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A Systematic Review of Psychological Distress that Occurs During the Treatment of Tuberculosis

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Abstract--- *Compliance with treatment is the key to the success of the DOTS program in patients with tuberculosis. Psychological problems are one of the factors that can result in non-compliance of patients following the DOTS treatment regimen. The purpose of this review is to explain the psychological problems that can arise in tuberculosis patients following the treatment program. This study used a systematic review with the Preferred Reporting Items for Systematic Reviews and Meta-analyses (PRISMA). A search used the following data sources: Scopus, Science Direct, Pubmed and ProQuest. The total articles found were 1042 articles, the articles used totaled 17. The article search was limited to the last 5 years (2015-2020), the English language as well as full-text articles. Keywords used were "Psychological Distress", "Emotional Distress", and "Tuberculosis". The population included were respondents aged> 18 years who were undergoing a tuberculosis treatment regimen and had no previous history of mental disorders. The results show that the psychological disorders that may arise during the treatment of tuberculosis patients are depression, anxiety, loneliness, and psychological distress. Psychological disorders that arise can be associated with a decrease in quality of life and risk of multidrug-resistance and non-compliance with treatment. Conclusion: psychological distress occurs among tuberculosis patients and the most experienced of these among patients is depression. Interventions in tackling psychological disorders in tuberculosis patients are urgently needed to help patients improve in terms of completing tuberculosis treatment. The role of health workers in providing comprehensive nursing care and support from families is very helpful for patients in overcoming their psychological problems.*

Keywords--- *Anxiety; Depression; Loneliness; Psychological Distress; Tuberculosis*

I. INTRODUCTION

Tuberculosis is a chronic disease that can cause death. The incidence of tuberculosis is increasing every year. This disease is caused due to the presence of Mycobacterium Tuberculosis bacteria that live in the organs of the body [1]. Compliance in undergoing treatment is the key to the success of the DOTS (Directly Observed Treatment Short) program.

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Psychological problems are one of the factors that can result in non-compliance of patients following the DOTS tuberculosis treatment regimen. Prolonged treatment increases the risk of withdrawal, thereby increasing the spread of tuberculosis transmission and the incidence of drug resistance [2]. The incidence of tuberculosis is increasing every year [3]. Patients with chronic diseases have a risk of 2 to 3 times greater psychological problems compared to people who do not experience health problems [4]. Diagnosis of chronic diseases causes emotional disturbances and affects daily life [5]. The emergence of psychological problems can affect health behaviors, functional disorders, non-compliance with treatment, risk of complications and treatment costs to death [4]. Tuberculosis can affect the welfare of the patient's life and affect the patient's role in the environment [6].

This will harm the quality of life of patients in terms of physical, psychological, spiritual, environmental and social well-being [7] [8]. Psychological problems that often arise in patients undergoing tuberculosis treatment are depression and anxiety [9]. Patients who experience depression total 61.1% while undergoing treatment [10]. In research in Portugal, it was found that 49.4% of patients were depressed and 38.3% had anxiety [11]. In general, symptoms that appear in depressed patients are hopelessness, feelings of inferiority, decreased appetite, sleep disturbance, decreased concentration, fatigue, irritability and loss of interest in the environment and social relations [12]. Several studies have been conducted on psychological problems that arise, related factors and the impact of each psychological disorder on treatment. Psychological issues discussed in some previous studies discuss one psychological problem experienced by tuberculosis patients only but there is a need to describe some psychological problems that can occur in tuberculosis patients to help health workers to provide comprehensive care and in anticipation of dropout prevention measures due to psychological problems experienced by patients. There were no articles that explained the psychological problems that arise during the treatment of tuberculosis. The researchers in this study want to review the psychological problems that can occur in tuberculosis patients. The researchers hope that this review can be a guide for nurses and health professionals in the care of tuberculosis patients. The purpose of this review was to explain the psychological problems that can arise in tuberculosis patients in following treatment programs.

II. METHODS

- Strategy for searching for studies

This article used a systematic study review, compiled based on PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-analyses). Articles were searched for using the Scopus, Science Direct, Pubmed and ProQuest databases. The article search was limited to the most recent five years of publication (2015-2020), the English language as well as full-text articles. Keywords used in the search were "Psychological Distress", "Emotional Distress", and "Tuberculosis".

