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THE EFFECT OF MOBILE HEALTH ON TREATMENT EFFECTIVENESS AND COMPLIANCE IN PULMONARY TUBERCULOSIS (TB) PATIENTS: LITERATURE REVIEW

Anggia Astuti, Indra Muliani, Arista Maisyaroh, R. Endro Sulistyono
Faculty of Nursing, University of Jember, Lumajang, Indonesia

A R T I C L E   I N F O

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E-mail:
indra.muliani1609@gmail.com

ABSTRACT

Introduction: Tuberculosis (TB) is a health problem of global concern. Pulmonary tuberculosis (TB) is an infectious disease caused by Mycobacterium tuberculosis in the lower respiratory tract. Pulmonary TB treatment for 6 months. The possibility of patients not being obedient to taking medication is very large because of the long treatment time, the large number of drugs, side effects, the patient's lack of awareness of the disease and the patient does not take the drug because he forgets. the use of reminders (mobile health) has the potential to help promote TB treatment adherence.

Method: The method used in this study is a literature review. source of articles using Springerlink, PubMed and Scholar database databases.

Result: The results of 9 articles assessed that the use of Mobile Health consisted of automatic sms, phone calls, and educational videos. Utilization of various types of mHealth is used according to the needs of the patient. The benefits of Mobile Health are automatic sms and telephone, namely as a reminder to take medication and schedule regular visits. Educational videos provide information about TB and the motivation of the peer group. The use of Mobile Health technology can improve TB patient compliance in treatment with medication reminder methods, regular visit schedules, education, and social support. Some of the benefits of using Mobile Health have been proven by several studies abroad.

Conclusion: The use of Mobile Health technology can be an alternative to increase TB patient compliance in treatment with medication reminder methods, regular visit schedules, education, and social support and Mobile Health has a significant influence on the effectiveness and compliance of treatment in pulmonary TB patients.

1. Introduction

Pulmonary TB is an infectious disease. The possibility of TB patients being non-adherent (adherence) is very large, due to long-term drug use, antibiotics or drugs capable of destroying the organism. Until this happens, complications from TB disease can occur and get worse without being treated. Tuberculosis is a disease that spreads very quickly or is transmitted. Pulmonary TB is transmitted by means of phlegm (droplet nuclei) released by patients when coughing, talking, and sneezing.

The long treatment process causes patients to tend to be bored and may experience a decrease in motivation to seek treatment. Non-adherence to treatment will make TB difficult to cure and even risk becoming drug-resistant TB. Many cases of TB develop into drug-resistant TB, making treatment even more difficult. One of the causes of drug-resistant TB is that the level of adherence to treatment for TB patients is still low. According to a study, several reasons why patients do not adhere to medication are inadequate food, poor communication between health care providers and patients, belief in traditional healing systems, unavailability of close service facilities, side effects, and community stigma.

The forms of tuberculosis patients who do not adhere to medication include: patients who do not take medication, take the wrong medication, forget to take medication, and stop treatment prematurely. The form of intervention uses a reminder tool to improve compliance, namely by providing information based on the needs of pulmonary TB patients so that patients can understand their health status and risks, and understand the risk of non-compliance itself.

It is estimated that there are 10 million TB sufferers in the world, of which 8 countries have the highest incidence rates and Indonesia ranks third (Muhaimin Saranani, 2017). In 2017 there were 420,994 TB cases in Indonesia. In terms of data, the success rate of treatment for TB patients in 2018 increased from 85% and in 2017 to 85.1%. Even so, the cure rate has only reached 42%, which means the recovery rate is down from previous years [2], [22] .Meanwhile, data from the Lumajang Health Service stated that there had been a decline since 2011 or the last four years. The number of new discovery cases in 2014, as many as 740 Lumajang residents had pulmonary TB decreased when compared to the previous three years. In 2011, the number of sufferers was 1,138 people, in 2012 there were 952 people, and in 2013 there were 818 people. Meanwhile, in 2020 there was an increase of 11,764.

Nursing actions and efforts that can be made to improve drug adherence for pulmonary TB patients are health services that use health information technology interventions. Information technology in the healthcare world is a facility that changes the health paradigm from system-centred prevention to a shift in focus on patients through health promotion [2].

Various studies abroad describe the benefits of using Mobile Health in TB patients. The use of text messages (SMS) and telephone for the promotion of medication adherence has been carried out by research on various diseases, including: the results of a study conducted by [17]. stated that the level of adherence was higher in patients who used text messages compared to patients who used books. daily medicine.

According to [19] there are types of Mobile Health, namely automatic text messages, voice call reminders for treatment, laboratory examination schedule reminders for tuberculosis treatment evaluation, and fiber reminders for routine control.

The benefits of mobile health can be used to overcome the factors that cause low adherence to treatment in pulmonary TB patients and mHealth itself has been known in Indonesia since 2014, but was only applied in 2017. schedule of regular visits [18].

