


Implementation of Alarm and Pill Reminder for Medication Adherence in Tuberculosis Patients

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Article Info	ABSTRACT
Keywords: Tuberculosis (TB), Compliance with taking medication, Alarm and pill reminder	Pulmonary tuberculosis (TB) is an infectious disease caused by the bacteria Mycobacterium Tuberculosis that attacks the lung parenchyma which is characterized by the formation of granulomas. This study aims to determine the effect of alarms and pill reminders on medication adherence in TB patients at the Sikumana Health Center in Kupang City. This study uses a qualitative approach (Case study). This case study research was conducted on 2 (two) respondents with direct observation to obtain data in the form of respondent characteristics, medication adherence by means of a pre-test using a questionnaire before being given the implementation of alarms and pill reminders. This study shows an increase in medication adherence in TB patients by using alarms and pill reminders on respondents. This proves that alarms and pill reminders can increase medication adherence in TB patients. The implementation of alarms and pill reminders proves that it can increase and influence medication adherence in TB patients.
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INTRODUCTION

Pulmonary tuberculosis (TB) is an infectious disease caused by the bacteria Mycobacterium Tuberculosis which attacks the lung parenchyma which is characterized by the formation of granulomas. Transmission of TB infection can occur through the air, namely through droplets containing germs or tubercle bacillus bacteria originating from people infected with TB when talking, coughing, or sneezing (Nurmalasari Resky & Apriantoro Nursama Heru, 2020).

WHO (World Health Organization) in 2020, estimated that every year there are around 9,000,000 new sufferers of Tuberculosis with 3,000,000 deaths. In 2021, WHO estimated that every year there are 583,000 new cases of TB with deaths due to Tuberculosis (TB) around 140,000. Ministry of Health of the Republic of Indonesia, (2020). Indonesia ranks 4th in the world in terms of the number of tuberculosis (TB) sufferers, in 2020 the number of Tuberculosis sufferers in Indonesia was around 528,000, roughly estimated that every 100,000 Indonesian population there are 130 sufferers of pulmonary tuberculosis. Every year the number of TB sufferers in Indonesia increases by 500,000 people. Of that number, 175,000 of them died (Puspitaningrum et al., 2022).

TB patient compliance in taking medication is greatly influenced by the PMO (Drug Supervisor) who is generally a family member or personal assistant of the TB patient, but it is better if the PMO is a health worker so that supervision is in accordance with the standards

set out in the National TB Guidelines. The PMO is a person who is tasked with supervising TB patients taking medication regularly until the completion of treatment, encouraging patients to take medication regularly, reminding patients to re-check sputum at the specified time, providing counseling to family members of TB patients who have suspicious symptoms of TB to immediately check themselves at a health service unit. (Hartono, 2017).

Smartphones are communication tools and sources of information that are easily accessible. Smartphones have become a necessity for society because of their efficiency in time, energy and cost. . Data from research on the use of applications on smartphones shows that the first rank that is widely used is a reminder to take medication (pill reminder). The results of the pretest on health cadres showed a moderate compliance rate of 58% (Mardianto, 2021).

METHODS

This study uses a qualitative approach (Case study). The research design uses an Observation Case Study which is a type of study conducted by researchers to analyze or evaluate a physical object, process, or ongoing activity, which requires researchers to conduct direct observations in the field to obtain data. This case study research is the implementation of alarms & pill reminders for medication compliance in TB patients at the Sikumana Health Center, Kupang City. The subjects in this case were 2 patients suffering from tuberculosis, determined based on the following inclusion and exclusion criteria: The inclusion criteria are as follows:

- a. TB patients undergoing OAT treatment
- b. Patients aged 18 years and over

The exclusion criteria are as follows:

- a. Uncooperative patients
- b. TB patients who suffer from other diseases

The various research instruments used in this study are: questionnaires, observation sheets, alarm and pill reminder applications. Data collection methods are as follows: The data collection method in this study used questionnaires and interviews to obtain data on medication adherence. Observation sheets were used to obtain data on the amount of medication and time to determine patient compliance in taking medication.

Data analysis is done by presenting facts, then comparing them with existing theories, then poured into discussion opinions. The analysis technique used is by narrating the answers obtained from the interview results, by means of observation by researchers and documentation studies that produce data to answer the formulation of research problems, and then compared with existing theories as material for providing recommendations in the intervention.

Data presentation can be done with tables, images, charts, or narrative text. Confidentiality of research subjects is guaranteed by obscuring the identity of the research subjects. In the process during the research, there were weaknesses, including inadequate means of transportation used in the research process activities, lack of cooperation from respondents in several aspects, such as minimal knowledge or insight, and doubts about the

research activities carried out so that these factors could influence the research process. There are several limitations in it, such as participants not allowing researchers to take pictures freely because participants are afraid of being deceived and participants who do not want researchers to visit their homes.

