

# Digital health intervention for enhancing self-perceived and compliance with anti tuberculosis treatment

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## Digital health intervention for enhancing self-perceived and compliance with anti tuberculosis treatment

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### Abstract

2 **Background:** Pulmonary tuberculosis is a global health problem that has become a global concern for the last two decades. One-third of the world's population has been infected with pulmonary tuberculosis. This causes pulmonary tuberculosis to become the second leading cause of death from infectious diseases in the world after Human Immunodeficiency Virus (HIV)/AIDS.

**Purpose:** To analyze the effectiveness of digital health intervention for enhancing self-perceived and compliance with anti-tuberculosis treatment

9 **Method:** This study uses a quantitative approach. This research is pre-experimental research with one group pretest and posttest design. In this study, respondents were given treatment using the 'Ayo DOTS' (Directly Observed Treatment Short-course) application. The intervention was carried out within 4 (four) weeks. Every week the respondents were given twice interventions. Posttest 1 for knowledge, perception, and practice of adherence to TB medication was conducted after 2 weeks of intervention, while posttest 2 was conducted after 4 weeks of intervention. The sample in this study were all TB patients at Pamulang Health Center, Serpong 1 Health Center and Bambu Apus Health Center who were willing to become research respondents, as evidenced by filling out the informed consent that had been given, a sample of 33 TB patients.

**Results:** There are differences in knowledge, self-perception and adherence to taking TB drugs between pre test and post test 1 with the application of 'Ayo DOTS' (Directly Observed Treatment Shortcourse) p value <0.05. Similarly, the results of post test 1 and post test 2 show differences in knowledge, self-perception and adherence to taking TB medication between post test 1 and post test 2 with the application of 'Ayo DOTS' (Directly Observed Treatment Shortcourse).

**Conclusion:** The implementation of the application 'Ayo DOTS' (Directly Observed Treatment Shortcourse) intervention is effective in increasing knowledge, self-perception and adherence to taking TB drugs in TB patients.

**Keywords:** Digital health intervention; Enhancing self-perceived; Compliance; Anti tuberculosis treatment; DOTS (Directly Observed Treatment Short-course)

### INTRODUCTION

Pulmonary tuberculosis is a global health problem that has become a global concern for the last two decades. One-third of the world's

population has been infected with pulmonary tuberculosis. This causes pulmonary tuberculosis to become the second leading cause of death from infectious diseases in the world after Human

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Immunodeficiency Virus (HIV)/AIDS. The number of new cases of pulmonary tuberculosis in 2015 reached 10.4 million, an increase from the previous 9.6 million (Tim Program TB, 2017).

3 Indonesia is now ranked as the fifth country with the highest burden of pulmonary tuberculosis (TB) in the world. It is estimated that the prevalence of pulmonary tuberculosis (TB) for all cases is 660,000 cases and the estimated incidence is 430,000 new cases per year. The number of deaths from pulmonary tuberculosis (TB) is estimated at 61,000 deaths per year. The MDR-TB rate is estimated at 2% of all new pulmonary tuberculosis (TB) cases (lower than the regional estimate of 4%) and 20% of relapsed pulmonary tuberculosis (TB) cases. It is estimated that there are around 6,300 cases of MDR-TB each year. Despite having a high burden of pulmonary tuberculosis (TB), Indonesia is the first country among the WHO High Burden Countries in Southeast Asia to be able to achieve the global target of pulmonary tuberculosis (TB) for case detection and treatment success (Program Team TB, 2017).

In a report entitled Global Tuberculosis Report 2016, the death rate from pulmonary tuberculosis in Indonesia reached 274 cases per day or 100 thousand people in a year plus 26,000 people with pulmonary tuberculosis who were indicated to be HIV positive. Meanwhile, the world death rate caused by the bacterium *Mycobacterium tuberculosis* reached 1.4 million people plus 390,000 people who were positive for HIV. While the prevalence of pulmonary tuberculosis patients in Indonesia in 2015 was 395 per 100 thousand population with a death rate of 40 per 100 thousand population (Azhar, 2013). For this reason, WHO will reduce the number of new cases by 80% starting in 2016 and reduce deaths from pulmonary tuberculosis by 90% by 2030 (Danasantoso, 2016).

