

Effect of Telenursing-Based Health Education on Quality of Life among Patients with Pulmonary Tuberculosis: A Quasi-Experimental Study

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ABSTRACT

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The long duration of pulmonary tuberculosis treatment and the need to take medication regularly can cause treatment fatigue and emotional distress. Limited access to information and emotional support may further affect patients' quality of life. This study examined whether telenursing-based health education could improve the quality of life of patients with tuberculosis at Jemursari Islamic Hospital, Surabaya. A quasi-experimental pretest-posttest study with a control group was conducted among 38 patients with pulmonary tuberculosis. Participants were randomly divided into an intervention group and a control group. The intervention group received health education through telenursing for four weeks, while the control group received routine care according to hospital standards. Quality of life was measured using a questionnaire. The data were analyzed using paired and independent t-tests, with a significance level of 0.05. Quality of life improved significantly in the intervention group after four weeks of telenursing-based health education ($p < 0.001$). No significant improvement was observed in the control group. A significant difference was also found between the intervention and control groups after the intervention ($p < 0.001$). These findings suggest that telenursing-based health education can improve the quality of life of patients with pulmonary tuberculosis. Telenursing may therefore be a useful approach for providing continuous education and support to patients undergoing long-term treatment.

ABSTRAK

Lamanya durasi pengobatan tuberkulosis paru dan kebutuhan untuk minum obat secara teratur dapat menyebabkan kelelahan pengobatan dan tekanan emosional. Keterbatasan akses terhadap informasi dan dukungan emosional dapat lebih lanjut memengaruhi kualitas hidup pasien. Studi ini meneliti apakah pendidikan kesehatan berbasis telekeperawatan dapat meningkatkan kualitas hidup pasien tuberkulosis di Rumah Sakit Islam Jemursari, Surabaya. Studi kuasi-eksperimental pretest-posttest dengan kelompok kontrol dilakukan pada 38 pasien tuberkulosis paru. Partisipan dibagi secara acak menjadi kelompok intervensi dan kelompok kontrol. Kelompok intervensi menerima pendidikan kesehatan melalui telekeperawatan selama empat minggu, sedangkan kelompok kontrol menerima perawatan rutin sesuai standar rumah sakit. Kualitas hidup diukur menggunakan kuesioner. Data dianalisis menggunakan uji t berpasangan dan independen, dengan tingkat signifikansi 0,05. Kualitas hidup meningkat secara signifikan pada kelompok intervensi setelah empat minggu pendidikan kesehatan berbasis telekeperawatan ($p < 0,001$). Tidak ada peningkatan signifikan yang diamati pada

kelompok kontrol. Perbedaan signifikan juga ditemukan antara kelompok intervensi dan kontrol setelah intervensi ($p < 0,001$). Temuan ini menunjukkan bahwa pendidikan kesehatan berbasis telekeperawatan dapat meningkatkan kualitas hidup pasien tuberkulosis paru. Oleh karena itu, telekeperawatan dapat menjadi pendekatan yang bermanfaat untuk memberikan pendidikan dan dukungan berkelanjutan kepada pasien yang menjalani pengobatan jangka panjang.



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A. INTRODUCTION

Tuberculosis is an infectious disease caused by germs *Mycobacterium tuberculosis* (Wahdi et al., 2025; Setiyowati et al., 2020; Wahdi et al., 2025; Wahdi & Puspitosari, 2021). Treatment for pulmonary TB requires a relatively long time and regular medication intake can lead to patient boredom with treatment, and the informational and emotional support provided is also less than optimal, which can reduce quality of life.

The World Health Organization (WHO) recorded 10.4 million new cases of tuberculosis in 2015. These cases consisted of 5.9 million men, 3.5 million women and 1.0 million children. Around 1.2 million HIV sufferers are suspected of having tuberculosis. The global report of deaths from tuberculosis in 2015 was around 1.4 million people and the number of deaths of HIV sufferers with tuberculosis was around 0.4 million people. The average death rate has decreased by 22% since 2000 to 2015 (WHO, 2017). The prevalence of pulmonary tuberculosis in Indonesia in 2013 was 0.4%, in 2018 it was 0.4%, the prevalence of pulmonary tuberculosis in East Java in 2013 was 0.2%, in 2018 it increased to 0.3% (Risksedes, 2018). The number of new cases of pulmonary tuberculosis in the city of Surabaya in 2016 was 2,382 people (Profil Kesehatan, 2016). The number of cases of pulmonary tuberculosis in the Lung Polyclinic of Jemursari Islamic Hospital, Surabaya in 2019 was 722 patients with pulmonary tuberculosis, 53 new patients diagnosed with pulmonary tuberculosis, 269 cases of pulmonary tuberculosis in the last three months, 13 new patients diagnosed with pulmonary tuberculosis.