RESULTS AND DISCUSSION

Results

Overview of Research Location

Sikumana Health Center is located in Sikumana Village, Maulafa District, Kupang City. With a working area covering six villages, namely Sikumana, Belo, Oepura, Naikolan, Kolhua and Fatukoa. The east is bordered by Kupang Tengah District, the west is bordered by Alak District, the north is bordered by Oebobo District, the south is bordered by Kupang Barat District.

The respondents in this study were 2 (two) people, a woman and a man who lived in the same place at the research location and were registered in the medical record at the Sikumana Health Center in Kupang City. The study was conducted on respondent 1 on July 4, 2024, data was obtained on respondent 1 named Mr. IAL, male, 26 years old, unmarried, and currently living with his parents and 5 siblings at Jl. Ketela RT 24/RW 10 Kel. Oepura and is Catholic. After the interview, the respondent said that he often did not take his medicine on time. And after the interview, the researcher submitted an application to become a research respondent and the respondent was willing to sign the informed consent form.

The study was conducted on respondent 2 on July 4, 2024, obtained data from respondent 2 named Mrs. RSB, female, 36 years old, married and currently living with her husband and 1 child at Jl. Air Lobang 1 RT 42/RW 17 Kel. Sikumana and is a Protestant Christian. After the interview, the respondent said she was often lazy about taking medication, took medication not according to the specified time, and sometimes forgot to take medication. After the interview, the researcher submitted a request to be a research participant and the respondent was willing to sign the informed consent form.

Special Data

Respondent Characteristics

Respondents in this study were 2 (two) TB patients, who were registered in the medical record at the Sikumana Health Center, Kupang City. The characteristics of the respondents studied were characteristics based on age, gender, education and occupation.

Table 1. Respondent Characteristics based on age, gender, education, occupation (n=2)

Characteristics	Respondent 1	Respondent 2
Age	26 years old	36 years old
Gender	Man	Woman
Education	SENIOR HIGH SCHOOL	JUNIOR HIGH SCHOOL
Jobs	Doesn't work	housewife

Source: Primary Data, 2024

Based on table 1 shows the characteristics of respondents based on age, respondent 1 is 26 years old while respondent 2 is 36 years old. Based on gender, respondent 1 is male while respondent 2 is female. Based on education with the latest diploma, respondent 1 has a high school education while respondent 2 has a junior high school education. Based on occupation, respondent 1 has not worked while respondent 2 works as a housewife.

Table 2. Compliance in Taking TB Patients' Medication Before and After Implementing Alarm and Pill Reminder (n=2)

Respondents	Before (Pre)	After (Post)	
	(Observation)	(Observation I)	(Observation II)
Respondent 1	Taking medication not at the specified time Lazy to seek treatment Take medicine it is not in accordance with the specified time,	Patient taking medicine not on time The patient is still lazy	Taking medicine on time The patient is already
Respondent 2	sometimes forget to take the medicine,	get treatment, take medicine regularly, not on time, take medicine still forget in accordance with the time, don't forget to take your medicine in take medicine	take medicine

Source: Primary Data, 2024

Based on table 2 shows the compliance of taking medication in TB patients before and after using the alarm & pill reminder twice. In the first visit assessment on July 4, 2024, the interview results showed that respondent 1 often took medication not according to the specified time. And respondent 2 was often lazy in taking medication, often took medication not according to the specified time, sometimes also forgot to take medication. On the second visit on July 5, 2024, the observation of respondent 1 taking medication was still not on time. And respondent 2 was still lazy to take medication, still took medication not on time, still forgot to take medication. On the third visit on July 6, 2024, the observation of respondent 1 had taken medication on time. And respondent 2 has been diligent in taking medication, has been on time in taking medication, and has not forgotten to take medication. There is a difference in medication compliance between respondents 1 and 2 before implementing the alarm and pill reminder.

Discussion

Respondent Characteristics

The first characteristic of the research respondents is age. Table 4.1 shows that the majority of tuberculosis sufferers are in their early teens and late adults, which are included in the productive age category. Respondent 1 is 26 years old and respondent 2 is 36 years old, which are included in the productive age category.

This research is in line with research conducted by (Papeo et al., 2021), that most TB sufferers are aged 26-45 years. Productive age is very dangerous for the level of transmission because patients easily interact with other people, high mobility and allow for transmission

to other people and the environment around the residence. TB often occurs in adulthood, possibly due to two causes. First, the adult was infected with primary TB in his environment when he was a child but was not properly prevented so that it appeared in adulthood. The second possibility is the existence of activities and work environments in groups of adults who interact with TB sufferers or environments that make it easy to get infected.

