

# BELITUNG NURSING JOURNAL

<https://belitungraya.org/BRP/index.php/bnj/index>

Online ISSN: 2477-4073

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<https://doi.org/10.33546/bnj.749>



**BELITUNG RAYA PUBLISHER**

Belitung Raya Foundation  
Dsn. Cemara I RT 007 RW 004 Desa Kurnia Jaya Kecamatan Manggar  
Belitung Timur Propinsi Bangka Belitung, Indonesia  
Email: [belitungrayafoundation@gmail.com](mailto:belitungrayafoundation@gmail.com) | [editorbnj@gmail.com](mailto:editorbnj@gmail.com)

## REVIEW ARTICLE

# FACTORS RELATED TO THE SUCCESSFUL TREATMENT OF TUBERCULOSIS: A LITERATURE REVIEW

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### Article Info:

Received: 19 February 2019

Revised: 6 March 2019

Accepted: 14 May 2019

### DOI:

<https://doi.org/10.33546/bnj.749>

### Abstract

**Background:** Many tuberculosis sufferers experience recurrent events due to incomplete treatment processes. It is often found that tuberculosis sufferers re-enter the hospital because the condition is getting worse. Thus, factors related to the successfulness of the treatment of tuberculosis warrant identification.

**Objectives:** This review was to summarize and identify the current literature related to the successful treatment of tuberculosis and its factors.

**Design:** A Whittemore and Knafelz integrative review was used.

**Data Sources:** Data sources included four electronic databases: EBSCO, PubMed, Science Direct and Google Scholar to search literature published between 2002 and 2017.

**Review methods:** A systematic process was carried out to extract and analyze the data of all included studies.

**Results:** A total of 146 articles were deemed appropriate for the topic, but only 28 articles were included based on inclusion criteria. It was found that a wide range of factors related to the successful treatment of tuberculosis, including predisposing factors (socioeconomic, knowledge, psychological stress, and availability to access health service), reinforcing factor (family support and social stigma), and enabling factor (physician and nurse support).

**Conclusion:** Family support, socioeconomic, physician and nurse support, availability to access health services, social stigma, psychological stress, and knowledge were significant factors of the successful treatment of tuberculosis. For future research, the interventions to promote the program for decreasing the occurrence of the recurrent tuberculosis in the community need to consider these factors for the successful treatment of tuberculosis and collaborates with tuberculosis patients, family and health service for development of appropriate intervention.

### KEYWORDS

tuberculosis; successful treatment; precede-proceed model; literature review

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ISSN: 2477-4073

## INTRODUCTION

Tuberculosis is one of the most perceived health problems in the global community, despite the implementation of DOTS treatment strategies in many countries since 1995 ([Perhimpunan Dokter Paru Indonesia, 2006](#)). The incidence rate in Indonesia in accordance with national strategies for tuberculosis treatment 2010-2014 is expected to decrease from 235 per 100,000 population to 224 per 100,000 population ([Indonesian Ministry of Health, 2014](#)). Government of the Republic of Indonesia has a prime target for tuberculosis control in 2015-2019, which is a reduction in the incidence of tuberculosis faster than just about 1-

2% per year to 3-4% per year and reducing the mortality rate of 4-5% per year. It is expected that by 2020 Indonesia could reach the target of a 20% reduction in the incidence and mortality rate of 25% of the incidence rate in 2015 ([Indonesian Ministry of Health, 2014](#)).

Many tuberculosis sufferers experience recurrent events due to incomplete treatment processes. It is often found that tuberculosis sufferers reenter the hospital because the condition is getting worse. Tuberculosis sufferers who experienced this recurring

incident argued that fear of being excluded from neighbors caused by stigma from neighbors for their illnesses and also related to their economy (when they did treatment, their income would be reduced). For this reason, the authors want to find information regarding factors that can influence the success of tuberculosis treatment. The authors use the Precede-Proceed model to identify the initial factors. There are many factors that can be related to the successful treatment of tuberculosis, among other predisposing factors (socioeconomic, knowledge, psychological stress, belief, lifestyle, intelligence, perception, attitudes, and availability to access health service), reinforcing factor (family support, culture, and social stigma), and enabling factor (policies, programs of health, physician and nurse support). The aim of the review was to summarize and identify the current literature related to the successful treatment of tuberculosis and its factors.

factors, among other predisposing factors, reinforcing factors, and enabling factors. Predisposing factors are characteristics of a person or community that can manipulate the behavior of that person or community. Predisposing factors that will be included in this literature review, namely socioeconomic, availability to access health service, knowledge, and psychological stress. Reinforcing factors are consequence of the behavior carried out, either in the form of rewards or punishments, which in turn will strengthen the motivation for behavior change. Reinforcing factors are family support and social stigma. Enabling factors are factors possessed by the environment that can be used to facilitate behavior change. The enabling factors include physician and nurse support. The selection of Precede-Proceed Model as a conceptual framework for this review because it is considered appropriate to determine the factors that can influence the success of tuberculosis treatment, both from individuals, social, environmental, to health services (see Figure 1).