Risk factors affecting tuberculosis are direct contact with someone who has active tuberculosis, immunocompromised status (decreased immunity) for example, elderly, cancer, corticosteroid therapy, HIV, injection drug use, alcohol, people who lack adequate health care (poor, minority, children, young adults), pre-existing medical conditions including diabetes, chronic kidney failure, silicosis, malnutrition, immigrants from countries with high rates of tuberculosis (eg, Haiti, Southeast Asia), institutionalization (eg, long-term care facilities, prisons), living in crowded and substandard housing, occupation (eg, health care workers, especially those who perform high-risk activities (Puspasari, 2019).

Proses penyembuhan tuberkulosis membutuhkan waktu minimal 6 bulan dapat menimbulkan perubahan status kesehatan pasien. Perubahan secara fisik dan psikologis mempengaruhi kualitas hidup pasien tuberkulosis. Kualitas hidup seseorang yang mengalami sakit kronis banyak aspek kualitas hidup terganggu (Linggani, 2018). (Salehitali et al., 2019) said that tuberculosis is considered as one of the serious diseases that can damage the quality of life. Important factors in influencing the quality of life in TB patients, long-term treatment, multi-drug therapy, toxic reactions, drug side effects, adherence to drug regimens, social

impact, social support, social acceptance of the disease, family, lifestyle changes, patient marital status, extent of access to health services, economic status, patient knowledge about the disease, family knowledge about the disease, treatment of tuberculosis complications.

Video, image, and brochure-based health education can improve self-efficacy in hemodialysis patients (Saefulloh & Nuraeni, 2016). Promosi kesehatan dapat meningkatkan efikasi diri pasien kardiometabolik (Wu et al., 2019). (Gagné et al., 2019) stated that video-based health promotion can improve the quality of life of atrial fibrillation patients. (Lee et al., 2018) stated that video-based health promotion can improve the quality of life of BPS patients compared to text-based health promotion.

Telenursing, as a telecommunications and information technology tool for providing remote nursing practice without the need for daily home visits, (Fadhila & Afriani, 2019) . Telenursing is a component of the electronic health care project, which is defined as "the use of telemedicine technology and includes various communication technologies such as telephone, email, internet, and video clips to provide nursing care" (Amudha et al., 2017).

Telenursing using telephones can improve the quality of life in hypertension patients. (Fadhila & Afriani, 2019). Telenursing can enable the intervention group to control glucose better and monitor themselves better than patients who receive care in a clinic. (Kotsani et al., 2018). Telenursing is able to monitor the care of head trauma patients. (Shahrokhi et al., 2018)

Researchers used video to conduct telenursing-based health education to improve the quality of life for tuberculosis patients. This is in line with the findings of a computer research and publishing institute, Computer Technology Research (CTR), which stated that people can only remember 20% of what they see and 30% of what they hear. However, they can remember 50% of what they see and hear, and 80% of what they see when they hear and hear simultaneously. (Sahwanti et al., 2019.)

To date, there has been no research on telenursing-based health education to improve the quality of life in tuberculosis patients. Therefore, researchers are interested in analyzing the effect of telenursing-based health education on the quality of life of tuberculosis patients at Jemursari Islamic Hospital, Surabaya.

