

Article

The effects of acceptance and commitment therapy on psychosocial impact and adherence of multidrug-resistant tuberculosis patients

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Abstract

Background: The Worldwide resistance prevalence of the first-line tuberculosis drug, rifampicin, in 2017 was 7.4 per 100,000 population, and 82% of them experienced multidrug-resistant tuberculosis (MDR-TB). Indonesia is the top 20 country with an MDR-TB burden, and its prevalence is 8.8 per 100,000 population. MDR-TB requires a long-time treatment and has accompanying side effects: biological and psychosocial effects. However, efforts to overcome the psychosocial impacts have not been conducted. This study aims to determine the effect of acceptance and commitment therapy (ACT) on anxiety, depression, suicidal ideation, and treatment adherence in MDR-TB patients.

Design and methods: This research employed a quasi-experimental design with a pre-test three post-tests using total sampling. The pre-test was conducted before the standard nursing intervention, post-test 1 was after the standard nursing intervention, post-test 2 was after ACT session 1, and post-test 3 was after ACT session 2. Data were collected by the Hamilton Rating Scale for Anxiety, Beck Hopelessness Scale, a Scale for Suicide Ideation, and Morisky Medication Adherence Scale.

Results: The standard nursing action and ACT reduce anxiety ($p=0.002$), reduced depression ($p=0.0001$), reduced suicidal ideation ($p=0.008$), and increased treatment adherence ($p=0.0001$).

Conclusions: The standard nursing action and ACT reduce anxiety, depression, and suicidal ideation. They increase treatment adherence recommended for use in MDR-TB patients.

Introduction

Multidrug-resistant tuberculosis (MDR-TB) becomes a new problem in tuberculosis treatment using chemotherapy. In 2017, the world wide's prevalence was 7.4 per 100,000 population who were resistant to the first-line TB drug rifampicin (RR-TB). This figure indicates that 82% became MDR-TB. As much as 3.5% of new TB cases and 18% of previous TB treatment had MDR-TB. Indonesia is one of the top 20 countries with an MDR-TB burden; its incidence is 23,000 and its prevalence is 8.8 per 100,000 pop-

ulation.¹ The 2018 RISKESDAS survey results indicate that Central Java is the tenth rank of pulmonary TB prevalence in Indonesia. Ministry of Health reported that in 2018 TB cases in Central Java Province were 194 per 100,000 population.²

The MDR-TB treatment takes a long time and has side effects: biological, psychological, and social implications. Biological impacts include digestive disorders, respiratory system disorders, hearing system disorders, integumentary system disorders, fever, pain, weakness, hypokalemia, and nephrotoxicity.^{3,4} The MDR-TB patients' psychosocial impacts are anxiety, depression, treatment refusal, self-blame, committing suicide (in some patients). Furthermore, they experience an inability to continue social activities, or recreation, lose social freedom, cannot achieve desired-social goals, receive stigma, live below social standards, and lose social relationships, stigma in health facilities, stigma within the family, discrimination, social isolation, and low social.^{3,5,6} This study reveals that MDR-TB patients' psychosocial problems are anxiety, depression, and suicidal ideation.

Psychosocial problems are related to adherence to treatment programs, and thus, they affect the success and duration of the treatment program. MDR-TB patients with non-adherence to treatment have longer treatment times than adherent clients.⁷ Anxiety and depression contribute to non-adherence to treatment leading to poor treatment outcomes.⁸ This study concludes that there is a correlation between psychosocial problems and compliance.

