

# THE EFFECTIVENESS OF TELENURSING PROGRAM ON MEDICATION ADHERENCE IN PULMONARY TUBERCULOSIS PATIENTS UNDERGOING OUTPATIENT TREATMENT AT PIDIE DISTRICT HOSPITAL

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## Abstract

*Pulmonary tuberculosis is a chronic disease that requires long-term treatment. One of the factors that support healing is adherence to taking medication in patients. Telemedicine is an alternative for providing health and nursing services. Nursing is one of the latest information and communication technology systems in the health sector. One form of telemedicine is telenursing. This study aims to determine the degree of medication adherence in pulmonary tuberculosis patients before and after telenursing interventions. This is a quasi-experimental design using a Control Group Design. The sample as a respondent was 200 respondents, using purposive sampling at August 15 to September 22, 2022. Data analysis was performed using descriptive statistics and inferential statistics. Medication adherence was measured using MMAS. The results showed adherence to taking medication in the intervention group before test was carried out was 1.45, while the average adherence to taking medication after test was 2.74, this indicates that there is an average difference before and after the intervention treatment in the intervention group and shows that there is a significant difference when viewed from  $t$  value  $24.005 > 1.984$  and  $P$  value of 0.000. It can be concluded that there is a significant effect of the telenursing program on medication adherence in pulmonary tuberculosis patients.*

**Keywords:** Telenursing; Pulmonary Tuberculosis; Medication Adherence

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## 1. Introduction

Pulmonary tuberculosis (pulmonary TB) requires long-term treatment followed by good case management and treatment management to achieve recovery. One of the factors that support healing is patient adherence to the treatment regimen. Factors that influence medication adherence consist of internal factors and external factors. Internal factors that influence pulmonary TB adherence may be related to personal characteristics (age, gender, occupation, income, and level of education). When the patient's desire to recover is reduced, the patient responds negatively to TB treatment so that TB patient compliance in completing the treatment becomes erratic.

Indonesia is one of the countries in Southeast Asia with a TB case problem. There were 10.4 million cases of TB globally in 2016 (CI 8.8 million - 12 million), equivalent to 120 cases per 100,000 people. The five countries with the highest cases are

India, Indonesia, China, the Philippines and Pakistan. According to the 2018 Riskesdas data, the weighted prevalence of TB cases has reached 1 million, with 41,596 cases in Aceh Province. Judging from the level of adherence to taking medication for tuberculosis sufferers in Aceh Province, it is only 55.5%, and the level of availability of drug abuse supervisors (PMO) is 53.8%. The government provides guidelines for effective drugs to kill M. tuberculosis in a relatively short time, which is around 6 months.

tuberculosis (TB) is an infectious disease caused by Mycobacterium tuberculosis and is called Acid Resistant Bacteria (BTA). Most tuberculosis bacteria attack the lungs (pulmonary tuberculosis), but can also attack other organs of the body (extrapulmonary tuberculosis). Tuberculosis infection occurs mainly in the air or in the air in the form of droplets (sputum watering). The source of tuberculosis transmission is smear-positive

pulmonary tuberculosis patients who cough, sneeze, or emit droplets containing *M. tuberculosis* when talking. From 2014 to 2017, the Case Notification Rate (CNR) or the total number of TB cases treated and reported in Indonesia increased from 125 to 161 per 100,000 population. The treatment success rate for TB patients increased from 85% to 85.1% from 2016 to 2017. Treatment coverage or case detection rate (CDR) of all TB cases was 35.8% in 2016 and increased to 42.4% in 2016. 2017. In 2017, the treatment outcomes for TB patients for all cases were 42% recovered, 43.1% fully recovered, 4% metastatic, 2.7% undiagnosed, 2.5% died, and 0.4% failed (Kementrian Kesehatan RI., 2018).

Tuberculosis is an infectious disease caused by *Mycobacterium tuberculosis* which attacks the lungs and other organs of the body. These bacteria enter through the respiratory and digestive tracts and open wounds on the skin. Usually by inhaling drops from sufferers (Kusuma, 2015). Pulmonary tuberculosis is an infectious disease of the respiratory tract in the lungs caused by *Mycobacterium tuberculosis* (droplet nuclei) in the air when coughing or sneezing (Marmi, 2018).

Medication guides are a good practice, but treatment outcomes are generally compromised if the patient does not receive medication regularly or does not meet the medication regimen. In that case, every patient requires regularity, integrity and adherence to treatment (RI & Kesehatan, 2018). Poor adherence or incomplete treatment contributes to individual resistance. TB patients who do not follow treatment are more likely because long-term drug use, possible side effects, and lack of awareness of the patient's disease affect patient adherence to treatment and miss follow-up from treatment. On the other hand, according to the Indonesian Ministry of Health, the loss to follow-up rate should not exceed 10% due to the ineffectiveness of TB control and the higher rate of re-treatment in the future. Therefore, according to the Indonesian Ministry of Health, it is very important to monitor the patient's clinical condition during the treatment period in order to improve TB control efforts and especially to prevent patients from missing follow-up care, so that side effects can occur. promptly detected and dealt with adequately (Doko, J.K., Rengga, 2020).

