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Assessing the Spectrum of Depression in Tuberculosis Patients: A Study at Hospital Pulau Pinang, Malaysia

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Abstract

Introduction. The coexistence of tuberculosis (TB) and depression poses a substantial public health challenge worldwide. This seven-year study, conducted at Penang General Hospital, Malaysia, addresses this intricate relationship, acknowledging the rising incidence of TB in Malaysia and the persistent concern of depression among TB patients globally.

Materials and methods. A comprehensive cross-sectional study was conducted from November 2012 to January 2020, encompassing 500 TB patients. Depression assessment utilized the Patient Health Questionnaire (PHQ-9), with a focus on correlating depressive symptoms with various patient characteristics, including demographic data, clinical profiles, and social factors.

Results. The study revealed a diverse range of depression severities among TB patients, with 70% exhibiting minor or no symptoms of depression. Notable findings include the absence of significant correlations between demographic factors or social support levels and depression. However, crucial associations were identified with gender, marital status, addiction status, and living arrangements. The data indicates a nuanced pattern of depression prevalence in TB patients, suggesting unique challenges in managing mental health alongside TB treatment.

Conclusion. The findings highlight the complexity of TB treatment in the context of mental health, emphasizing the need for a multidimensional care approach. This involves integrating mental health assessment and support into TB care, especially considering the varying degrees of depression and their associations with social and lifestyle factors.

Keywords: TB, tuberculosis, depression, mycobacterium tuberculosis

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Оценка спектра депрессии у пациентов с туберкулезом: исследование в больнице Пулау Пинанг, Малайзия

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Резюме

Введение. Сосуществование туберкулеза и депрессии представляет собой серьезную проблему общественного здравоохранения во всем мире. Семилетнее исследование, проведенное в больнице общего профиля Пенанга, Малайзия, анализирует эту сложную взаимосвязь, отмечая рост заболеваемости туберкулезом в Малайзии и распространение депрессии среди пациентов с туберкулезом во всем мире.

Материалы и методы. Комплексное поперечное исследование было проведено с ноября 2012 г. по январь 2020 г., в нем принимали участие 500 пациентов с туберкулезом. Для оценки депрессии использовался опросник о состоянии здоровья пациента (PHQ-9), в котором особое внимание уделялось корреляции депрессивных симптомов с различными характеристиками пациентов, включая демографические данные, клинические профили и социальные факторы.

Результаты. Исследование выявило различную степень тяжести депрессии среди пациентов с туберкулезом, при этом у 70% наблюдались незначительные симптомы депрессии или они отсутствовали вообще. Примечательные результаты включают отсутствие значимой корреляции между демографическими факторами или уровнем социальной поддержки и депрессией. Однако решающие связи коррелировали с полом, семейным положением, статусом зависимости и условиями жизни. Данные указывают на тонкую картину распространенности депрессии у пациентов с туберкулезом, что указывает на уникальные проблемы в управлении психическим здоровьем наряду с лечением туберкулеза.

Заключение. Результаты подчеркивают сложность лечения туберкулеза в контексте психического здоровья, подчеркивая необходимость многомерного подхода к лечению. Это предполагает интеграцию оценки психического здоровья и поддержки в лечение туберкулеза, особенно с учетом различной степени депрессии и ее связи с социальными факторами и факторами образа жизни.

Ключевые слова: ТБ, туберкулез, депрессия, туберкулезная микобактерия

■ INTRODUCTION

The coexistence of tuberculosis (TB) and depression represents a complex and critical intersection in the realm of global health. TB, a persistent global epidemic, continues to pose substantial challenges to healthcare systems worldwide [1]. Meanwhile, depression, a widespread mental health disorder, silently shadows the lives of countless individuals. These two seemingly distinct entities converge, with significant implications for both the clinical management of TB and the psychological well-being of affected individuals [2].

TB has a deep-rooted history as a global menace, acknowledged for its potential lethality [3]. Despite substantial advancements in TB treatment and control, it remains an enduring threat, particularly in middle-income developing nations. In 1993, the World Health Organization (WHO) declared TB a global emergency, recognizing the urgency of addressing its impact [4, 5].

The global burden of TB is striking. In 2016, an astonishing 6.3 million new TB cases were reported, making up a substantial portion of the estimated 10.4 million global incidences. While the global treatment success rate for TB stands at 83%, drug-resistant TB remains a formidable challenge, with a treatment success rate of only 54% [6]. Malaysia, located in Southeast Asia, has a historical record of TB as a predominant cause of mortality [7]. In 2016, Malaysia reported an incidence rate of 92 TB cases per 100,000 individuals, according to WHO data, reflecting a country grappling with TB's continued impact [6].