Previous research results found that acceptance and commitment therapy (ACT) can reduce the intensity and/or frequency of suicidal ideas by increasing the ability to accept and clarify the most important things in life, and increasing meaning through personal involvement towards value-oriented actions.⁹ ACT can reduce suicidal ideation from clinical conditions associated with the risk of suicide in patients suffering from suicidal behavior disorder.¹⁰ ACT intervention significantly reduces the signs and symptoms of anxiety and increases the acceptance of pain.¹¹ A meta-analysis of the trial of ACT also found that ACT is effective for symptom reduction for both anxiety and depression.¹² In chronic diseases or long-term conditions such as MDR-TB, medication adherence is an important aspect that affects the success of therapy. Previous studies through a series of case studies

Significance for public health

Multidrug-resistant tuberculosis (MDR-TB) treatment need a long period, while biological, psychological, and social impacts require acceptance and commitment to treatment adherence. The MDR-TB treatment program focuses on treating disease and has not yet been treated for psychosocial problems. It is necessary to handle psychosocial problems in MDR-TB clients in the form of individual and family actions as a system thereby increasing adherence to taking medication, so that improve treatment success. Current and future healthcare professionals play an important role in psychosocial intervention in MDR-TB patients.

explained that ACT was able to improve self-management behavior including medication adherence.¹³

This background suggests that clients undergoing MDR-TB treatment need a long period, while biological, psychological, and social impacts require acceptance and commitment to treatment adherence. The MDR-TB treatment program focuses on treating disease and has not yet been treated for psychosocial problems. This study has the novelty of investigating MDR-TB patients' psychosocial problems, so this study aims to determine the effect of acceptance and commitment therapy (ACT) on anxiety, depression, suicidal ideation, and treatment adherence in MDR-TB patients.

Design and Methods

Research design and sample

This research employed a quasi-experimental design with a pre-test three post-tests using total sampling carried out from July to August 2020. Total sampling is used by considering the number of MDR-TB population that is not too large. This study involved 31 patients from Cilacap Regency (Central Java, Indonesia) and the surrounding districts: Banyumas Regency, Banjarnegara Regency, Brebes Regency, and Kebumen Regency, who meet the inclusion criteria are clients who are diagnosed with MDR-TB and registered in the Drug-Resistant TB Management Program, the client is declared to have not recovered and/or has not completed the treatment program, the client is willing to become a respondent, the client is cooperative and can communicate well (Table 1).

Measurement

Data collection using questionnaires data demographics of respondents which include sex, age, occupation, marital status, education, and length of treatment. Anxiety measurement uses the Hamilton Rating Scale for Anxiety (HAM-A) which has been translated into Indonesian, the instrument has been tested for validity, reliability and used by Hamarno *et al.* the validity test uses the Pearson Product Moment correlation,¹⁴ the calculated r-value is in the range of 0.52 to 0.841 which means it is greater than the r table value (0.514) so that the questionnaire is said to be valid. The results of statistical tests show the Cronbach Alpha value of 0.890, meaning that the questionnaire is reliable so that it can be used in this study. HAM-A employed 14 questioner items, and the scale interpretation is 0 = no, <17 = mild, 18-24 = moderate, 25-30 = severe, and >30 = very severe.¹⁴

Assessment of depression using the Beck' Hopelessness Scale (BHS) instrument, the instrument has been translated into Indonesian and has been tested for validity, reliability and is used by Ardi *et al.*,¹⁵ obtained a Cronbach Alpha of 0.72, meaning that the questionnaire it is reliable. Positive questions (1, 3, 5, 6, 8, 10, 13, 15, 19) answers "correct" score 0 and "wrong" score 1, negative questions (2, 4, 7, 9, 11, 12, 14, 16, 17, 18, 20) answer "correct" is worth 1 and "false" is worth 0. Beck Hopelessness Scale (BHS) is to measure depression, and the scale interpretation is 0-3=normal, 4-8=mild, 9-14=moderate, and >14=severe.¹⁵

