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Review Article: Systematic Review

THE EFFECT OF PSYCHOLOGICAL AND HEALTH EDUCATION APPROACHES BASED ON SELF-EFFICACY ON COMPLIANCE WITH TUBERCULOSIS PATIENT: A SYSTEMATIC REVIEW

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Abstract

Background: One of the obstacles to TB management today has been non-compliance. Non-compliance of TB patients in treatment can be influenced by the perception of self-efficacy.

Objective: The study aimed to analyze the effect of psychological and health education approaches based on self-efficacy on adherence with tuberculosis patients.

Design: Design research uses systematic review based on PRISMA checklist.

Data Sources: Using three databases: Scopus, Science direct, and CINAHL. The three databases are of high and medium reputation. The search was conducted from June to July 2020. The keywords in this systematic review are “mycobacterium tuberculosis” OR "tuberculosis" OR "pulmonary TB", "adherence OR Compliance" and "psychology OR health education OR self-efficacy". Searching are limited to journal articles, 2012-2020 publication years and English language articles.

Review Methods: To assess the quality of articles is using the JBI Critical Appraisal Tool and PRISMA checklist as a guide to filter articles.

Results: A total of 10 articles were analyzed according to inclusion criteria. The results obtained as many as 6 studies are randomized control Trials, 2 studies use Quasi-Experiment, and 2 observational studies. The number of samples varied from 19 to 361 respondents. Age from 15 to 65 and above. Gender characteristics are dominated by men and the study was multi-regional. and most levels of education at the elementary and junior high school levels. The psychological and health education approaches based on self-efficacy are divided into several approaches that are proven to increase compliance including: psychotherapy, mindfulness, counseling and education, Medication Adherence Enhancement Program (MAEP).

Conclusion: Psychological approaches and Health Education based on self-efficacy consist of various interventions. The articles analyzed mostly use the HBM concept. There needs to be a self-efficacy development program that not only emphasizes the individual and cognitive, but also needs social and family support in improving self-efficacy, so that it affects the effectiveness of treatment.

Keywords: *Mycobacterium Tuberculosis, Compliance, Psychology, Health Education, Self-Efficacy.*

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INTRODUCTION

Tuberculosis (TB) is a contagious disease which is still a high case in the community. (WHO, 2018). One of the main problems why TB cases are still high is non-compliance (Riquelme-Miralle., et al 2019).on-compliance results in several socio-economic and health consequences, creates psychological disorders and increases the risk of death. (Tola et al., 2016). Based on the WHO (2018), Indonesia ranked second largest in the world as a contributor to TB sufferers after India. The success rate of TB treatment (SR) in Indonesia has decreased. This can be seen from the last 3 years data. Where in 2015 reached 85% and rose 1% in 2016 then decreased to reach 80% in 2017 (Dirjen P2P, 2018). A number of studies have been conducted in order to improve medication adherence.

Result of studies was conducted by Tola et al., (2016) with psychological counseling and education interventions significantly reduced the level of non-compliance among the intervention groups. Educational intervention strategies and remote surveillance of post-discharge management in hospitals have a positive effect on recovery. This intervention can reduce treatment failure significantly (Müller et al., 2019). In addition, motivational interviewing has also proven to be effective in increasing compliance. (Naderloo et al., 2018).

Compliance with treatment of pulmonary TB patients can be influenced by the perception of self-efficacy and the perception of treatment barriers (specific behavior), the patient's knowledge of pulmonary TB disease (previous behavior), and the support of health workers during treatment (interpersonal influence). While the perception of self-efficacy is the most main determinant. (Syafrida. dan Achmad Fickry Faisya, 2013).

Self-Efficacy will determine how a person feels, thinks and motivates himself to act and behave, so that it affects his life. According to Bandura, (1997) Self-efficacy is one's belief about the ability to overcome problems and expectations of positive results. The purpose of this study will be to analyze the effect of psychological and health education approaches based on self-efficacy toward adherence to tuberculosis patient.

METHODS

Design

The study design uses systematic review. The protocol used refers to the Joanna Briggs Institute (JBI) critical appraisal tool as a guide in assessing the quality of the summarized studies. Filtering articles will use the PRISMA checklist. The aim is to determine the selection of studies that have been found and adjusted for the systematic review.

