

ORIGINAL RESEARCH

EFFECT OF COPING EFFORTS ON THE TREATMENT BEHAVIOR OF PATIENTS WITH PULMONARY TUBERCULOSIS

Pengaruh Upaya Koping Terhadap Perilaku Pengobatan Pada Pasien dengan Tuberkulosis Paru

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ABSTRACT

Background: Pulmonary tuberculosis has a huge impact on the lives of patients—physically, economically, and socially—and can thus cause stress. Prolonged stress can cause illness and affect one's health behavior, so that it requires proper coping efforts such as management problems and emotional regulation so that adaptive health behavior can be formed. **Purpose:** The aim of this study was to analyze the effect of coping efforts (problem management and emotional regulation) on the treatment behavior of patients with lung tuberculosis in the city of Surabaya using the theoretical approach of transactional stress and coping. **Methods:** This study was an observational study with a cross-sectional design conducted in 13 Public Health Center (PHC) in Surabaya with the highest number of new cases of positive acid resistant bacteria of tuberculosis (TB-BTA+) with 229 populations. The sampling technique used was simple random sampling and found 142 respondents, with the inclusion criteria being patients with pulmonary TB who were undergoing treatment in the first quarter. The data collection used a questionnaire, and the data analysis was performed using logistic regression. **Results:** This study found that there was an influence of problem management ($p = 0.01$; prevalence ratio [PR] = 1.36; 95% confidence interval [CI] = $1.04 < PR < 1.78$) on treatment behavior, while the emotional regulation variable and the characteristic variable did not influence treatment behavior. **Conclusion:** The results of this study showed that patients with pulmonary TB who performed good coping efforts formed good treatment behavior.

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ABSTRAK

Pendahuluan: Penyakit Tuberkulosis Paru memiliki dampak yang sangat besar dalam kehidupan penderita baik secara fisik, ekonomi dan sosial yang bisa menimbulkan stres. Stres yang berkepanjangan dapat berpengaruh terhadap perilaku kesehatan seseorang sehingga dibutuhkan upaya coping yang tepat seperti problem management dan emotional regulation sehingga dapat terbentuk perilaku kesehatan yang adaptif. **Tujuan:** Tujuan penelitian ini adalah menganalisis pengaruh upaya coping (managemen masalah dan regulasi emosi terhadap perilaku pengobatan Tuberkulosis Paru di Kota Surabaya dengan menggunakan pendekatan teori Transactional of Stres and Coping. **Metode:** Penelitian ini merupakan penelitian observasional dengan desain cross sectional yang dilakukan di tiga belas Puskesmas di Kota Surabaya dengan jumlah penderita kasus baru TB BTA+ terbanyak sejumlah 229 populasi. Teknik pengambilan sampel menggunakan simple random sampling dan didapatkan 142 responden dengan kriteria inklusi penderita TB Paru yang sedang melakukan pengobatan pada triwulan pertama. Pengumpulan data menggunakan kuesioner dan analisis data dilakukan dengan menggunakan regresi logistik. **Hasil:** Penelitian ini didapatkan ada pengaruh antara variabel problem management ($p=0,01$; $PR=1,36$; $95\% CI =1,04 < PR < 1,78$) terhadap perilaku pengobatan TB Paru sedangkan variabel emotional regulation dan variabel karakteristik tidak berpengaruh terhadap perilaku pengobatan. **Kesimpulan:** Penderita Tuberkulosis Paru yang melakukan coping effort yang baik akan membentuk perilaku pengobatan yang baik.

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INTRODUCTION

Pulmonary tuberculosis is an infectious disease caused by Mycobacterium tuberculosis Bacilli that attacks the lower respiratory system (Horison, 2013). East Java Province has experienced an increase in the number of new cases of pulmonary tuberculosis (TB) with positive acid-resistant bacilli within the last four years. In 2018, the number of new cases of pulmonary TB found with positive acid-resistant bacilli in East Java was 3,003, an increase from 2017 of 2,893 residents (Ministry of Health RI, 2018).

