



Tracing HIV Infection among high-risk Tuberculosis Patients in Hodiedah Referral Center, Yemen

Khaled Alselwi ^{1,*}, M.A. Suhail ¹

¹ Department of Community Medicine, Faculty of Medical and Health Sciences, Hodiedah University, Yemen.

*Corresponding author: khaledselwy@gmail.com

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ABSTRACT

Background: HIV and tuberculosis [TB] are major public health concerns in Yemen. However, in this population, there is limited information on the prevalence of HIV infection among TB patients. This study aims to trace and describe cases of HIV infection among high-risk tuberculosis patients attending the Hodiedah referral center in Yemen.

Methods: A cross-sectional study design was employed, and a convenience sampling method was used to select 40 high-risk tuberculosis patients out of 164 confirmed cases. Data was collected through a questionnaire regarding sociodemographic features and clinical signs.

Results: Of 40 high-risk TB patients, only 4 tested positive for HIV, indicating a 10% prevalence. More than half [55.0%] were aged between 18 and 40 years, with the majority [57.5%] being male. Over half [57.5%] resided in urban areas, and approximately two-thirds [62.5%] had no formal education. Most participants [87.5%] belonged to a low socioeconomic status, with a monthly income of less than 50,000 Yemeni Riyals. The age group of 18–40 years had the highest frequency of HIV-positive cases [50.0%]. All HIV-positive cases occurred in males. Younger age and travel history showed higher odds of HIV positivity. Diarrhea, bone pain, and abdominal pain were associated with HIV-TB co-infection.

Conclusion: A relatively high HIV prevalence points to an urgent need to scale up integrated screening, testing, and treatment programs within existing TB clinics to address this unmet HIV/TB burden. Males, younger ages, and travel outside the country emerged as potential high-risk groups that could be prioritized for screening; incorporating symptom-based algorithms into clinical protocols may help front-line workers recognize and refer to suspected co-infection cases for testing. Larger studies are warranted to validate the findings and better inform control programs.

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1. Introduction:

HIV poses a significant worldwide health threat, especially in developing countries. Yemen, one of the most affected, has a 0.2% prevalence rate

[1]. The specific prevalence of HIV among high-risk groups of tuberculosis [TB] patients in Yemen is unclear. This study aims to trace and describe HIV cases among high-risk TB patients who visited referral services in Hodeida, Yemen.

The prevalence of coexisting diseases among TB patients in Yemen increased from 2006 to 2018 [1]. A study in Spain suggested that TB infection among intravenous drug users links to prior imprisonment [2].

A study in Sana'a City, Yemen, reported HIV stigma in teaching hospitals [3]. The ongoing political and armed conflicts in Yemen worsen HIV treatment and care, leading to high HIV-related mortality rates among hospitalized patients [4,5]. The 2019 Global AIDS Update from UNAIDS highlighted barriers hindering HIV services, including gender inequality, violence against women and girls, and marginalization of vulnerable populations [6].

TB higher risk groups are those with recent exposure, weakened immune systems from conditions like HIV/AIDS, cancer, or diabetes, malnutrition, crowded housing, specific job locations catering to high-risk individuals, drug injection, homelessness, areas with a high TB incidence, close contact with active TB patients, tobacco exposure, and indoor pollution [7, 9]. Identifying high-risk groups for TB is crucial for implementing targeted prevention and control efforts, including screening, testing, and treatment, to reduce the burden of TB in these communities [7, 8, 9, 10].

Within high-risk groups, individuals with weakened immune systems from various conditions, drug users, and locations with a high prevalence of HIV [13, 14, 15, 16, 17]. Assessing HIV levels in this group is important. People living with HIV are 20–30 times more likely to develop TB compared to those without HIV [14]. Implementing screening, testing, and treatment strategies can help mitigate the impact of both HIV and TB within these populations. Therefore, it is crucial to identify groups at high risk for both TB and HIV and implement targeted screening, testing, and treatment interventions aimed at reducing the burden of these diseases [13, 14, 15, 16, 17, 18]. Implementing targeted measures can

effectively lower the disease burden among these populations.

2. Materials and Methods

Study Design

This cross-sectional study involved a convenience sampling of 40 patients in the TB high-risk group, as defined by the WHO, out of 164 confirmed TB patients. The analysis lasted 11 months, from January to November 2022.

Setting: Hodeida Referral Center, Hodeidah Governorate, Yemen.

Participants: A sample of 40 high-risk tuberculosis patients out of 164 confirmed cases was enrolled. Participants were analyzed and identified as a high-risk group based on the comprehensive assessment of patients' clinical, radiological, and laboratory characteristics, according to the criteria used by the Tuberculosis Control Center. They underwent laboratory screenings for TB and HIV status, participation in The study was voluntary, and verbal recorded consent was obtained after receiving an explanation about the analysis objectives and methodology.

The inclusion criteria included individuals with confirmed tuberculosis who are classified as a high-risk group and who sought treatment at the center between January 2022 and November 2022.

The exclusion criteria for this study included patients who were not treated at the TB control center, patients with negative tuberculosis test results, and patients who declined to participate in the analysis. It also encompassed patients treated before January 2022 or after November 2022.

Variables: HIV infection and demographics, symptomatic factors

Data collection: Information-gathering techniques included a questionnaire to collect data regarding patients, including sociodemographic features and clinical signs.

Data analysis: The data was analyzed using IBM SPSS Statistics version 21.0 for Windows and interpreted in percentages.

3. Results

In our study, 40 patients of the TB high-risk group were enrolled. Among them, 4 patients tested positive for HIV, indicating a prevalence of 10.0% in this high-risk TB group. According to the demographic characteristics of the participants, more than half [55.0%] were aged between 18 and 40 years, with the majority [57.5%] being male. Over half [57.5%] resided in urban areas, and approximately two-thirds [62.5%] had no formal education. Most participants [87.5%] belonged to a low socioeconomic status, with a monthly income of less than 50,000 Yemeni Riyals. The age group of 18–40 years had the highest frequency of HIV-positive cases [50.0%]. All HIV-positive cases were male; sex and travel history showed borderline significant associations. This study shows a significant association between many symptoms and being HIV-positive. These symptoms—diarrhea [$p < 0.05$], bone pain [$p < 0.05$], and abdominal pain [$p < 0.05$]—were significantly associated with HIV-positive TB patients, providing clinically relevant signs that may aid in identifying potential HIV infections.

4. Discussion

This study provides estimates of HIV prevalence and characteristics in the TB patient population. Although limited by a small sample size, the prevalence observed in this study is relatively high compared to similar studies conducted in Yemen, the Middle East, and Africa [19, 20, 21, 22, 23]. These findings align with other reports that highlight the vulnerability of individuals living in poverty, those with weakened immune systems, and people who use drugs to co-infect

with TB and HIV. Notably, certain sociodemographic factors, such as gender and a history of traveling outside the country, showed a borderline significant association with HIV status [$p = 0.070$]. However, further research is needed to confirm whether these factors are truly associated with HIV in this population [30]. The potential risk factor of travel history for HIV infection aligns with findings from other studies conducted in Yemen and other regions [31], suggesting that HIV infection in this population may primarily be imported. As a result, it is critical to implement health policies and extended screening procedures at the country's ports and airports. Further studies with larger sample sizes are necessary to validate these findings. Additionally, the significant associations found between symptoms such as diarrhea, bone pain, and abdominal pain in HIV-positive TB patients may aid in increasing suspicion of HIV infection and improving screening for the disease.

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