**Conceptual Framework**

In educational and ecological assessment phase of Precede-Proceed Model addressed by [Green and Kreuter \(2005\)](#) had three

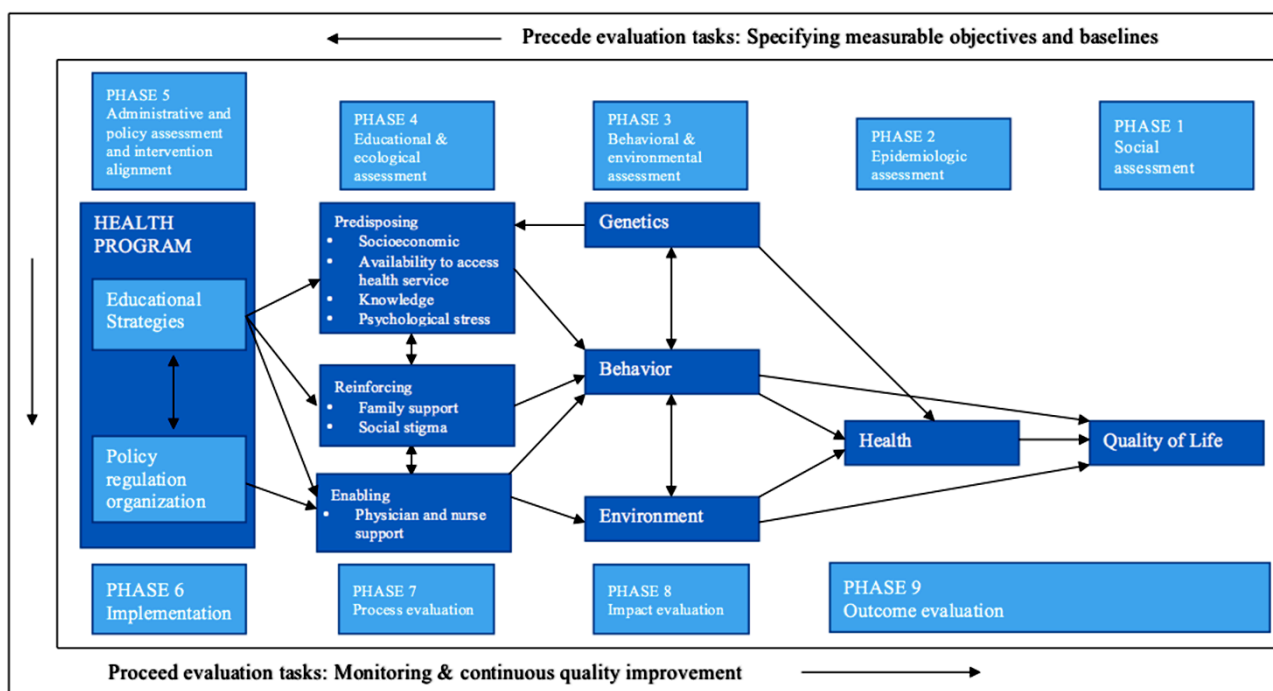


Figure 1 Conceptual framework of integrative review of the factors related to the successful treatment of tuberculosis

**METHODS**

**Design**

Our review used a guideline of the integrative review created by [Whittemore and Knafl \(2005\)](#) to identify literature relating to phenomenon analysis and health problems. It allows the inclusion of both experimental and non-experimental research. Studies indicate that well-done literature review can present state of science and potential to play the significant role in evidence-based practice to nursing science and practice, and to contribute theory development ([Whittemore & Knafl, 2005](#)). The literature

review has been identified as a robust tool for synthesizing available literature on a given topic. This approach combines data from theoretical and empirical literature and allows for a full understanding of the topic under investigation ([Souza et al., 2010](#)).

**Search methods**

The following electronic databases were searched for relevant research articles: EBSCO, PubMed, Science Direct and Google Scholar. The literature search used keywords “tuberculosis” and

the “successful treatment of tuberculosis”, and “factors related to the successful treatment of tuberculosis”.

The authors used four steps in the process of selecting literature originating from electronic databases before getting the articles as the final sample of this review. First step, we generally did a search and found 362,124 articles. From these articles we did a screening to find articles that were very relevant and could be used as material for the review. The screening results obtained 1,569 articles that were considered relevant for use. The third stage was re-screening all articles with inclusion and exclusion criteria, as well as avoiding duplication of the same title. One hundred forty-six articles obtained from this screening. The final step, of 146 articles, 28 articles were considered best fit for further review (Figure 2).

To explore factors that related to the successful treatment of tuberculosis, we collected data from the published literature through electronic databases. The information derived from the literature that includes opinions, theoretical, research-qualitative and quantitative research, in addition to integrative and systematic reviews. For identifying and selecting from a variety of literature that was used as a review, we broadened the search to include factors related to the successful treatment of tuberculosis, including the aspect of the patient, family, community and other factors originating the service system.

