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UTILISATION OF VIDEO CALLS TO IMPROVE ADHERENCE IN TUBERCULOSIS PATIENTS: PILOT STUDY

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ABSTRACT

Tuberculosis is the 9th leading cause of death in the world, but it takes at least 6 months to be treated. One of the challenges in tuberculosis treatment is that the treatment time is quite long, and the drugs used are also quite a lot so that it affects patient adherence in taking medication. The objective of this study was to see the effectiveness of video calls in enhancing the adherence of tuberculosis patients. The research method used was experimental pre-post noncontrol design. This study involved 12 tuberculosis patients from the Kepulungan Community Health Centre who were enrolled in the Pulmonary Tuberculosis Control Programme (Program Penanggulangan Tuberkulosis Paru/P2TB) and who met the study's inclusion and exclusion criteria. In the study, video call treatment was the independent variable while adherence was the dependent variable. The sample collection used total sampling and statistical analysis using Wilcoxon test. The findings of this investigation suggest that there is a substantial discrepancy in compliance levels between the pre- and post-video call treatment phases, as evidenced by the augmentation in the mean TB-MAS score from 102.5 to 113.6, accompanied by a p-value of 0.018 (<0.05). This shows that video calls are useful in improving patient adherence in taking antituberculosis drugs.
Keyword: Adherence, Tuberculosis, Video calls

ABSTRAK

Tuberkulosis adalah penyakit yang penyebab kematian ke-9 di dunia akan tetapi penyakit ini disembuhkan waktu yang dibutuhkan minimal 6 bulan. Salah satu tantangan dalam terapi tuberkulosis adalah waktu pengobatan yang cukup panjang dan obat yang digunakan juga cukup banyak sehingga berpengaruh terhadap kepatuhan pasien dalam meminum obat. Tujuan dari penelitian ini adalah untuk melihat efektivitas video call dalam meningkatkan kepatuhan pasien tuberculosis. Desain penelitian yang digunakan eksperimental *pre-post noncontrol design.* Penelitian ini melibatkan 12 pasien tuberkulosis dari Puskesmas Kepulungan yang masuk dalam Program Penanggulangan Tuberkulosis Paru (P2TB) yang memenuhi kriteria inklusi dan eksklusi. Dalam penelitian pemberian perlakuan video call merupakan variabel bebas sedangkan kepatuhan merupakan variabel terikat. Pengambilan sampel menggunakan total sampling dan analisis statistika menggunakan uji Wilcoxon. Hasil penelitian ini menunjukkan bahwa terdapat perbedaan perbedaan yang bermakna terhadap kepatuh antara sebelum dan setelah pemberian perlakuan video call yang dapat dilihat dari peningkatan rata-rata skor TB-MAS dari 102,5 menjadi 113,6 dengan nilai *p-value* 0,018 (<0,05). Hal ini menunjukkan bahwa video call bermanfaat dalam meningkatkan kepatuhan pasien dalam mengkonsumsi obat antituberkulosis.
Keyword: *Kepatuhan, Tuberkulosis, Video callsl*

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1. INTRODUCTION

Tuberculosis (TB) is a contagious infectious disease caused by a bacterial infection, Mycobacterium tuberculosis. Mycobacterium tuberculosis has been observed to predominantly infect the lung parenchyma,

otherwise termed pulmonary TB. However, it should be noted that these bacteria are also capable of infecting other organs (extra-pulmonary TB) [1].

The World Health Organization (WHO) asserts that tuberculosis (TB) is the ninth most prevalent cause of mortality worldwide, subsequent with HIV/AIDS, and it is likewise among the foremost causes of infectious diseases. At present, Indonesia is the second-largest contributor of TB cases worldwide, exceeded only by India. The country's TB incidence stands at 845,000 cases, amounting to 312 cases per 100,000 population. This is further complemented by a mortality rate of 92,000 cases, equivalent to 34 cases per 100,000 population, excluding cases of TB and HIV [2]. In 2020, East Java occupied eighth position in the national ranking of TB patients, with a total of 42,922 cases recorded [3].

The treatment failure rate for tuberculosis in East Java is 18%. The observed failure rate is influenced by low patient adherence in taking medication.[3,4]. Digital and mobile technology has the potential to enhance medication adherence in tuberculosis patients, thereby addressing a critical issue in healthcare. It is imperative to acknowledge the necessity for enhancement in the domain of communication between patients and healthcare professionals. The utilisation of communication technology, such as video calls, has the potential to serve as an alternative means of enhancing patient adherence in medication adherence. The integration of digital technology especially Video Directly Observed Therapy (VDOT) in healthcare has been demonstrated to engender a high level of adherence, thereby suggesting a positive correlation between digital technology utilisation and enhanced patient medication adherence[5]. A cross-sectional research study conducted in India used mobile phone communication technology. The communication process between health professionals and patients encompassed the discussion of medication schedules and the reporting of adverse effects. This finding is of significant value and can serve as a potential strategy to enhance treatment adherence among individuals diagnosed with tuberculosis [6].