Banten Province has an estimated number of pulmonary tuberculosis sufferers at 40,227 people, 216,608 people have been detected or recorded, with the first increase in the number of sufferers

being in South Tangerang reaching 2,089 people. In South Tangerang City in 2015, 5,246 suspected pulmonary TB were found, of which 735 cases were smear positive pulmonary TB cases (Andareto, 2015).

To overcome these problems, various strategies are needed. One of the strategies currently being developed is the DOTS strategy. The Direct Observed Treatment Short-Course (DOTS) strategy is the discovery and cure of patients, priority is given to patients with infectious pulmonary tuberculosis (TB). This strategy will cut off the transmission of pulmonary tuberculosis (TB) and thereby reduce the incidence of pulmonary tuberculosis (TB) in the community (Atik, 2013). The objective of this study was to analyze the effectiveness of the application media 'Ayo DOTS' (Directly Observed Treatment Short-course) as a media for health promotion in an effort to increase knowledge, Self-perceived and practice of adherence of TB patients in taking TB drugs.

## RESEARCH METHOD

9 This study uses a quantitative approach. This research is pre-experiment with one group pretest and posttest design. This is because the grouping of sample members in the experimental group and control group is not done randomly or randomly (Notoatmodjo, 2010). To find out the increase in knowledge, Self-perceived and adherence to taking TB drugs, a pretest and posttest were carried out. In this study, respondents were given treatment using the 'Ayo DOTS' application. Intervention was carried out within 4 (four) weeks. Every week the respondents were given twice intervention.

Posttest 1 for knowledge, perception, and practice of adherence to taking TB drugs was carried out after 2 weeks of intervention, while posttest 2 was carried out after 4 weeks of intervention. The sample in this study were all TB patients in the Pamulang Health Center, Serpong 1 Health Center and Bambu Apus Health Center who were willing to become research respondents, as evidenced by filling out the provided informed consent, a sample of 33 TB patients.

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## RESULTS

**Table 1. Demographic Data of Respondents N=33**

Variable	(n/%)
<b>Gender</b>	
Male	22/66.7
Female	11/33.3
<b>Education</b>	
Illiterate	2/6.1
Elementary School	5/15.2
Junior High School	5/15.2
Senior High School	14/42.4
Undergraduate	6/18.2
Postgraduate	13/39.4
<b>Occupation</b>	
unemployment	13/39.4
has an employment	20/60.6

Source: Primary Data, 2021

Based on Table 1, it can be seen that in terms of gender demographics, more than half of the respondents were male as many as 22 respondents (66.7%). The latest education demographic shows that almost half of the respondents have the last education of senior high school as many as 14 respondents (42.4%). As for the demographics of work, more than half of the respondents work as much as 20 respondents and 60.6%.

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Table 2. The Effectiveness of The Application 'Ayo DOTS' Model N=33

Variable	(Mean ± SD)(Range)	p-value
<b>Knowledge</b>		
Pre Test	(33.66 – 3.705)(28.00 – 44.00)	0.000 (pretest-posttest1)
Post Test 1	(35.27 – 3.537)(30.00 – 42.00)	
Post Test 2	(16.66 – 3.705)( 31.00 – 43.00)	0.024 (posttest1-posttest2)
<b>Self-perceived</b>		
Pre Test	(14.69 – 0.983)( 12.00 – 16.00)	0.000 (pretest-posttest1)
Post Test 1	(16.51 – 1.253)( 13.00 – 18.00)	
Post Test 2	(17.57 – 1.199)( 14.00 – 19.00)	0.034 (posttest1-posttest2)
<b>Compliance with anti-tuberculosis treatment</b>		
Pre Test	(14.96 – 1.015)( 13.00 – 16.00)	0.000 (pretest-posttest1)
Post Test 1	(16.96 – 1.015)( 15.00 – 18.00)	
Post Test 2	(17.78 – 1.199)( 15.00 – 19.00)	0.046 (posttest1-posttest2)

#### The Effectiveness in Improve Knowledge

Based on table 2. It can be seen that there was an increase in knowledge scores in taking drugs in TB patients, where before the intervention was found a value (p value = 0.000), while after the intervention a value was found (p value = 0.024). M-health is a health promotion strategy in the field of technology at this time the use of technology in human civilization is very large, especially in the field of telecommunications using mobile phones/smartphones (Coughlin, 2016). The use of M-health provides the necessary health information anytime anywhere., can improve decision-making processes and health care outcomes, improve the management of chronic health conditions through systematic reviews, provide consumers with essential access to health services in an emergency (Varshney, 2014) .