Preliminary study results obtained from the Surabaya City Health Office (2019) showed that the number of new cases of pulmonary TB with positive acid-resistant bacilli amounted to 410 patients and that most cases were found in Public Health Center (PHC) of Perak, Manukan Kulon, Dr. Soetomo, Pacar Keling, Sawah Pulo, Wonokusumo, Rangkah, Morokrembangan,

Kenjeran, Kalijudan, Putat Jaya, Sidosermo, Hamlet Kupang, Sawahan, and Asemrowo.

Pulmonary TB patients are at risk of experiencing poor mental health and having a low quality of life related to their health (Saleem, Malik, Ghulam, Ahmed, & Hussain, 2018). High psychological pressure can increase non-compliance with treatment and can cause drug resistance and increased mortality (Tola et al., 2017).

The transactional theory of stress and coping illustrates the complexity of stress, its handling, and its impact on psychological and health behaviors. An individual is said to be stressed if they are unable to deal with situations that could threaten them and their health conditions caused by the relationships that occur between the individual and their environment (Glanz, Rimer, & Viswanath, 2015).

External factors (environmental) such as social isolation and stigma tend to contribute to the onset of depression (Kastien-Hilka et al., 2016). A

long duration of treatment, side effects of drugs, and a large drug dosage can also cause stress in patients with pulmonary TB (Gyimah & Dako-Gyeke, 2019).

Correct coping efforts are needed to deal with stress that arises. Coping efforts can be done with problem management and emotional regulation. Problem management aims to reduce the impact of stress and increase resources, while emotional regulation focuses more on a person's way of thinking and acting (Glanz, Rimer, & Viswanath, 2015).

Patients with pulmonary TB in Ghana do coping mechanisms by self-medication without going to a health facility to cope with stress. This is due to distance from health facilities, moving to different health facilities for fear of facing the social stigma that arises, and implementing spiritual coping mechanisms (Gyimah & Dako-Gyeke, 2019). Supervision and support from health professionals for the health services provided during treatment can help sufferers of TB reduce the stigma and their poor mental health during the treatment process (Workicho, Kassahun, & Alemseged, 2018).

Adaptive coping stress affects the treatment behavior of individuals with pulmonary TB (Sitorus & Barus, 2018). Behavior is the overall understanding and activity of a person. Activities carried out by individuals to maintain and improve their health are called healthy behaviors. Healthy behaviors in patients with pulmonary TB include taking drugs regularly according to the treatment program for six months, exercising health control according to the schedule determined at the health facility, performing behaviors based on individual awareness to maintain health in daily life, familiarizing themselves with carrying out good behavior and correct cough ethics, always maintaining the condition of their house and their environment by healthy home standards, and improving their body's immune system (Ministry of Health RI, 2017).

Most of the research done previously discussed the choice of coping types when faced with stress, so this study was conducted to analyze the effects of coping efforts (problem management and emotional regulation) on the behavior of patients undergoing pulmonary TB treatment in PHC in Surabaya City.

METHODS

This study was an analytical study with a cross-sectional design conducted from March to

June 2019 in 15 PHC in Surabaya City, which the most new cases of pulmonary TB with positive acid-resistant bacilli, namely Perak Timur, Manukan Kulon, Dr. Soetomo, Pacar Keling, Sawah Pulo, Wonokusumo, Rangkah, Morokrengan, Kenjeran, Kalijudan, Putat Jaya, Sidosermo, Dukuh Kupang, Sawahan, Asemrowo. The population was 229 people with pulmonary TB.

The sample counting technique used was the Lemeshow formula, and 142 were found respondents based on the inclusion criteria of patients with pulmonary TB who were taking their medication in the first quarter and were willing to be respondents. Meanwhile, the exclusion criteria were patients with pulmonary TB who had experienced drug resistance. The respondents' data in this study were collected using a questionnaire and analyzed using logistic regression tests.