In the literature review, we set inclusion and exclusion criteria in the search of electronic databases. The inclusion criteria included, among others, (1) published in English and Indonesian language, (2) published between 2002 and 2017, and (3) focused on factors and the successful treatment of tuberculosis. Exclusion criteria were studies that did not focus on the factors that related to the successful treatment of tuberculosis, research design that had poor quality, and unclear arguments in the literatures.

The literature included in this review had no limitations that must be the same as the conceptual framework we wanted to find information regarding factors that could influence the success of tuberculosis treatment and supported the model that was used as the conceptual framework. In the search method, the authors were only guided by the inclusion criteria and exclusion criteria specified above.

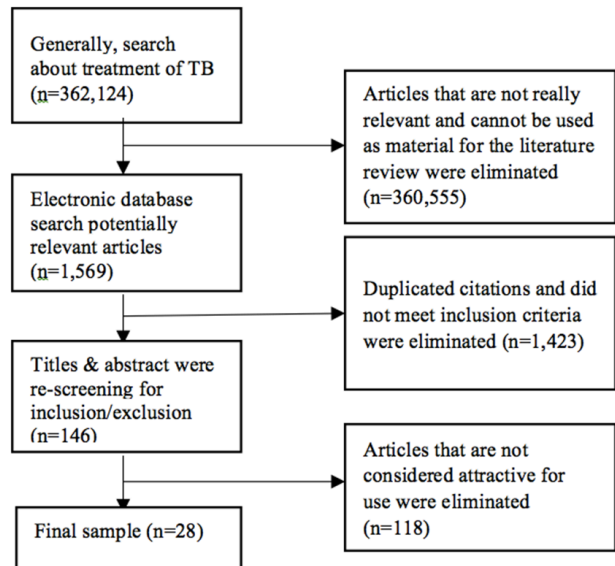


Figure 2 Flowchart of literature search

**Data analysis**

The data analysis in the research review requires that the data from the primary source be ordered, encoded, categorized, and summarized into an integrated conclusion explaining the research problem (Cooper, 1998). In this case, the authenticity of information and methodological quality in search of data originating from primary sources should be considered and discussed in the final report (Kirkevold, 1997). However, in order to reach the aim of this study, to determine the state of knowledge gaps related to the successful treatment of tuberculosis on tuberculosis patients, the authors used framework developed by Green and Kreuter (2005) as guide. The articles were read several times to determine the patterns, directions, similarities, and differences to produce a quality final report. Using a constant comparison method of grouping similar comparable data, making the analysis and synthesis process even further to achieve the objective of this review leads to a better understanding of the issues raised, particularly the successful treatment of tuberculosis among tuberculosis patients.

**RESULTS**

Based on the search results, there were some articles that match the criteria that had been set. Summary of included literature could be seen in Table 1 and Table 2.

Table 1 Summary of included literature

Author (year), country	Design	Purpose	Results
Bani et al. (2015), Indonesia	Descriptive correlational study (Cross-sectional)	To find out correlation between knowledge, attitude, and the prevention of pulmonary tuberculosis in Dayu district	A part of more humanity had good knowledge (92.5%), negative attitude (50.5%), and positive attitude (54.5%). Chi square obtained p-value of .508 on knowledge, p-value of .747 on attitude, indicated no correlation between knowledge, attitude, and the prevention of pulmonary tuberculosis.

