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# Exploring anxiety in elderly pulmonary tuberculosis inpatients using propensity score matching method

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## Abstract

**Objective** The objective of this study is to explore the factors that influence anxiety in elderly hospitalized pulmonary tuberculosis patients using propensity score matching (PSM) methods.

**Methods** We retrospectively analyzed the clinical data of elderly patients with pulmonary tuberculosis admitted to the tuberculosis Department of Lishui Hospital of Traditional Chinese Medicine from January 2021 to October 2023. The patients were then divided into anxiety and non-anxiety groups based on their GAD-7 scores. Propensity score matching was used to match the baseline data of the two groups, followed by multivariate logistic regression analysis to identify the influencing factors of anxiety in elderly hospitalized pulmonary tuberculosis patients.

**Results** The study included 795 elderly hospitalized patients with pulmonary tuberculosis, with 599 classified as carefree and 196 as anxious (32.72%). Using the propensity score matching method, we successfully matched 185 pairs of patients. After matching, there were no statistically significant differences in gender, age, occupation, or other aspects between the two groups of patients (all $P > 0.05$). Multivariate logistic regression analysis revealed that chronic comorbidities (OR = 2.36, 95% CI: 1.54–3.61), lack of daily social interaction (OR = 1.79, 95% CI: 1.15–2.76), tuberculosis recurrence (OR = 2.08, 95% CI: 1.35–3.21), and lack of daily behavioral ability (OR = 1.99, 95% CI: 1.23–3.23) were influencing factors for anxiety in elderly hospitalized pulmonary tuberculosis patients ($P < 0.05$).

**Conclusion** After controlling for confounding factors through PSM, we found that chronic comorbidities, lack of daily social interaction, tuberculosis recurrence, and lack of daily behavioral ability are influencing factors for anxiety in elderly pulmonary tuberculosis inpatients. This suggests a need for clinical intervention.

**Clinical trial number** Not applicable.

**Keywords** Pulmonary tuberculosis, Elderly age, Anxiety, Propensity score matching, Influencing factors

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## Introduction

With the aging of the population, the incidence rate of tuberculosis in the elderly population is higher at present. The elderly are easy to be infected with new tuberculosis and reactivate latent tuberculosis. Therefore, the elderly population is a major source of tuberculosis infection [1]. The incidence rate of pulmonary tuberculosis in individuals over 60 years of age is 2–3 times higher than in young people [2]. The decline in immune and nutritional functions in the elderly has led to the highest incidence of pulmonary tuberculosis in this age group. Elderly patients with pulmonary tuberculosis often exhibit atypical clinical symptoms and diverse imaging manifestations, leading to potential misdiagnosis and missed diagnosis. Furthermore, delays in treatment can easily occur, exacerbating the condition [3, 4]. Anxiety is a prevalent mental illness among the elderly, significantly impacting their quality of life, and it can interact with tuberculosis, compounding the health issues. Research conducted on the prevalence of anxiety and depression in tuberculosis patients in different countries or regions shows that the prevalence of anxiety ranges from 40.67 to 72.88%, and for depression, it ranges from 9.93 to 61% [5]. A study in China revealed that the prevalence of anxiety and depression in tuberculosis patients is about 18.37% and 18.13%, respectively [6]. This study aims to identify the influencing factors of anxiety among elderly hospitalized patients with pulmonary tuberculosis, providing a theoretical basis for early prevention and treatment.

## Object and methods

### Research object selection

A retrospective analysis was conducted on the clinical data of elderly pulmonary tuberculosis patients who were hospitalized in our department from January 2021 to October 2023. The data included information such as age, gender, occupation, history of alcohol consumption, history of smoking, living arrangements (whether they live alone), frequency of daily social interaction, presence of chronic comorbidities, history of tuberculosis recurrence, daily functional ability, and presence of sleep disorders.The study was approved by the hospital's Medical Ethics Committee (Approval number:LW-2024010).