Assessment of suicidal ideation using the Suicide Ideation Scale (SSI) instrument, the instrument has been translated into Indonesian and has been tested for validity, reliability and has been used by Nasution *et al.*,¹⁶ the value of r count > from r table = 0.361 and Cronbach Alpha > from the value of r table means the questionnaire is reliable so that it can be used in this study. The SSI

contains 19 questions with a score of no ideas given a score of 0, there are ideas but weak are given a score of 1, and moderate to large are given a score of 2. The scale interpretation for suicide ideation (SSI) to measure suicidal ideation is 0 = no, 1-2 = mild, and >2 = high.¹⁶

Assessment of compliance using the Morisky Medication Adherence Scale (MMAS) instrument, the instrument has also been translated into Indonesian and tested for validity, reliability and used by Vika *et al.*¹⁷ good (Spearman coefficient = 0.860) so that the questionnaire is reliable. MMAS contains 8 questions with questions (1, 2, 3, 4, 6, 7, 8) the answer "yes" is worth 0 and "no" is worth 1, question number 5 answers "yes" is worth 1 and the answer "no" is 0. The Morisky Medication Adherence Scale (MMAS) was used to measure adherence to therapy, and its interpretations were <6 = low adherence, 7 = moderate adherence, and 8 = high adherence.¹⁷

The pre-test was conducted before the standard nursing intervention, post-test 1 was after the standard nursing intervention, post-test 2 was after ACT session 1, and post-test 3 was after ACT session 2.

Intervention

Previous research revealed that the psychosocial problems of MDR-TB patients were anxiety, depression, and suicidal ideation. Therefore, nursing interventions in this study were focused on efforts to handle the five psychosocial problems experienced by these MDR-TB patients. Standard nursing interventions for nursing diagnoses of anxiety, helplessness, hopelessness, and risk of suicide in clients and health education to families were conducted by making home visits in the first visit. The patients performed independent activities with a self-monitor using a workbook.

The second home visit was conducted a week later to evaluate the workbook and conduct the first post-test. Then, the ACT with

Table 1. Sociodemographic characteristics of respondents (n=31).

Variable	N (%)
Sex	
Male	21 (67.7)
Female	10 (32.3)
Age (years)	
Under 20	1 (3.2)
20-39	15 (48.4)
40-59	14 (45.2)
60-70	1 (3.2)
Occupation	
Does not work	19 (61.3)
Work	12 (38.7)
Marital status	
Single	7 (22.6)
Married	22 (71.0)
Divorced/separated	2 (6.5)
Education	
Not attending school	2 (6.5)
Elementary school	8 (25.8)
Junior high school	8 (25.8)
Senior high school	12 (38.7)
University	1 (3.2)
Length of treatment (months)	
0-5	11 (35.4)
6-10	14 (45.2)
11-15	3 (9.7)
16-20	3 (9.7)

an independent monitor using a workbook was conducted in the first session to encourage the patients to perform independent activities. The third home visit was conducted a week later to evaluate the workbook and conduct the second post-test. Then, the second session of ACT with an independent monitor using a workbook was conducted to encourage the patients to perform independent activities. The fourth home visit was conducted a week later to evaluate the workbook and conduct the third post-test. The implementation of standard nursing interventions and ACT is described in Table 2.

Data analysis

This research employed paired t-tests to explore the influence of standard nursing intervention and ACT on anxiety. Meanwhile, the Wilcoxon test was employed to explore the influence of stan-

dard nursing intervention and ACT on depression, suicidal ideation, and adherence.

Results

The average value of anxiety decreases from 8.10 to 2.84. The findings reveal a significant difference from the pre-test to post-test 3 with $[p(0.002)<0.05]$. It indicates that standard nursing intervention and ACT simultaneously reduce MDR-TB patients' anxiety (Figure 1). The average value of depression decreases from 3.58 to 1.65. The findings discover a significant difference from the pre-test to post-test 3 with $[p(0.0001)<0.05]$. It indicates that standard nursing intervention and ACT simultaneously reduce MDR-TB patients' depression (Figure 2).

Table 2. Standard nursing intervention and acceptance commitment therapy.