Amid the multifaceted nature of TB control, an often-underestimated facet comes into focus – the psychological well-being of TB patients. Depression, a prevalent mental health condition, emerges as a significant comorbidity among TB patients [8]. The relationship between TB and depression is intricate and bi-directional.

Depression's prevalence among individuals diagnosed with TB is noteworthy, profoundly affecting their quality of life and influencing treatment outcomes. The burden of TB, with its long treatment duration and potential for adverse effects, can contribute to the development or exacerbation of depressive symptoms [9]. Conversely, depression can hinder patients' motivation, adherence to treatment regimens, and their ability to cope with the challenges of managing TB [10].

This paper embarks on a comprehensive exploration of the relationship between TB and depression. Through a rigorous study conducted at Hospital Pulau Pinang in Malaysia, we seek to assess the prevalence of depression, evaluate its severity, and scrutinize the factors that contribute to the co-occurrence of these two conditions among TB patients. By delving deeper into this intricate interplay, our aim is to provide insights that can enhance the holistic management of TB, taking into account the psychological well-being of the individuals affected by this dual burden.

■ MATERIALS AND METHODS

A cross-sectional study design was employed at Penang General Hospital to investigate the relationship between tuberculosis (TB) and depression among 500 TB patients. This study, conducted from November 2012 to January 2020, allowed for a snapshot examination of the prevailing conditions within the TB patient population. The study took place at Penang General Hospital, a central healthcare facility in Penang, Malaysia, with over 1,000 beds. The Respiratory Department of the hospital, well-equipped and staffed, provided an ideal setting for the research.

The study population consisted of 500 TB patients categorized into two groups: those with symptoms of depression and those without. Inclusion criteria encompassed TB diagnosis, age 18 and above, and initiation of first-line TB treatment, while exclusion criteria included HIV co-infection, pre-existing mental illnesses, communication barriers, and second-line/multidrug-resistant TB treatment. Sampling procedures employed the Cochran formula, with a sample size of 500 patients calculated based on the prevalence of TB in Penang. Data collection focused on depression assessment during different phases of TB treatment, utilizing the Patient Health Questionnaire (PHQ-9), a validated tool available in multiple languages.

Data analysis employed Statistical Package for Social Sciences (SPSS) software, version 27. Descriptive statistics were used to calculate frequency values and percentages for variables, with the chi-square test employed to compare between groups for descriptive data. Significance was determined at $p < 0.05$.

Ethical considerations were paramount, with approvals obtained from the Clinical Research Center (CRC) of Penang General Hospital, the National Institutes of Health (NIH), and the Medical Research Ethics Committee (MREC). Patient information sheets and informed consent forms, available in Bahasa Malaysia, English, and Chinese, ensured participants were fully informed and provided consent.

■ RESULTS

This table presents an overview of the depression categories among study participants. It shows that the majority of patients fell into the "None (minor)" category (70.0%), while smaller percentages reported mild (20.4%), moderate (7.6%), and severe (2.0%) depression. This information underscores the varying degrees of depression prevalence within the TB patient population (Table 1).

Table 2 offers insights into how tuberculosis patients responded to the PHQ-9 questionnaire, which assesses depressive symptoms. The findings reveal a significant burden of depressive symptoms among TB patients, including feelings of hopelessness, sleep disturbances, fatigue, and thoughts of self-harm or suicide. These results emphasize the importance of addressing mental health alongside TB treatment.

This table provides a comprehensive overview of the distribution of general demographic data concerning depression status. While age, occupation, and educational level did not significantly differ between the normal and depression groups, there were significant associations with gender and marital status. Gender, in particular, showed a notable difference in depression susceptibility, with more males in the depression group. Additionally, marital status was significantly associated with depression, suggesting a potential link (Table 3).

Table 1
Depression categories of patients with tuberculosis

Variables		Frequency (No. 500)	Percentage
Depression Category	None (minor)	350	70.0%
	Mild	102	20.4%
	Moderate	38	7.6%
	Severe	10	2.0%