## Methods

### Patients inclusion and exclusion criteria

Inclusion criteria: (1) Patients who meet the diagnostic criteria for pulmonary tuberculosis [7]; (2) Elderly hospitalized patients aged ≥ 65 years old; (3) The clinical data is complete. Exclusion criteria: (1) Patients with concomitant mental disorders who are unable to communicate normally; (2) Patients with severe missing clinical data.

### Patients data collection

Please gather information on the patients' age, gender, occupation, drinking history, smoking history, living arrangements, daily social interaction, chronic comorbidities, history of tuberculosis recurrence, daily behavioral ability, and sleep disorders through the inpatient management information system.

### Case grouping

According to the Generalized Anxiety Scale (GAD-7),GAD-7 was initially developed by Spitzer et al. as a brief tool to identify probable diagnosis of generalized anxiety disorder and its severity, has been validated across different countries and populations and has shown good psychometric properties [8]. The anxiety symptoms of elderly individuals are assessed after admission. A total score of $<5$ indicates the absence of anxiety symptoms, while a total score of $\geq 5$ indicates the presence of anxiety symptoms.

### Statistical analysis

All data were analyzed using SPSS 26.0 software. Counting data were expressed as percentages (%) and differences between groups were compared using Chi-Square tests. Econometric data that did not conform to normal distribution were represented by the median (M) and interquartile range (P25, P75), and inter-group comparisons were made using the Mann Whitney U test. Propensity score matching (PSM) was conducted using a 1:1 nearest neighbor matching method with the help of an extension program, and the goodness of the matching results was ensured by defining clamp values. Multivariate logistic regression analysis was used to investigate the influencing factors of anxiety in elderly hospitalized patients with pulmonary tuberculosis. The differences were statistically significant ($P<0.05$).

## Results

### Case screening

A total of 863 elderly hospitalized patients with pulmonary tuberculosis were initially identified. However, 26 cases were excluded due to incomplete clinical data, 37 cases were excluded due to other mental disorders, and 5 cases were excluded due to deaths. Thus, a total of 795 patients were ultimately included in the study. Among these patients, 599 did not have anxiety and 196 had anxiety. After conducting propensity score matching (PSM), 185 pairs of patients were successfully matched (Fig. 1).

### Comparison of clinical features between two groups of patients before PSM

There were no statistically significant differences ($P>0.05$) in age, gender, occupation, alcohol