B. METHODS

This research was conducted at Jemursari Islamic Hospital, Surabaya. This research is a quasi-experimental study with a pre-post test control group design approach. In each group, the respondents' quality of life will be measured. After that, the intervention will be given. The respondents' quality of life will then be reassessed. Then the level of respondents' quality of life will be reassessed. The study population was 38 tuberculosis patients at Jemursari Islamic Hospital, Surabaya. The sample size was 38 patients, 19 in the intervention group and 19 in the control group, the sampling technique used Non probability sampling with purposive sampling, the intervention group was given telenursing-based health education for 4 weeks using the WhatsApp application. The control group was given interventions according to Hospital standards. The research instrument used the WHOQOL-BREF quality of life questionnaire with guidelines for compiling Quality of Life scale. Data analysis used paired t-test and independent t-test with $\alpha = 0.05$. This research has received approval from the Health Research Ethics Commission of Jemursari Islamic Hospital, Surabaya with number 0172/KEPK-RSI JS/IV/2020.

C. RESULT AND DISCUSSION

1. Result

a. Distribution of Respondents

Table 1 Distribution of Respondents

Respondent Characteristics	Intervention	(n=19)	Control	(n=19)
	F	%	F	%
Age				
21-35 year	8	42.1	2	10.5
36-45 year	3	15.8	4	21.1
46-60 year	7	36.8	9	47.4
>60 year	1	5.3	4	21.1
Total	19	100	19	100
Gender				
Man	10	52.6	14	73.7
Woman	9	47.4	5	26.3
Total	19	100	19	100
Education				
SD	1	5.3	2	10.5
SMP	6	31.6	3	15.8
SMA	11	57.9	11	57.9
PT	1	5.3	3	15.8
Total	19	100	19	100
Work				
Work	10	52.6	14	73.3
Doesn't work	9	47.4	5	26.3
Total	19	100	19	100
Smoke				
No	9	47.4	8	42.1
Yes	10	52.6	11	57.9
Total	19	100	19	100
Accompanying Diseases				
DM	4	21.1	6	31.6
HT	5	26.3	5	26.3
There isn't any	10	52.6	8	47.4
Total	19	100	19	100
Duration of TB Treatment				
Fase Intensif	6	31.6		
Fase Lanjut	13	68.4	3	15.8
			16	84.2
Total	19	100	19	100

Based on table 1, it shows that almost half of the respondents in the intervention group (42.1%) were aged 21-35 years and almost half of the respondents in the control group (47.4%) were aged 46-60 years. The characteristics of respondents in the intervention group based on gender were half (52.6%) male and the majority of respondents in the control group (73.7%) were male. The characteristics of respondents in the intervention group based on education were half (57.9%) high school and the respondents in the control group were half (57.9%) high school. The characteristics of respondents in the intervention group based on occupation were half (52.6%) working and the respondents

- b. Quality of life before and after the provision of telenursing-based health education in the intervention and control groups

Table 2 Quality of life before and after the provision of telenursing-based health education in the intervention and control groups

		Group				Group			
		Intervensi Pre		Intervensi Post		Control Pre		Control Post	
		N	%	n	%	n	%	n	%
<i>Quality of Life</i>	Fair	4	21.1	0	0	4	21.1	4	21.1
	Good	14	73.7	7	36.8	15	78.9	15	78.9
	Ver Good	1	5.3	12	63.2	0	0	0	01
Total		19	100	19	100	19	100	19	100

Based on Table 2, the quality of life of the 19 respondents in the intervention group was shown to be good before receiving telenursing-based health education intervention. However, after receiving telenursing-based health education intervention, the quality of life of the 19 respondents in the intervention group was mostly (73.7%), and after receiving telenursing-based health education intervention, the quality of life of the majority (63.2%) was very good. In the control group, which received intervention according to hospital standards, the quality of life of the majority (78.9%) remained good. After receiving treatment according to hospital standards, the quality of life of the majority (78.9%) remained good.

- c. Analysis of quality of life before and after the provision of telenursing-based health education in the intervention and control groups.

Table 3 Analysis of quality of life before and after the provision of telenursing-based health education in the intervention and control groups.

In the Intervention and Control groups									
		N	Mean	SD	SE	95%CI		T	P
						Lower	Upper		
Intervention	Pre	19	80.16	15.30	3.51				
						12.41	18.32	10.92	.000
	Post	19	95.53	12.16	2.79				
Control	Pre	19	78.32	12.48	2.86				
						-.023	.338	1.83	.083
	Post	19	78.47	12.35	3.82				

Based on table 3, The results showed that quality of life score of 17 respondents in the intervention group before receiving telenursing-based health education intervention was 80.16 with a standard deviation of 15.30. After receiving telenursing-based health education intervention, quality of life score increased to 95.53 with a standard deviation of 12.16. The paired t-test results showed a P value $< \alpha = 0.05$, or 0.000, indicating a difference in quality of life before and after the telenursing-based health education intervention.