The variables studied in this study (problem management, emotional regulation, and treatment behavior) were categorized as good if the total score was \geq mean and bad if $<$ mean. The categorization of variables was based on the central value (mean) wherein the normality test data were normally distributed. This research was conducted on an ethics test at the Ethics Committee of the Faculty of Dentistry, Universitas Airlangga on June 13, 2019, under number 322 / HRECC.FODM / VI / 2019.

RESULTS

Respondent Characteristics

Table 1 shows that the majority of respondents with new cases of pulmonary TB with positive acid-resistant bacilli were aged 46–55 years, with a total of 29 respondents (20%). The majority of respondents' education was high school at 42 respondents (44%). The work variable found that the majority of respondents worked in the category of private jobs and other jobs such as online motorcycle taxis and pedicab drivers, with a total of 54 respondents each (38%). The variable regarding whether they had ever obtained information had 77 respondents (54%) who had never gotten information. When suffering from pulmonary TB, the majority of respondents received social support from family members, friends, and their environment, with a total of 126 respondents (89%), and the majority had a drug supervisor (PMO), with a total of 104 respondents (73%). Table 1 also explains that when suffering from pulmonary TB, as many as 95 respondents (67%) remained involved in community activities.

Table 1

Characteristics of Respondents with Pulmonary TB in Surabaya City in 2019

Variable	Frequency (n)	Persentase (%)
Age (Years old)		
0–16	4	3
17–25	27	19
26–35	23	16
36–45	26	18
46–55	29	20
56–65	23	16
>65	10	8
Level of Education		
Elementary School	32	23
Junior High School	36	25
Senior High School	62	44
College	12	8
Occupation		
Does Not Work	23	16
Student	8	6
Private Employee	54	38
Civil Servant	3	2
Other	54	38
Got Information		
Yes	65	46
No	77	54
Social Support		
Yes	126	89
No	16	11
Have a supervisor take medication		
Yes	104	73
No	38	27
Active in community activities		
Yes	95	67
No	47	33
Total	142	100

Problem Management, Emotional Regulation, and Treatment Behavior of Patients with Pulmonary TB

Table 2 shows that the majority of respondents in this study had good problem management (85 respondents [60%]), had good treatment behavior (a total of 94 respondents [66%]) but had poor emotional regulation (78 respondents [55%]).

Effect of Problem Management on Pulmonary TB Treatment Behavior

The logistic regression test results showed that there was an influence of the problem management variables on the treatment behavior of patients with new cases of pulmonary TB with positive acid-resistant bacilli with a value of $p = 0.01 (<0.05)$. The value of exponentiation of the B coefficient [Exp (B)] was 1.36 (95% CI= 1.04 < PR < 1.78), i.e., respondents who had good

problem management could increase the chance of positive treatment behavior 1.36 times higher than respondents who had poor problem management (Table 3).

Effect of Emotional Regulation on Pulmonary TB Treatment Behavior

The results showed no influence between the emotional regulation variables on treatment behavior with $p = 0.10 (> 0.05)$ with Exp (B) at 1.32 (95% CI = 1.05 < PR < 1.67), which meant that the respondents with good emotional regulation could increase their chance of good treatment behavior 1.32 times more than the respondents who had poor emotional regulation (Table 3).

Effect of Research Characteristic Variables on Treatment Behavior

The results also showed that there was no influence of the variables of the study characteristics (age, education, occupation, information, social support, having a supervisor take medication, and being active in community activities) on treatment behavior (Table 3; Table 4).