The results of related research indicate that there is a positive impact on using short messages as reminders for pulmonary tuberculosis patients who are undergoing tuberculosis treatment (Sari, 2017). This was discussed in another study which found that participants in the treatment group

(giving a short message as a reminder) had an average adherence score of 77% while in the control group it was only 53% (Iribarren et al 2013). Short messages gateway innovation is expected to achieve treatment success/Success Rate (SR) according to the national target of 85% (Iribarren, 2013). Short messages gateway is a system that is used as a complement to the supervision of taking medication for patients with pulmonary tuberculosis. The risk of loss to follow-up is not expected to exist with this program.

#### The Effectiveness in Enhancing Self-Perceived

Based on table 2. It can be seen that there was an increase in Self-perceived scores in taking drugs in TB patients, where before the intervention was found a value (p value = 0.000), while after the intervention a value was found (p value = 0.034). The source of tuberculosis transmission is smear-positive TB patients through sprinkling of phlegm (droplets) when coughing or sneezing so as to spread germs into the air. Once a cough/sneeze can contain TB germs that can survive in the air for several hours at room temperature, infection

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occurs when other people breathe air containing droplets and enter the respiratory tract which will then spread from the lungs to other parts of the body (Kementerian Kesehatan Republik Indonesia, 2018; Kementerian Kesehatan Republik Indonesia, 2016)

TB sufferers need to cover their mouths when coughing and expel phlegm not in any place, prevention of infection by washing hands and practice of maintaining house hygiene by means of good ventilation by adding ultraviolet light, taking drugs regularly and on time (Ramdan, 2020; Caesar, 2019; Ramadhaniati, 2019; Suprajitno, 2015). The results of a related study conducted by Dhewi et al entitled The Relationship Between Knowledge, Patient Attitudes And Family Support With Drug Adherence In Pulmonary Tuberculosis Patients At Investment Coordinating Board Pati showed that there was a significant relationship between attitudes and adherence to taking pulmonary TB medication with p value = 0.001 (Dhewi, 2012).

#### The Effectiveness in Compliance With Anti Tuberculosis Treatment

Based on table 2. It can be seen that there was an increase in Self-perceived scores in taking drugs in TB patients, where before the intervention was found a value (p value = 0.000), while after the intervention a value was found (p value = 0.046). Adherence in carrying out treatment is one of the main determining factors in the success of therapy. The average patient becomes disobedient because of the side effects of the drug and the patient's lack of confidence because they suffer from the disease (Afandi, 2017). Pulmonary TB treatment requires a long and routine period of 6 to 8 months. Therefore, if consuming or taking irregular treatment measures, it will result in double immunity of pulmonary TB bacteria to Anti-tuberculosis Drugs, and ultimately the patient must take relatively longer treatment measures (Dhewi, 2012).

Related research conducted by Pampalia and Waluyo, the results of the use of m-health consist of automatic short messages, phone calls, and

educational videos (Pampalia, 2019). The utilization of various types of m-health is used according to the needs of the patient. Various types of m-health include automatic messages, voice calls as reminders to take medication, reminders for routine control, and reminding schedule for laboratory examinations for evaluation of TB treatment (Arjuna, 2019; Efendi, 2017; Kamagi, 2020). A study in Ethiopia on the factors that cause non-adherence to medication include forgetfulness (34%), side effects of vomiting (24%), while the other reason is travel (17%). Reminders from m-health technology are one of the alternatives that can be offered for patient care and as a support system.

#### CONCLUSION

There are differences in knowledge, Self-perceived and adherence to taking TB drugs between pre-test and post-test 1 with the application of 'Ayo DOTS' (Directly Observed Treatment Short-course) with p value <0.05. Likewise with the results between post test 1 and post test 2, there are differences in knowledge, Self-perceived and adherence to taking TB drugs between post test 1 and post test 2 giving the 'Ayo DOTS' application (Directly Observed Treatment Short-course). So it can be concluded that the application intervention 'Ayo DOTS' (Directly Observed Treatment Short-course) is effective in increasing knowledge, Self-perceived and adherence to taking TB drugs in TB patients.

#### SUGGESTION

It is hoped that health workers or related agencies will further enhance campaigns to increase knowledge, Self-perceived and adherence to consuming TB drugs in interesting ways and methods and can take advantage of the 'Ayo DOTS' (Directly Observed Treatment Short-course) application media.

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