In the control group, which received intervention according to hospital standards, quality of life score before was 78.32 with a standard deviation of 12.48, and after receiving treatment according to hospital standards, quality of Life score was 78.47 with a standard deviation of 12.35. The results of the paired t-test showed a P value $> \alpha = 0.05$, namely 0.083, which indicates that there is no difference in the level of quality of life before and after the intervention was carried out according to Hospital standards.

- d. Analysis of the influence of telenursing-based health education on the quality of life of the intervention group and the control group.

Table 4 Analysis of the influence of telenursing-based health education on the quality of life of the intervention group and the control group.

Variabel	Group	Mean	St.Dev	SE	Df	P
Dissimilar	Intervensi	15.37	6.130	1.406	36	.000
Quality of life	Control	0.16	0.37	0.086		

Based on table 4, the results of the statistical test show the average value of the difference in quality of life in the intervention group is 15.37 with a standard deviation of 6.130 and in the control group shows a difference in quality of life of 0.16 and a standard deviation of 0.37. The results of the Independent t-test to analyze the difference in quality of life in the intervention group and the control group obtained a value of $P = 0.000$ and a value of $\alpha = 0.05$ means $P < \alpha$ then H_0 is rejected, meaning that telenursing-based health education can improve the quality of life in tuberculosis patients at Jemursari Islamic Hospital Surabaya

2. Discussion

a. Quality of life in tuberculosis patients before and after being given telenursing-based health education intervention at Jemursari Islamic Hospital, Surabaya.

Based on the research results, it was shown that in the intervention group, there was an increase in quality of life after being given a telenursing-based health education intervention from good quality of life to very good quality of life in tuberculosis patients, while in the control group there was still no increase in quality of life after being given an intervention according to hospital standards in tuberculosis patients, the quality of life remained good.

This phenomenon is shown in the results of the study conducted in Table 3, proving that there is an influence of providing telenursing-based health education on improving the quality of life in tuberculosis patients with a p value = 0.000. Health promotion can be defined as an effort to disseminate or sell health messages so that the community accepts and knows to follow health messages (Niman, 2017). This is in accordance with research conducted by Gagné *et al.*, (2019) stated that video-based health promotion can improve the quality of life of atrial fibrillation patients. This is in line with research conducted by (Lee *et al.*, 2018) said that video-based health promotion was able to improve the quality of life of BPS patients compared to using text-based health promotion.

Telenursing, as one of the primary services for caring for chronic patients at home, refers to the provision of nursing services through the use of telecommunications technologies such as telephones, computers, telemonitoring devices, and the Internet. The use of these technologies leads to faster patient access to better services at lower costs, easier access to the most appropriate professional skills, and an overall improvement in the quality of healthcare delivery (Goudarzian *et al.*, 2019). This is in accordance with research conducted by (Dadgari *et al.*, 2017) Telenursing using telephones can improve the quality of life in hypertensive patients. Telenursing interventions can monitor care for head trauma patients. (Shahrokhi *et al.*, 2018)

Telenursing-based health education using educational slides, motivational videos, and testimonials from patients who have successfully recovered from tuberculosis can improve the quality of life of tuberculosis patients. Ideally, the more senses a person uses to perceive something, the more diverse and varied the

understanding patterns they will gain. Therefore, media can be an effective and efficient tool in health promotion activities. The health materials and messages conveyed are more easily conveyed and understood by the community participating in health promotion activities. Various types of media can be used in health promotion, including posters, leaflets, bulletins, PowerPoint presentations, videos, demonstrations, imitation objects such as statues of human body parts, and others. (Induniasih & Ratna, 2019). This is consistent with findings from a computer research and publishing institute, Computer Technology Research (CTR), which stated that a person can remember 50% of what they see and hear. If someone sees, hears, and does it all at once, they can remember 80% of what they see, hear, and do. (Sahwanti et al., 2019.)