2. Methods

The method used by the researcher is a literature review. Using the Springerlink, PubMed, and Scholar data base via the National Library of the Republic of Indonesia link. At the initial search stage, 413 articles were found (Springerlink=97, PubMed=130 and Scholar=186), filtered from 2013-2020 totaling is (Springerlink=4, PubMed=28 and Scholar=186). After that, selecting articles with titles and abstracts amounted to 110 articles with 37 complete review articles and 73 duplicate articles. The total articles that can be reviewed are 9 articles, of which 7 are in English and 2 are in Indonesian. The results of the selection of study articles can be seen in Figure 1 below ;
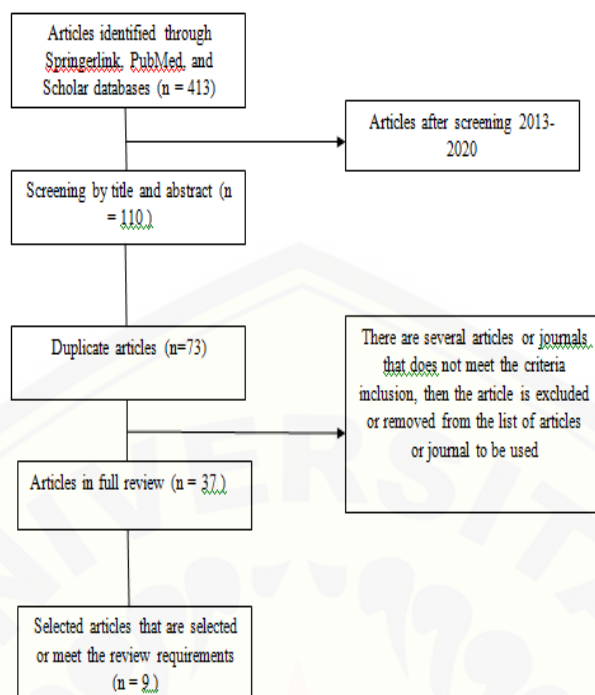
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Figure 1. Diagram Flow

3.   Results and Analysis

The results of a literature review of 9 articles that have been found show that the respondents in the study were pulmonary TB patients who experienced treatment non-adherence in each country with an adult and elderly age range (with an average age of respondents 26-45 years, adult men and women, 46 - >60 years old male and female).

TABLE 1
Characteristics of Study Respondents

Author dan Title	Characteristics of Respondents (age)	Characteristics of Respondents (gender)
(Novi Pampalia, 2019) *MHealth* For Adherance TB Patients In Treatment	A total of 150 patients 26-45 years old	Female and Male
(Musiimenta dkk., 2020) *Mobile Health* Technologies May Be Acceptable Tools for Providing Social Support to Tuberculosis Patients in Rural Uganda	13 pulmonary TB patients >45 years old	Not explained
(Nglazi dkk., 2013) Mobile Phone Text Messaging For Promoting Adherence To Anti-Tuberculosis Treatment	565 adult patients 26-45 years (including pregnant women 27-35 years) and children receiving treatment for TB infection	Male as much as 72.94% and female 69.4%
(Alipanah dkk., 2018) Adherence interventions and outcomes of tuberculosis treatment	129 adult patients on active TB treatment 26- >58 years old	Female and Male
(Marschollek, 2017) *MHealth* Application Areas and Technology Combinations	255 respondents with active TB treatment 26- >60 years old	Female and Male
(Arjuna dan Sukihananto, 2018)	835 respondents 26- >60 years old	Female and Male

Author dan Title	Characteristics of Respondents (age)	Characteristics of Respondents (gender)
Mobile Health Upaya Dalam Meningkatkan Keberhasilan Pengobatan Pasien Tuberkulosis (Tb) Paru		
(Liu dkk., 2014) Reminder Systems To Improve Patient Adherence To Tuberculosis Clinic Appointments For Diagnosis And Treatment	835 respondents 26- >60 years old	Female and Male
(Huang dkk., 2013) Effects Of And Satisfaction With Short Message Service Reminders For Patient Medication Adherence	275 control group respondents 28- >58 years old	Female and Male
(C.M Denkinger, 2013) *Mobile Health* To Improve Tuberculosis Care And Control: A Call Worth Making	75 respondents	Female and Male

TABLE 2
Article Research Results

No	Journal Articles	Tool
1	(Novi Pampalia, 2019)	Various kinds of mobile health (automatic SMS, voice calls as reminders to take medication, reminders for routine control, and reminding schedule for laboratory examinations for evaluation of treatment)
2.	(Musiimenta dkk., 2020)	Interventions using text messages/sms, cell phones
3.	(Nglazi dkk., 2013)	Intervention using text messages/sms
4.	(Alipanah dkk., 2018)	Intervention and monitoring using text messages/sms, cell phones, educational videos
5.	(Marschollek, 2017)	Interventions using text messages/sms, cell phones
6.	(Arjuna dan Sukihananto, 2018)	Intervention and monitoring using text messages/sms, cell phones, educational videos
7.	(Liu dkk., 2014)	Interventions using text messages/sms, cell phones
8.	(Huang dkk., 2013)	Intervention using text messages/sms

There are various types of Mobile Health, namely automatic text/sms messages, voice calls as reminders to take medication, reminding schedule for laboratory examinations to evaluate pulmonary TB treatment and reminders for routine control.

