

# Medication adherence and visiting compliance: interventions self-management education based on health belief model



Joni Iskandar<sup>1</sup>, Eppy Setiyowati<sup>2\*</sup>, Chilyatis Zahroh<sup>2</sup>

## ABSTRACT

**Introduction:** The large number of TB cases was caused by the boredom of treatment for too long, the lack of knowledge of patients about pulmonary TB, the distance between the patient's home and public health services. The purpose was to analyze effect interventions of self-management education based on the health belief model on adherence medications and visiting compliance in pulmonary tuberculosis patients at Community health center Pamekasan Regency.

**Method:** This research is conducted using a quantitative approach, type of intervention research. Participants in this study were the >20 year old age group. This study has certain characteristics on the selection of subjects; therefore use purposive sampling techniques. Intervention Researchers gave treatment self-management education based on a health belief model. The collected data is then analyzed using a statistical test independent T-test with the level of significance  $\alpha = 0,05$ .

**Result:** The average difference in drug administration adherence in the intervention group was 17.89 with a standard deviation of 9,650. The control group showed a difference in drug adherence value of 5.23 and a standard deviation of 3,456. The average difference in visiting compliance in the intervention group was 15.37 with a standard deviation of 6,130. In the control group it showed a visiting compliance difference value of 5.76 and a standard deviation of 4,162.

**Conclusion:** There was an influence of self-management education based on health belief model on increasing adherence to taking medications and increasing visiting compliance in tuberculosis patients at community health centers in Pamekasan Regency, East Java, Indonesia.

**Keywords:** adherence, compliance, health belief model, self-management, tuberculosis.

**Cite This Article:** Iskandar, J., Setiyowati, E., Zahroh, C. 2023. Medication adherence and visiting compliance: interventions self-management education based on health belief model. *Bali Medical Journal* 12(2): 1211-1216. DOI: 10.15562/bmj.v12i2.4302

<sup>1</sup>Students of the Master of Applied Nursing program, Faculty of Nursing and midwifery, Universitas Nahdlatul Ulama Surabaya, East Java, Indonesia;

<sup>2</sup>Department of Nursing, Faculty of Nursing and midwifery, Universitas Nahdlatul Ulama Surabaya, East Java, Indonesia;

\*Corresponding author:

Eppy Setiyowati;  
Department of Nursing, Faculty of Nursing and midwifery, Universitas Nahdlatul Ulama Surabaya, East Java, Indonesia;  
eppy@unusa.ac.id

Received: 2023-02-04

Accepted: 2023-03-28

Published: 2023-04-13

## INTRODUCTION

Tuberculosis (TB) is one of the infectious diseases that is a global problem, mostly found in developing countries.<sup>1,2</sup> The number of TB cases is caused by the boredom of treatment for too long, the lack of knowledge of patients about pulmonary TB<sup>3,4</sup>, the distance between the patient's home and the general health service<sup>5</sup>, health workers who do not remind sufferers if they neglect treatment.<sup>6,7</sup> This can cause TB sufferers not to complete the treatment program.<sup>8,9</sup>

Based on the results of the study of the prevalence of Tuberculosis (TB) years by<sup>10</sup> and refers to the strategic plan of the Ministry of Health of the Republic of Indonesia 2015– 2019 it is known that the prevalence of TB with bacteriological confirmation at the age of  $\geq 15$  is 759/100,000 population. In contrast, the prevalence of TB of all forms at all ages is

as large as 660/100.000 inhabitant.<sup>11</sup> With such a large number, it is estimated that 1.6 million Indonesians are experiencing TB. The TB problem in Indonesia is exacerbated by the low number of case notifications (CNR) which was just 81/100.000 the population and case notification rate in Bali is lower by 74/100.000 inhabitant.<sup>12</sup> In other words, most TB cases are not recorded or treated properly. During the COVID-19 pandemic, the treatment of pulmonary TB sufferers is somewhat problematic<sup>13,14</sup>, this is due to the fear that pulmonary TB sufferers will contract covid 19 if they come to visit at the Community Health Center.<sup>15,9</sup> This causes the TB stop program to need to rethinking TB sufferers who visit the Community Health Center has decreased. The study's results stated that self-management education can increase the quality of life by 78,5%.<sup>16,17</sup> Research results<sup>18,19</sup>, health

education based on the health belief model can overcome medication adherence over a long period.<sup>20-21</sup>

