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Intersecting challenges: tuberculosis, substance abuse, and mental health comorbidities - A case series study

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Abstract
The intersecting challenges of tuberculosis (TB), substance abuse, and mental health disorders present complex health issues requiring holistic and integrated care approaches. This case series study explores the intricate relationship between Tuberculosis, substance abuse, and psychiatric symptoms through the analysis of three male patients with TB and comorbidities. The cases highlight the bidirectional association between TB and substance abuse, emphasizing the impact of substance use on TB acquisition, progression, and treatment outcomes. Additionally, psychiatric symptoms such as insomnia and anxiety underscore the prevalence of mental health disorders among TB patients, further complicating treatment management. Social determinants of health, including occupational factors and comorbid conditions like HIV, influence TB outcomes and treatment adherence. A multidisciplinary approach involving pulmonologists, psychiatrists, addiction specialists, and social workers is essential for addressing the complex needs of TB patients with comorbidities. Integrated care models are crucial for optimizing treatment outcomes and promoting overall well-being. Future research should focus on understanding the underlying mechanisms linking TB, substance abuse, and mental health disorders, to inform evidence-based interventions and improve patient outcomes. Addressing social determinants of health and implementing targeted interventions can reduce disparities in TB management and improve overall health outcomes.

Keywords: Tuberculosis, mental illness, substance abuse

Introduction

Tuberculosis (TB) [1] is a major public health problem in the world. TB is caused by bacteria (Mycobacterium tuberculosis) [2] and it most often affects the lungs. TB is spread through the air when people with lung TB cough, sneeze or spit. A person needs to inhale only a few germs to become infected. Despite being a preventable and curable disease, it the world's top infectious killer that 1.5 million people die from TB each year [3]. Although there are numerous global efforts to control tuberculosis (TB), it remains a chronic infectious disease with high morbidity and mortality in several parts of the world [3–5].

Background

To eliminate tuberculosis (TB) by 2030, the World Health Organization's End TB Strategy calls for integrated, patient-centered care and prevention [6]. This strategic pillar underscores the management of co-morbidities, including mental disorders, which have been identified in up to 70% of TB patients.2 TB and mental disorders share common risk factors including homelessness, substance use, and HIV infection which may affect health-related behaviors and treatment outcomes [7].

Worldwide, almost 1 billion people are living with a mental health condition. People affected by TB have a higher risk of mental health conditions, which can negatively impact TB treatment outcomes, health-related quality of life and other health and social outcomes. In fact, mental health conditions are one of the top impairments suffered by people with TB. Stigma and discrimination associated with a TB diagnosis and the treatment course, as well as human rights-related barriers to TB care can also adversely affect mental health. Therefore, mental health care should be addressed as an important part of holistic people-centered care for people with TB and their families [8].

Tuberculosis with an estimated 1.5 million deaths per year, caused the most deaths from an infectious disease [9, 10] Another significant cause of morbidity worldwide is mental illness, such as that caused by depression, anxiety, and alcohol [11, 12]. Evidence exists that persons with TB suffer higher rates of depression than the general population [10, 11], [13, 14] which can impact on TB treatment outcomes. [15, 16, 17]

Two conditions are connected bidirectionally. Contracting tuberculosis (TB) can result in mental health issues due to a reduced capacity to work from the illness and being ostracized by family and society because of stigma. Research suggests that mental health disorders are biologically correlated with a higher occurrence of TB because of the inflammatory or suppressive impact on the immune system. From a psychological perspective, depression, anxiety, and alcohol use disorder can lead to poor medication adherence, which in turn can affect TB treatment and outcomes [18].

An insightful scoping review by Van Rensburg and colleagues in 2020 examined the co-occurrence of tuberculosis and prevalent mental disorders in low- and middle-income, as well as BRICS countries, between 2000 and 2019. The review identified four major categories of mental health conditions: depression, anxiety, alcohol use, and a broad, undefined category of general mental health. The paper outlined notable findings regarding TB and mental health symptom rates, the impact of TB diagnosis and treatment on mental health, and the influence of factors such as gender, socioeconomic status, and education level. The evidence from this study is integrated into the

respective sections on depression, anxiety, and alcohol use disorder below [19].

Doherty *et al*., in reviewing the relationship between TB and mental health from 316 articles, noted rates of mental illness of up to 70%. However, the high rate included the two-way effects of anti-TB medications and those used to treat mental illness. An anti-TB medication such as cycloserine is well known to cause psychosis, while rifampicin may decrease the effective dose of anti-psychotic drugs [20].

Alcohol use disorder (AUD): Can have a significant impact on tuberculosis (TB) at different stages of the disease and treatment process:

1. Before TB

Increased Risk: AUD is a risk factor for contracting TB. Individuals with AUD may have compromised immune systems, making them more susceptible to TB infection. Poor Lifestyle Choices: AUD can lead to poor nutritional status and other health-compromising behaviors, increasing vulnerability to TB.

2. After TB Disease

Stigma and Isolation: Those who have had TB and AUD may face stigma, which can affect mental health and lead to further alcohol use. Mental Health Impacts*: TB can cause emotional and psychological stress, which may lead to increased alcohol consumption as a coping mechanism.