- Study selection

The data obtained were then analyzed and synthesized based on inclusion and exclusion criteria. In this systematic review, the inclusion criteria were: (1) respondents are 18-65 years old; (2) problems occur during the tuberculosis patient's treatment phase; (3) in English; (4) original articles; (5) in the last five years (2015-2020). Exclusion criteria were: the patient has a history of previous mental disorders. The psychological distress discussed focused on psychological problems caused by tuberculosis. Psychological distress discussed in this review emphasizes psychological distress attributable to psychological distress in individuals rather than social-psychological problems. The articles used were not limited in terms

of the type of study design. Articles had to comply with the inclusion and exclusion criteria. Abstracts and full texts had to be compatible and explain the questionnaire used in measuring the perceived psychological distress.

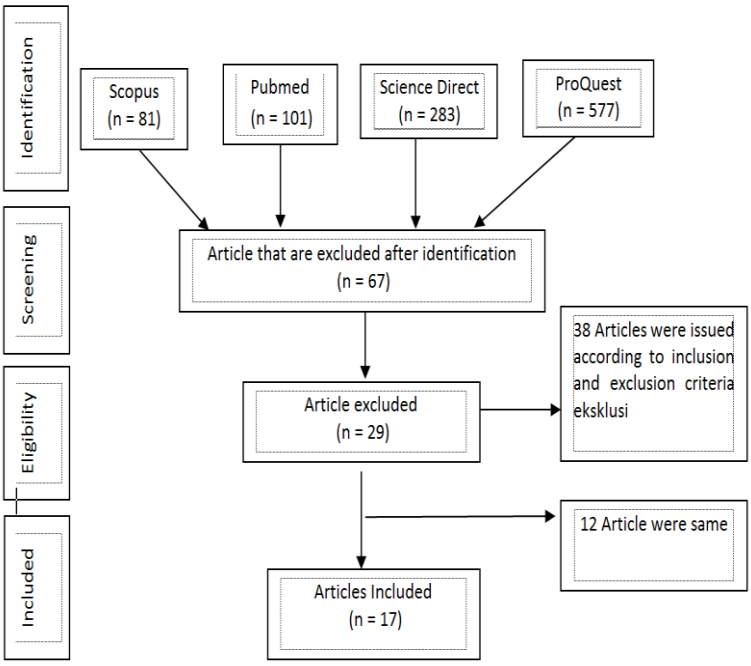

Figure 1

III. RESULT

The early literature search identified 1042 articles, 81 obtained from Scopus, 101 from PubMed, 283 from Science Direct and 577 from ProQuest. The articles found were then reviewed in the abstract, for relevance to the theme and adjusted for inclusion and exclusion criteria.

Table 1. General characteristics of selected studies (n=17)

Category	n	%
Year of publishing		
2015	2	11.8
2016	5	29.4
2017	1	5.9
2018	1	5.9
2019	7	41.1
2020	1	5.9
Country of Study		
Angola	2	11.8
Brazil	1	5.9
Cameron	1	5.9
China	2	11.8
Ethiopia	5	29.4
India	1	5.9
Indonesia	1	5.9

Category	n	%
Nepal	1	5.9
Pakistan	2	11.8
Turki	1	5.9
Type of Tuberculosis		
Pulmonary	7	41.1
Extra-pulmonary	10	58.9
Type of Study		
Cross-sectional	17	100
Psychological Distress		
Depression	8	47.2
Depression and anxiety	4	23.6
Depression, anxiety, and loneliness	1	5.9
Psychological distress	4	23.6

The respondents totaled 7,201 patients with tuberculosis. Research in this review covered 17 studies with cross-sectional designs: seven studies on people with pulmonary tuberculosis and ten studies on extrapulmonary tuberculosis patients. Several studies examined psychological disorders in the initial treatment, after 2 months, 6 months and also in MDR patients. Psychological disorders occur in every phase of tuberculosis treatment. The highest number of articles found in this review came from Ethiopia: 5 articles, then Angola: 2 articles, China: 2 articles, Pakistan: 2 articles, Cameron: 1 article, Brazil: 1 article, Indonesia: 1 article, Turkey: 1 article, and Nepal: 1 article. The study included 8 articles about depression, 4 articles about depression and anxiety, 4 articles about psychological distress, and 1 article about depression, loneliness, and anxiety.

IV. DISCUSSION

From the journals obtained and examined according to the theme, the articles used previously were screened according to the inclusion and exclusion criteria [13]. Psychological problems that can occur during the tuberculosis treatment period are depression, loneliness, anxiety, and psychological stress.