Standard nursing intervention	Session 1: Anxiety	<ol style="list-style-type: none"> 1. Assess for signs and symptoms of anxiety and the client's ability to reduce anxiety 2. Describe the process of anxiety 3. Exercises to deal with anxiety: Take a deep breath, Distraction, Five finger hypnosis, Spiritual activities 4. Help the client to do the exercises according to the schedule of activities.
	Session 2: Helplessness	<ol style="list-style-type: none"> 1. Assess for signs and symptoms of helplessness 2. Explain the process of helplessness 3. Practice how to control the situation 4. Practice how to control your mind 5. Role-playing exercises that can be done 6. Help the client to do the exercises according to the activity schedule
	Session 3: Hopelessness	<ol style="list-style-type: none"> 1. Assess for signs and symptoms of hopelessness 2. Explain the process of hopelessness 3. Discuss with clients: Ability possessed, Owned support system, Life expectancy 4. Exercise social relations with the environment 5. Practice doing daily activities (eating, resting/sleeping, personal hygiene, spiritual activities) 6. Practice building realistic expectations 7. Help the client to do the exercises according to the activity schedule
	Session 4: Risk for suicide	<ol style="list-style-type: none"> 1. Assess the signs and symptoms of suicide risk, causes and ability to overcome them 2. Explain the process of risk of suicide and its consequences 3. Build hope and future 4. Practice how to control suicidal ideation 5. Help the client to do the exercises according to the activity schedule
Acceptance and commitment therapy	Session 1: identifying unpleasant events, thoughts, feelings and behaviors that arise and accepting the changes	<ol style="list-style-type: none"> 1. Identify unpleasant events in life 2. Identify thoughts, feelings and behaviors that arise due to unpleasant events 3. Exploring the impact of thoughts, feelings and thoughts on the client's life 4. Accepting health conditions, treatment and care 5. Identify changes that occur after accepting the condition
	Session 2: finding positive life values and commitment using client's chosen values to prevent relapse	<ol style="list-style-type: none"> 1. Find positive value after receiving 2. Form a commitment to recovery by agreeing on positive values that the client can take and do to prevent recurrence

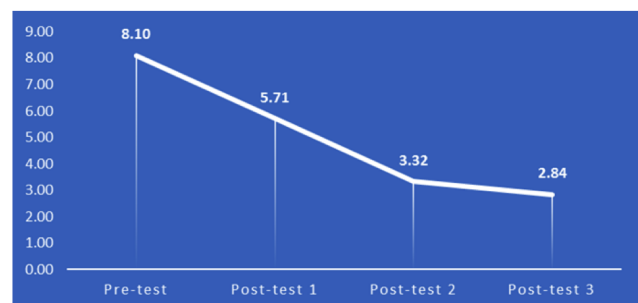


Figure 1. The effects of acceptance and commitment therapy on anxiety of multidrug-resistant tuberculosis clients in Cilacap Regional Hospital in 2020 (n=31).



Figure 2. The effects of acceptance and commitment therapy on depression of multidrug-resistant tuberculosis clients in Cilacap Regional Hospital in 2020 (n=31).

The average value of suicidal ideation decreases from 0.39 to 0.006. The findings reveal a significant difference from the pre-test to post-test 3 with $[p(0.008)<0.05]$. It indicates that standard nursing intervention and ACT simultaneously reduce MDR-TB clients' suicidal ideation (Figure 3).

The average value of treatment adherence increases from 7.00 to 7.52. The findings show a significant difference from the pre-test to post-test 3 with $[p(0.0001)<0.05]$. It indicates that standard nursing intervention and ACT simultaneously increase MDR-TB clients' treatment adherence (Figure 4).