3. During Active TB and Anti-TB Treatment

Adherence to Treatment: AUD can impair an individual's ability to adhere to TB treatment, including missing doses or stopping treatment prematurely. This can lead to drug resistance and treatment failure. Drug Interactions: Alcohol can interact negatively with TB medications, potentially increasing the risk of side effects and hepatotoxicity (liver damage). Compromised Immune Function: Alcohol weakens the immune system, which can impair the body's ability to fight off TB and slow recovery. Worsened Prognosis: AUD can lead to a worse prognosis for TB patients due to reduced treatment effectiveness, increased risk of complications, and a higher likelihood of relapse.

It is important for healthcare providers to address AUD in TB patients, as managing alcohol use can improve treatment outcomes and overall health. This may involve providing support for reducing or abstaining from alcohol, as well as monitoring for potential interactions between alcohol and anti-TB medications.

Objective

To explore the complex interplay between tuberculosis (TB) infection, substance abuse, and mental health disorders through a case series analysis, highlighting the importance of holistic and integrated care approaches in managing these overlapping health concerns.

Materials and Method

A case series a Descriptive type, Retrospective study

Case Series

1. 28 years male, Sputum. Trunaat 4/1/24: MTB detected, Rifampicin sensitive, History: Alcohol since 8-10 years, last use 2 months ago, Tobacco daily since 8-10 years stopped since last 3 months. Psychiatric History: 3/1/24: decreased sleep, No active suicidal ideas Rx: Inj thiamine, tab olanzapine
2. 58 years male, Occupation- (was laborer) doesn't work anymore, Sputum Smear- 15/12/23= 2+Sputum Trunaat- 27/12/23= MTB detected, Rifampicin sensitive, AKT started from 18/12/2023 History: H/o alcohol 250ml since teenage (once in a while), now left since 1-2 years, Tobacco since 20-21 years, still consumes, Smoking beedi- 2-3 beedis per day, stopped since a year, No cigarette, No suicidal thoughts, Good behavior with family and friends. Psychiatric History: Now, c/o Insomnia. Sleep was adequate previously, 19/12/23: decreased sleep, anxiety Rx: Inj Thiamine, Tab Escitalopram, Tab Olanzapine, 3/1/24: No fresh psych complaints Rx: Tab Escitalopram, tab Olanzapine
3. 48 years/ Male, Occupation- Laborer (Housekeeping), Sputum smear- positive (9/12/23), Taking AKT (4FDC since 8/12/23), HIV positive (11/12/23), RVD Rx: TLD+ DTG, CPT. History: Alcohol since 10-15 years 250ml daily, Beedi and tobacco daily, No cigarette and suicidal thoughts, Good behavior with family and friends.

Discussion

The presented case series depicts three male patients of varying ages with tuberculosis (TB) infection and comorbidities, including substance use disorders and psychiatric symptoms. The cases shed light on the complex interplay between TB, substance abuse, and mental health issues, highlighting the importance of holistic care and interdisciplinary management.

1. Case 1 (1.28 years, male)

This case underscores the association between TB and substance abuse, with a history of alcohol and tobacco use.

Psychiatric symptoms, such as decreased sleep, were observed, necessitating pharmacological intervention with thiamine and olanzapine.

The cessation of substance use, although recent, indicates a potential positive prognostic factor for TB treatment adherence and overall health outcomes.

2. Case 2 (2.58 years, male)

This patient's occupational history as a laborer and past substance use, including alcohol and tobacco, are risk factors for TB acquisition and progression.

The presence of insomnia and anxiety highlights the mental health burden in TB patients, necessitating treatment with thiamine, escitalopram, and olanzapine.

The cessation of smoking beedis is a positive step toward improving respiratory health and TB treatment outcomes.

3. Case 3 (48 years, male)

The case of an HIV-positive laborer with TB underscores the heightened vulnerability of individuals with immunocompromised status to infectious diseases.

Chronic alcohol and tobacco use pose additional challenges in managing TB and HIV co-infection, necessitating tailored treatment regimens and comprehensive care.

The absence of suicidal thoughts and positive interpersonal relationships are protective factors in coping with the dual burden of infectious and psychiatric illnesses.

Overall Discussion Points: Multifaceted Approach: The cases highlight the need for a multidisciplinary approach involving pulmonologists, psychiatrists, and addiction

specialists in managing TB patients with comorbid substance use and mental health disorders.

Integrated Care: Integrating TB treatment with substance abuse interventions and mental health services is crucial for addressing the complex needs of these patients comprehensively.

Preventive Strategies: Addressing substance abuse through targeted interventions and promoting mental health awareness can contribute to TB prevention and control efforts.

Challenges: Challenges in managing TB in vulnerable populations, such as those with substance use disorders and HIV, necessitate tailored strategies to enhance treatment adherence and health outcomes.

Research Implications: Further research is needed to explore the underlying mechanisms linking TB, substance abuse, and mental health disorders, as well as to evaluate the effectiveness of integrated care models in improving patient outcomes.