It is evident, as demonstrated by data obtained from the Kepulungan Health Centre in Gempol Sub-district, that there remains a significant number of cases of tuberculosis patients. A total of 15 individuals were documented as being under treatment in the Pulmonary Tuberculosis Control Programme (Program Penanggulangan Tuberkulosis Paru/P2TB). However, this is reportedly due to a lack of support for patients to carry out treatment, in addition to the lack of monitoring of medication intake from family members or officers [1].

A subsequent study was initiated on the basis the previously outlined background. The objective of this study was to determine the effectiveness of video calls in enhancing the adherence levels of tuberculosis (TB) patients at Kepulungan Health Centre, Gempol Sub-district. The objective of the video call-based system was to facilitate the delivery of information related to the medication schedule of tuberculosis patients, who were monitored face-to-face. The researcher's objective was to ascertain the impact of utilising video calls on the adherence of tuberculosis patients at the Kepulungan Community Health Centre, Gempol Sub-district, to their medication regimen.

2. METHOD

This study is a pilot study used an experimental pre-post non-control design and was conducted prospectively. The population of this study was TB patients who were still under treatment in April 2023. The population at Kepulungan Health Centre was 15 TB patients who were enrolled in the Pulmonary Tuberculosis Control Programme (Program Penanggulangan Tuberkulosis Paru/P2TB). Prior to sampling, the 15 patients were contacted via WhatsApp to obtain their consent to participate in the study. Out of the 15 patients, 12 patients agreed to be research respondents, 2 patients were excluded because they did not have a mobile phone and did not use WhatsApp, and 1 patient refused to be a research respondent. In order obtain a research sample of 12 people, the sample selection was also based on the established inclusion and exclusion criteria.

Data for the study were collected from the patients medical records, which would later be used as patient demographics, including age, gender, education, distance from home, duration of treatment and amount of OAT. Interviews were conducted with TB patients when data from medical records were incomplete. Data were also collected by contacting patients via Whatsapp video calls.

The study was conducted for 28 days, with 12 patients (samples) being measured for adherence on the first day before monitoring using a Whatsapp video call and on the last day of monitoring by completing the TB-MAS questionnaire using the response options strongly disagree (1), disagree (2), normal (3), agree (4) and strongly agree (5). There are 30 statements relating to 9 factors that may affect adherence in TB patients. A score of <113 is considered non-adherent and a score of 113-150 is considered adherent [7].

Table 1. TBMAS Questionnaire [7]

No	Item	Strongly disagree (1)	disagree (2)	Neutral (3)	Agree (4)	Strongly Agree (5)
Factor 1: Communication with healthcare provider						
1	I am satisfied with healthcare worker's attitude.					
2	Healthcare worker described TB to me clearly.					
3	Healthcare worker explained my condition to me clearly.					
4	Healthcare worker explained the method of taking medicine clearly.					
5	Healthcare worker explained the side-effects of medicine clearly.					
6	Healthcare worker led me to believe that my TB can be cured.					
Factor II: Personal traits						
7	I often keep my things neat and clean.					
8	I am strict with myself to follow my plan.					
9	I often seek the most effective way in doing things.					
10	I often set clear target.					
11	I am organized and systematic in approaching my target.					
Factor III: Confidence in curing TB						
12	I am very confident to completely cure TB.					
13	My treatment regimen is very simple.					
14	I am very confident in taking TB medicine regularly for 6 months.					
15	I am very confident in tolerating side-effects.					
Factor IV: Social support						
16	I am satisfied with the support between our family members.					
17	My family members often remind me to take medicine.					
18	My friends often remind me to do things.					
19	People around me often give me necessary help.					
Factor V: Mood Disorder						
20	I sometimes feel depressed.					
21	When I do something wrong, I feel frustrated and want to give up					
22	I sometimes feel helpless and want other people's help.					
Factor VI: Living Habits						
23	I sleep and wake up regularly every day.					
24	I have meals regularly every day.					
Factor VII: Active coping behavior						
25	I actively pursued knowledge on TB when I knew I had been infected.					
26	I often ask the doctor about my condition since I know I have been infected.					
Factor VIII: Forgetfulness						
27	I sometimes forgot to do important things I planned to do.					
28	My memory is good.					