- Depression

Depression is a common mental problem with several symptoms that can appear, namely sadness, despair, feelings of guilt, low self-esteem, loss of appetite, sleep disturbance, fatigue and decreased concentration to suicidal ideation [14]. Depression is the most common psychological disorder in tuberculosis patients undergoing treatment. From the journals studied, most of them focused on developing countries and were included in the top five tuberculosis events, both of which were countries on the African continent, China, Indonesia [30] [3]. The health system in developed countries is better when compared to developing countries [15]. Depression is also characterized by a reduction in energy and a loss of interest in things [16]. Gul et al.'s study shows that patients with pulmonary tuberculosis are depressed. The factors that influence depression are age and sex [17]. Some other factors are stigmatization, social stigmatization, low socioeconomic status, duration of treatment, fear and the high risk of transmission to families and communities [18]. The higher prevalence of women compared to men who are depressed can be associated with women being more at risk due to lifestyle, stigmatization of society and women taking care more of the family in household life [18]. Studies in Pakistan also show factors related to depression in women are

linked to problems with husbands and in-laws [19]. Some other possibilities are biological factors such as hormonal changes associated with menstruation, pregnancy, and childbirth [20]. In line with the research [21], women are more vulnerable to the risk of experiencing depression. The most vulnerable age group for experiencing depression is 26-35 years and age groups over 55 years. In Dasa's research, much of the depression occurred in those less than 35 years of age. A younger age is associated with high social activities; a younger age is a productive age and there is a high sense of shame at this age [22] [18]. Stigmatization related to the incidence of depression is caused by community isolation, HIV coinfection, and low self-image and low self-esteem [23] [21]. Tuberculosis affects the patient's social and financial activities [18][24]. Other factors associated with the incidence of depression are drug side effects and new diagnoses [18]. Smoking and alcohol consumption, the presence of chronic comorbidities in tuberculosis patients, diagnosis of extra-pulmonary TB and low social support are also risk factors for depression (19) [23]. Dyspnea is also a factor that can increase the risk of depression [22]. Depression that occurs can affect the emotional, mental and physical well-being of patients and is associated with the threat of decreased quality of life among patients [25]. In tuberculosis patients, depression can result in the patient's despair in undergoing treatment, increasing the spread of germs, as well as a major effect on tuberculosis patient compliance with regard to undergoing treatment regimens even at an increased risk of death. Physical and mental interventions are needed to improve the comprehensive care of tuberculosis patients.

- Loneliness

Feelings of loneliness can occur in patients with tuberculosis. The loneliness felt by patients is related to the fac that treatment is given separately in an isolation room. Feelings of loneliness will lead to anxiety and depression when the patient does not manage the feelings appropriately [26]. Loneliness can result in cognitive decline as well as other physical problems [27]. The prevalence of loneliness is experienced in adults [28]. Feelings of loneliness can reduce patient confidence and affect the ability of patients to manage tuberculosis so that it affects the success of patients in following treatment [29][30].

- Anxiety

Anxiety is one of the psychological problems that occurs in tuberculosis patients. Patients mostly experience moderate anxiety [20]. Women are more prone to experiencing anxiety [20]. Tuberculosis, which is contagious and is a chronic disease, increases anxiety in patients. Low family and friend relationships result in anxiety [20]. The social isolation felt by the patient makes the patient withdraw, ashamed, afraid and suffering low self-esteem. Anxiety is correlated with marital status; in married patients the anxiety is twice as high [22]. Marital status is related to a lack of support from the spouse [22]. In the study of Walker et al. (2018), it was explained that patients who are single also experienced high anxiety with MDR-TB [31]. The occurrence of extra-pulmonary TB and multidrug-resistance is also one of the factors associated with anxiety [32]. Another factor associated with anxiety is drug side effects [31]. Anxiety experienced by patients can affect the quality of life of patients [33], as well as patient compliance, is undergoing treatment [22]. It is very important to handle both physical and mental health comprehensively to achieve successful outcomes in the treatment of tuberculosis [34].