In conclusion, the case series underscores the intricate relationship between TB, substance abuse, and mental health, emphasizing the importance of holistic care and collaborative management approaches in optimizing outcomes for affected individuals.

Conclusion

In conclusion, the presented case series sheds light on the intersecting challenges of tuberculosis (TB) infection, substance abuse, and mental health disorders, highlighting the critical need for holistic and integrated care approaches in managing these complex health issues. Across the three cases, common themes emerge, including the association between TB and substance use, the presence of psychiatric symptoms, and the importance of addressing social determinants of health.

Firstly, the cases underscore the bidirectional relationship between TB and substance abuse, with individuals engaging in chronic alcohol and tobacco consumption being at higher risk of TB acquisition and progression. Substance abuse not only weakens the immune system, making individuals more susceptible to TB infection, but it also complicates TB treatment by reducing treatment adherence and increasing the risk of treatment failure and relapse.

Secondly, the presence of psychiatric symptoms, such as insomnia and anxiety, among TB patients underscores the high prevalence of mental health disorders in this population. The co-occurrence of TB and mental illness further exacerbates treatment complexities and underscores the importance of addressing mental health needs alongside TB management.

Furthermore, the cases highlight the social determinants of health influencing TB outcomes, including occupational factors, such as labor-intensive work, and the presence of comorbid conditions like HIV. These social determinants underscore the need for tailored interventions addressing structural barriers to care and promoting health equity among vulnerable populations.

In addressing these complex challenges, a multidisciplinary approach is paramount, involving collaboration between pulmonologists, psychiatrists, addiction specialists, and social workers. Integrated care models that address both medical and psychosocial needs have shown promise in improving TB treatment outcomes and reducing substance abuse relapse rates.

Moving forward, further research is needed to better understand the underlying mechanisms linking TB, substance abuse, and mental health disorders and to evaluate the effectiveness of integrated care interventions in diverse settings. By adopting a comprehensive and patient-centered approach, healthcare systems can better meet the needs of individuals affected by the intersecting burdens of TB, substance abuse, and mental illness, ultimately improving health outcomes and promoting overall well-being

Summary

The presented case series comprises three male patients of varying ages diagnosed with tuberculosis (TB) alongside substance abuse and mental health concerns. Each case illustrates the intricate interplay between TB infection, substance use, and psychiatric symptoms, emphasizing the importance of comprehensive care approaches.

TB and Substance Abuse: Across the cases, a common theme emerges of individuals with a history of chronic alcohol and tobacco use being at heightened risk for TB infection and complications. Substance abuse not only weakens the immune system, increasing susceptibility to TB, but also complicates treatment adherence and outcomes.

Psychiatric Symptoms: Mental health issues, such as insomnia and anxiety, were observed in some cases, highlighting the prevalence of psychiatric comorbidities among TB patients. Addressing these mental health concerns is essential for optimizing TB treatment outcomes and overall well-being.

Social Determinants of Health: Occupational factors, such as labor-intensive work, and the presence of comorbid conditions like HIV, underscore the influence of social determinants on TB outcomes. Tailored interventions addressing structural barriers to care are crucial for promoting health equity among vulnerable populations.

Multidisciplinary Approach: Collaboration between pulmonologists, psychiatrists, addiction specialists, and social workers is essential for addressing the complex needs of TB patients with comorbid substance abuse and mental health disorders. Integrated care models have shown promise in improving treatment outcomes and reducing relapse rates.

Future Directions: Further research is needed to better understand the underlying mechanisms linking TB, substance abuse, and mental health disorders, as well as to evaluate the effectiveness of integrated care interventions. By adopting a comprehensive and patient-centered approach, healthcare systems can better meet the needs of individuals affected by the intersecting burdens of TB, substance abuse, and mental illness.

In conclusion, the case series highlights the importance of holistic and interdisciplinary care in effectively managing TB patients with comorbid substance abuse and mental health concerns, ultimately improving health outcomes and promoting overall well-being.

Message

Social Message: Addressing the social determinants of health is crucial in tackling the complex challenges presented in the case series. Factors such as occupational

conditions and access to healthcare services significantly influence TB outcomes and treatment adherence. Implementing interventions that target structural barriers to care and promote health equity among vulnerable populations can improve overall health outcomes and reduce disparities in TB management.

Medical Message: The cases highlight the importance of a comprehensive and integrated medical approach in managing TB patients with comorbid substance abuse and mental health disorders. Collaboration between various healthcare disciplines, including pulmonology, psychiatry, addiction medicine, and social work, is essential for providing tailored care that addresses both medical and psychosocial needs. Integrated care models have shown promise in improving treatment adherence and outcomes for these complex cases.

Prospective Message: Future research should focus on exploring innovative strategies to address the underlying mechanisms linking TB, substance abuse, and mental health disorders. Evaluating the effectiveness of integrated care interventions in diverse settings and populations can inform the development of evidence-based approaches to optimize TB management and improve patient outcomes. By prioritizing interdisciplinary collaboration and patient-centered care, healthcare systems can better meet the evolving needs of individuals affected by TB and its associated comorbidities.

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