Search Methods

The literature search strategy uses several databases; Scopus, Science direct, and CINAHL. The three databases are of high and medium reputation. The search was conducted from June to July 2020 to identify relevant research. To facilitate the search, the author uses keywords. The keywords in this Systematic review used Medical Subject Heading (MeSH). The keywords used are “mycobacterium tuberculosis” OR "tuberculosis" OR "pulmonary TB", "adherence OR compliance" and "psychology OR health education OR self-efficacy". Searching are limited to journal articles, 2012-2020 publication years and English language articles. Inclusion criteria uses PICOS framework. 1) Population, active and advanced phase TB patients. ≥15 years old. 2) Intervention, Intervention providing education and psychology. 3) Comparison, other interventions and groups are observed without intervention being given. 4) Outcome,

interventions that affect treatment compliance in pulmonary TB patients. 5) Study design and publication types, randomized controlled trials (RCTs), Quasi-Experimental, and Cross sectional. Due to the lack of true experiment research, the researchers included several quasi-experiment studies and two cross-sectional studies. 6) Publication years, research years 2011 to 2020. 7) Language, English.

Search Outcome

From the 10 articles that met the inclusion criteria, the results obtained as many as 6 studies were Randomized Control Trials, 2 studies use Quasi-Experiment, and 2 Cross Sectional. Based on these results, after doing a critical appraisal using the JBI critical appraisal tools to be given a quality score. Studies using the design of RCTs were given a total score ranging from nine to thirteen points out of a total of thirteen points on the checklist. Quasi-Experimental studies in this systematic review are given seven to nine points from a total of nine points on the checklist, and the last is a Cross-sectional study that is rated 6 out of a total of eight points on the checklist.

An initial literature search resulted in 929 articles (315 Scopus articles, 534 Science Direct and 80 CINAHL articles). A total of 247 are duplicate articles. Then the title was screened, and as many as 467 articles then selected articles based on abstract as many as 215. Through this abstract screening, 187 articles were excluded because they were not appropriate and the remaining 28 articles were full text and were eligible to be assessed. After doing a critical appraisal, there are 10 articles that fit the inclusion criteria. A total of 18 articles were excluded because they reached ≤50%. The selection process can also be seen through the flow diagram (Figure 1).

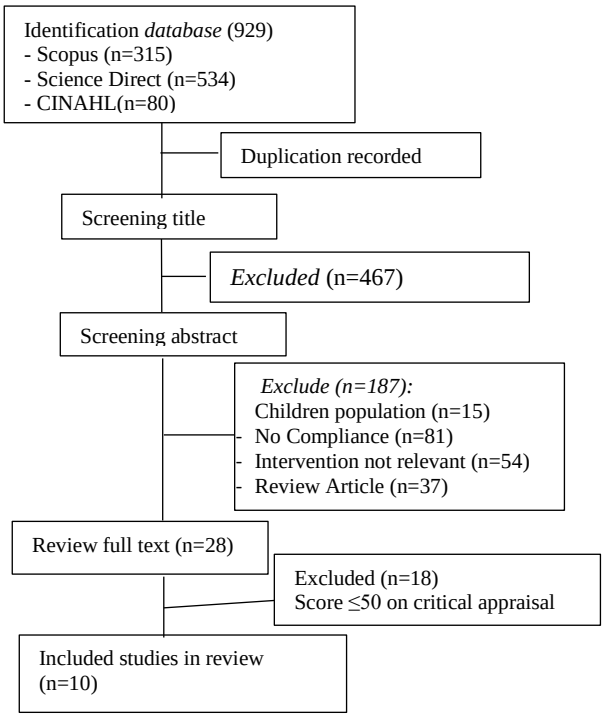

Figure 1 Flowchart of literature search.

Quality Appraisal

The JBI Critical Appraisal Tool for several types of Randomized controlled trials (RCTs), Quasi-Experimental, and Observational Studies. Studies was used to analyze the quality of the methodology in each study (n = 12). The assessment checklist based on The JBI Critical Appraisal Tool has provided several questions to assess the quality of the study. Assessment criteria are rated 'yes', 'no', 'unclear' or 'not valid', and each criterion with a score of 'yes' is given one point and the other scores are zero, each study score is then calculated and added up. Critical Appraisal for assessing eligible studies is conducted by researchers. If the research score is at least 50%, it meets the critical criterion criteria with a cut-off point value.