Innovations in strengthening knowledge through health education or telenursing<sup>17</sup> have been tested to increase the knowledge of people with pulmonary TB, but have not been able to overcome adherence to taking medications and adherence to visiting for a long time continuously.<sup>19</sup> To improve adherence to taking the drug over a long period (at least 6 months) in patients with pulmonary tuberculosis, self-management education intervention based on the health belief model can be modified and innovate to improve medication adherence and visiting compliance.

So far, there has been no self-management education research based on health belief models on medication adherence and improved respiratory

function in people with pulmonary tuberculosis. For this reason, this study focused on the influence of the application of self-management education based on a health belief model. There is adherence to taking medications and adherence to visiting patients with pulmonary tuberculosis at the Community Health Center in Pamekasan Regency.

The purpose of the study in general was to analyze the effect of the application of self-management education based on the health belief model on medication adherence and visiting compliance in pulmonary tuberculosis patients at the Community Health Center Pamekasan Regency. The results of the study were in the form of sociodemographic characterization phenomena, medication adherence and visiting compliance, and the results of an analysis of the influence of self-management education based on health belief models on drug-taking compliance and control compliance.

## METHOD

### Research Design

Research is conducted with a quantitative approach, with a type of intervention research. This study explains how independent variables relate to dependent variables, by looking at whether there is a quantitative relationship of the four main dimensions of adherence to taking medications and adherence to visiting.

### Participants

Participants in this study were the >20 year old age group. This study has certain characteristics on the selection of subjects; therefore, researchers use purposive sampling techniques. Purposive sampling obtains subjects according to the criteria; therefore, the specific population number is unknown. The authors successfully recruited 101 participants (Mage=38.83; Elementary school age=10,679; 61.4 percent of women) fit the criteria, with the spread of the majority of subjects in community health center at Pamekasan Regency (98.3%), with 45% of all subjects from East Java Indonesia.

### Measurement

The study used an online survey containing adherence to taking medications and

adherence to visiting questionnaires. The survey was conducted through a digital platform, Google Forms, which contains informed consent, information related to biodata covering the demographics of participants, as well as a Likert scale fill that measures the variables measured. The item of the stuffing is taken from the adherence to taking medications and adherence to visiting scale for independent variables, as well as the Clean and Contain scale adapted over language. Surveys are disseminated by grabbing participants through social media and instant messaging apps, including links to those surveys.

Intervention Researchers gave treatment in the form of self-management education based on health belief models and demonstrations related to the prevention and termination of the TB pulmonary transmission through serial video media installed in WhatsApp groups, the duration of education for + 1 hour played repeatedly for 2 weeks. Supporting instruments in the research were leaflets distributed to respondents.

Statistical analyses by the World Health Organization (WHO), instructing the prevention of the spread of coronavirus through hand washing, using masks, social distancing and physical distancing are arranged instruments for perception and knowledge of the prevention and spread of corona.<sup>5</sup> The questionnaire was given during the pre-test and post-test. The research lasted 3 months from July to September 2022 in two public health centers at Pamekasan Regency East Java Indonesia, with a division of 1 month for the control group and 1 month for the treatment group. The collected data is then analyzed using a statistical test independent T-test with the level of significance  $\alpha = 0,05$ . That is, if it produces  $(p) = 0,05$ , then  $H_1$  is accepted, this means there is influence on Self-management education based on the health belief model to change adherence to taking medications and adherence to visiting about the prevention and termination of the TB pulmonary transmission. To see the difference between the control and treatment groups was Independent T-test (with the level of significance  $\alpha = 0,05$ ).