Discussion

Serious health problems cause stress to almost everyone, and the stress level depends on one's disease perception. Psychological factors, such as thoughts of prolonged disability, job loss, suffering, role dysfunction, stigmatization, and social factors play important roles in the level of anxiety experienced.¹⁸ A qualitative study on RR-TB patients in South Africa found that anxiety was caused by fear of transmitting the disease to others.¹⁹ A qualitative study on MDR-TB patients in Bangladesh also found that concerns frequently arose in women's treatment programs who had to stay away from children for fear of transmitting the disease to them; they were concerned about how children cared without their role as mothers.²⁰ It can be concluded that the MDR-TB clients' concerns about transmitting the disease to other people and inability to carry out their role cause anxiety.

Anxiety levels decrease significantly after conducting the standard nursing intervention and ACT. The MDR-TB patients' anxiety makes them hopeless and less motivated for the recovery process. Biological and psychological side effects of MDR-TB and a lack of knowledge encourage anxiety and feelings of hopelessness. These affect healing beliefs that seeing other clients suffer difficultly maintains hope.²¹ The goal of ACT helps maintain flexible posture psychologically. Therefore, anxiety has less impact on the behavioral choices made, and the patients can start more meaningful living ways because their thoughts, urges, and feelings have less impact on their actions and choices. Patients engage in valuable actions instead of avoiding inner experiences; this condition allows the inner experiences to occur and continue in their life more easily.²²

Patients with ACT show a better emotional state and greater psychological flexibility than patients without treatment in the control groups. ACT works through functional relationship analy-

sis between their behaviors and the contextual conditions that sustain them. This analysis is to identify and modify experience avoidance patterns at the root of their difficulties and to commit valuable actions for them.²³ ACT intervention was significantly lowered signs and symptoms of anxiety and increases the acceptance of the illness.¹¹

This study shows that standard nursing intervention and ACT simultaneously reduce MDR-TB clients' depression. This result agrees with a study randomly controlled trial showing that ACT could reduce patients' depression during their treatment.²⁴ Depression in clients with tuberculosis can be influenced by various factors, including side effects of treatment, low levels of education, smoking and alcohol, and separation (divorce). The results of this study indicate that as many as 70.9% of MDR-TB patients do not work. Their low socioeconomic status can contribute to depression. Depression can have negative impacts on the patients' quality of life, immunity, self-care, and medication adherence.²⁴ A meta-analysis study suggests that depressive symptoms are associated with treatment outcomes, loss to follow-up, and mortality.²⁵

In this study, patients tried to consciously accept that there were bacteria in their bodies that made them sick. Individual awareness and self-acceptance of his current condition can reduce negative thoughts, stimulate behavior into positive actions, and reduce individual depression. Therefore, through ACT they are stimulated not to give up easily on their condition.²⁶ Another study on HIV/AIDS patients found a significant difference in depression (p -value <0.05) after ACT action as many as 7.40, from 18.90 to 11.50; This indicates that the depression status decreases from major depression to moderate depression.^{27,28}

This study only found a few cases of MDR-TB patients' suicide. An American study on 13 MDR-TB patients who were undergoing treatment discovered that 1 person had committed suicide as a side effect of MDR-TB treatment.²⁹ This study denotes that the average value of suicidal ideation simultaneously decreases after the patients received nursing intervention and ACT. This agrees with a previous study on the randomized controlled trial of ACT for the management of suicidal patients that showed that ACT could reduce suicidal ideation. Secondary outcomes were the rates of change for depressive symptomatology, psychological pains, anxiety, hopelessness, anger, quality of life, and therapeutic processes.¹⁰ Acceptance and commitment therapy (ACT) can reduce the intensity and/or frequency of self-suicidal ideation through the increased acceptance and clarification of the most important things in life and can increase valuable meanings through personal involvement toward ones' value-oriented



Figure 3. The effect of acceptance and commitment therapy on suicidal ideation of multidrug-resistant tuberculosis clients' in Cilacap Regional hospital in 2020 (n=31).