Table 2
Responses of tuberculosis patients to items on the PHQ-9 questionnaire

Variables	Not at all	Several days	More than half of the days	Every day
Little interest or pleasure in doing things	185 (37.0%)	245 (49.0%)	43 (8.6%)	27 (5.4%)
Feeling down, depressed, or hopeless	220 (44.0%)	206 (41.2%)	32 (6.4%)	42 (8.4%)
Trouble falling or staying asleep, or sleeping too much	229 (45.8)	170 (34.0%)	48 (9.6%)	53 (10.6%)
Feeling tired or having little energy	88 (17.6%)	250 (50.0%)	91 (18.2%)	71 (14.2%)
Poor appetite or overeating	224 (44.8%)	163 (32.6%)	50 (10.0%)	63 (12.6%)
Feeling bad about yourself or that you are a failure or have let yourself or your family down	253 (50.6%)	193 (38.6%)	25 (5.0%)	29 (5.8%)
Trouble concentrating on things such as reading the newspaper or watching television	256 (51.2%)	214 (42.8%)	11 (2.2%)	19 (3.8%)
Moving or speaking so slowly that other people could have noticed? Or the opposite being so antsy or restless that you have been moving around a lot more than usual	253 (50.6%)	174 (34.8%)	42 (8.4%)	31 (6.2%)
Thoughts that you would be better off dead or hurting yourself in some ways	332 (66.4%)	145 (29.0%)	16 (3.2%)	7 (1.4%)

Table 4 breaks down general social data in the context of depression status. Smoking history, smoking severity, addiction status, and living arrangements exhibited significant associations with depression. Notably, a higher proportion of active smokers and addicts were found in the depression group, underlining the relationship between these factors and depression status. Living alone was also linked to depression.

Table 3
General demographic data distribution regarding depression status

Variables		Normal group	Depression group	P- value
Age	Mean±Sd.	49.74±16.77	50.69±16.44	0.174
Gender	Male	307 (67.9%)	42 (87.5%)	0.005
	Female	145 (32.1%)	6 (12.5%)	
Occupation	Employee	284 (62.8%)	31 (64.6%)	0.064
	Non-employee	125 (27.7%)	17 (35.4%)	
	Retired	43 (9.5%)	0 (0.0%)	
Marital status	Married	299 (66.2%)	22 (45.8%)	0.005
	Single	142 (31.4%)	22 (45.8%)	
	Divorced	7 (1.5%)	4 (8.4%)	
	Widow	2 (0.4%)	0 (0.0%)	
	Dead wife	2 (0.4%)	0 (0.0%)	
Educational level	Educated	368 (81.4%)	34 (70.8%)	0.079
	Non-educated	84 (18.6%)	14 (29.2%)	
Race	Malaysian	194 (42.9%)	26 (54.2%)	0.056
	Chinese	211 (46.7%)	14 (29.2%)	
	Indian	47 (10.4%)	8 (16.7%)	

Table 4
General social data distribution regarding depression status

Variables		Normal group (No. 452)	Depression group (No. 48)	P-value
Smoking history	Active smoker	147 (32.5%)	26 (54.2%)	0.001
	Ex-smoker	65 (14.4%)	12 (25.0%)	
	Non-smoker	240 (53.1%)	10 (20.8%)	
Smoking severity	Passive smoker	6 (1.3%)	0 (0%)	0.001
	Light Smoker 0.1–<20 packs year	137 (30.3%)	27 (56.3%)	
	Moderate smoker 20–<40 packs year	53 (11.7%)	11 (22.9%)	
	Heavy smoker >40 packs year	11 (4.6%)	0 (0%)	
Alcoholic		35 (7.7%)	0 (0.0%)	0.054
Addiction status	Active addict	23 (5.1%)	21 (43.8%)	0.001
	Non-addict	392 (86.7%)	14 (29.2%)	
	Ex-addict	37 (8.2%)	13 (27.1%)	
Living status	Alone	52 (11.5%)	11 (22.9%)	0.015
	With family	390 (86.3%)	34 (70.8%)	
	Others (Nursing House, Friends, eldest sitter)	10 (2.2%)	3 (6.3%)	

Table 5
Clinical data distribution of patients with tuberculosis regarding depression status

Variables		Normal group (No. 452)	Depression group (No. 48)	P-value
Treatment phase	Baseline phase	26 (5.8%)	5 (10.4%)	0.417
	Intensive phase	258 (5.8%)	24 (50%)	
	Maintenance phase	161 (35.6%)	19 (39.6%)	
	No treatment	7 (1.5%)	0 (0.0%)	
Comorbidities	Yes	216 (47.8%)	26 (54.2%)	0.4
	No	236 (52.2%)	22 (45.8%)	
Type of comorbidities	Human immunodeficiency virus	25 (5.5%)	8 (16.7%)	0.003
	Diabetes mellitus	122 (27.0%)	10 (20.8%)	0.357
	Liver disease	44 (9.7%)	14 (29.2%)	0.001
	Dyslipidemia	48 (10.6%)	0 (0.0%)	0.018
	Renal disease	14 (3.1%)	0 (0.0%)	0.216
	Hypertension	49 (10.8%)	3 (6.3%)	0.322
	Heart disease	11 (2.4%)	3 (6.3%)	0.128
	Lung disease	21 (4.6%)	3 (6.3%)	0.621
	Thyroid disease	10 (2.2%)	0 (0.0%)	0.298
	Gastrointestinal disease	4 (0.9%)	0 (0.0%)	0.513
	Pancreas disease	3 (0.7%)	0 (0.0%)	0.571
Steroid treatment		10 (2.2%)	3 (6.3%)	0.095
The type of tuberculosis	Extrapulmonary TB	84 (18.5%)	6 (12.5%)	0.271
	Pulmonary TB smear negative	149 (33%)	13 (27.1%)	
	Pulmonary TB smear positive	219 (48.5%)	29 (60.4%)	