Table 2

Cross-Tabulation of Problem Management and Emotional Regulation of Pulmonary TB Treatment Behavior in Surabaya City in 2019

Variable	Treatment Behavior			
	Good		Poor	
	n	%	n	%
Problem Management				
Good	63	67	22	46
Poor	31	33	26	54
Emotional Regulation				
Good	49	52	15	31
Poor	45	48	33	69
Total	94	100	48	100

Table 3

Bivariate Analysis Between Problem Management, Emotional Regulation, and Research Variable Characteristics on Pulmonary TB Treatment Behavior in Surabaya City

Variable	Sig	Exp (B)	95% CI Exp (B)	
			Lower	Upper
Problem Management	0.01	0.41	0.20	0.84
Emotional Regulation	0.01	0.41	0.20	0.86
Age	0.06	0.20	0.03	1.12
Education	0.20	2.38	0.63	2.00
Occupation	0.45	2.35	0.24	3.54
Information	0.88	0.94	0.46	1.93
Social Support	0.81	1.14	0.37	3.49
Having a Supervisor take Medication	0.38	0.71	0.33	1.54
Active in Community Activities	0.42	0.74	0.35	1.55

Table 4

Multivariate Analysis Between Problem Management, Emotional Regulation, and Research Variable Characteristics on Pulmonary TB Treatment Behavior in Surabaya City

Variable	Sig	Exp (B)	95% CI Exp (B)	
			Lower	Upper
Problem Management	0.01	1.36	1.04	1.78
Emotional Regulation	0.10	1.32	1.05	1.67
Age	0.14	0.73	0.00	2.38
Education	0.21	0.35	0.72	1.80
Occupation	0.77	0.81	0.19	3.40
Information	0.26	2.96	0.43	3.92
Social Support	0.38	2.06	0.39	3.69
Having a Supervisor take Medication	0.66	0.64	0.89	4.67
Active in Community Activities	0.27	0.25	0.02	3.02

DISCUSSION

Effect of Research Variable Characteristics on Pulmonary TB Treatment Behavior

The results showed no effect of age on pulmonary TB treatment behavior, with a p-value of 0.14 (>0.05). As their age increases, the more a person becomes able to deal with problems and the more they are able to adjust their behavior in this environment (Notoatmodjo, 2010).

This current study was in line with research conducted by Nugroho, Shaluhayah, & Adi (2018) that stated that age does not affect a person's behavior. This could be caused by several factors such as the attitudes and stress levels experienced by a person because the attitudes and stress levels of each person are different.

The current study showed there was no influence of education on pulmonary TB treatment behavior, with a p-value of 0.21 (>0.05). This was in line with research conducted by Yusi, Widagdo, & Cahyo (2018) that said that recent education does not affect the successful behavior of TB treatment. The majority of respondents in this study had a high school education level. A person with higher education better understands the illness and treatment that will be undertaken. However, formal education does not always affect behavior because the respondents had previously been exposed to information about pulmonary TB when they first began to suffer from it.

The current study showed there was no effect of occupation on pulmonary TB treatment behavior, with a p-value of 0.77 (> 0.05). This was in line with research by Yusi, Widagdo, & Cahyo (2018) conducted in the city of Semarang that stated that there is no influence between work and the successful behavior of TB treatment. The majority of respondents in this study had private work and other occupations such as pedicab drivers, motorcycle taxi drivers, and traders. Even though their working hours were long and on average they do not have time to rest, if they had a positive attitude, high self-efficacy and good social support would increase their motivation in treatment.

The results showed that there was no influence of information on the behavior of pulmonary TB treatment, with a p-value of 0.26 (>0.05). The majority of respondents in this study never received information when they first began to suffer from pulmonary TB. Information is influenced by the level of education of a person. The higher the level of one's education, the more information received, so it influences behavior (Notoatmodjo, 2010).

The results showed that there was no influence of obtaining social support on pulmonary TB treatment behavior, with a p-value of 0.38 (>0.05). Social support can be obtained from one's family, environment, or health workers. The results of this study were not in line with research conducted by Puspita, Oktaviarini, Dyah, & Santik (2017) that stated that the support received from family members and health workers who give

good attention will increase motivation in treatment. Receiving support but not having good coping mechanisms for stress affected respondents' behavior.