Figure 4. The effect of acceptance and commitment therapy on treatment adherence of multidrug-resistant tuberculosis clients in Cilacap Regional hospital in 2020 (n=31).

actions.⁹ Adherence to taking a medication strongly influences the success of the treatment program for MDR-TB patients. Increased treatment success is related to the patients' increased supports, including treatment adherence supports. Treatment adherence is related to drug pharmacokinetics that causes a lower peak drug concentration than normal; in contrast, additional doses may result in a higher risk of toxicity than usual peak concentrations.³⁰ A qualitative study explains that many factors influence MDR-TB patients' treatment adherence; these factors are side effects of treatment, lack of support from health service providers, financial conditions, alcohol use, and the existence of social stigma MDR-TB patients experienced.³¹

Psychological and social stressors also influence medication adherence. Depression can affect the severity of medical disorders, increase personal stress, and interfere with function as well as medication adherence. Patients' depression was found three times more likely to be non-adherent to medical care, and adherence to treatment affects the clients' quality of life.¹⁶ A qualitative study conducted on TB clients in Bogor found that the success of TB treatment in taking medication adherence was influenced by 1) patients' perceptions of vulnerability, severity, benefits, and obstacles experienced during the treatment, 2) family supports, and 3) complete information about TB.³²

The MDR-TB patients' average adherence after the general nursing intervention and ACT increases simultaneously. ACT stimulates the patients' perceptions. The development of psychological flexibility helped the patients increase their ability to change their lives consciously and accept changes based on their believed values despite many obstacles in life. Psychosocial problems of MDR-TB patients' who do not receive intervention can contribute to high dropout rates for the following MDR-TB treatment programs.⁸ The treatment for psychosocial problems has effects on increasing medication adherence, decreasing default rates, and decreasing transmission rates.³³

Conclusions

The results of this study reveal that general nursing intervention and specialist nursing intervention (ACT) significantly reduce MDR-TB clients' anxiety and depression. Furthermore, this study finds a moderately significant relationship between adherence and anxiety. Further research can investigate the relationship between characteristics and psychosocial problems of MDR-TB clients. Besides that, it is necessary to handle psychosocial problems in MDR-TB clients in the form of individual and family actions as a system thereby increasing adherence to taking medication, so that improve treatment success. In addition, MDR-TB clients with different backgrounds according to the region where the place of residence, so it is necessary to optimize community nurses at the public health service to provide mental health nursing care under the same cultural background making it easier to build reciprocal relationships believe. The limitation of this study is that this study has not used an RCT study design, therefore in future studies it is recommended to perform randomization to minimize bias and false causality.

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Institutions where the research was carried out: This study was carried out in Cilacap Regency and the surrounding districts: Banyumas Regency, Banjarnegara Regency, Brebes Regency, and Kebumen Regency (Central Java, Indonesia).

Availability of data and materials: The datasets used and/or analyzed during this study are available from the corresponding author on reasonable request.

Ethical approval: This study was approved by the Research Ethics Committee Faculty of Nursing Universitas Indonesia with document number SK-60/UN2.F12.D1.2.1/ETIK2020. Informed consent was obtained from all respondents. The manuscript does not contain any individual person's data in any form.

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References

1. World Health Organization. Global tuberculosis report 2018. Available from: <https://apps.who.int/iris/handle/10665/274453>
2. Ministry of Health Republic of Indonesia. [Hasil utama risekdas 2018 (Main results of Basic Health Research 2018)]. [in Indonesian]. Jakarta: Ministry of Health; 2018. Available from: <https://www.litbang.kemkes.go.id/hasil-utama-risekdas-2018/>
3. Dela AI, Tank ND, Singh AP, Piparva KG. Adverse drug reactions and treatment outcome analysis of DOTS-plus therapy of MDR-TB patients at district tuberculosis centre: a four year retrospective