## RESULTS

We received 250 respondents during the period of research this lasted. Respondents in this study were 64/250, 24% aged 21–30 years and 64.8% of them (162/250) pointed to the highest level of education at the high school level (table 1). Most of the respondents were private sector 88.8% (156/250), Muslim 53.6% (134/250), married status 52.8 % (132/250) is single and 38.8% based on confirmed tracking results have comorbid disease. Respondents had a risk of being infected with pulmonary TB at the age of 41-50 years 26.8% (67/250) because one of the family members suffered from the disease (Table 1) .

Table 2 shows that the score of drug adherence rate from 125 respondents of the intervention group before being given a health belief model-based self-management education intervention was 87.16 with a standard deviation of 15.76. After being given a self-management education intervention based on the health belief model, it was obtained to increase the level of medication adherence to 95.57 with a standard deviation of 13.16 Paired t-test results  $\rho$  value  $< \alpha = 0,05$ , which is 0.000. This shows differences in adherence to medications before and after self-management education interventions based on a health belief model. In the control group that received intervention according to the standards of the community health center, the compliance score of taking the drug before was 77.97 with a standard deviation of 12.87. After being given action according to the standards of the community, the Health center obtained a drug-taking compliance score of 78.01 with a standard deviation of 12.95. The result of the independent t-test test value  $\rho$  value  $> \alpha = 0,05$ , which is 0.176. This shows that there is no difference in adherence to taking medications before and after interventions according to the standards of the Community Health Center.

Table 3 shows that the visiting compliance rate score of 125 respondents of the intervention group before being given a health belief model-based self-management education intervention was 87.16 with a standard deviation of 15.76. After being given a health belief

**Table 1. Characteristic Respondent.**

Variable	n(%)	Accept n (%)	Unadjusted		Adjusted	
			OR (95% CI)	P-Value	aOR (95%CI)	p-Value
<b>Age Group (year) :</b>						
< 20 (R)	23 (9.2)	15 (65.2)	1		1	
21-30	61(24.4)	53 (86.9)	0.81 (0.39-1.71)	0.58	0.74 (0.32-1.86)	0.57
31-40	64 (25.6)	54 ((84.4)	0.38 (0.17-0.72)	0.01	0.32 (0.9-1.03)	0.05
41-50	52 (20.8)	34 (65.4)	0.83 (0.26-2.86)	0.61	0.82 (0.22-3.42)	0.91
51-60	38 (15.2)	15 (39.5)	0.61 (0.21-1.92)	0.41	1.23 (0.26-4.90)	0.87
>60	12 (4.8)	7 (58.3)	0.62 (0.22-1.90)	0.43	0.67 (0.32-1.92)	0.45
<b>Gender:</b>						
Male (R)	104 (41.6)	76 (73.10)	1		1	
Female	146 (58.4)	88 (60.3)	1.45 (1.23- 1.30)	0.12	1.49 (0.95-2.35)	0.01
<b>Education attainment (R):</b>						
- Higher education (Maximum High School)	162 (64.8)	79 (48.8)	0.87 (0.52-1.43)	0.42	0.91 (0.45-1.81)	0.76
- Low education (Maximum Junior High School)	88 (45.2)	58 (60.7)	0.50 (0.21-1.13)	0.09	0.48 (90.17-1.23)	0.133
<b>Occupation</b>						
- Cical sector (R)	39 (15.6)	36 (92.3)	1		1	
- Private sector employee	156 (18.4)	87 (88.8)	1.65 (0.94-2.96)	0.087	1.23 (0.47-2.13)	0.76
- Entrepreneur	51 (20.4)	23 (45.1)	1.01(0.51 – 2.01)	0.89	1.16 (0.61-2.12)	0.63
- Retired	16 (6.4)	7 (43.8)	0.29 (0.09-0.87)	0.03	0.13 (0.04-0.62)	0.01
<b>Religion</b>						
- Islam (R)	134 (53.6)	126 (94.1)	1		1	
- Hindu	7 (2.8)	2 (28.6)	1.32 (0.32-4.73)	0.63	1.01 (0.23 -.32)	0.76
- Cristian	49 (19.6)	32 (65.3)	0.53 (0.22-1.29)	0.16	0.49 (0.19-1.23)	0.23
- Catholic	53 (21.2)	27 (50.9)	0.58 (0.17-1.96)	0.38	0.46 (0.13-1.70)	0.23
- Buddhism	7 (2.8)	2 (28.6)	1.36 (0.32-5.77)	0.64	1.01 (0.23-3.32)	0.98
<b>Marital Status</b>						
- Single (R)	132 (52.8)	110 (83.3)	1		1	
- Married	118 (47.2)	98 (83.1)	0.63 (0.41-0.92)	0.02	1.03 (0.52-2.02)	0.72
<b>Tracking Comorbid</b>						
- Yes (R)	97 (38.8)	97 (100)	1		1	
- No	153 (61.2)	79 (51.6)	0.86 (0.23-0.97)	0.32	1.02 (0.53-2.03)	0.23
<b>Perceived risk to be infection</b>						
< 20 (R)	23 (9.2)	17 (73.9)	1		1	
21-30	35 (14)	26 (74.3)	1.63 (0.67-2.17)	0.02	1.2 (0.80-2.23)	0.18
31-40	42 (16.8)	23 (54.8)	1.34 (0.82-3.33)	0.18	1.53 (0.76-3.21)	0.23
41-50	67 (26.8)	42 (62.7)	2.13 (1.03-3.21)	0.23	2.21 (1.02-3.27)	0.02
51-60	57 (22.8)	32 (56.1)	2.10 (1.03 – 3.42)	0.32	1.17(0.34-3.78)	0.03
>60	26 (10.4)	12 (46.2)	1.34 (0.34-3.43)	0.34	1.14 (0.23 – 3.82)	0.76