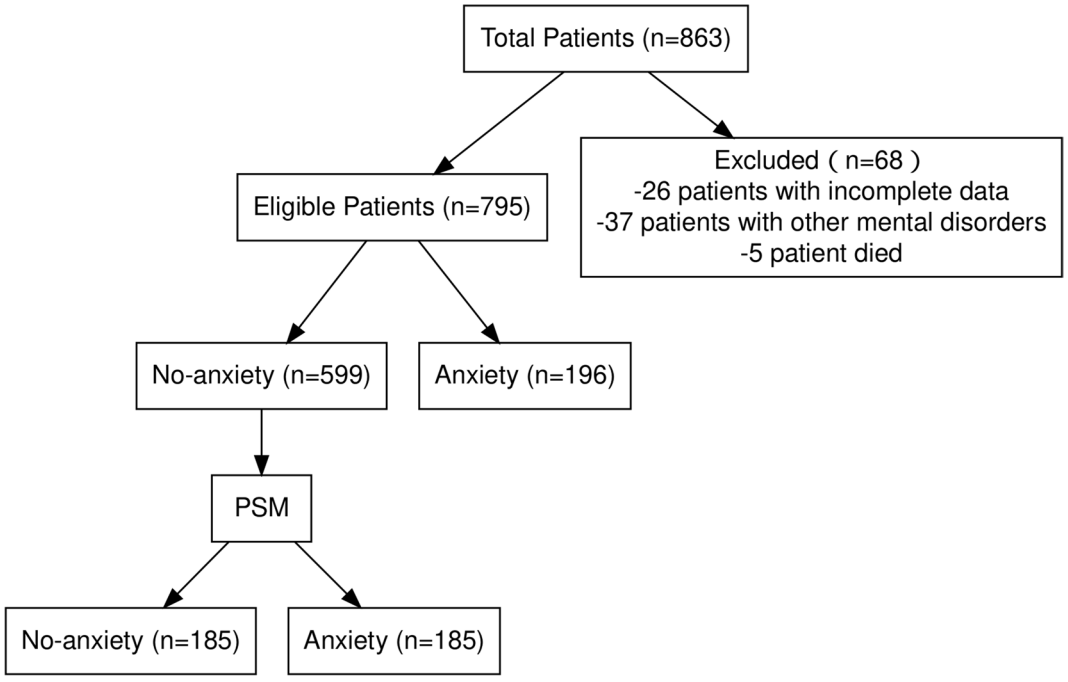


**Fig. 1** A flow chart for screening eligible studies

**Table 1** Comparison of clinical features between two groups of patients before PSM

| Variables | Total (*n* = 795) | No-anxiety group (*n* = 599) | Anxiety group (*n* = 196) | Statistic | *P* |
|---|---|---|---|---|---|
| Age, M ($Q_1$, $Q_3$) | 74.00 (68.00, 81.00) | 74.00 (69.00, 81.00) | 73.00 (68.00, 82.00) | Z = 0.843 | 0.399 |
| Gender, n (%) | | | | $\chi^2$=1.724 | 0.189 |
| Female | 177 (22.26) | 140 (23.37) | 37 (18.88) | | |
| Male | 618 (77.74) | 459 (76.63) | 159 (81.12) | | |
| Occupation, n (%) | | | | $\chi^2$=1.766 | 0.184 |
| Non-peasants | 381 (47.92) | 279 (46.58) | 102 (52.04) | | |
| Peasants | 414 (52.08) | 320 (53.42) | 94 (47.96) | | |
| Drinking, n (%) | | | | $\chi^2$=0.108 | 0.742 |
| No | 551 (69.31) | 417 (69.62) | 134 (68.37) | | |
| Yes | 244 (30.69) | 182 (30.38) | 62 (31.63) | | |
| Smoking, n (%) | | | | $\chi^2$=0.202 | 0.653 |
| No | 445 (55.97) | 338 (56.43) | 107 (54.59) | | |
| Yes | 350 (44.03) | 261 (43.57) | 89 (45.41) | | |

consumption, smoking status, living alone, and sleep disorders between the two groups of patients (Table 1).

### Clinical characteristics of two groups of patients after PSM

A 1:1 propensity score matching was carried out using the age, gender, occupation, alcohol consumption, and smoking status of the patients as matching variables. It was determined that 185 pairs of patients were successfully matched, and there were no statistically significant differences in any of the variables after matching, $P>0.05$ (Table 2).

### Single factor analysis after PSM

After conducting PSM to equalize the covariates of the two groups, we further compared the differences between other factors in the anxiety group and the non-anxiety group. We found significant differences between the two groups in terms of chronic disease comorbidity, daily social interaction, tuberculosis recurrence, and daily living ability, all $P<0.05$ (Table 3).

### Multivariate logistic regression analysis after PSM

Using the variables that showed statistical significance ($P<0.05$) in the above univariate analysis as independent variables and anxiety as the dependent variable, a binary logistic regression analysis was conducted. The results