The results showed that there was no effect of having a PMO on pulmonary TB treatment behavior, with a p-value of 0.66 (>0.05). This was not in line with research conducted by Yusi, Widagdo, & Cahyo (2018) that stated there is an influence of supervisor a take medication on the success of treatment. The majority of respondents in this study had a PMO when undergoing treatment. A PMO was tasked with supervising the respondents in carrying out the treatment and providing motivation to comply with the treatment. There was no influence that could have been caused because there were still respondents who did not have a PMO and PMOs who were lacking in conducting supervision of the respondents. The better the role and support provided by a PMO to TB patients, the higher the possibility of TB patients to succeed in treatment.

The results showed that there was no influence of being active in community activities on pulmonary TB treatment behavior, with a p-value of 0.27 (>0.05). Notoatmodjo (2010) stated that a person's behavior is influenced by their knowledge and attitude. Being actively involved in activities in the community is an example of good behavior of respondents. If the knowledge and attitude shown by someone are good, this will affect their behavior.

Effect of Problem Management on Pulmonary TB Treatment Behavior

Coping strategies for management problems can reduce the pressure within and produce positive effects (Tsaur, Ku, & Luoh, 2015). Coping that focuses on problems (problem management) can be done by searching for information and solving the problems (Glanz, Rimer, & Viswanath, 2015).

The results of current study found that the majority of respondents had never received information about pulmonary TB. When suffering from TB, they were less active in seeking information, so it affects each individual's feelings or emotions. The addition of information can help a person improve their health and form good coping efforts to create adaptive behavior (Glanz, Rimer, & Viswanath, 2015).

Research conducted on asthma sufferers found that problem-solving is a major contributor to controlling asthma and improving the quality of life. Individuals who carry out problem-solving

strategies positively can form adaptive behaviors, including behaviors for improving health (McCormick et al., 2014). When faced with conditions of illness, excessive stress, or conditions that can cause feelings of suffering, religion and spirituality are coping methods that can be done (Suciani & Nuraini, 2017). Research conducted on patients with kidney failure who were undergoing hemodialysis found that an effective spirituality approach is used as a coping effort in dealing with stress. Closeness with God becomes a reinforcement when dealing with stress and increases motivation in treatment, so spirituality has a significant role in health management (Mailani & Cholina, 2015).

Research conducted on the relationship between religion and spirituality and overcoming stress in adolescents found that high religious value and spirituality possessed by a person influence the coping strategies used in dealing with stress. Individuals who have a largely religious side will use efficient coping resources when faced with problems (Krok, 2015).

The source, amount, and intensity of stressors differ at each age level. The higher the age of someone, the less stress they experience (Putri, Hamid, & Priscilla, 2017). The demographic data showed the age of the respondents with pulmonary TB in this study to be in the age range of 46–55 years. The more mature a person is, the better their ways and abilities of coping are; thus, when faced with stressful situations, it is hoped that the individual can make good coping efforts with problem solving or information seeking (Deckert, Schmoeger, Auff, & Willinger, 2019).

Another study on the psychosocial relationship with the successful behavior of pulmonary TB treatment found that education level did not affect a person when undergoing treatment (Yusi, Widagdo, & Cahyo, 2018). The majority of the final education of the respondents in the above research was elementary school education, while the majority of the final education of the respondents in this study was high school. A higher education level affects the psychological maturity of a person in solving problems. When someone knows and understands a disease, they can apply the information to actual situations and conditions by carrying out healthy behaviors. However, formal education does not always affect the success of one's treatment behavior because each respondent received information about pulmonary TB from the health officer about which medications to take when they first suffered from it (Krok, 2015).

A high level of education helps individuals get more and more information because the more information obtained, the better their level of knowledge (Nazriati, Pratiwi, & Restuastuti, 2018). A good level of knowledge can increase the compliance of patients with pulmonary TB to take medication regularly so that they can prevent transmission to others and improve planned treatment behavior.