- Psychological Distress

Stress is a physical and psychological reaction that arises because of pressure. Stress can last several hours to much longer. Psychological stress states are also interpreted as painful emotional states that are characterized by depression and anxiety [35]. Stressful symptoms arise such as irritability, and anxiety [36]. Patients with tuberculosis were found to experience mild, moderate to severe stress [36]. Stress that occurs can affect the quality of life of tuberculosis patients [36]. Factors associated with psychological distress are women and the presence of comorbid diseases such as HIV [37] (10). Psychological pressure in the intensive phase is higher than the psychological pressure that occurs in the advanced phase [38]. Factors related to psychological distress in the intensive phase are a history of past TB disease, following two TB treatments and HIV, not being married, low economic status and a history of alcohol use [38][39]. Factors related to psychological distress in the advanced phase are employment status, low economic status and changes in diagnosis for multidrug-resistant patients [38] [32]. The length of time diagnosed in the following treatment is also related to psychological distress [40]. Low education and perception of stigma are also factors associated with psychological pressure [41] [42] [40]. Psychological pressure experienced by patients can cause patient non-compliance in the treatment of tuberculosis [43].

V. CONCLUSIONS

Psychological problems can occur during the tuberculosis treatment period both in intensive and advanced phases. Patients with multi drug-resistance experience a high risk of psychological problems. Psychological distress occurs in tuberculosis patients and the most commonly experienced by patients is depression. Intervention in overcoming psychological disorders in tuberculosis patients is needed to assist patients in increasing patient participation in completing tuberculosis treatment. The role of health workers, family, and motivation in patients is needed to help patients overcome psychological problems that they face.

CONFLICT OF INTEREST

There is no conflict of interest.

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VI. APPENDIX

Table 1 Summary of Psychological distress that occurs during the treatment of tuberculosis

No	Author	Country	Method	Outcome
1	Emotional Distress Patients With Several Types Of Tuberculosis. A Pilot Study With Patients From The Sanatorium Hospital Of Huombo, (Paulo and Peixoto, 2016) [11]	Angola	Design: Cross-sectional study Sample: 81 TB patients Variable: Instrument: The questionnaire used was the Hospital Anxiety and Depression Scale (HADS) Analysis: Frequencies and percentage for each variable and persoss Chi-square	38.3% of patients experience anxiety, 49.4% of patients experience depression and 44.4% of patients experience emotional distress
2	Frequency Of Depression In Patients Suffering From Pulmonary Tuberculosis (Gul et al., 2017) [17]	Pakistan	Design: Cross-sectional study Sample: 256 patients, 154 male patients and 102 female patients Variable: Pulmonary Tuberculosis, Depression Instrument: Measurements using the HDRS questionnaire (Hamilton Depression Rating Scale) Analysis: Mean score and standard deviation	Patients who were depressed: 52 patients (20.3%), depressed moderate 102 (39.8%), weight 51 (19.9%). No depression: 51 people (19.9). Depression is more common in females (61.95%) compared to male patients (38.04%). The age group 18 - 59 years is more susceptible to depression.
3	The Relationship Of Stress Level And Quality Of Life Among Patients With Tuberculosis In Makassar, Indonesia (Wijaya, and Ummah, 2019) [36]	Indonesia	Design: Cross-sectional study Sample: 37 respondents Variable: Quality of life, stress level, Pulmonary Tuberculosis Instrument: DASS 14 questionnaire and WHQOL-BREF 26 quality of life questionnaire Analysis: Kolmogorov smirnov with significant degree of 95%	Patients who experienced mild stress with good quality of life: 19 respondents (79.2%); moderate stress with good quality of life: 3 people; severe stress with good quality of life: 0. Respondents with mild stress and poor quality of life: 5 respondents; moderate stress: 8 people and severe stress: 2 people.
4	Prevalence And Association Factor Of Depression Among Tuberculosis Patients In Eastern Ethiopia (Dasa *et al.*, 2019) [14]	Ethiopia	Design: Cross-sectional study Sample: 403 respondents Variable Dependent: Depression, Independent: age, sex, residence, religion, ethnicity, marital status, occupational status, educational status, family size, treatment duration, type of medication, level TB treatment and Quality of life Instrument: Measuring depression using the Patient Health Questionnaire (PHQ) questionnaire Analysis: Descriptive statistics were used frequency, median, mean, and standard deviation. Bivariate and multivariate logistic regression model to identify independent factor for dependent factor	Prevalence of depression among TB patients was 51.9% - mild cases, and the prevalence of high depression in this study is related to age, low monthly income, category of patients as "new TB treatment" and the first three months of treatment.
5	The Effect Of Psychosocial Factors And Patients' Perception Of Tuberculosis Treatment Non Adherence In Addis Adaba Ethiopia (Tola *et al.*, 2017) [43]	Ethiopia	Design: Cross-sectional study Sample: 698 respondents Variable: Psychosocial factors, Health Belief Model, Treatment Non Adherence Instrument: Measurements were performed using, sociodemographic data questionnaires, knowledge questionnaires, HBM questionnaires, psychological distress using K10 Analysis Bivariate and multivariate use logistic regression	Some factors that have a relationship with non-compliance with treatment are HIV co-morbidities, alcohol use, economic status, perceived barriers, and psychological distress.
6	Depression and Anxiety in Patients with multidrug-resistant tuberculosis in Nepal: An observational study	Nepal	Design: Cross-sectional study Sample: 135 respondents Variable: Depression, Anxiety, Multidrug-resistance Instrument: 25-item Hopskin Symptomp Cheklist (HSCL-25)	Respondents who experienced the side effects of physical problems had higher depression and anxiety scores and respondents who were single also had high anxiety.