Author (year), country	Design	Purpose	Results
<a href="#">Bothamley et al. (2011)</a> , United Kingdom	Cohort	To identify workload and effectiveness of tuberculosis control programs in UK cities	Data retrieval was done varies, namely from 0 to 22 months. The results showed that national achievements had a good correlation with changes in workload for commissioning organizations ( $r = 0.8$ ; $p < .01$ ), but this factor was inversely proportional to the number of clinics. There were 4 cities that had not reached the target, including Birmingham, Bradford, Manchester and Sheffield ( $C2 = 4.2$ ; $p < .05$ ).
<a href="#">Dimas et al. (2016)</a> , Indonesia	Descriptive correlative (Cross-sectional study)	To provide information about the correlation of drug supervisor activeness with motivation and medication compliance	There was a relationship between the activeness of supervisors taking medication with motivation and medication adherence in tuberculosis patients ( $p = .000$ ; $p = .001$ , respectively). The existence of good motivation was also correlated with the level of adherence to taking medication also good ( $p = .011$ ).
<a href="#">Dobler et al. (2015)</a> , Mongolia (Western Pacific region)	Retrospective cohort study	To determine the effectiveness of community-based DOT compared to traditional clinic-based DOT in Ulaanbaatar, the capital of Mongolia	The success of TB treatment with positive smear reached 85.1%. The cure rate and treatment success were quite high in patients who received DOT treatment in the community than those who received treatment at the DOT clinic (aOR 2.66, 95% CI 1.81–3.90; aOR 2.95, 95% CI 1.85–4.71, $p = .001$ , respectively).
<a href="#">Gao et al. (2015)</a> , Canada	Cross-sectional study	To identify knowledge levels of patients in a TB clinic, identify Chinese immigrants' knowledge and perceptions of Latent TB Infection (LTBI), specify messages that would be most appropriate for LTBI education in this population, and identify the most appropriate format of health promotional materials to address the specifics needs of this population	The level of knowledge of respondents was very low about LTBI (95% CI: 38.3%, 41.7%) due to their difficulties in accessing the health system so that they experienced confusion and caused stigma among them related to LTBI. In addition, the health promotion method suitable for Chinese immigrants was online video.
<a href="#">Gupta et al. (2004)</a> , India	Case-control study	To look into the socio-economic and demographic characteristics of patients of tuberculosis (TB)	There was a correlation between the increase in TB incidence and socio-economic and demographic factors, including age, education level, income level, home environment conditions, water availability, and density living in the same house.
<a href="#">Herrero et al. (2015)</a> , Argentina	Cross-sectional study	To identify the association between non-adherence to tuberculosis treatment and access to treatment	Men were more likely to experience non-compliance in undergoing treatment (OR = 2.8; 95% CI 1.2 - 6.7). In addition, TB patients who underwent hospital health checks (OR = 3.4; 95% CI 1.1 - 10.0) and those who experienced difficulties in transportation costs (OR = 2.5; 95% CI 1.1 - 5.9) also experienced non-compliance in undergoing treatment.
<a href="#">Ibrahim et al. (2014)</a> , Nigeria	Cross-sectional study	To determine the proportion of TB patients with interrupted treatment, and to identify the factors associated with interruption of TB treatment	There were 378 TB sufferers and 71 (19%) of whom had experienced a treatment breakup. There were several factors that prevent a TB sufferer from undergoing treatment, including distance to a place to stay for TB treatment related to travel costs (AOR: 11.3; 95% CI: 5.7-22.2), ignorance of the duration of treatment and when it feels the condition is better (AOR : 6.1; 95% CI: 2.8-13.2), and smoking behavior (AOR: 3.4; 95% CI: 1.5-8.0). In addition, TB sufferers also said there was an unfriendliness of health workers when providing services.
<a href="#">Irnawati et al. (2016)</a> , Indonesia	Cross-sectional study	To determine the effect on the family support medication adherence of tuberculosis patients in Puskesmas Motoboi Kecil	There was an influence of family support for medication compliance in TB patients ( $p = .001$ ).

Author (year), country	Design	Purpose	Results
<a href="#">Karyadi et al. (2002)</a> , Indonesia	Cross-sectional study	To determine the social conditions endured by patients with pulmonary TB and to consider the consequences of the disease	The results showed that TB patients experienced poor nutritional status, negative attitudes from the surrounding community so that some of them were expelled from work and experienced fear that conditions could interfere with their marriage. However, TB sufferers get support from their families, both financially and socially.
<a href="#">Kirana et al. (2016)</a> , Indonesia	Descriptive survey (Cross-sectional study)	To evaluate the compliance of patient with tuberculosis in BKPM Magelang	There were 63% of respondents who adhered to the treatment of tuberculosis. The result of the study showed high rate of medications compliances in patients with tuberculosis. The factors that cause the disobediences were effects of the medicine, other diseases, perception of distance and transportation. The study showed high compliances of tuberculosis patient as the result of the respondent's knowledge that were good.
<a href="#">Kondoy et al. (2014)</a> , Indonesia	Cross-sectional study	To know risk of factors (age, gender, education, employment, level of income, knowledge and the side effects of anti-tuberculosis drugs related with obedience of treatment patients with pulmonary tuberculosis in five health centers in the city of Manado	The result of research indicates that the variables, which were related with treatment compliance of TB patient, were education ( $p=.000$ ) and knowledge ( $p=.000$ ). Variable that were not related to obedience of treatment TB patients were age, gender, education, occupation, level of income, and side effect OAT ( $p>.05$ ).
<a href="#">Kurniati (2015)</a> , Indonesia	Cross-sectional study	To identify any obstacles in the implementation of tuberculosis therapy and how to overcome them in Balai Pengobatan Penyakit Paru-paru (BP4) Unit Minggiran, Yogyakarta	The psychological response to the respondents was the highest category at 82.5% (33 respondents), family support for the most respondents was in the good category that was equal to 75% (30 respondents). The family support variable was not significant at the probability of .584 greater than the constant value of .024, which indicated that there was no influence on the implementation of TB therapy. The psychological response variable was significant at the probability of .008 smaller than .024 which indicated that there was an influence on the implementation of tuberculosis therapy. The efforts of officers according to the DOTS Corner procedure are in the good category of 100%.
<a href="#">Loriana et al. (2014)</a> , Indonesia	Quasy-Experiment (Non-Randomized Control Group Pretest and Posttest Design)	To determine the effects of counseling on knowledge, attitudes, and adherence to treatment of pulmonary TB patients in the region of Samarinda City Health Department	There was an influence of counseling on increasing knowledge, attitudes, and adherence to patients with pulmonary TB treatment. This can be seen from the results of the Wilcoxon test carried out before and after the counseling ( $p=.000$ ).
<a href="#">Smit et al. (2011)</a> , Ghana	Descriptive study	To determine personal, health service, community and treatment factors contributing to the high default rate of DOTS implementation in Kwaebibirim district of Ghana	TB patients who experienced treatment breakdown due to several factors, including interactions between individuals, social, and health status (duration of treatment and side effects that occur).
<a href="#">Nugroho et al. (2016)</a> , Indonesia	Descriptive correlative (Cross-sectional study)	To determine the relationship between knowledge of tuberculosis patients and family support with medication adherence tuberculosis in public health service of Jekulo Kudus	The results showed that the better the level of knowledge and family support for TB patients, the better the level of adherence to treatment ( $p=.003$ ; $p=.039$ , respectively).
<a href="#">Pongoh et al. (2015)</a> , Indonesia	Descriptive study	To determine the behavior of particular knowledge attitude and practice of health workers in health centers Manado	The majority of respondents had ages 26-35 years as many as 39 respondents (52.0%), most of them were female with 65 respondents (86.7%). Respondents had good knowledge, attitude, and practice.