**Table 2** Clinical characteristics of two groups of patients after PSM

| Variables | Total (*n* = 370) | No-anxiety group (*n* = 185) | Anxiety group (*n* = 185) | Statistic | *P* |
|---|---|---|---|---|---|
| Age, M ($Q_1$, $Q_3$) | 73.00 (68.00–81.00) | 73.00 (68.00–81.00) | 73.00 (68.00–82.00) | Z = 0.311 | 0.756 |
| Gender, n (%) | | | | $\chi^2$=0.716 | 0.397 |
| Female | 60 (16.22) | 27 (14.59) | 33 (17.84) | | |
| Male | 310 (83.78) | 158 (85.41) | 152 (82.16) | | |
| Occupation, n (%) | | | | $\chi^2$=0.043 | 0.835 |
| Non-peasants | 186 (50.27) | 92 (49.73) | 94 (50.81) | | |
| Peasants | 184 (49.73) | 93 (50.27) | 91 (49.19) | | |
| Drinking, n (%) | | | | $\chi^2$=0.110 | 0.741 |
| No | 247 (66.76) | 122 (65.95) | 125 (67.57) | | |
| Yes | 123 (33.24) | 63 (34.05) | 60 (32.43) | | |
| Smoking, n (%) | | | | $\chi^2$=0.098 | 0.754 |
| No | 201 (54.32) | 102 (55.14) | 99 (53.51) | | |
| Yes | 169 (45.68) | 83 (44.86) | 86 (46.49) | | |

**Table 3** Single factor analysis after PSM

| Variables | Total (*n* = 370) | No-anxiety group (*n* = 185) | Anxiety group (*n* = 185) | Statistic | *P* |
|---|---|---|---|---|---|
| Chronic comorbidities, n (%) | | | | $\chi^2$=18.484 | < 0.001 |
| No | 209 (56.49) | 125 (67.57) | 84 (45.41) | | |
| Yes | 161 (43.51) | 60 (32.43) | 101 (54.59) | | |
| Living Alone, n (%) | | | | $\chi^2$=0.011 | 0.917 |
| No | 179 (48.38) | 89 (48.11) | 90 (48.65) | | |
| Yes | 191 (51.62) | 96 (51.89) | 95 (51.35) | | |
| Social activities, n (%) | | | | $\chi^2$=5.112 | 0.024 |
| No | 233 (62.97) | 127 (68.65) | 106 (57.30) | | |
| Yes | 137 (37.03) | 58 (31.35) | 79 (42.70) | | |
| Recurrence of tuberculosis, n (%) | | | | $\chi^2$=11.012 | < 0.001 |
| No | 229 (61.89) | 130 (70.27) | 99 (53.51) | | |
| Yes | 141 (38.11) | 55 (29.73) | 86 (46.49) | | |
| Daily behavioral ability, n (%) | | | | $\chi^2$=8.852 | 0.003 |
| No | 275 (74.32) | 150 (81.08) | 125 (67.57) | | |
| Yes | 95 (25.68) | 35 (18.92) | 60 (32.43) | | |
| Sleeping, n (%) | | | | $\chi^2$=1.170 | 0.279 |
| No | 236 (63.78) | 123 (66.49) | 113 (61.08) | | |
| Yes | 134 (36.22) | 62 (33.51) | 72 (38.92) | | |

**Table 4** Multivariate logistic regression analysis after PSM

| Variables | β | SE | Wald $\chi^2$ | *P* | OR (95%CI) |
|---|---|---|---|---|---|
| Chronic comorbidities | 0.86 | 0.22 | 3.95 | < 0.001 | 2.36 (1.54–3.61) |
| Social activities | 0.58 | 0.22 | 2.60 | 0.009 | 1.79 (1.15–2.76) |
| Recurrence of tuberculosis | 0.73 | 0.22 | 3.30 | < 0.001 | 2.08 (1.35–3.21) |
| Daily behavioral ability | 0.69 | 0.25 | 2.80 | 0.005 | 1.99 (1.23–3.23) |

indicated that chronic comorbidity (OR = 2.36, 95% CI: 1.54–3.61), lack of daily social interaction (OR = 1.79, 95% CI: 1.15–2.76), tuberculosis recurrence (OR = 2.08, 95% CI: 1.35–3.21), and lack of daily behavioral ability (OR = 1.99, 95% CI: 1.23–3.23) are risk factors for anxiety in elderly hospitalized pulmonary tuberculosis patients, $P < 0.05$ (Table 4).