Factor IX: Akses terhadap layanan kesehatan	
29	It's convenient to refill my TB medicine.
30	The TB control institution I visit meets my need.

Subsequent to the initial assessment, patients diagnosed with tuberculosis (TB) will be subject to a 28-day monitoring period, which will be conducted via WhatsApp video calls. These consultations will be scheduled thrice weekly or on a daily basis, contingent upon the patient's respective drinking schedule. In the course of the implementation, the researcher formulated a standard operating procedure with the aim of prompting patients to complete their treatment and to inquire about any adverse effects and the quantity of unused medication. The standard operational procedures that are in place can be viewed in table 2.

Table 2. Standard Operational Procedure

No	Stages
1	Greetings
2	Ask if the patient has taken the medicine today
3	Remind the patient to take the next day's
4	medicine Ask about the patient's medicine stock and remind to return to the health centre if the medicine stock is low or runs out
5	Provide support that the patient can complete the treatment and recover
6	Ask about complaints or side effects that appear
7	Closing greetings

Majority of TB patients were treated at an advanced stage, with 10 patients and 2 at an intensive stage. Majority of patients suffering from tuberculosis (TB) ingested antituberculosis medication during either the day or night-time hours. The rationale for nocturnal administration of medication was primarily due to work-related constraints or the occurrence of adverse effects, such as dizziness. Over the course of the 28-day study period, a significant obstacle that impeded the data collection process was the fact that not all patients provided documentation attesting to their drug supply. Furthermore, since monitoring was conducted via WhatsApp video call, it necessitated the patient's availability during their leisure time. This was due to the fact that the majority of TB patients were of working age and therefore engaged in employment or other activities. In light of the non-normal distribution of the data, the Wilcoxon test was utilised to assess the efficacy of WhatsApp video calls on patient adherence.

3. RESULTS AND DISCUSSION

3.1 Patient demographic

The patients involved in this study were enrolled in the pulmonary tuberculosis control programme (Program Penanggulangan Tuberkulosis Paru/P2TB) at the Kepulungan Community Health Centre. Consequently, the number of patients was restricted. Furthermore, only 12 patients were willing to participate in this study, as two patients did not possess mobile phones and one individual was unwilling to participate.

The demographic data of patients with tuberculosis (TB) at the Kepulungan Health Centre, Gempol District, Pasuruan Regency, is presented in Table 3. Majority of TB patients are at a productive age (15-64 years), with 10 cases constituting 83.33% of the total, and the remaining two cases representing 16.67%. The results of this study are consistent with those of cross-sectional studies, which have demonstrated that tuberculosis (TB) patients are more prevalent among the productive age group (15-58 years) [8]. The findings of the study conducted in the Wori sub-district indicated that the majority of patients were within the 15-54 age range (67%). This phenomenon is hypothesised to be attributable to the fact that individuals of productive age are often preoccupied with their professional and domestic responsibilities, resulting in elevated levels of risk exposure to TB. In the workplace, there is undoubtedly a greater probability of interaction, which can concomitantly engender an elevated risk of exposure to tuberculosis (TB). Consequently, individuals afflicted with TB are predominantly those of productive age [9].

The gender distribution of TB patients at the Kepulungan Health Centre exhibited a similar trend, with six male patients (50.00%) and six female patients (50.00%). These results are at odds with data from the Ministry of Health, which indicates that the prevalence of TB in men exceeds that in women. A study demonstrated that the proportion of male patients with TB was higher than that of female patients (73.3% versus 26.7%) [10]. This is attributable to the fact that men tend to engage in activities to a greater extent outside the home, and are more likely to smoke, consume alcohol and adhere less strictly to prescribed medication. Consequently, men are more susceptible to infection with TB than women [10]

Table 3. Patient demographic

characteristic	Category	Total	Percentage
Age	15-64 years	10	83.33
	> 64	2	16.67
Gender	Male	6	50.00
	Female	6	50.00
Education level	High	3	25.00
	Low	9	75.00
Distance to health care center	< 3 km	11	91.67
	> 3 km	1	8.33
Duration treatment	1– 2 month	2	16.37
	> 3 month	10	83.33
Number of antituberculosis	1– 3	8	66.67
	> 3	4	33.33

