RCT and quasi-experimental methodologies have a low risk of bias.

The frequency of giving the intervention VOT once a week ($n = 3$ articles), the frequency of giving the intervention every day ($n = 1$ article). The duration of the intervention was 22 months ($n = 1$ article), 7 months

(n = 1 article), and 1 month (n = 2 articles). The age of the respondents was 18–60 years (n = 1 article), 18–65 years (n = 1 article), 15–65 years (n = 1 article), and 15–71 years (n = 1 article).

The results of this study indicate that from the four articles reviewed, the role of technology, namely, VOT, is needed to improve medication adherence in tuberculosis patients. Technology can function optimally when health workers utilize and empower patients. The existence of VOT technology as a medication supervisor will increase the motivation for medication adherence in tuberculosis patients. In addition, technology that is easily accessible will be accepted by patients and health-care providers as a cost-effective and time-saving monitoring of tuberculosis patient treatment.

Discussion

VOT

Most tuberculosis patients can be cured with anti-tuberculosis drugs, but poor adherence to prolonged treatment regimens can lead to continued transmission, drug resistance, and death [11]. Non-adherence to treatment is a major obstacle to tuberculosis control because it reduces the cure rate of tuberculosis patients [12]. Adherence support and monitoring interventions improve tuberculosis treatment outcomes compared to self-administered unsupervised treatment [13]. Innovative approaches to improve care and prevention are needed to improve effective treatment. Observation therapy for tuberculosis treatment that involves a health worker or person who is trusted to supervise the patient taking medication according to the dose [11].

According to the researcher's assumption, adherence to taking medication is caused by several factors, firstly, long treatment resulting in boredom to take medication, resulting in decreased medication adherence. Second, the distance between the patient's house and the nearest health service, because the long distance causes patients to be lazy to come for treatment. Third, the ease of access to health services is also an important factor, if it is difficult to access the patient tends to be lazy. Fourth, the patient's knowledge about the importance of treatment, side effects when discontinuing the drug. Hence, it is necessary to have a cellular medical device as a monitoring device for taking medication, VOT can be an alternative to long-distance tuberculosis treatment.

JBI's critical appraisal

A systematic review of the literature on a particular intervention, condition, or problem is at the

heart of the synthesis of evidence. A systematic review is basically an analysis of available literature and an assessment of effectiveness or practice involving a complex series of steps. JBI takes a particular view of what constitutes evidence and the methods used to synthesize the various types of evidence. In line with this broader view of evidence, JBI has developed rigorous theories, methodologies, and processes for critical assessment and synthesis of diverse forms of evidence to assist in clinical decision-making in healthcare. There are currently JBI guidelines for conducting reviews of effectiveness research, qualitative research, prevalence/incidence, etiology/risk, economic evaluation, text or opinion, diagnostic test accuracy, mixed methods, and scoping reviews [14].

According to the researcher's assumptions, the more systematic in analyzing the articles used, the better the articles used as references. Therefore, in carrying out Critical Appraisal, a tool that has been tested for validity is needed.

Frequency of VOT interventions

Directly observed treatment is the standard strategy established to ensure medication adherence. Proper implementation is proving difficult to achieve [15], [16] said that the increase in video surveillance of taking medication will result in high drug adherence, this is because patients will continue to feel supervised when taking medication [17] explained that the frequency of giving videos increased medication adherence in patients. According to the researcher's assumption, the more often or the higher the frequency of giving VOT, the higher the patient's motivation for better medication adherence.

Conclusion

This review shows the role of VOT technology to be effective in improving medication adherence in tuberculosis patients. The long-term goal of VOT is to revolutionize patient monitoring, improve patient motivation, and self-management with technology. The future research is expected to take a larger sample.

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