Author (year), country	Design	Purpose	Results
<a href="#">Retni and Sugiyanto (2010)</a> , Indonesia	Cohort (Retrospective)	To determine the relationship of social support families with a cure rate of pulmonary tuberculosis patients at the health center Umbulharjo, Yogyakarta	Family support of pulmonary tuberculosis patients mostly was in the high category at 83.8% of all respondents. Cure rate of pulmonary tuberculosis patients was mostly in the fast category of 90.3% of all respondents. There was association between family social support and recovery rates of pulmonary TB patients ( $p = .047$ ).
<a href="#">Rohmana and Suhartini (2014)</a> , Indonesia	Case-control study	To discover the correlation between the factors which are exist in taking medicine observer (Pengawas Minum Obat/ PMO) towards medication compliance of pulmonary tuberculosis patients. And also, dominant variables that influence medication compliance of pulmonary tuberculosis patients	The result of research shows that variable of PMO's knowledge level ( $p = .013$ , $\alpha = .05$ ), and health education ( $p = .000$ , $\alpha = .05$ ) correlated with medication compliance of pulmonary tuberculosis patients. Health education was a dominant variable that 6.018 times on medication compliance of pulmonary tuberculosis patients.
<a href="#">Sari et al. (2016)</a> , Indonesia	Cross-sectional study	To determine the relationship between knowledge, attitudes and compliance outpatient pulmonary tuberculosis in 5 regional public hospitals in Jakarta	There was no significant relationship between knowledge, attitudes and compliance of outpatients with pulmonary TB patients.
<a href="#">Setiawan (2013)</a> , Indonesia	Cross-sectional study	To analyze the influence of the side effect of anti-tuberculosis treatment adherence in BBKPM Surakarta	There was an influence of the side effects of anti-tuberculosis treatment with TB patient adherence in undergoing treatment in BBKPM Surakarta ( $p = .04$ )
<a href="#">Tang et al. (2015)</a> , China	Cross-sectional study	To assess non-adherence to anti-TB treatment among internal migrants with pulmonary TB living in Shenzhen, China, and examine risk factors for non-adherence in order to identify targets for intervention	Around 33.74% of respondents experienced non-compliance in undergoing treatment. This was caused by several factors, including lack of information regarding the treatment process that must be undertaken, and travel time to the nearest health service.
<a href="#">Tesfahuneygn et al. (2015)</a> , Ethiopia	Cross-sectional study	To assess the level of adherence to anti-TB treatment among patients taking anti-TB drug treatment and to identify factors associated with non-adherence, and to assess treatment outcomes and factors associated with poor treatment outcomes among TB patients previously treated at the health institutions of Alamata District, northeast Ethiopia	The level of adherence and the success rate in anti-tuberculosis treatment was quite high. Respondents who were unsuccessful in treatment due to economic problems, died, and experienced treatment failure related to Human Immunodeficiency Virus (HIV) infection [aOR = 2.1, 95% CI 1.5–3.0]; SPPTB case (aOR = 3.4, 95% CI 2.4–4.8); SNPTB case (aOR = 2.0, 95% CI 1.5–2.8); and cases of bone care (aOR = 2.6, 95% CI 1.5–3.7).
<a href="#">Theron et al. (2015)</a> , Multi Centre Study (South Africa, Zimbabwe, Zambia, & Tanzania)	Cohort	To explore the association between psychological distress, clinical characteristics (such as TB-related morbidity), socio economic characteristics (such as income, educational level, health literacy, and unemployment), and healthcare seeking behaviour, such as the duration of symptoms that passed before patients sought care	The results showed that respondents experienced psychological distress. Respondents who experienced psychological distress were associated with heavy consumption of alcohol, female gender, increased morbidity, and previous TB. All of these affect the level of adherence to the treatment process.
<a href="#">Tolossa et al. (2014)</a> , Ethiopia	Community-based cross-sectional survey	To identify community knowledge, attitude, and practices towards tuberculosis	Most respondents had sufficient knowledge about TB and knew that TB transmission could be prevented. Respondents would seek the closest health care when experiencing symptoms of TB and prefer to take medication in modern medicine
<a href="#">Tupasi et al. (2016)</a> , Philippines	Case-control study	To identify factors associated with loss to follow-up during treatment for multidrug-resistant (MDR) tuberculosis (TB) in the Philippines	Factors that led to treatment discontinuation in multidrug-resistant TB (MDR-TB) cases included treatment side effects (vomiting severity) and alcohol consumption. However, several other factors that could reduce the incidence of discontinuation include good levels of knowledge, assistance in the treatment process, support, and a high level of trust from health workers.