Data Abstraction

The researcher made a checklist sheet based on the PRISMA template to randomly check selected articles and make adjustments according to the guidelines. The researcher then extracts data from the articles that enter according to the inclusion criteria: The data

extraction process goes through the following stages:

1. Determine the topic
2. Determine and compile a registration protocol using the JBI Critical Appraisal Tool and PRISMA Checklist.
3. Determine keywords
4. Determine the database to be used,
5. Determine eligibility criteria based on the PICOS framework
6. Conduct study selection and record it in the PRISMA flow chart
7. Pay attention to the risks of bias with the JBI Critical Appraisal Tool
8. Analyze one by one to determine the results and discussion in the study.

Data Analysis/ Synthesis

This study uses descriptive analysis that describes and explains through narratives about the results of research described in the literature. Relevant data analyzed included: author, country, year, background, theoretical framework, research objectives, research design, sample size, sampling methods, participant descriptive, reliability, and validity, measurement instruments, statistical analysis and techniques, and results analysis (Nursalam, 2020)

RESULTS

Based on the search results, there were some articles that match with the criteria that had been set.

Table 1 Summary of included literature.

No	Titles, Authors and Years	Methods	Results
1	The effect of hypnosis on adherence To antituberculosis drugs using the Health Belief Model (Prasetya et al., 2018)	**Study Design**: Randomized Controlled Trial (RCT) **Sample**: 361 TB patients **Independent Variable**: *Hypnosis* **Dependent Variable:** Adherence **Instrument:** 7 constructs of HBM **Analysis:** 1. Uji *t Test* 2. Uji *Chi Square* Using SPSS 22	Hypnotherapy is able to effectively increase adherence to the treatment of pulmonary TB DOTS.
2	The relationship between family's informational support and self-efficacy of pulmonary tuberculosis client (Solikhah et al., 2019)	**Study Design:** Cross-Sectional **Sample**: 99 TB Patients. **Independent Variable**: Family's informational support **Dependent Variable**: Self-Efficacy **Instrument:** 1. Family support questionnaire 2. Self-efficacy questionnaire **Analysis:**	Statistical test results showed that self-efficacy was influenced by information support (p value 0.002; ˛ 0.05). It can be concluded that correspondents with low information support may have 0.047 times lower self-efficacy than respondents who received good information support (95% CI OR: 1,721; 9,519).

		1. Univariate test 2. Bivariate test	
3	Improving Self-Efficacy and Physical Self-Reliance of Patients with Pulmonary Tuberculosis through Mindfulness(Noorratri, Margawati, and Dwidiyanti, 2017)	**Study Design**: quasi-experiment with pre-post-test group design **Sample:** 19 intervention patients and 19 control patients. **Independent Variable:** Mindfulness **Dependent Variable:** Self-Efficacy dan Self-reliance **Instrument:** Questionnaire **Analysis:** Wilcoxon and delta tests.	This study shows an increase in self-efficacy and physical independence in patients in the intervention group with a p value <0.05. In the intervention group, there were differences in the activities of taking medication, eating, sleeping, preventing infection, practicing and coping with physical symptoms before and after the intervention. Patients in the intervention group also showed differences in increasing their confidence to recover. Mindfulness interventions have a good effect on patients in the intervention group because it helps them develop more awareness.
4	Educational strategy intervention and remote supervision on the post-discharge management of tuberculosis diagnosed in the hospital: Randomized clinical trial (Müller et al., 2019)	**Study Design**: Randomized control trial **Sample:** 169 new TB patient **Independent Variable:** Educational strategy intervention and remote supervision on **Dependent Variable:** the post-discharge management of **Instrument:** questionnaire **Analysis:** Chi-Square Test dan Fisher's exact test	A total of 169 new TB patients were registered. Among them, 80 were assigned to the intervention group and 89 to the control group. The cure rate was 71.3% in the intervention group and 58.4% in the control group. In a multivariate binary logistic regression model to evaluate the effects of interventions, controlled by age, sex, current and short smoking status directly observed, interventions were independently associated with cure rates (OR = 0.47; 95% CI: 0.24 -0.94; P = 0.033). There was a significant difference in the standard level between the control and intervention groups (18.0% vs 5.0% respectively, P = 0.039).
5	A Medication Adherence Enhancement Program for Persons with Pulmonary Tuberculosis: A Randomized Controlled Trial Study (Suwannakeeree et al., 2015)	**Study Design**: Randomized Controlled Trial (RCT) **Sample:** 50 patients; 25 intervention patients and 25 control patients. **Independent Variable:** Medication Adherence Enhancement Program (MAEP) **Dependent Variable:** Medication adherence **Instrument:** 1. The Demographic	The results showed that the average score of treatment adherence in the intervention group at 3 months after implementing the program was significantly higher than the control group. However, at 6 months after implementation, the average score of treatment adherence and treatment success of participants in the intervention group was higher than the control group but not significantly different. Nurses can implement this program to improve treatment compliance in the short term and