## Discussion

According to the World Health Organization's latest global tuberculosis report in 2023, there were 10.6 million tuberculosis patients worldwide in 2022, which is higher than the 10.3 million in 2021, and there were 1.3 million tuberculosis-related deaths [9]. Factors such as weakened immunity, nutritional status, and chronic diseases like diabetes have significantly increased the prevalence of pulmonary tuberculosis among the elderly. Furthermore, the risk of disease increases with age, especially for individuals aged 65 and older. Additionally, tuberculosis treatment may lead to more adverse outcomes due to multiple complications, drug combinations, and physical status [10]. In addition to physical health issues, the mental health of elderly individuals is receiving increasing attention. Anxiety is one of the most

common mental health problems among the elderly, and its symptoms can worsen mental disorders and affect their quality of life [11]. Anxiety also has a significant impact on medical costs, patient quality of life, and subjective well-being [12]. The well-known link between tuberculosis and mental disorders is underscored by the high incidence of anxiety, depression, and other mental illnesses among tuberculosis patients, attributed to the need for long-term treatment, the toxic side effects of anti-TB drugs, and the easy recurrence of tuberculosis [13]. Additionally, tuberculosis patients may experience social discrimination and an increased sense of self-humiliation after falling ill [14]. The physical decline caused by tuberculosis itself and other factors can also lead to anxiety symptoms among patients [15].

The aim of this study is to explore the incidence and influencing factors of anxiety symptoms in elderly hospitalized patients with pulmonary tuberculosis. Elderly tuberculosis patients with comorbidities of chronic diseases are more prone to anxiety (OR=2.36, 95% CI: 1.54–3.61). Chronic diseases are characterized by prolonged illness, repeated exacerbation, multiple complications, and require long-term treatment and care. They are a major public health problem that threatens the health of the elderly, endangering not only their physical health, but also causing psychological health problems [16]. A study [17] shows that the incidence of anxiety in elderly patients with chronic comorbidities is 1.399 times higher than in those without comorbidities. Among chronic comorbidities, diabetes and chronic obstructive pulmonary disease (COPD) are the most common. The prevalence rate of pulmonary tuberculosis among diabetes patients is 2–3 times that of normal people [18]. At present, it is believed that the pathogenesis is mainly the change of biological metabolism and the imbalance of immune response [19]. COPD is characterized by airflow restriction and is a common and frequently occurring disease in the elderly. COPD and pulmonary tuberculosis are mutual risk factors [20]. Anxiety is common in COPD, especially in elderly patients [21]. Other chronic diseases such as hypertension, silicosis, and bronchiectasis are also common chronic comorbidities of pulmonary tuberculosis. A study [22] shows that daily social activities are a protective factor for mild cognitive impairment and that certain daily social activities are beneficial for the physical and mental health of elderly people. Because tuberculosis patients are infectious and have been treated for a long time, they will reduce their self-confidence, and social discrimination will also reduce their self-esteem. The reduction of patients' daily social activities is also the cause of anxiety [23]. This study shows that elderly hospitalized pulmonary tuberculosis patients without daily social interaction are more likely to suffer from anxiety symptoms (OR=1.79, 95% CI: 1.15–2.76). Recurrence of tuberculosis is also a risk factor for elderly hospitalized patients with pulmonary tuberculosis accompanied by anxiety (OR=2.08, 95% CI: 1.35–3.21). Some patients with pulmonary tuberculosis may still relapse after successful treatment. With age, the recurrence rate increases, especially for the elderly. The elderly patients with recurrent pulmonary tuberculosis accounted for 36.51% of all recurrent patients in Chongqing from 2011 to 2020 [24]. Age is a risk factor for recurrence after successful treatment of initial smear-positive pulmonary tuberculosis [25]. Elderly people have more fear of tuberculosis recurrence and will be isolated from society because of fear of tuberculosis infectivity, which will cause more psychological distress and anxiety [26]. Tuberculosis patients themselves experience increased perceived stress due to inflammation, resulting in higher social pressure and self-esteem setbacks, making them more prone to anxiety [27]. Elderly patients are prone to experiencing limitations in their daily behavior abilities, inconvenience in movement, feelings of isolation, reduced social value, and anxiety symptoms due to a large number of underlying diseases, as well as osteoporosis and joint diseases. Therefore, elderly hospitalized pulmonary tuberculosis patients with limited daily behavioral abilities are more likely to experience anxiety (OR=1.99, 95% CI: 1.23–3.23).