The study was conducted on tuberculosis patients at Jemursari Islamic Hospital in Surabaya. Both the intervention and control groups were predominantly in the continuation phase of treatment. These results align with research by Wahyono & Widiastutu (2019), which found that patients with treatment lasting more than two months experienced a poorer quality of life.

Based on interviews with patients, they reported a decline in quality of life due to boredom with taking anti-tuberculosis drugs for a minimum of six months. Patients reported numerous changes in their bodies, such as weight gain and nausea and vomiting, while taking anti-tuberculosis drugs.

These results align with the theory proposed by (Salehitali et al., 2019) Tuberculosis is considered a serious disease that can impair quality of life. Important factors influencing quality of life in TB patients include long-term treatment, multi-drug therapy, toxic reactions, drug side effects, adherence to drug regimens, social impact, social support, social acceptance of the disease, family, lifestyle changes, the patient's marital status, access to health services, economic status, patient knowledge of the disease, family knowledge of the disease, and treatment of tuberculosis complications.

Tuberculosis can affect the quality of life of sufferers, including psychological health, physical function, and social feelings. (Dhuria, 2008; Hendrik dkk, 2015). In line with Yuniati's (2012) statement in Hendrik et al., 2015, quality of life is one of the main criteria for determining health service interventions, such as morbidity, fertility, and disability.

Quality of life is defined as the individual's perception of life within the context of culture and value systems, and its relationship to goals, expectations, established standards, and concerns (Nimas, 2012; Wahyono & Widiastutu, 2019). In this context, the quality of life of a TB patient refers to a TB patient's perspective on their own condition and the environment in which they live. Therefore, the quality of life of a TB patient is crucial for their recovery. One factor influencing the quality of life of a TB patient is the length of time they have been ill. The length of therapy for a TB patient is a significant concern for those undergoing treatment. This creates a frightening impression because the length of treatment required is so long that patients feel their illness will never be cured until they complete the six-month course. Providing telenursing-based health education to tuberculosis patients can improve their quality of life. The results of the study showed no change in quality of life in the control group before and after the intervention according to hospital standards, as evidenced by Table 5.4. However, the intervention group experienced a significant improvement. The results of the hypothesis testing indicate that telenursing-based health education can improve quality of life in tuberculosis patients compared to interventions according to hospital standards. Therefore, additional intervention methods are needed for chronic patients.

Telenursing-based health education can foster motivation to continue antituberculosis treatment, thereby improving the quality of life of tuberculosis patients.

b. The Impact of Telenursing-Based Health Education on Quality of Life in Tuberculosis Patients

Berdasarkan hasil penelitian pada tabel 4 Menunjukkan bahwa ada pengaruh *health education* berbasis *telenursing* terhadap kualitas hidup pada pasien hemodialysis dengan nilai sig .000

Research supporting these findings includes Gagné et al. (2019), who found that video-based health promotion can improve the quality of life for patients with atrial fibrillation. This finding aligns with research by (Lee et al., 2018), who found that video-based health promotion can improve the quality of life for patients with BPS compared to text-based health promotion. Research by Dadgaria et al. (2017) found that telenursing using telephones can improve the quality of life for patients with hypertension. This finding aligns with research by (Shahrokhi et al., 2018), who found that telenursing can monitor the care of patients with head trauma.

This improved quality of life can be achieved through a learning process through health education, particularly the use of slides and videos specifically designed by researchers to meet the needs of tuberculosis patients. Slides and videos can provide motivational information based on telenursing, making it easy to understand. Quality of life is also influenced by increased patient confidence in their ability to navigate life during the anti-tuberculosis treatment process. According to Pratiwi et al. (2018), education is an interactive process that encourages learning, and learning is an effort to add new knowledge, attitudes, and skills through strengthening specific practices and experiences. Patients with a high level of education have a better quality of life than those with a low level of education.

Telenursing-based health education can improve the quality of life of tuberculosis patients undergoing anti-tuberculosis treatment, so it is hoped that tuberculosis patients will comply with anti-tuberculosis treatment and patients will recover from tuberculosis.

D. CONCLUSION AND SUGGESTIONS

Telenursing-based health education can increase self-efficacy in tuberculosis patients. Hospitals and nurses can utilize telenursing to provide health education to patients with chronic diseases

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