- study. *Lung India* 2017;34:522–26.
4. Patel S, Bhikhubhai N, Patel A, et al. Adverse drug reactions in patients put on multi drug resistant tuberculosis (MDR-TB) treatment in seven districts of Central Gujarat. *J Young Pharm* 2015;7:425–31.
 5. Alene KA, Clements ACA, McBryde ES, et al. Mental health disorders, social stressors, and health-related quality of life in patients with multidrug-resistant tuberculosis: a systematic review and meta-analysis. *J Infect* 2018;77:357–67.
 6. Watts KN. MDR-TB, isolation, and anomie: has anyone referred to social work?: comment on ‘the ethics of isolation for patients with tuberculosis in Australia.’ *J Bioeth Inq* 2016;13:157–8.
 7. Limenih YA, Workie DL. Survival analysis of time to cure on multi-drug resistance tuberculosis patients in Amhara region, Ethiopia. *BMC Public Health* 2019;19:165.
 8. Walker IF, Kanal S, Baral SC, et al. Depression and anxiety in patients with multidrug-resistant tuberculosis in Nepal: an observational study. *Public Health Action* 2019;9:31–49.
 9. Ducasse D, René E, Béziat S, et al. Acceptance and commitment therapy for management of suicidal patients: a pilot study. *Psychother Psychosom* 2014;83:374–6.
 10. Ducasse D, Jaussent I, Arpon-Brand V, et al. Acceptance and commitment therapy for the management of suicidal patients: a randomized controlled trial. *Psychother Psychosom* 2018;87:211–22.
 11. Sianturi R, Keliat BA, Wardani IY. [Pengaruh terapi penerimaan komitmen dan psikoedukasi keluarga terhadap penerimaan diri dan ansietas klien stroke di rumah sakit khusus otak (The effect of acceptance of commitment therapy and family psychoeducation on self-acceptance and anxiety of stroke clients in a special brainhospital)]. [Unpublished thesis in Indonesian]. Depok: Universitas Indonesia; 2016.
 12. Graham CD, Gouick J, Krahé C, Gillanders D. A systematic review of the use of acceptance and commitment therapy (ACT) in chronic disease and long-term conditions. *Clin Psychol Rev* 2016;46:46–58.
 13. Hacker T, Stone P, MacBeth A. Acceptance and commitment therapy—do we know enough? cumulative and sequential meta-analyses of randomized controlled trials. *J Affect Disord* 2016;190:551–65.
 14. Hamarno R, Nurachmah E, Widyatuti W. [Pengaruh latihan relaksasi otot progresif terhadap penurunan tekanan darah klien hipertensi primer di Kota Malang (The effect of progressive muscle relaxation exercises on reducing blood pressure of primary hypertension clients in Malang City)]. [Unpublished thesis in Indonesian Depok: Universitas Indonesia; 2010.
 15. Ardi M, Sitorus R, Waluyo A. [Analisis hubungan ketidakmampuan fisik dan kognitif dengan keputusan pada pasien stroke di Makassar (Analysis of the relationship between physical and cognitive disability with hopelessness in stroke patients in Makassar)]. [Unpublished thesis in Indonesian Depok: Universitas Indonesia; 2011.
 16. Nasution RA, Keliat BA, Wardani IY. [Pengaruh terapi kognitif perilaku dan peer leadership terhadap ide bunuh diri pada remaja di sekolah menengah atas (SMA) (The effect of cognitive behavioral therapy and peer leadership on suicidal ideation in adolescents in high school)]. [Unpublished thesis in Indonesian]. Depok: Universitas Indonesia; 2011.
 17. Vika V, Wangge G, Siagian M. [Validitas dan reliabilitas morisky medication adherence scale 8 versi Bahasa Indonesia untuk mengukur kepatuhan konsumsi statin pada penerbang militer (The validity and reliability of the Indonesian version of the Morisky medication adherence scale 8 to measure adherence to statin consumption in military pilots)]. [Unpublished thesis in Indonesian]. Depok: Universitas Indonesia; 2016.