Professionalism is increasingly demanded from nurses and the development of health technology is prioritized, where patients/clients who need care can come from various backgrounds and in "cyberspace" (cybernet), which is increasingly marked by the high number of internet users in Indonesia. and the growing number of health websites. The use of the internet is increasingly widespread, followed by developments in the world of health and nursing. Telemedicine is an alternative for providing health and nursing services. Remote nursing is one of the latest information and

communication technology systems in the health sector that can be used to provide remote nursing services and care (Shahrokhi et al., 2018). This means that patients and nurses do not meet directly, but through media available to patients and their families (Ramelet et al., 2017).

According to the American Nurses Association (ANA), remote nursing is an information and communication technology and web-based system for nurses. Remote nursing is also defined as the process of providing, organizing, and coordinating the provision of medical care and services through information and communication technology. The technologies that can be used in remote nursing vary widely, including telephones, personal digital assistants, smartphones, facsimile machines, tablets, computers, the internet, video and audio conferencing, and computer information systems. Although there have been some changes in the provision of long-term care through remote nursing, it has not fundamentally changed the principles of long-term care (Asiri & Househ, 2016).

One of the treatment technologies that continues to develop is telemedicine care or remote care. Remote nursing is currently developing in various countries and is known to have strong evidence and benefits for its use. It has proven to be an efficient tool to help countries overcome geographic barriers and provide medical information to their population (Souza-Junior et al., 2016). In this case, telenursing is used as a means of communication between nurses and patients in carrying out nursing care, especially as an educational and therapeutic medium for caring for pulmonary tuberculosis patients. The media that can be used are very diverse, including personal digital assistants, fax machines, Internet via e-mail and computer information systems (Kleinpell, 2015). Outpatients with chronic diseases such as tuberculosis can be controlled by adherence to taking medication, which can be done at home through telenursing under the guidance of caregivers (Tavsanlı et al., 2019)

Purpose This study aims to determine the degree of medication adherence in pulmonary tuberculosis patients before and after the telenursing intervention and it can be seen the effect of implementing the telenursing program on the level of medication adherence in pulmonary tuberculosis patients. The theoretical concept of intervention in this study was developed by Nola J. Pender (Alligood, 2018). The urgency of this study is reflected in the low medication adherence in pulmonary tuberculosis patients.

## 2. Method

This type of research is a quasi-experimental design using a Control Group Design. In this design, there were two groups

selected randomly in a population of 420 people and 200 respondents were used as samples. Sampling used purposive sampling based on patient visit data at the outpatient polyclinic. The process of selecting respondents is those who meet the inclusion criteria including; aged 35 to 65 years, outpatients, and willing to be respondents. This research was conducted on date sampling at August 15 to September 22, 2022.

The stages in this study were then given a pretest and after further treatment were given a posttest to determine whether there was a difference in the initial state between the experimental group and the control group. The treatment given is telenursing, in the form of monitoring taking medication through the WhatsApp social media platform. Respondents were put into groups on WhatsApp and then monitored through the media. The study was conducted for three months implementing telenursing interventions in outpatients at Tgk. Abdullah Syafi'i, Pidie Regency. Data analysis was performed using descriptive statistics and inferential statistics. Medication adherence was measured during the pretest and posttest using the Morisky Medication Adherence Scale (MMAS) (Zhang et al., 2021). The Cronbach's  $\alpha$  coefficient was 0.625, indicating that the scale's internal consistency was relatively satisfactory. Two common factors, which explained 62.978% of the total variance, were extracted by factor analysis to examine the construct validity of the MMAS-8, and the load of the 6 items was greater than 0.4. The Pearson correlation coefficient was 0.845 ( $P < 0.001$ ); thus, convergent validity was high.

### 3. Results and Discussion

#### Characteristics of Respondents by Age

Based on the table above, it can be seen that the majority of respondents in the intervention group were in the early elderly age category with 42 respondents, while in the control group the majority were in the late elderly age category with 40 respondents.

**Table 1.** Description of the age characteristics of Pulmonary Tuberculosis Outpatient Patients

Age	Intervention Group		Control Group	
	f	%	f	%
Late adulthood	26	26	22	22
Early Elder	42	42	38	38
Late Elder	32	32	40	40
Total	100	100	100	100

#### Characteristics of Respondents Based on Gender

Based on the table above, it can be seen that the sex of the respondents in the intervention group and the control group was mostly male, 57 respondents in the intervention group and 55 respondents in the control group.