**Table 2. Analysis of Adherence to medication before and after administration of health belief model-based self-management education in intervention and control groups.**

Group		N	Mean	SD	SE	95 % CI		T	P value
						Lower	Upper		
Intervention	Before	125	87.16	15.76	4.81	12.41	18.31	10.87	0.000
	After	105	95.57	13.16	2.78				
Control	Before	125	77.97	12.87	3.89	1.089	3.98	1.87	0.176
	After	119	78.01	12.95	3.99				

**Table 3. Compliance Analysis visited before and after the provision of self-management education based on health belief model in intervention and control groups.**

Group	N	Mean	SD	SE	95 % CI		T	P value	
					Lower	Upper			
Intervention	Before	125	87.16	15.76	4.81	12.41	18.31	10.87	<.001
	After	105	95.57	13.16	2.78				
Control	Before	125	77.97	12.87	3.89	1.089	3.98	1.87	0.076
	After	119	78.01	12.95	3.99				

**Table 4. Analysis of differences in differences in medication adherence and control adherence in intervention groups and groups.**

Variable	Group	Mean	St Dev	SE	Df	P value
Adherence to taking medications	Intervention	17.89	9.650	3.076	32	0.000
	control	5.23	3.456	1.076		
Visiting compliance	Intervention	18.37	8.130		36	0.000
	Control	5.76	4.162	1.012		

model-based self-management education intervention, the visiting compliance score was increased to 95.57 with a standard deviation of 13.16. The result of an independent t-test showed the  $p$  value <0.001. This shows differences in the visiting compliance before and after the self-management education intervention based on the health belief model.

In the control group that received interventions according to the standards of the Public Health Center, the visiting compliance score was reported before it was 77.97 with a standard deviation of 12.87. After given action according to the standards of the community, the Health center obtained a visiting compliance score of 78.01 with a standard deviation of 12.95. The results of the independent t-test test value  $p$  value=0.076 showed no visiting compliance before and after the intervention was carried out according to the standards of the Center for Public Health.