Analysis of patient education levels indicates a predominance of tuberculosis (TB) cases at the Kepulungan Health Centre, largely attributable to individuals with a high school diploma or higher (Senior High School-Higher Education), constituting 90.00% of the total. In contrast, patients with a primary school diploma or below (Elementary school – Junior High School) accounted for 25.00%, a proportion that can be attributed to the minimum educational requirement in Indonesia being junior high school. There are different studies that most TB patients based on the education level of respondents are respondents with low education [11]. Individuals with limited educational attainment may encounter greater challenges in accessing information provided by healthcare professionals. It is evident that higher education has the capacity to facilitate the absorption of information and knowledge, thereby enabling individuals to lead healthy lives and overcome health challenges. It is imperative that knowledge regarding tuberculosis and its treatment is increased, concurrently with the level of education obtained. In the context of health education, the level of education of the respondent has been shown to be a determining factor. Furthermore, these patients are more likely to receive adequate information about tuberculosis from a variety of media sources. However, the findings indicate that information regarding pulmonary tuberculosis obtained from health worker counselling exerts a greater influence on medication adherence than formal education [11]. The discrepancy in outcomes observed in this study when compared to those of previous research may be attributable to the fact that a greater proportion of individuals diagnosed with TB at the Kepulungan Community Health Centre possess a higher level of education, namely high school or university.

The geographical proximity of patients to the health centre is a salient factor in the epidemiology of tuberculosis. The Kepulungan Health Centre has observed that the majority of its tuberculosis patients reside within a 3 km radius of the health centre. This observation is further delineated by the fact that 11 patients (91.67%) reside within this radius, while a single patient (8.33%) resides at a greater distance. The present study examined the treatment of tuberculosis (TB) at Puskesmas Kepulungan. The analysis revealed that the majority of patients (n = 10, 83.33%) exhibited advanced-stage disease and had been undergoing treatment for a period exceeding two months. In contrast, a smaller proportion of patients (n = 2, 16.67%) had initiated treatment for a duration of one to two months or were at the intensive stage. At the Kepulungan Health Centre, a greater proportion of tuberculosis (TB) patients consumed one to three tablets of anti-tuberculosis therapy, constituting 66.67% of the total sample. In contrast, a smaller proportion of patients consumed more than three tablets per day, accounting for 33.33% of the sample.

3.2 Correlation between video calls on adherence

Patients who are willing to participate in the research will be requested to complete an Informed Consent Form on the first day of the study. This will be followed by a video call via the WhatsApp application for the purpose of monitoring.Adherence to the treatment will be measured in two ways. Firstly, all respondents will be asked to complete the TB-MAS questionnaire. Secondly, on the 28th day, adherence will be measured once more using the same questionnaire. The Tuberculosis Medication Adherence Scale (TB-MAS) is a specific questionnaire that has been developed for the purpose of measuring the adherence of tuberculosis (TB) patients. It has been demonstrated to be both valid and reliable [7]. The results of the adherence score are exposed in Table 3.

The Wilcoxon test was utilised to assess patient adherence, yielding a significant result. The study revealed a statistically significant difference in respondent adherence, with a p-value of 0.018, indicating a notable change in adherence levels before and after the administration of WhatsApp video call treatment. It

has been demonstrated that WhatsApp video calls can enhance adherence to OAT for patients with tuberculosis. A notable increase in the proportion of compliant respondents was observed, from three individuals in the pre-test data to 10 individuals in the post-test data. Prior to the implementation of the WhatsApp video call monitoring system, patients diagnosed with TB at the Kepulungan health centre exhibited suboptimal adherence levels, with an average adherence value of 102.5. Notably, the number of adherent patients was minimal, amounting to only three individuals. This is likely attributable to a deficiency in motivation, beliefs, attitudes and personality among the respondents. Furthermore, extrinsic factors, such as social support in the form of emotional support from other family members or friends, have also been demonstrated to influence the adherence of TB patients. The absence of adequate supervision by healthcare professionals has been demonstrated to exert a significant influence on the efficacy of treatment regimens for patients diagnosed with tuberculosis. Supervision or monitoring is another extrinsic factor that has the capacity to influence patient adherence in undergoing antituberculosis therapy. The quality of interaction between health workers and patients is an important factor in determining adherence.