TABLE 3
Article Research Results

No	Journal Articles	Influence
1.	(Novi Pampalia, 2019)	An alternative to increase adherence of TB patients in treatment with medication reminder method.
2.	(Musiimenta dkk., 2020)	Alternatives to provide support for taking medication
3.	(Nglazi dkk., 2013)	Improve TB treatment adherence, and develop drug resistance
4.	(Alipanah dkk., 2018)	TB treatment improved with use of digital adherence interventions

5.	(Marschollek, 2017)	TB treatment and surveillance improved with use of digital adherence interventions
6.	(Arjuna dan Sukihananto, 2018)	TB treatment and surveillance improved with use of digital adherence interventions
7.	(Liu dkk., 2014)	TB treatment improved with use of digital adherence interventions
8.	(Huang dkk., 2013)	Improve TB treatment adherence, and develop drug resistance
9.	(C.M Denkinger, 2016)	Improve the flow of information in the health care environment and shorten the lines of communication.

According to the KNVC Foundation or the non-profit organization for TB alleviation in Indonesia, the flow of Mobile Health utilization is that health workers carry out initial assessments and arrange assistance for patients suspected of or diagnosed with pulmonary TB, patients following treatment according to standards. Health workers provide motivation and education about treatment, and the use of mobile health. Patients must follow motivation and education 8 times for 7-15 minutes

TABLE 4
Medication Adherence Motivation

No	Journal Articles	Motivation
1.	(Musiimenta dkk., 2020)	Through social support
2.	(Alipanah dkk., 2018)	Through social support, material, perception, psychological
3.	(Marschollek, 2017)	Through perception support
4.	(Arjuna dan Sukihananto, 2018)	Through perception support
5.	(C.M Denkinger, 2013)	Through perception support (health workers)

Motivation or support is needed for patients with pulmonary TB in routine treatment. Motivation or support can come from anywhere such as through perceptual support, social support, material support and psychological support.

4. Discussion

Mobile phones are now a familiar technology for all age groups. In the world of health, the use of cellular technology is known as Mobile Health. Various studies abroad describe the benefits of using Mobile Health in TB patients. The use of text messages (SMS) and telephone for the promotion of medication adherence has been carried out by research on various diseases, including: the results of a study conducted by [17] stated that the level of adherence was higher in patients who used text messages compared to patients who used books. daily medication, Another study by [14] Most patients usually contact their health care provider to clarify their concerns about side effects, diet, and symptoms of illness. Tuberculosis treatment supervisors effectively use cell phones to advise patients to follow treatment plans. You can send text messages (SMS) to patients weekly or daily to promote tuberculosis treatment adherence, remind them to take medication, one-way communication or two-way interactive communication, and patients can receive and reply to messages. SMS/SMS can be used to notify health care providers that the patient has taken medication [6] According to [19] there are types of Mobile Health, namely automatic text messages, voice call reminders for treatment, laboratory examination schedule reminders for tuberculosis treatment evaluation, and fiber reminders for routine control. A study mentions factors that cause non-adherence to treatment, including forgetfulness (34%), side effects of vomiting (24%), and traveling (17%). Mobile Health is an alternative solution that can be used in patient care and support systems [1]. One of the patient's needs is to communicate with health workers to get information. When a person leaves medical services, mobile health benefits. In addition to reminders, mobile health technology is also a solution that allows patients to obtain information through educational videos and telephone consultations when experiencing side effects or needing other information. [18]. The impact that can be obtained is that it can save time and finance to come to health services. Mobile

Health can reduce social stigma because communication can be via telephone, so that patients do not need to come to a special TB clinic for needs that can be solved by telephone (Marschollek, 2017).

5. Conclusion and Suggestions

From several articles, it was found that Mobile Health is an innovative and interesting digital tool in the fight against pulmonary TB, especially in countries with the highest number of Pulmonary TB, including Indonesia. The presence of Mobile Health can make a big impact for the completion of Pulmonary TB in Indonesia. Controlling treatment adherence and monitoring DOTS using Mobile Health in reminding, and monitoring pulmonary TB patients can prove to be very effective with limited human resources, especially when geographical area problems hinder such as Indonesia. The existence of Mobile Health can assist the effective management and control of pulmonary TB.

It is hoped that this research can be used as a reference for development in other research on the Effect of Mobile Health on the Effectiveness and Compliance of Treatment in Pulmonary Tuberculosis (TB) patients, especially in Indonesia because research in this case is still relatively small and is able to increase knowledge in improving treatment adherence for patients with pulmonary TB.

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