Table 6
Logistic regression test of significant variables in relation to depression status

Variables		Odds ratio	Sig.	95% CI Lower – upper bound
Gender (male)		3.306	0.008	1.409–5.87
Marital status	Married	0.587	0.999	0.432–1.367
	Single	27.84	0.999	14.543–30.743
	Divorced	12.489	0.999	5.741–19.671
	Widow	0.014	0.999	0.068–1.971
Smoking history		–	0.999	–
Addiction status	Active addiction	2.599	0.031	1.989–7.628
	Non-addict	0.102	0.001	0.781–0.017
Living status	Family	0.291	0.07	0.932–0.0376
	Alone	1.705	0.636	1.479–5.296
HIV		7.68	0.86	4.068–20.969
Liver disease		2.679	0.074	1.232–10.96

This table explores clinical data in relation to depression status among TB patients. Treatment phase and comorbidity presence did not significantly differ between the normal and depression groups. However, the type of comorbidities, including HIV, liver disease, and dyslipidemia, showed significant associations with depression status. Additionally, the type of TB (pulmonary smear positive, pulmonary smear negative, or extrapulmonary) exhibited variations between the two groups (Table 5).

Table 6 presents the results of a logistic regression analysis, identifying significant predictors of depression among TB patients. Male gender and active addiction status were found to be significant positive predictors of depression. This highlights the importance of considering these factors when assessing depression risk in TB patients.

■ DISCUSSION

The study investigated the prevalence of depression among individuals with tuberculosis in Penang, Malaysia. This study marked the second research conducted in Malaysia, following a previous study in Kuching, Sarawak by Ying, Abd Aziz, Kamaluddin, & Hamzah, 2020. Despite Malaysia’s achievements in reducing the prevalence of other infectious diseases, tuberculosis remains a persistent concern with steadily rising notification rates [11]. Factors contributing to the rise in TB incidence include diabetes mellitus, HIV infection, urban migration, the influx of migrants from countries with higher TB prevalence, and drug abuse leading to drug-resistant strains [11, 12].

Tuberculosis has a comprehensive impact on health, encompassing physical, mental, occupational, and social domains [11]. Health is defined by the World Health Organization (WHO) as total physical, mental, and social well-being, not just the absence of illness. Mental health considerations are crucial in TB treatment, with many patients experiencing challenges related to mental health disorders, side effects of treatment, and discontinuation of treatment [12, 13].

Depression is prevalent among tuberculosis patients, with rates ranging from 16.8% to 56% [14–18]. It has a substantial impact on patients’ quality of life, exacerbates self-care

challenges, and may discourage social interactions. The prevalence of depression among TB patients is notably higher than in the general population [2, 19, 20].

Demographic data on TB patients in the study showed a consistent mean age of 49.83 years, suggesting unchanged living conditions. Smoking and alcohol intake were associated with unsuccessful TB treatment outcomes. Tobacco smoking is linked to a heightened risk of active TB and poorer treatment outcomes [21, 22].

TB/HIV co-infected patients exhibited a lower prevalence of depression than in other studies [23, 24]. However, felt stigma was an independent predictor of depression among co-infected patients. Overall, the low prevalence of depression in this study may be attributed to patient satisfaction with healthcare services, positive rapport with clinic staff, and innovative approaches to directly observed therapy.

Patients receiving TB treatment in Penang have relatively easy access to free TB drugs and support from non-governmental organizations (NGOs), contributing to treatment adherence and patient satisfaction. Gender and marital status were associated with depression, with single, divorced, or widowed individuals being at higher risk. Married TB patients may face challenges related to disrupted gender roles, contributing to depression [25, 26].

Future research in the Malaysian context should include longitudinal studies to understand depression's course in TB patients, qualitative investigations to explore their experiences, and comparative studies to assess depression prevalence across regions.

■ CONCLUSION

This study highlights the critical need for financial support and vigilant depression and alcohol use screening in providing holistic care for tuberculosis patients. Notably, the prevalence of depression in our cohort was lower than that reported in similar studies. Additionally, no significant correlation was found between demographic factors, social support levels, and depression in tuberculosis patients.

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