Table 4. TB-MAS score before and after

No.	Before	After
1	90	90
2	120	120
3	97	118
4	102	120
5	99	116
6	94	118
7	120	120
8	90	90
9	107	120
10	110	116
11	88	116
12	120	120
Average score	102.5	113.6

Table 5. Result Willcoxon Test

*Negative Ranks**	*Positive Ranks***	*Ties****	*Sig.*
0	7	5	0.018

The findings of the study indicate that digital and mobile technology has the potential to enhance adherence to tuberculosis treatment regimens among patients. It is imperative to acknowledge the necessity for enhancement in the domain of communication between patients and healthcare professionals. The utilisation of communication technology, such as WhatsApp video calls, has the potential to serve as a substitute for enhancing patient adherence in the administration of tuberculosis (TB) medications. Sekandi's research (2020) posits that digital technology in the form of Video Directly Observed Therapy (VDOT) has been demonstrated to engender elevated levels of adherence, thereby suggesting a correlation between the utilisation of digital technology and the enhancement of patient medication adherence [5]. Research in India employing a cross-sectional methodology utilises communication technology via mobile phones. Healthcare professionals communicate with patients regarding medication schedules and the reporting of adverse effects. This is a very helpful resource and can be one way to improve the treatment adherence of TB patients. [6].

4. CONCLUSION

The utilisation of WhatsApp video calls has been posited as a potential intervention to enhance the adherence of tuberculosis (TB) patients, as evidenced by the TB-MAS questionnaire. It is recommended that Puskemas employ this method to enhance patient adherence, with the ultimate objective of eradicating TB in Indonesia. Further research is advised, encompassing a larger sample size or the concurrent engagement of multiple health centres. Furthermore, research can be conducted on the cost-effectiveness of using video calls to assess their costs and effectiveness, with a view to incorporating video calls into policies for tuberculosis eradication in Indonesia.

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REFERENCES

[1] Kementerian Kesehatan Republik Indonesia. Keputusan Menteri RI tentang Pedoman Nasional Pelayanan Kedokteran Tata Laksana Tuberkulosis. Jakarta: Kemenkes RI; 2019. p. 1–139.
[2] World Health Organization. Global Tuberculosis Report 2020 [Internet]. Geneva: World Health Organization; 2020 [cited 2025 Jul 7]. Available from: https://www.who.int/publications/i/item/9789240013131
[3] Dinas Kesehatan Provinsi Jawa Timur. Profil Kesehatan Provinsi Jawa Timur Tahun 2019. Surabaya: Dinkes Provinsi Jawa Timur; 2020. Tabel 53.
[4] Bediang G, Stoll B, Elia N, Abena JL, Geissbuhler A. SMS reminders to improve adherence and cure of tuberculosis patients in Cameroon (TB-SMS Cameroon): A randomized controlled trial. BMC Public Health. 2018;18(1):583. doi:10.1186/s12889-018-5490-4
[5] Sekandi JN, Buregyeya E, Zalwango S, Dobbin KK, Atuyambe L, Nakkonde D, et al. Video directly observed therapy for supporting and monitoring adherence to tuberculosis treatment in Uganda: A pilot cohort study. ERJ Open Res. 2020;6(1):00175-2019. doi:10.1183/23120541.00175-2019
[6] Pampalia N, Waluyo A. Mhealth untuk kepatuhan pasien TB dalam pengobatan: Sebuah tinjauan literatur. J Wacana Kesehat. 2019;4(1):404–10.
[7] Yin X, Tu X, Tong Y. Development and validation of tuberculosis medication adherence scale. Patient Prefer Adherence. 2012;6:427–34. doi:10.2147/PPA.S34833
[8] Sikumbang RH, Eyanoer PC, Siregar NP. Faktor-faktor yang berhubungan dengan kejadian TB paru pada usia produktif di wilayah kerja Puskesmas Tegal Sari Kecamatan Medan Denai. Ibnu Sina J Kedokt dan Kesehat. 2022;21(1):32–43.
[9] Dotulong JFJ, Sapulete MR, Kandou GD. Hubungan faktor risiko umur, jenis kelamin, dan kepadatan hunian dengan kejadian penyakit TB paru di Desa Wori Kecamatan Wori. J Kedokt Komunitas dan Trop. 2015;3(2):57–65.
[10] Nopita E, Suryani L, Siringoringo HE. Analisis kejadian tuberkulosis (TB) paru. J Kesehat Glob. 2023;6(1):50–6.
[11] Pranda V, Andatani N. Hubungan tingkat pendidikan terhadap angka kejadian multidrugs resistant tuberculosis (MDR-TB) di RSUDZA Banda Aceh. J Penelit Nanggroe Med. 2018;1(4):7–13.
[12] Puskesmas Kepulungan. Laporan Kegiatan Program Penanggulangan Tuberkulosis Paru (P2TB) Tahun 2023. Pasuruan: Puskesmas Kepulungan; 2023.
[13] Puskesmas Kepulungan. Standar Operasional Prosedur (SOP) Pemantauan Pasien TB Melalui Video Call (WhatsApp). Pasuruan: Puskesmas Kepulungan; 2023.