		2. Clinical Data Collection 3. Form, and the PTB-related Data Collection Form, 4. *he Anti-TB MA Scale* (ATBMAS) 5. *The Criteria to Identify TB Treatment Outcome* **Analysis:** 1. Chi-square 2. Fisher's exact test 3. The Mann-Whitney U test	increase the success of treatment in targeted people.
6	The effectiveness of face to face education using catharsis education action (CEA) method in improving the adherence of private general practitioners to national guideline on management of tuberculosis in Bandung, Indonesia (Arisanti, 2012)	**Study Design**: A randomized controlled trial **Sample:** 86 PPs **Independent Variable:** catharsis education action (CEA) method **Dependent Variable:** Adherence **Instrument:** Questionnaire **Analysis:** Wilcoxon Signed Ranks test	A total of 82 PPs were included in the analysis. The intervention group showed some positive trends in compliance especially in the use of sputum as a first laboratory examination (RR = 1.24) and follow-up (RR = 1.37), although it did not reach statistical significance. After the intervention, PP in the CEA group-maintained compliance, but PP in the pamphlet group showed a decrease (score before becoming after: -12.5).
7	Effects of Motivational Interviewing on Treatment Adherence among Patients with Chronic Obstructive Pulmonary Disease: a Randomized Controlled Clinical Trial (Naderloo et al., 2018)	**Study Design**: randomized controlled clinical trial **Sample:** 54 patients **Independent Variable:** Motivational Interviewing **Dependent Variable:** Adherence **Instrument:** Questionnaire **Analysis:** Chi-square and the independent-sample t tests	At baseline, there were no significant differences between groups regarding treatment adherence (P> 0.05); However, one and two months after the intervention, the differences between groups regarding treatment compliance were statistically significant (P <0.05).
8	Educational measure for promoting adherence to treatment for tuberculosis (Guix-Comellas et al., 2017)	**Study Design**: a prospective observational study **Sample:** 68 TB patients. **Independent Variable:** Leaflet **Dependent Variable:** Adherence **Instrument:** Questionnaire **Analysis:** Kolmogorov-Smirnov test	The overall rate of completion therapy was 89.7% (61 patients). Non-adherence was associated with being born abroad (p=0.048) and family of foreign origin p=0.001), but language barrier was not statistically significant as a factor of non-adherence.

9	Psychological and Educational Intervention to Improve Tuberculosis Treatment Adherence in Ethiopia Based on Health Belief Model: A Cluster Randomized Control Trial (Tola et al., 2016)	**Study Design**: A Cluster Randomized Control Trial **Sample:** 30 TB patients. **Independent Variable:** Psychological and Educational Intervention **Dependent Variable:** Adherence **Instrument:** 1. Questionnaires HBM 2. K-10 items scale 3. Visual Analogue Scale (VAS) 4. Alcohol Use Disorder Identification Test (AUDIT) **Analysis:** 1. multilevel logistic regression analysis# 2. Wald tests 3. Penalized Quasi Likelihood (PQL)	At enrollment, the level of non-compliance between the intervention groups (19.4%) and controls (19.6%) was almost the same. However, after the intervention, the non-compliance rate decreased among the intervention groups from 19.4 (at the beginning) to 9.5% (at the end point), while it increased among the control group from 19.4% (baseline) to 25.4 % (endpoint). Psychological counseling and educational interventions produced significant differences with respect to the level of non-compliance between the intervention and control groups (adjusted OR = 0.31, 95% Confidence Interval (CI) (0.18-0.53), p <0.001).
10	Impact of pharmacist counseling and leaflet on the adherence of pulmonary tuberculosis patients in lungs hospital in Indonesia (Karuniawati, et al., 2019)	**Study Design:** *a quasi-experiment method* **Sample:** 75 TB patients. **Independent Variable:** *pharmacist counseling and leaflet* **Dependent Variable:** Adherence **Instrument:** The compliance questionnaire contained 13 questions. **Analysis:** Wilcoxon and Kruskal Wallis with post hoc Mann Whitney	Before the intervention, out of 20 respondents (42.6%) of 75 respondents were compliant with their TB drugs, whereas after the intervention the number of obedient patients was 33 respondents (70.2%). There was a significant increase in adherence between before and after two weeks of counseling intervention with a p value of 0.029 before and after two weeks of counseling with leaflets with a p value of 0.003. Counseling and counseling with leaflets increased patient compliance compared to the control group with p-values of 0.028 and 0.001 respectively.