Effect of Emotional Regulation on Pulmonary TB Treatment Behavior

Emotional regulation is very important when faced with stress in everyday life (Richardson, 2017). Coping efforts for emotional regulation can be done by seeking social support, venting feelings, avoiding, and denying (Glanz, Rimer, & Viswanath, 2015).

Research was conducted on the relationship between child abuse, neuroticism, social support, and active coping styles affecting a person's depressive symptoms (Zhou et al., 2019). Individuals who feel a great amount of social support are likely to have a low level of depression. Emotional regulation accompanied by good social support can make an individual view their life more positively and influence their behavior (Lagdon et al., 2018).

Social support involves affection and warmth, which help individuals build self-defenses and cope effectively with bad situations so that feelings of accompaniment arise and they can deal with negative perceptions that arise. Support received directly can reduce a person's psychological burden (Zhou et al., 2019).

Social support has four types, namely emotional support such as empathy, love, trust, and care, instrumental support by providing assistance directly for people in need, informational support such as providing advice and information that can be used to solve problems, and appraisal support, which includes providing information useful for self-evaluation purposes. Appraisal support relates to assisting in decision-making, providing appropriate feedback, or deciding on actions taken (Glanz, Rimer, & Viswanath, 2015).

Poor social support affects the level of depression of a person because it causes an increase in psychological pressure that affects the healing of their disease and the welfare of their life. Patients with pulmonary TB who have depression will affect their quality of life, health care costs, and self-care, causing resistance to infection, adversely affecting their compliance

with treatment, and causing increased mortality from pulmonary TB (Duko, Gebeyehu, & Ayano, 2015).

There is no correlation between the regulation of emotions and behavior in this current study because the respondents only received support from their families and did not receive support from the community because there was a fear of negative perceptions that affected their mindset. They tended to use coping styles to avoid and shut down and were reluctant to get involved in community activities as evidenced by 47 respondents (33%) in this study not being involved in community activities. Research conducted in India found that the majority of respondents did not share their disease status with other people, except close family members, because they were afraid of facing the stigma that had emerged in the community (Pourfallahi, Gholami, Tarrahi, Toulabi, & Moghadam, 2019; Yellappa, Lefèvre, Battaglioli, Narayanan, & Van der Stuyft, 2016).

The wrong mindset can affect the regulation of emotions. Low emotional regulation can affect the patients' behavior in the form of negative behavior related to the treatment carried out. Each individual has a different way and focus when dealing with stress; positive or negative behavior depends on how they react to the stress experienced (Glanz, Rimer, & Viswanath, 2015).

Research Limitations

This study only analyzed the effect of coping efforts (problem management and emotional regulation) on the treatment behavior of patients with pulmonary tuberculosis, and the results were only based on questionnaires filled out by respondents without making observations.

Further research carried out by direct observation is needed to analyze the effect of each variable that has a relationship with coping efforts on the behavior and type of copying done by patients with pulmonary TB when experiencing stress with treatment.

CONCLUSION

Pulmonary TB can be stressful, and coping mechanisms are needed. Problem management affects the treatment behavior of pulmonary TB, which can be influenced by information seeking and previous experience. The information received affects the level of knowledge, which impacts behavior. Previous experience influences mindset and, thus, influences treatment behavior.

The variable characteristics of the study and emotional regulation did not influence the treatment behavior of patients with pulmonary tuberculosis. The regulation of one's emotions is influenced by the social support received. Although the support provided was optimal, everyone has different perceptions and efforts when faced with stress, which affects their behavior.

CONFLICT OF INTEREST

The authors declare that no conflict of interest in this study.

AUTHOR CONTRIBUTION

All authors participate actively in this article and are responsible for the content of writing, including in preparation, draft writing, research design selection, analysis, and revision of the article. REM: Conceptualization, methodology, software PY, data curation, writing original draft preparation, investigation, and validation. MBQ: Visualization, reviewing, and editing. OS: Visualization, reviewing, and editing.

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