No	Author	Country	Method	Outcome
	[Walker, *et al.*, 2018] [31]		Analysis: Logistic regression models, multilevel linear regression models	
7	Depression And Associated Factors Among Patients With Tuberculosis In Ethiopia: A Cross Sectional Study (Molla, Mekuriaw and Kerebih, 2019) [23]	Ethiopia	Design: Cross-sectional study Sample: 415 TB patients Variable: Depression illness, social support, stigma, tuberculosis patient Instrument: The measurement used Patient Health Questionnaire -9 (PHQ) to measure depression, Social support was assessed by 3 item Oslo Social support scale, TB stigma wa assessed using 12 item perceived stigma scale Analysis: Bivariate analyses and multivariate analyses	Factors associated with depression in tuberculosis were extra-pulmonary TB, low social support and the perceived stigma of the patient.
8	Depressive Symptoms Mediate The Association Of Stigma With Medication Adherence And Quality Of Life In Tuberculosis Patients In China (Qiu *et al.*, 2019) [25]	China	Design: Cross-sectional study Sample: 1342 Tuberculosis patients Variable: Demographic Characteristic, stigma, depressive, medication adherence, quality of life Instrument: The questionnaire used was a demographic questionnaire, TB related stigma, depressive symptoms, medication adherence and quality of life Analysis: Structural equation modeling	Depression that occurs in TB patients is related to stigma, medication adherence, and quality of life in patients with TB.
9	Emotional Distress In Angolan Patients With Several Types Of Tuberculosis (Xavier and Peixoto, 2015) [32]	Angola	Design: Cross-sectional study Sample: 81 Tuberculosis patients Variable: Instrument: Measurement of depression and anxiety using HADS (Hospital Anxiety and Depression Scale). Analysis: Pearson's Chi-square	The results of the measurement showed that tuberculosis patients experienced anxiety (38.3%) and depression (49.4%) and emotional stress level (44.4%).
10	A Survey Of Anxiety And Depressive Symptoms In Pulmonary Tuberculosis Patients With And Without Tracheobronchial Tuberculosis (Wang *et al.*, 2018) [22]	China	Design: Cross-sectional study Sample: 1525 patients with pulmonary tuberculosis Variable: Social support, depression, anxiety, dyspnea, thorachobronchial tuberculosis Instrument: Measurements using HADS and PHQ-9 questionnaires, socio-demographics, body mass index, education level, TB symptoms, occupational status, marital status, monthly income, family history, smoking status, comorbidities, other social factors, and mMRC Scale. income, symptoms of dyspnea. Analysis: Multivariate logistic regression model	Factors related to depression and anxiety in TB patients are age, divorce, body mass index and low income, symptoms of dyspnea.
11	Incidence Of Depression In People With Newly Diagnosed Tuberculosis In Ethiopia: A Cohort Study (Ambaw, 2020) [44]	Ethiopia	Design: Cross-sectional study Sample: 648 patients with a new Tuberculosis diagnosis Variable: Depression, Quality of life, treatment outcome Instrument: Measurements using the Patient Health Questionnaire-9 (PHQ-9). Measurements were made at the 2nd and 6th month of treatment Analysis: Independent t test and Mann Whitney U test .	299 patients with a diagnosis of pulmonary TB did not experience depression at the start of treatment, 22 patients had depression in the second month and that rose to 26 in the 6th month.
12	Prevalence Of Psychological Distress And Associated Factors Among Adult	Ethiopia	Design: Cross-sectional study Sample: 365 patients with Tuberculosis	Psychological pressure that occurs in pulmonary tuberculosis patients was experienced by 63.3%, factors related to the psychological stress that occurs in