 18. Halter MJ. *Vancouver’s Canadian psychiatric mental health nursing*. Toronto: Saunders Elsevier; 2014.
 19. Furin J, Loveday M, Hlangu S, et al. A very humiliating illness: a qualitative study of patient-centered care for rifampicin-resistant tuberculosis in South Africa. *BMC Public Health* 2020;20:76.
 20. Huque R, Elsey H, Fieroz F, et al. Death is a better option than being treated like this: a prevalence survey and qualitative study of depression among multi-drug resistant tuberculosis in-patients. *BMC Public Health* 2020;20:848.
 21. Khanal S, Elsey H, King R, et al. Development of a patient-centred, psychosocial support intervention for multi-drug-resistant tuberculosis (MDR-TB) care in Nepal. *PLoS One* 2017;12:e0167559.
 22. Twohig MP, Levin ME. Acceptance and commitment therapy as a treatment for anxiety and depression: a review. *Psychiatr Clin North Am* 2020;40:751–70.
 23. Coto-Lesmes R, Fernández-Rodríguez C, González-Fernández S. Acceptance and commitment Therapy in group format for anxiety and depression. A systematic review. *J Affect Disord* 2019;263:107–20.
 24. Shrestha P, Subba UK, Brouwer M, Sweetland AC. Depression among TB patients and associated factors in Kathmandu Valley, Nepal. *Glob Ment Heal* 2020;7:e4.
 25. Ruiz-Grosso P, Cachay R, de la Flor A, et al. Association between tuberculosis and depression on negative outcomes of tuberculosis treatment: a systematic review and meta-analysis. *PloS One* 2020;15:e0227472.
 26. Pots WTM, Fledderus M, Meulenbeek PAM, et al. Acceptance and commitment therapy as a web-based intervention for depressive symptoms: randomised controlled trial. *Br J Psychiatry* 2016;208:69–77.
 27. Silitonga RO, Keliat BA, Wardani IY. Pengaruh acceptance and commitement therapy dan family psychoeducation terhadap kemampuan menerima dan berkomiten serta mengatasi kondisi depresi dan ansietas pasien HIV/AIDS di RSCM (The effect of acceptance and commitment therapy and family psychoeducation on the ability to accept and commit and overcome depression and anxiety conditions of HIV/AIDS patients in RSCM)]. [Unpublished thesis in Indonesian]. Depok: Universitas Indonesia; 2013.
 28. A-Tjak JGL, Morina N, Topper M, Emmelkamp PMG. A randomized controlled trial in routine clinical practice comparing acceptance and commitment therapy with cognitive behavioral therapy for the treatment of major depressive disorder. *Psychother Psychosom* 2018;87:154–63.
 29. Belanger A, Morris SB, Brostrom R, et al. Introduction and evaluation of multidrug-resistant tuberculosis supplemental surveillance in the United States. *J Clin Tuberc Other Mycobact Dis* 2019;15:100090.
 30. Vernon A, Fielding K, Savic R, et al. The importance of adherence in tuberculosis treatment clinical trials and its relevance in explanatory and pragmatic trials. *PloS Medicine* 2019;16:e1002884.
 31. Deshmukh RD, Dhande DJ, Sachdeva KS, et al. Patient and provider reported reasons for lost to follow up in MDRTB treatment: a qualitative study from a drug resistant TB Centre in India. *PLoS One* 2015;10:e0135802.
 32. Jakaria J. [Keberhasilan pengobatan dalam kepatuhan minum obat TB paru di Puskesmas Dramaga Kabupaten Bogor (The success of treatment in adherence to pulmonary TB medication at the Dramaga Health Center, Bogor Regency)]. [Unpublished thesis in Indonesian]. Depok: Universitas Indonesia; 2017.
 33. Singh NK, Gupta PK, Yadav JS. Psychological distress in patients of multi drug resistant tuberculosis. *Int J Health Sci Res* 2019;9:126–30.