Based on the 10 studies summarized, all studies show significant results of data analysis and testing. Some studies suggest that further research needs to be done by taking into account confounding factors. In addition, many interventions are given to improve treatment adherence, so there needs to be more specific research for further research. The risk of bias in this study is low because the study shows the results of the articles specified in the systematic review are considered low risk of selection bias because most of the determination of the sample is by random selection. Although there are several studies that use quasi-experimental and cross-sectional designs, there is a high risk of bias.

Study characteristics

A total of 5 studies were conducted in Indonesia, and 5 other articles were conducted in Thailand, Brazil, Iran, India and Ethiopia. Respondents in this study were pulmonary TB

patients from several countries. With the majority of respondents numbering 19 to 361 respondents. Age from 15 to 65 and above. Gender characteristics are dominated by men and the study is multi-regional. and most levels of education at the elementary and junior high school levels. The psychological approach and health education based on the results of the study are divided into several approaches that are proven to increase compliance. Psychological dan education intervention consists of Psychotherapy, Mindfulness, Medication Adherence Enhancement Program (MAEP), and counseling and education.

Psychotherapy Intervention

Hypnotherapy with posthypnotic suggestion has been shown increasing the patient's perceived susceptibility, strengthen the perceived benefit, increase the perceived barrier, reduce the perceived obstacles, and increase self-efficacy. Patients who received hypnotherapy had higher adherence scores (mean = 53.40, SD = 6.43) than those who did not receive hypnotherapy (mean = 49.37, SD = 8.68), and this difference was statistically significant (p = 0.045). In addition, patients who received hypnotherapy was more high mean scores in perceived susceptibility, perceived seriousness, perceived threat, perceived benefit, and self-efficacy, than those who did not receive hypnotherapy. The mean difference in HBM construction was also statistically significant (p <0.05) (Prasetya *et al.*, 2018).

Mindfulness intervention

Studies using the Mindfulness intervention shows a significant increase in self-efficacy in the intervention group with a value of p = 0,000 (p <0.05). TB patients demonstrate self-efficacy and exercise consciously, and are able to manage daily activities. Mindfulness intervention can reduce patient emotions and stress, encourage patients to take treatment secularly, allowing patients to sleep well and realize the importance of eating (Noorratri et al., 2017).

Counseling and Education Interventions

Psychological and educational counseling interventions have the effect of knowledge and each of the dominance of the Health Believe Model (HBM) at the end of the program (p <0.001) (Tola et al. 2016). Pharmacy counseling also has an impact on increasing patient compliance. Educational media such as leaflet makes it easy for patients to get information related to the care being carried out (Karuniawati et al. 2019).

MAEP Intervention

MAEP is designed based on social cognitive theory, for pulmonary TB patients in achieving successful care and treatment compliance. The intervention group received the MAEP program in addition receiving usual care, while the control group only received usual care. Study Suwannakeeree et al. (2015) states that the high number of medication adherence (MA) is triggered by activities that increase one's self-confidence (self-efficacy) to regulate themselves and the supportive environment supported by the family.

DISCUSSION

Psychological and health education approaches based on self-efficacy are very important to be applied to overcome non-compliance with pulmonary TB patients. Psychological dan education intervention consists of Psychotherapy, Mindfulness, Medication Adherence Enhancement Program (MAEP), and Counseling and education. The First, Mindfulness intervention can increase the self-efficacy of pulmonary TB patients. The implication is that patients feel unemotional and stressed, patients are encouraged to take medication regularly. In addition, patients feel calm and relaxed, take medicine independently, be aware of their surroundings, are not ashamed to wear masks to prevent infection, develop sincerity, accept their illness and make efforts to recover by taking medication regularly, and

increase their appetite (Noorratri et al., 2017). The relationship between self-efficacy, and adherence directly impacts the treatment of pulmonary TB patients (Firth et al., 2019). Patients with high self-efficacy will have the confidence to complete various tasks and various difficulties during treatment. (Dwidiyanti, 2014)

The second, hypnotherapy effectively increases adherence to TB treatment by increasing health-related perceptions and beliefs in the Health Belief Model (HBM). Hypnotherapy with posthypnotic suggestion has been shown to increase self-efficacy. These changes in self-efficacy ultimately increase adherence to DOTS treatment (Prasetya et al., 2018).