No	Author	Country	Method	Outcome
	Tuberculosis Patients Attending Public Health Institutions In Dire Dawa And Hara Cities, Eastern Ethiopia (Ayana, Roba and Mabalhin, 2019) [45]		Variable: Psychological distress, Tuberculosis, Stigma Instrument: Psychological measurement of distress using K-10 questionnaire Analysis: Bivariate analysis using frequency, means, and standard deviations. Multivariate analysis using logistic regression model	pulmonary tuberculosis patients are originating from rural areas, the presence of a chronic HIV/AIDS disease, the experience of stigma, smoking, pulmonary TB diagnosis and MDR TB.
13	Prevalence And Correlates Of Depressive Symptoms In Adult Patients With Pulmonary Tuberculosis In The Southwest Region Of Cameroon (Kehbila *et al.*, 2016) [10]	Cameroon	Design: Cross-sectional study Sample: 265 patients with tuberculosis, Variable: Depression, pulmonary tuberculosis, social demographic Instrument: Measurements using the Patient Health Questionnaire - 9 (PHQ-9) questionnaire Analysis: Bivariate analysis used means and standard deviation, chi square test was conducted to determine the associations between potential predictor variable and depression. Multivariate logistic regression	The prevalence of depression in TB patients was 61.1% and 38.9% of patients did not experience depression; 36.6% had mild depression and 65 patients (24.5%) had moderate depression
14	Prevalence Of Depression Among Patients With Presumptive Pulmonary Tuberculosis In Rio De Janeiro, Brazil (De Castro-Silva *et al.*, 2019) [46]	Brazil	Design: Cross-sectional study Sample: Respondents in this study were 260 Variable: Depression, social demographic, tuberculosis Instrument: Depression measurement using the Patient Health Questionnaire (PHQ) -9 and using interviews according to the Mini-International Neuropsychiatric Interview (MINI Plus) questionnaire to confirm the diagnosis of depression Analysis: Bivariate analysis means score, frequent, standard deviation. Associations of categorical variable with chi square. Multivariate analysis used logistic regression	The results of this study showed that women are more likely to face depression than men. In pulmonary tuberculosis, higher values were obtained in the measurement of depression compared to extra-pulmonary TB patients (59.5% and 50.9%, respectively). Prolonged cough> 8 weeks can aggravate symptoms of depression.
15	A Study Of Prevalence Of Depression And Anxiety In Patient Suffering From Tuberculosis (Kumar *et al.*, 2016) [47]	India	Design: Cross-sectional study Sample: Respondents in this study totaled 100 Variable: Depression, anxiety, Tuberculosis Instrument: The questionnaire used was general health questionnaire 12 (GHQ-12), Beck Depression Inventory-II (BDI-II) and Hamilton Anxiety Rating Scale (HARS) Analysis: Means score, percentage	Out of 100 cases, 74 cases were found to be having psychiatric symptoms, with 35 cases suffering from depression and 39 suffering from anxiety.
16	Frequency Of Depression And Anxiety Among Tuberculosis Patients (Rizvi, 2016) [20]	Pakistan	Design: Cross-sectional study Sample: The sample in this study was 100 tuberculosis patients Variable: Depression, anxiety, tuberculosis Instrument: Depression measurements were carried out using the PHQ - 9 (Patient Health Questionnaire - 9) and anxiety measurement using Generalized Anxiety Disorder Questionnaire (GAD-7) Analysis: T test	The results found as many as 56% had depression, 65% had anxiety. Prevalence showed that females had higher instance of depression than men. The prevalence of anxiety also found significant results that women were more prone to experiencing anxiety than men
17	Assessment Of Anxiety, Depression, Loneliness And Stigmatization In Patients With Tuberculosis	Turkey	Design: Cross-sectional study Sample: 208 patients, measurements using the tuberculosis patients	The prevalence of anxiety in tuberculosis patients was 26%, depression 60.5% and loneliness 49% and stigmatization 47.6%.

No	Author	Country	Method	Outcome
	(Yilmaz and Dedeli, 2016) [26]		Variable: Stigmatization, Anxiety, Depression, Loneliness, Tuberculosis Pulmonary Instrument: Stigma Scale (TPSS) questionnaire, Hospital Anxiety and Depression Scale (HAD), and the University of California of Los Angeles-Loneliness Scale (UCLA Loneliness Scale) Analysis: Percentage, means score, standard deviation.	