Author (year), country	Design	Purpose	Results
<a href="#">Wijayanti and Khusnal (2010)</a> , Indonesia	Descriptive correlative (Cross-sectional study)	To identify the correlation between the parents' healthy attitudes and the life quality of children with tuberculosis	All of respondents had good quality of life. However, only 46% of parents had high healthy attitude. The results of the statistical examination by Spearman Rank Correlation showed that the correlation value was .551 for TACQOL questionnaires for the parents and the correlation value was .316 for TACQOL questionnaires for the children with the significance level of $p < .05$
<a href="#">World Health Organization (2013)</a> , Switzerland and USA	Guidelines	To develop the evidence-informed recommendations using procedures outlined in the WHO handbook for guideline development	Guidance from the World Health Organization (WHO) on nutritional care and support for patients with TB, in support of their efforts to achieve the Millennium Development Goals

**Table 2** Factors related to the successful treatment of tuberculosis

Author	Predisposing Factors				Reinforcing Factors		Enabling Factor
	Socio-economic	Availability to access health service	Knowledge	Psychological stress	Family support	Social stigma	Physician and nurse support
<a href="#">Bani et al. (2015)</a>			✓				
<a href="#">Bothamley et al. (2011)</a>							✓
<a href="#">Dimas et al. (2016)</a>							✓
<a href="#">Dobler et al. (2015)</a>		✓					
<a href="#">Gao et al. (2015)</a>			✓			✓	
<a href="#">Gupta et al. (2004)</a>	✓						
<a href="#">Herrero et al. (2015)</a>	✓	✓					
<a href="#">Ibrahim et al. (2014)</a>		✓					✓
<a href="#">Imawati et al. (2016)</a>					✓		
<a href="#">Karvadi et al. (2002)</a>	✓						
<a href="#">Kirana et al. (2016)</a>		✓					
<a href="#">Kondoy et al. (2014)</a>			✓				
<a href="#">Kurniati (2015)</a>				✓			
<a href="#">Loriana et al. (2014)</a>			✓				
<a href="#">Smit et al. (2011)</a>						✓	
<a href="#">Nugroho et al. (2016)</a>					✓		
<a href="#">Pongoh et al. (2015)</a>			✓				✓
<a href="#">Retni and Sugiyanto (2010)</a>					✓		
<a href="#">Rohmana and Suhartini (2014)</a>			✓				
<a href="#">Sari et al. (2016)</a>			✓				
<a href="#">Setiawan (2013)</a>			✓				
<a href="#">Tang et al. (2015)</a>			✓				
<a href="#">Teshahuneygn et al. (2015)</a>		✓					✓
<a href="#">Theron et al. (2015)</a>				✓			
<a href="#">Tolossa et al. (2014)</a>			✓				
<a href="#">Tupasi et al. (2016)</a>							✓
<a href="#">Wijayanti and Khusnal (2010)</a>					✓		
<a href="#">World Health Organization (2013)</a>					✓		

The factors related to the successful treatment of tuberculosis include predisposing factors (socioeconomic, availability to access health service, knowledge, and psychological stress), reinforcing factors (family support and social stigma), and enabling factors (physician and nurse support). **Figure 1** illustrates a diagram of the model adaptation to identify factors related to the successful treatment of tuberculosis among tuberculosis patients.

### Predisposing Factors

#### *Socioeconomic*

Many tuberculosis patients in the community who recognize that tuberculosis treatment is sometimes constrained by socioeconomic factors. They reasoned that if they took treatment for tuberculosis it would take up their work time, so they get sanctions related to the overly licensing process or lack of opinion on the day they take control/ treatment for their tuberculosis



(Gupta et al., 2004). It is also supported by the results of research conducted by Karyadi et al. (2002) who said that socioeconomics can become an obstacle to tuberculosis treatment because people with tuberculosis will have difficulty in changing their living conditions. Herrero et al. (2015) also said that socioeconomics has a negative effect on the treatment of tuberculosis. The negative effects are related to transportation costs and costs associated with additional drugs. Transportation costs are linked to the long distance between home and health care where they control tuberculosis.