The second characteristic of respondents is gender. Based on the results of the study, respondent 1 is male while respondent 2 is female. According to researchers, people with male gender tend to have a risk of contracting TB, because it can be caused by an unhealthy lifestyle, such as smoking and frequent alcohol consumption.

This research is in line with research conducted by (Saputra et al., 2024), that male patients have a higher risk of being exposed to tuberculosis than females. This can be caused by the tendency of men to adopt unhealthy lifestyle habits. Most men smoke, which is a risk factor for being infected with tuberculosis for men, and unhealthy male lifestyles such as smoking and drinking alcohol, which cause the body's defense system to decrease and are more easily exposed to agents that cause pulmonary TB.

The third characteristic of the research respondents is education. Based on the research results, respondent 1 has a high school education and respondent 2 has a junior high school education. According to researchers, education can bring insight or knowledge to a person. In general, someone with a higher education will have broader knowledge compared to someone with a lower level of education.

This research is in line with research conducted by (Papeo et al., 2021), that the level of formal education is the basis for someone to do something, make them understand and comprehend something better, or accept and reject something. The level of formal education also allows for differences in knowledge and decision making. Most patients who are not compliant with treatment are patients with low education, this proves that it is true that a person's level of education will affect a person's knowledge, such as recognizing a house that meets health requirements and knowledge of Pulmonary TB disease, so that with sufficient knowledge a person will try to have a clean and healthy lifestyle.

The fourth characteristic of respondents is work. Based on the results of the study, respondent 1 does not have a job and respondent 2 works as a housewife. According to researchers, work is one of the factors that can affect the body's immunity. Generally, people who are busy working do not have time to check their health at health facilities. However, it is possible that people who do not have jobs can also trigger an increased risk of TB disease. This research is in line with research conducted by (Papeo et al., 2021), that work can affect the physical condition and immunity of the body, TB patients who receive anti-tuberculosis therapy generally show symptoms of drug side effects, from mild to severe, which have an impact on the productivity of TB patients.

Patient Medication Compliance Before and After Implementing Alarm and Pill Reminder

The implementation and observation of medication adherence in TB patients before and after implementing the alarm and pill reminder showed changes in medication adherence in respondents 1 and 2. In the first visit assessment on July 4, 2024, the interview results showed that respondent 1 often took medication not according to the specified time. And

respondent 2 was lazy in taking medication, often took medication not according to the specified time, sometimes also forgot to take medication. On the second visit on July 5, 2024, the observation of respondent 1 taking medication was still not on time. And respondent 2 was still lazy to take medication, still took medication not on time, still forgot to take medication. On the third visit on July 6, 2024, the observation of respondent 1 was taking medication on time. And respondent 2 was diligent in taking medication, was on time in taking medication, and did not forget to take medication. There was a difference in medication compliance in responses 1 and respondent 2 before implementing the alarm and pill reminder, and this showed a change in medication compliance after implementing the alarm and pill reminder.

This research is in line with research conducted by (Setyowati et al., 2019), that compliance can also be defined as individual behavior (taking medication, following a diet or changing lifestyle) in accordance with health recommendations. So, compliance is the extent to which a client's behavior is in accordance with the provisions given by a health professional. These behaviors include taking medication, following a recommended diet and changing lifestyle.

According to researchers, the implementation carried out for 2 days has been effective in increasing medication compliance for respondents. This research is in line with research conducted by (Hendra & Naffiah, 2023), that TB patients are said to be compliant if the difference between the time of taking medication and the alarm schedule is no more than 2 hours, whereas they are said to be non-compliant if the difference between the time of taking medication and the alarm schedule is more than 2 hours.

This research is also supported by research (Saputra et al., 2024) that, Reminder to take medication via WhatsApp for 60 days which is done once a day by sending text messages can increase medication adherence in pulmonary tuberculosis patients. The increase occurred because of daily interaction between respondents and researchers and the increasing understanding of respondents about the disease they are experiencing. The increase in compliance can be seen in Table 2 above.

Sending reminder messages specifically for TB patients using mobile phones is said to be effective because apart from being able to act as an alarm to take medication, patients also feel cared for and build trust in health service providers and the health system in general. (Barik et al., 2020).

CONCLUSION

Based on the results of the research conducted, it can be concluded regarding the implementation of alarms and pill reminders for medication adherence in TB patients at the Sikumana Health Center in Kupang City, namely 1) Characteristics of respondents based on age, gender, education, and occupation. 2) The results of observations of medication adherence in respondents also showed changes in compliance after the implementation of alarms and pill reminders.

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