Based on table 4, the results of the statistical test showed the average value of the difference in drug administration adherence in the intervention group of 17.89 with a standard deviation of 9.650 and in the control group showed the value of the difference in adherence to taking drugs 5.23 and the standard deviation of 3.456. The results of the Independent t-test to analyze the difference in drug adherence in the intervention group and the control group obtained a value of  $p=0.000$  and a value of  $\alpha=0.05$  means  $p < \alpha$ , this means that self-management education based

on a health belief model can increase adherence to taking medications in tuberculosis patients at the community health center of Pamekasan Regency, East Java, Indonesia. The statistical test showed the average value of the difference in visiting compliance in the intervention group of 15.37 with a standard deviation of 6.130. In the control group, the difference in visiting compliance was 5.76 and the standard deviation of 4.162. The results of the Independent t-test test to analyze the differences in visiting compliance in the intervention group and the control group obtained a value of  $p=0.000$  and a value of  $\alpha=0.05$  means  $p < \alpha$ , this means that self-management education based on health belief models can improve visiting compliance with tuberculosis patients at the community health center in Pamekasan Regency, East Java, Indonesia.

## DISCUSSION

Self-management education interventions are based on health beliefs in tuberculosis patients so that patients can improve visiting compliance. The results of the study in the control group before and after being given interventions according to the standards of the Center for Public Health did not experience changes in compliance, this is evidenced in table 2 whereas in the intervention group there was a significant increase in visiting compliance. Hypothesis testing results that state that self-management education based on health belief models can improve visiting adherence in tuberculosis patients,

compared to interventions that are following the standards of the Community Health Center, so it is necessary to add methods in providing interventions to chronic patients.<sup>22</sup>

Influence of self-management education based on a health belief model to increase visiting compliance in tuberculosis patients with a value of  $p$  value = 0.000. Health promotion can be defined as an effort to disseminate or sell health messages so that the public receives and recognizes to follow health messages.<sup>8</sup> This follows research saying that video-based health promotion can improve the quality of life of stroke patients.<sup>23</sup> This is in line with previous research showed that video-based health promotion can improve patients' quality of life compared to text-based health promotion.<sup>24,25</sup>

Self-management education based on the health belief model as one of the main services of treating patients in community health centers, refers to providing nursing services through telecommunications technologies such as telephones, computers, telemonitoring devices, and the Internet. This technology leads to rapid access of patients to better services at a lower cost, easy access to the most appropriate professional skills, and a comprehensive improvement in the quality of healthcare provision.<sup>26-27</sup> This is in accordance with researchers conducted by<sup>7</sup> self-management education based on the health belief model using telephones to improve the quality of life in hypertensive patients. Self-management education interventions based on health



belief models can monitor the care of patients with chronic diseases.<sup>28</sup>

Self-management education based on a health belief model using educational slides, motivation, motivational videos and testimonials of patients successfully recovering from tuberculosis disease to increase visiting compliance with tuberculosis patients. Ideally, the more human senses used to accept something, the more and more types of patterns of understanding it acquires.<sup>22</sup> Therefore, the media can be an effective and efficient tool to improve the public health of people with pulmonary tuberculosis. The health materials and messages conveyed are easier to arrive and understand by the people who are participants in health promotion activities. Various types of media can be used in health promotion, namely posters, leaflets, bulletins, powerpoint shows, videos, demos of material, imitation objects in the form of statues of human body parts, and others.<sup>28</sup> This agrees with the results put forward by a computer research and publishing institute, Computer Technology Research (CTR) which states that a person's ability to remember 50% of what is seen and heard.<sup>29</sup>

## CONCLUSION

There is an influence of self-management education based on health belief models on increasing adherence to taking medications and increasing visiting compliance with tuberculosis patients at community health centers in Pamekasan Regency, East Java, Indonesia. Researchers are further expected to continue the study by adding a number of different variables, such as stress, stress, depression and depression in tuberculosis patients.

## ACKNOWLEDGMENTS

A thank you to the Chairman of the Higher Education Service institution region VII, through Task Letter No 006 / SP2H / PPKM / LL7/2022 Master's thesis grant at the Directorate General of Vocational Education, Ministry of Cultural Education, research and technology for fiscal year 2022

## AUTHOR CONTRIBUTION

The author contributed to submitting the clearance ethical test, obtaining research permits, collecting data in the field and analyzing data

## ETHICAL APPROVAL

In this study no ethical clearance were carried out, but when collecting data on respondents the researcher adhered to ethical principles

## CONFLICT OF INTEREST

No.