To conclude, the propensity score matching method effectively balances mixed bias, revealing that chronic comorbidity, lack of daily social interaction, tuberculosis relapse, and impaired daily functioning are all risk factors for anxiety in elderly patients hospitalized with pulmonary tuberculosis. Anxiety symptoms can negatively impact treatment compliance, treatment effectiveness, and long-term prognosis for elderly patients with pulmonary tuberculosis. Therefore, early active intervention is warranted. However, this study is a single center retrospective study and did not cover different regions and medical institutions, so it has certain limitations. It is hoped that future prospective studies with larger sample sizes will be designed to further clarify the risk factors for anxiety in elderly patients hospitalized with pulmonary tuberculosis.

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**Author contributions**
FYP, GJ. Acquisition of data: LSR. Analysis and interpretation of the data: FYP,Statistical analysis: FYP, LSR, Obtaining financing: GJ, Writing of the manuscript: FYP, Critical revision of the manuscript for intellectual content: ZZJ, FYP, All authors read and approved the final draft.

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**Data availability**
No datasets were generated or analysed during the current study.

## Declarations

**Ethics approval and consent to participate**
I confirm that I have read the Editorial Policy pages. This study was conducted with approval from the Ethics Committee of Lishui Hospital of Traditional Chi nese Medicine. This study was conducted in accordance with the declaration of Helsinki. Written informed consent was obtained from all participants.