#### *Availability to access health service*

In addition to socioeconomic, another factor that may affect tuberculosis treatment process is the availability of access to health services. The availability of access to health services is usually related to the distance between houses with health care facilities and the convenience of transportation to health services (Herrero et al., 2015; Ibrahim et al., 2014; Kirana et al., 2016; Tesfahuneygn et al., 2015). Herrero et al. (2015) said that with the problems associated with the distance and ease of transportation, the need for decentralization of health services tuberculosis, making it more affordable and more accessible to people with tuberculosis. Decentralization of tuberculosis health services will have a better impact on adherence and high success in treatment of tuberculosis (Dobler et al., 2015; Herrero et al., 2015). Based on the results of research from Dobler et al. (2015), it can be seen that the presence of health services in the form of DOTS services closer to people with tuberculosis in the community will have a positive impact of high compliance rate and success of tuberculosis treatment in the community.

#### *Knowledge*

Knowledge is one of the domains of behavior formation in the treatment of tuberculosis, so it can improve the success of tuberculosis treatment and prevent the occurrence of recurrent tuberculosis (Bani et al., 2015; Kondoy et al., 2014; Tang et al., 2015). In addition to the knowledge of tuberculosis sufferers themselves, the knowledge of drug controllers can also influence the success rate of treatment in tuberculosis patients, especially adherence in DOTS treatment (Rohmana & Suhartini, 2014). Increasing the knowledge of tuberculosis patients can be through the provision of counseling and counseling with the ultimate goal is to improve the success of treatment of tuberculosis patients (Loriana et al., 2014; Pongoh et al., 2015; Tang et al., 2015). Community knowledge of tuberculosis also affects the success of tuberculosis treatment in the community because it can reduce the stigma that arises in the community and prevent the spread of tuberculosis in the community (Gao et al., 2015; Tolossa et al., 2014). However, there is also a study says that knowledge has nothing to do with the success of tuberculosis treatment, especially tuberculosis treatment adherence (Sari et al., 2016). Sari et al. (2016) argue that there may be other factors that may influence the success of tuberculosis treatment that is not present in the study, such as the role of the drug supervisor, family support, and the disturbing side effects of poor drug combinations. Knowledge of drug side effects also needs to be noted in the success of tuberculosis treatment. When side effects of DOTS are given to tuberculosis sufferers with unsupported good knowledge of the side effects of consuming DOTS may

cause concerns of tuberculosis patients in undergoing treatment so that it can lead to the breaking of treatment and the occurrence of recurrent tuberculosis (Setiawan, 2013).

#### *Psychological stress*

One of the internal factors that must be considered is the management of psychological stress. Management of good psychological stress will make a tuberculosis patient more likely to undergo treatment. This is supported by the results of research from (Kurniati, 2015) who said that a good psychological response influences the implementation of tuberculosis therapy. The same is expressed by Theron et al. (2015) who said that with the existence of severe psychological distress will lead to increased adherence to tuberculosis treatment so that the need for management of psychological stress to overcome it. Theron et al. (2015) also explained that this psychological distress relates to knowledge of medical and socioeconomic procedures.

### **Reinforcing Factors**

#### *Family support*

Family support is one of the factors that can influence adherence of tuberculosis patients in undergoing the treatment process and result in recurrent tuberculosis. Family support can include motivation for tuberculosis patients to undergo treatment, become drug supervisors in providing support in accessing health services to get anti-tuberculosis drugs (Irnawati et al., 2016; Nugroho et al., 2016; Retni & Sugiyanto, 2010; World Health Organization, 2013). If poor family support can lead to failure in treatment and recurrent tuberculosis, it can lead to an increasing severe prognosis of the disease. However, different things are expressed by Wijayanti and Khusnal (2010) that family support in the form of parental behavior has no significant relationship with the quality of life of children suffering from tuberculosis. This is because of the child's perception of the disease he/she suffered.

#### *Social stigma*

One of the factors that can affect the process of tuberculosis treatment and lead to recurrent tuberculosis is social stigma. Gao et al. (2015) revealed that most tuberculosis patients will hide their illness and refuse to take regular medication according to their concerns about their neighbors who will isolate and stay away from them when they know they have tuberculosis. Smit et al. (2011) revealed that the stigma in society will arise when knowing someone undergoing tuberculosis treatment and most people will avoid the tuberculosis patients because it is considered an infectious disease. The stigma that arises in the community is often related to a person's level of knowledge related to tuberculosis and its treatment (Gao et al. (2015).