## FUNDING

Thesis grant at the Directorate General of Vocational Education, Ministry of Cultural Education, research and technology for fiscal year 2022

## REFERENCE

- Chee CBE, Reves R, Zhang Y, Belknap R. Latent tuberculosis infection: Opportunities and challenges. *Respirology*. 2018;23(10):893–900. Available from: <http://dx.doi.org/10.1111/resp.13346>
- Setiyowati E, Hanik U, Adiba D, Mazida EM, Sri Wahyuni R, Agus Andriawan F, et al. Determinan Quality of life Pada Pasien TB Paru di Kota Surabaya. *J Heal Sci*. 2020;13(2). Available from: <http://dx.doi.org/10.33086/jhs.v13i2.1306>
- Louw JS, Mabaso M, Peltzer K. Change in Health-Related Quality of Life among Pulmonary Tuberculosis Patients at Primary Health Care Settings in South Africa: A Prospective Cohort Study. *PLoS One*. 2016;11(5):e0151892–e0151892. Available from: <https://pubmed.ncbi.nlm.nih.gov/27137914>
- Sabri A, Quistebert J, Amrani HN, Abid A, Zegmout A, Ghorfi IA, et al. Prevalence and risk factors for latent tuberculosis infection among healthcare workers in Morocco. *PLoS One*. 2019;14(8):1–14.
- Nduba V, Van't Hoog AH, de Bruijn A, Mitchell EMH, Laserson K, Borgdorff M. Estimating the annual risk of infection with Mycobacterium tuberculosis among adolescents in Western Kenya in preparation for TB vaccine trials. *BMC Infect Dis*. 2019;19(1):682. Available from: <https://pubmed.ncbi.nlm.nih.gov/31375068>
- Mzembe T, Lessells R, Karat AS, Randera-Rees S, Edwards A, Khan P, et al. Prevalence and Risk Factors for Mycobacterium tuberculosis Infection Among Adolescents in Rural South Africa. *Open forum Infect Dis*. 2020;8(1):ofaa520–ofaa520. Available from: <https://pubmed.ncbi.nlm.nih.gov/33511219>
- Kielmann K, Karat AS, Zwama G, Colvin C, Swartz A, Voce AS, et al. Tuberculosis infection prevention and control: why we need a whole systems approach. *Infect Dis poverty*. 2020;9(1):56. Available from: <https://pubmed.ncbi.nlm.nih.gov/32450916>
- Marra CA, Marra F, Cox VC, Palepu A, Fitzgerald JM. Factors influencing quality of life in patients with active tuberculosis. *Health Qual Life Outcomes*. 2004;2(Oktober):1–10.
- Tesema T, Seyoum D, Ejeta E, Tsegaye R. Determinants of tuberculosis treatment outcome under directly observed treatment short courses in Adama City, Ethiopia. *PLoS One*. 2020;15(4):e0232468–e0232468. Available from: <https://pubmed.ncbi.nlm.nih.gov/32348358>
- Setiyowati E. DETERMINANTS OF THE QUALITY OF LIFE OF PULMONARY TUBERCULOSIS (PTB) PATIENTS IN SURABAYA CITY. *J Heal Sci*. 2020;13(02):116–23.
- Kemenkes RI. Pedoman Nasional Pengendalian Tuberkulosis-Keputusan Menteri Kesehatan Republik Indonesia Nomor 364. Kementerian Kesehatan Republik Indones. 2011;(Pengendalian Tuberkulosis):110.
- Badan Penelitian dan Pengembangan Kesehatan. Laporan\_Nasional\_RKD2018\_FINAL.pdf. Badan Penelitian dan Pengembangan Kesehatan. 2018. p. 198.
- Ha JF. The COVID-19 pandemic, personal protective equipment and respirator: A narrative review. *Int J Clin Pract*. 2020/06/28. 2020;74(10):e13578–e13578. Available from: <https://pubmed.ncbi.nlm.nih.gov/32511834>
- Wilson J. Infection prevention and control in the COVID-19 pandemic: what have we learnt? *J Infect Prev*. 2021/01/22. 2021;22(1):5–6. Available from: <https://pubmed.ncbi.nlm.nih.gov/33841555>
- WHO. Primary Health Care on the Road to Universal Health Coverage 2019 Global Monitoring Report Executive Summary. 2019;151.
- Setiyowati E, Hanik U, Juliasih NN, Wahdi A. Self-Management Education for the Quality of Life of Patients with Pulmonary Tuberculosis. *J Qual Public Heal*. 2020;4(1):10–9. Available from: <http://dx.doi.org/10.30994/jqph.v4i1.144>
- Lorig KR, Holman HR, Med AB. Self-Management Education : History , Definition , Outcomes , and Mechanisms. *Ann Behav Med*. 2003;26(1):1–7.
- Eriksson I, Wilhsson M, Blom T, Broo Wahlström C, Larsson M. Telephone nurses' strategies for managing difficult calls: A qualitative content analysis. *Nurs Open*. 2020;7(6):1671–9.
- Bunn F, Byrne G, Kendall S. The effects of telephone consultation and triage on healthcare use and patient satisfaction: A systematic review. *Br J Gen Pract*. 2005;55(521):956–61.
- Allegranzi B. Report on the Burden of Endemic Health Care-Associated Infection Worldwide Clean Care is Safer Care. *World Heal Organ*. 2011;34.