**Consent for publication**
Not applicable.

**Competing interests**
The authors declare no competing interests.

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**References**

1. Di Gennaro F, Vittozzi P, Gualano G, et al. Active pulmonary tuberculosis in Elderly patients: a 2016–2019 retrospective analysis from an Italian Referral Hospital. Antibiot (Basel). 2020;9(8):489.
2. Dong Z, Wang QQ, Yu SC, et al. Age-period-cohort analysis of pulmonary tuberculosis reported incidence, China, 2006–2020. Infect Dis Poverty. 2022;11(1):85.
3. Negin J, Abimbola S, Marais BJ. Tuberculosis among older adults–time to take notice. Int J Infect Dis. 2015;32:135–7.
4. Velayutham BR, Nair D, Chandrasekaran V, et al. Profile and response to anti-tuberculosis treatment among elderly tuberculosis patients treated under the TB Control programme in South India. PLoS ONE. 2014;9(3):e88045.
5. Gong Y, Yan S, Qiu L, et al. Prevalence of depressive symptoms and related risk factors among patients with tuberculosis in China: a multistage cross-sectional study. Am J Trop Med Hyg. 2018;98:1624–8.
6. Wang XB, Li XL, Zhang Q, et al. A survey of anxiety and depressive symptoms in pulmonary tuberculosis patients with and without tracheobronchial tuberculosis. Front Psychiatry. 2018;9:308.
7. The National Health and Family Planning Commission of the People'. s Republic of China Diagnostic criteria for pulmonary tuberculosis (WS 288–2017). Electron J Emerg Infect Dis. 2018;3(1):59–61.
8. Pheh KS, Tan CS, Lee KW, et al. Factorial structure, reliability, and construct validity of the Generalized Anxiety Disorder 7-item (GAD-7): Evidence from Malaysia. PLoS ONE. 2023;18(5):e0285435.
9. Word Health Organization. Global Tuberculosis report 2023. Geneva:World Health Organization; 2023.
10. Gardner Toren K, Spitters C, Pecha M, et al. Tuberculosis in Older Adults: Seattle and King County, Washington. Clin Infect Dis. 2020;70(6):1202–7.
11. ANDREESCU C, LEE S. Anxiety disorders in the elderly. Adv Exp Med Biol. 2020;1191:561–76.
12. Husain MO, Dearman SP, Chaudhry IB, et al. The relationship between anxiety, depression and illness perception in tberculosis patients in Pakistan. Clin Pract Epidemiol Ment Health. 2008;4:4.
13. Van Janse A, Dube A, Curran R, et al. Comorbidities between tuberculosis and common mental disorders: a scoping review of epidemiological patterns and person-centred care interventions from low-to-middle income and BRICS countries. Infect Dis Poverty. 2020;9(1):4.
14. Courtwright A, Turner AN. Tuberculosis and stigmatization: pathways and interventions. Public Health Rep. 2010;125(Suppl 4):34–42.
15. Molla A, Mengesha A, Derajew H et al. Suicidal ideation, attempt, and associated factors among patients with tuberculosis in ethiopia: a cross-sectional study. PsychiatryJ. (2019) 2019:4149806.
16. Yan Hong, Liu Shuwen. The current status and influencing factors of mental health in elderly people with chronic diseases. Chin J Gerontol. 2019;39(21):5366–9.
17. Wang Xiaoran Z, Dan. A study on the impact of chronic comorbidities on anxiety symptoms in elderly people in China: based on propensity score matching. Chin Gen Med. 2023;26(29):3622–7.
18. Van Crevel R, Critchley JA. The Interaction of Diabetes and Tuberculosis: Translating Research to Policy and Practice. Trop Med Infect Dis. 2021;6(1):8.
19. Dong Hang. Du Yingrong Clinical research progress on comorbidity of diabetes and pulmonary tuberculosis [J]. J Tuberculosis Pulmonary Disease. 2022;3(1):65–9.
20. Zhou, Yinan, Zhu Huili. Research progress on chronic obstructive pulmonary disease combined with pulmonary tuberculosis [J]. J Tuberculosis Pulmonary Disease. 2022;3(4):338–42.
21. Katare S, Harsha A. Correlations Between Inflammatory Biomarkers in Tuberculosis- Associated Obstructive Pulmonary Disease Patients With Anxiety and Depression. Cureus. 2022;14(3):e22742.
22. Huiying P, Junqiao W, Chaojun P. etc The prevalence and influencing factors of mild cognitive impairment among elderly people in rural areas of Jinhua City. Chin J Gerontol. 2020;40(20):4448–51.
23. Liu K, Zhang Y, Qu S, et al. Prevalence and Correlates of Anxiety and Depressive Symptoms in Patients With and Without Multi-Drug Resistant Pulmonary Tuberculosis in China. Front Psychiatry. 2021;12:674891.
24. Lei Rongrong Z, Ting W, Qingya et al. Epidemiological characteristics and treatment outcomes of recurrent pulmonary tuberculosis in the elderly in Chongqing from 2011 to 2020. Mod Prev Med. 2022;49(11):1945–8, 1954.
25. Li Y, Zukang W, Youliang W, et al. Follow-up observation and analysis of influencing factors on recurrence of newly treated smear positive pulmonary tuberculosis patients after cure. Chin Gen Med. 2021;24(14):1785–9.
26. Lee LY, Tung HH, Chen SC, et al. Perceived stigma and depression in initially diagnosed pulmonary tuberculosis patients. J Clin Nurs. 2017;26(23–24):4813–21.
27. Mohammedhussein M, Dule A, Tessema W et al. Perceived stress and its psychosocialand clinical correlates among patients with pulmonary tuberculosis: A cross-sectional study Indian J. Psychiatry. 2023;65(1):103–6.

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