### **Enabling Factor**

#### *Physician and nurse support*

Patients with tuberculosis who experience withdrawal treatment that is sometimes caused by lack of support from physicians, nursing staff, and other caregivers in the treatment facilities (Tupasi et al., 2016). Lack of support from physicians and nurses is due to the lack of numbers of tuberculosis nurses who really understand the tuberculosis treatment process (Bothamley et al., 2011). Physician and nurse support can be manifested in good attitude and action when providing information / counseling

about treatment and side effects caused by treatment to be served as well as in providing DOTS services (Pongoh et al., 2015; Tupasi et al., 2016). Attitudes of physician and nursing staff who are less friendly cause patients with tuberculosis to be disobedient in undergoing treatment (Ibrahim et al., 2014). Most tuberculosis nurses are also drug supervisors who provide motivation to patients with tuberculosis during treatment. Their activity is closely related to the level of adherence of tuberculosis patients in receiving tuberculosis treatment (Dimas et al., 2016). The success of the treatment of tuberculosis and the occurrence of recurrent tuberculosis rate reduction can be achieved when there is a positive response from the public health service for the handling of tuberculosis in the community (Tesfahuneygn et al., 2015).

## DISCUSSION

This integrative review indicates major factors which related to the successful treatment of tuberculosis and the incident of recurrent tuberculosis among tuberculosis patients of a socioeconomic, availability to access health services, knowledge, psychological stress, family support, social stigma, and physician and nurse support. From the results of the review of the above article it can be concluded that factors that are closely related to the success of tuberculosis treatment and the occurrence of recurrent tuberculosis are socioeconomic, knowledge, family support, and physician and nurse support. From a socioeconomic perspective, many people with tuberculosis argue that if they are taking treatment for tuberculosis, they will take up their work time, so they get sanctions related to the overly licensing process or lack of opinion on the day they are in control of their tuberculosis (Herrero et al., 2015; Karyadi et al., 2002). In addition, socioeconomic is also closely related to availability to access health service, where the availability of access to closer health services and affordability can save their expenses and facilitate them to access health services, especially tuberculosis treatment services (Herrero et al., 2015; Ibrahim et al., 2014; Kirana et al., 2016; Tesfahuneygn et al., 2015). Herrero et al. (2015) suggest that with the problems associated with the distance and ease of transport, hence the need for decentralization of tuberculosis health services, making it more affordable and more accessible to people with tuberculosis.

One other dominant factor is knowledge as one of the domains forming one's behavior. This knowledge is not only the knowledge of tuberculosis sufferers but also the family's knowledge of tuberculosis and its treatment process. With good knowledge of the tuberculosis treatment process, the family can provide good family support, perform the duties as the supervisor of taking medicine, and reduce the stigma that arise within the family (Irnawati et al., 2016; Nugroho et al., 2016; Retni & Sugiyanto, 2010; World Health Organization, 2013). In addition, knowledge of tuberculosis and its treatment process is also important to the community with the goal of an active role in preventing the spread of tuberculosis and providing support for tuberculosis treatment in its environment (Gao et al., 2015).

Physician and nurse support are also an important factor in the success of tuberculosis treatment. This is because their activity in providing information/ counseling associated with tuberculosis and treatment process, especially in terms of side effects DOTS, is needed by patients with tuberculosis so they can undergo treatment without worrying about side effects and know how to deal with side effects of DOTS consumed (Pongoh et al., 2015; Tupasi et al., 2016). The less friendly attitude of physician and nursing staff causes patients with tuberculosis not to continue the treatment process that they are undergoing (Ibrahim et al., 2014). In addition, the lack of physician and nursing staff support is also due to a lack of physicians and nursing staff who understand tuberculosis and its treatment process (Bothamley et al., 2011).

Limitations of this study are the words used in searching and clarifying the existing literature. The research literature is limited to journal articles obtained from four search engines, EBSCO, PubMed, Direct Sciences and Google Scholar, which results in insufficient sampling probability. This study also was limited only to seven factors that can influence the success of tuberculosis treatment, so that it does not rule out the possibility of other factors that can also influence the success of tuberculosis treatment.

## CONCLUSION

The most important factor that must be considered to provide health promotion action among tuberculosis patients doing tuberculosis treatment were socioeconomic factors and knowledge of tuberculosis disease and treatment. With this literature review, it is expected that every health worker will pay attention to the factors that can influence the success of tuberculosis treatment.

## ACKNOWLEDGMENT

I extend my deeply gratitude to the Kerta Cendekia Nursing Academy and Burapha University for the facilities provided, so I can finish writing this article.

## DECLARATION OF CONFLICTING INTEREST

None.

## FUNDING

Thanks to the Kerta Cendekia Nursing Academy for giving me funding in the form of scientific article writing grants.

## AUTHORS CONTRIBUTION

KWRP: The main compiler of the literature review and looking for sources used for article writing. CT: Searching for sources used for writing and checking for English writing.

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**Cite this article as:** Putra, K. W. R., Toonsiri, C. (2019). Factors related to the successful treatment of tuberculosis: A literature review. *Belitung Nursing Journal* 5(4): 136-146. <https://doi.org/10.33546/bnj.749>