21. Fekadu G, Bekele F, Bekele K, Girma T, Mosisa G, Gebre M, et al. Adherence to Anti-Tuberculosis Treatment Among Pediatric Patients at Nekemte Specialized Hospital, Western Ethiopia. *Patient Prefer Adherence*. 2020;14:1259–65. Available from: <https://pubmed.ncbi.nlm.nih.gov/32801656>
22. Bischoff EWMA, Akkermans R, Bourbeau J, van Weel C, Vercoulen JH, Schermer TRJ. Comprehensive self management and routine monitoring in chronic obstructive pulmonary disease patients in general practice: randomised controlled trial. *BMJ*. 2012;345:e7642–e7642. Available from: <https://pubmed.ncbi.nlm.nih.gov/23190905>
23. Fryer CE, Luker JA, McDonnell MN, Hillier SL. Self-management programs for quality of life in people with stroke. In: *Cochrane Database of Systematic Reviews*. John Wiley & Sons, Ltd; 2013. Available from: <http://dx.doi.org/10.1002/14651858.cd010442>
24. Sumari-de Boer M, Pima FM, Ngowi KM, Chelangwa GM, Mtesha BA, Minja LM, et al. Implementation and effectiveness of evriMED with short messages service (SMS) reminders and tailored feedback compared to standard care on adherence to treatment among tuberculosis patients in Kilimanjaro, Tanzania: proposal for a cluster randomized controlled trial. *Trials*. 2019;20(1):426. Available from: <https://pubmed.ncbi.nlm.nih.gov/31300028>
25. Monninkhof E, van der Valk P, van der Palen J, van Herwaarden C, Zielhuis G. Effects of a comprehensive self-management programme in patients with chronic obstructive pulmonary disease. *Eur Respir J*. 2003;22(5):815–20. Available from: <http://dx.doi.org/10.1183/09031936.03.00047003>
26. Id OO, Adepoju V, Emeka F, Id A. Treatment outcomes of drug susceptible Tuberculosis in private health facilities in. *PLoS One*. 2021;1535:1–18.
27. Grady PA, Gough LL. Self-management: A comprehensive approach to management of chronic conditions. *Am J Public Health*. 2018;108(8):S430–6.
28. Ambaw F, Mayston R, Hanlon C, Medhin G, Alem A. Untreated depression and tuberculosis treatment outcomes, quality of life and disability, Ethiopia. *Bull World Health Organ*. 2018/02/05. 2018;96(4):243–55. Available from: <https://pubmed.ncbi.nlm.nih.gov/29695881>
29. Effing TW, Monninkhof EM, Van Der Valk PDLPM, Zielhuis GA, Van Herwaarden CLA, Partridge MR, et al. Self-management education for patients with chronic obstructive pulmonary disease. *Cochrane Database Syst Rev*. 2007;(4):394–8.



This work is licensed under a Creative Commons Attribution