The third, educational and psychological counseling interventions based on the concept of the Health Believe Model (HBM) reveal that non-compliance decreases after intervention is given. This compliance is serialized by changes in the perception of self-efficacy which is a component of HBM (Tola et al., 2016). Education and counseling of patients suggest to participate actively in their own health care. (M'Imunya & Volmink, 2007). HBM is a appropriate model for understanding and explaining health behaviors including medication adherence that needs to be practiced in patient compliance treatment behavior (Ilongo, 2004; Munro et al., 2007). Educational programs influence patient attitudes and create awareness about the importance of treatment completion (Ndwiga et al., 2016). Increasing patient knowledge can increase patient awareness about illness and risk of complications so that patients become compliant. There was a statistically significant effect of providing counseling and leaflets or pharmacy counseling on the level of compliance of pulmonary TB patients in taking TB drugs before and 2 weeks after the intervention (Karuniawati et al., 2019). Counseling activities are also beneficial in helping patients understand their treatment, advance treatment compliance and patient treatment satisfaction and accordingly improve clinical outcomes (Volino et al., 2014; Sanii et al., 2016).

The fourth, the high number of medication adherence (MA) is triggered by activities that increase one's self-confidence (self-efficacy) to regulate themselves and the supportive environment supported by the family. MAEP interventions were effective in increasing compliance 3 months after entering the Program, but were unsuccessful in increasing compliance and treatment success 6 months after entering the Program (Suwannakeeree et al., 2015). MAEP was developed based on the concepts of self-efficacy and self-regulation from Social Cognitive Theory (SCT). The program includes two components: the first component provides activities to improve self-efficacy for self-regulation in complying with TB treatment, and the second component provides environmental support consisting of family support options and telephone reminders and counseling.

Compliance with treatment of pulmonary TB patients can be influenced by the perception of self-efficacy and the perception of obstacle treatment (specific behavior), the patient's knowledge of pulmonary TB disease (previous behavior), and the support of health workers during treatment (interpersonal influence). While the perception of self-efficacy is the most dominant determinant (Syafrida. dan Faisya, 2013).

According to Bandura (1997) self-efficacy is one's belief about the ability to overcome problems and their expectations of positive results. Sources of assessment about one's self-efficacy are based on four sources of information: (1) active achievement, which is the patient's performance in the form of a behavior; (2) the experience of a representative or visualizing other people who are similar doing the behavior; (3) verbal control or pressure; and (4) physiological state or physiological feedback during behavior, such as pain or fatigue.

Psychological and health education approaches based on self-efficacy in this study use more HBM theory. During this time, HBM

has really been recommended in behavioral interventions including the handling of adherence needed by patients (Poss, 1998; Ilongo, 2004; Munro et al., 2007). However, the use of HBM is frequently criticized because it places more emphasis on individual characteristics and cognitive factors, but gives less attention to social influences and emotional components of behavior (Barnhoorn & Adriaanse, 1992).

Studies on the relationship between family information support and self-efficacy have been recommended to empower families to provide support for increased self-efficacy of TB patients (Solikhah et al., 2019). Patients will more easily change their behavior if they feel the availability of environmental support (family support) during the process and maintenance of behavior change, then help improve long-term success (Bandura, 2004).

Improved self-efficacy can be integrated into regular TB clinic services for newly diagnosed people. Program development is very necessary in increasing self-efficacy. Not only limited to psychological and Health Education approaches. Four sources for increasing self-efficacy must be the basis for developing one's self-efficacy. Social or family support is needed to strengthen the patient's self-confidence to be compliant in undergoing treatment, then they can complete treatment and be declared cured

CONCLUSION

Psychological approaches and Health Education based on self-efficacy consist of various interventions; Mindfulness, psychotherapy, counseling and education, and self-efficacy programs. The articles analyzed mostly use the HBM concept. There needs to be a self-efficacy development program that not only emphasizes the individual and cognitive, but also needs social and family support in improving self-efficacy, so that it affects the effectiveness of treatment.

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DECLARATION OF CONFLICTING INTEREST

This comprehensive summary or systematic review is independent writing, so there is no conflict of interest in the writing.

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AUTHOR CONTRIBUTION

Idham Choliq: Designed the study, collected and analyzed articles, and contributed to completion of systematic review.

Tintin Sukartini: Contributed to completion of systematic review.

Makhfudli: Contributed to completion of systematic review.

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