**Table 2.** Characteristics description of Gender Outpatients with Pulmonary Tuberculosis

Gender	Outpatient			
	Intervention Group		Control Group	
	f	%	f	%
Men	57	57	55	55
Women	43	43	45	45
Total	100	100	100	100

#### Compliance with Taking Pulmonary Tuberculosis Drugs in the Intervention Group

Based on the table above it can be seen that in the intervention group before being given treatment the majority of medication adherence was in the low category of 58 respondents, whereas after being given treatment the majority of medication adherence was in the high category of 74 respondents.

**Table 3.** Characteristics of Pulmonary Tuberculosis Medication Compliance in the Intervention Group

Medication Adherence	Before test		After test	
	F	%	f	%
Low	58	58.0	0	0
Moderate	39	39.0	26	26.0
High	3	3.0	74	74.0

#### Compliance with Taking Pulmonary Tuberculosis Drugs in the Control Group

**Table 4.** Description of the characteristics of Compliance with Taking Pulmonary Tuberculosis Drugs in the Control Group

Medication Adherence	Before test		After test	
	f	%	f	%
Low	48	48.0	59	59.0
Moderate	49	49.0	40	40.0
High	3	3.0	1	1.0

Based on the table above, it can be seen that in the control group during the pretest, the majority of adherence to taking medication was in the moderate category, as many as 49 respondents, while during the posttest, the majority of adherence to taking medication was in the low category, namely as many as 59 respondents.

### The Effect of Telenursing Application on Medication Compliance in Pulmonary Tuberculosis Patients

Based on the table above, it can be seen that the average adherence in the experimental group before the telenursing program was carried out was 1.45 with a standard deviation of 0.557, while the average adherence to taking medication after telenursing was carried out was 2.74 with a standard deviation of 0.441. This shows that there is a difference in the average before and after the intervention treatment in the experimental group and shows that there is a significant difference when seen from  $t_{count} > t_{table}$ , namely  $24.005 > 1.984$  and a P value of 0.000. Whereas in the control group there was no significant difference when viewed from  $t_{count} < t_{table}$ , namely  $1.812 < 1.984$  and a P value of 0.067.

**Table 5.** The effect of implementing telenursing before and after the intervention in the intervention group and the control group

Intervention Group	Mean	SD	Beda Mean	t	P value
Before test	1.45	.557	.056	24.005	.000
After test	2.74	.441	.044		
Control Group	Mean	SD	Beda Mean	t	P value
Before test	1.55	.557	.056	1.812	.067
After test	1.42	.516	.052		

The Effectiveness of Telenursing Application on Medication Compliance in Pulmonary Tuberculosis Patients Undergoing Outpatient Treatment at Pidie District Hospital From the results of data analysis, it was found that the average adherence to taking medication in the experimental group before the telenursing program was carried out was 1.45 with a standard deviation of 0.557, while the average adherence to taking medication after telenursing was 2.74 with a standard deviation of 0.441, which indicates that there is the average difference before and after the

intervention treatment in the experimental group and showed that there was a significant difference when viewed from  $t_{count} > t_{table}$ , namely  $24.005 > 1.984$  and a P value of 0.000.

The key to successful TB treatment is patient adherence to pharmacotherapy. The possibility of TB patients not complying is very large, due to long-term drug use, the number of drugs taken per day, side effects that may arise and the patient's lack of awareness of their disease. Forms of intervention to increase adherence by providing information according to patient needs so that sufferers understand their condition and health risks and understand the risks if they do not comply. One of the most important ways to ensure the success of TB treatment is to increase patient compliance to prevent disease infection, achieve recovery, prevent drug resistance, relapse and death (Gebreweld et al., 2018)

Telenursing can be interpreted as remote nursing practice using telecommunication technology (Hensel & Billings, 2020). According to research by (Ernesäter et al., 2019) that telenursing can be used as referring, assessing and giving advice. Telenursing carried out also contains trust in the caller and the person being called. Telenursing aims to increase access to health services.

Research by (Susanto et al., 2019) used a quasi-experimental design with a control group which stated that there was an increase in medication adherence in the group that was given an intervention in the form of providing information to remember to take medication using whatsapp social media. The results showed that there was a significant difference ( $p=0.000$ ) in medication adherence before ( $22.04 \pm 1.57$ ) and after ( $24.83 \pm 0.38$ ) intervention.

Currently, communication no longer has to be face-to-face, because many technologies have emerged by creating new communication media to make it easier for someone to interact without having to meet in person. Today's new communication media such as WhatsApp. With this application one can easily interact, send messages, send pictures, and other information, so that it attracts more attention of users in reading information. Therefore, this program may be a promising new therapeutic strategy in the management of TB to increase patient compliance and health awareness.

### 4. Conclusions and suggestions

The results of this study indicate that there is a significant effect of the telenursing program on medication adherence in pulmonary tuberculosis patients. Patients who received the telenursing program were able to improve their medication-taking patterns better than the control group. It is recommended for patients to be able to remember the medication schedule properly and independently

after participating in this program, then for health workers to be able to develop this program to be more complete and can be developed in further research.

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