



SOCIO-DEMOGRAPHIC DETERMINANTS AND CLINICAL MANIFESTATIONS AMONG HIV-TB CO-INFECTED PATIENTS

Dr. Neha Damor¹, Dr. Prem Chand^{2*}, Dr. Ankit Bhagora³

¹Assistant Professor, Department of Respiratory Medicine, RNT Medical College, Udaipur.

^{2*}Junior Specialist, MD Respiratory Medicine, MB Hospital, Udaipur.

³Assistant Professor, Department of Community Medicine, Govt. Medical College, Dungarpur.

***Corresponding Author** – Dr. Prem Chand

*Junior Specialist, MD Respiratory Medicine, MB Hospital, Udaipur.

Abstract

Background: HIV and TB together pose a major global health challenge, with co-infection altering disease epidemiology and clinical presentation.

Objective: To assess socio-demographic determinants and clinical manifestations among HIV-TB co-infected patients in Southern Rajasthan.

Methods: A cross-sectional study was conducted on 100 newly diagnosed pulmonary TB patients (50 HIV seropositive, 50 HIV seronegative). Socio-demographic and clinical details were collected, along with sputum AFB, Mantoux, chest X-ray, and CD4 counts (in HIV-positive). Data were analyzed using SPSS v16.0.

Results: Majority were males (72%) and rural residents (71%). HIV-TB patients more frequently presented with chest pain, weight loss, weakness, lymphadenopathy, and undernutrition, while Mantoux positivity was significantly lower. Radiologically, HIV-TB patients showed mid/lower zone and far-advanced lesions, unlike TB-only patients who more often had upper-zone lesions.

Conclusion: HIV-TB co-infected patients differ significantly in socio-demographic and clinical profiles compared to TB-only cases, underscoring the need for early diagnosis, nutritional support, and tailored management strategies in high-burden regions like Southern Rajasthan.

Keywords: HIV; Tuberculosis; Co-infection; Socio-demographic determinants; Clinical manifestations; Southern Rajasthan

Introduction

Tuberculosis (TB) continues to be one of the leading infectious causes of morbidity and mortality worldwide. The emergence of the human immunodeficiency virus (HIV) has dramatically altered the epidemiology of TB, leading to an unprecedented dual epidemic, particularly in resource-limited settings. The World Health Organization has identified the HIV epidemic as a major driver of the resurgence of TB in many parts of the world, with co-infection significantly amplifying the burden of both diseases[1].

HIV infection increases the risk of developing active TB by accelerating progression from latent infection to active disease. Intravenous drug users and other immunocompromised populations have been shown to have markedly elevated TB risk when infected with HIV[2]. Sub-Saharan Africa has borne the heaviest impact of the HIV-TB syndemic, with TB becoming the most common opportunistic infection and the leading cause of mortality among people living with HIV[3].

In addition to pulmonary TB, extrapulmonary and disseminated forms, such as tuberculous meningitis, are more common in HIV-infected individuals and present diagnostic and therapeutic challenges[4–6]. Several studies have highlighted differences in clinical presentation and severity of TB between HIV-infected and uninfected patients, with HIV-infected individuals more likely to have atypical radiographic findings, higher rates of disseminated disease, and worse clinical outcomes[7–10].

Despite global evidence, regional variations exist in socio-demographic determinants, clinical manifestations, and disease outcomes. Data from low-incidence countries and Asian populations suggest variable patterns in disease presentation, particularly with central nervous system involvement and immune reconstitution inflammatory syndrome[11–13]. Indian studies have also documented distinctive clinical features of TB in HIV-infected patients compared to HIV-negative individuals, including higher rates of weight loss, weakness, and lymphadenopathy[9,14,15].

Southern Rajasthan is a region with a significant burden of both HIV and TB, yet limited data exist on the socio-demographic and clinical profile of co-infected patients. Understanding these factors is essential for early diagnosis, improved management, and targeted interventions. Therefore, the present study was undertaken to assess the socio-demographic determinants and clinical manifestations among HIV-TB co-infected patients in this region.

Aims and Objectives

To assess the socio-demographic profile and clinical manifestations of pulmonary TB patients with and without HIV co-infection, and to compare their investigation findings in order to identify differences that may aid in early diagnosis and management in Southern Rajasthan.

Methodology

A cross-sectional study was conducted at R.N.T. Medical College, Udaipur, including 100 newly diagnosed pulmonary TB patients (50 HIV seropositive and 50 HIV seronegative). Detailed socio-demographic, clinical, and anthropometric data were recorded. All patients underwent sputum AFB, Mantoux test, chest X-ray, and HIV testing, with CD4 counts in HIV-positive cases. Data were analyzed using SPSS v16.0, applying Chi-square and t-tests; $p < 0.05$ was considered statistically significant.

Results

Table 1: Socio-Demographic Characteristics

Variable	Reactive (n=50)	Non-Reactive (n=50)	Total (N=100)
<20 yrs	1 (2%)	4 (8%)	5 (5%)
20-39 yrs	25 (50%)	29 (58%)	54 (54%)
40-60 yrs	24 (48%)	17 (34%)	41 (41%)
Male	39 (78%)	33 (66%)	72 (72%)
Female	11 (22%)	17 (34%)	28 (28%)
Married	41 (82%)	45 (90%)	86 (86%)
Unmarried	9 (18%)	5 (10%)	14 (14%)
Rural	34 (68%)	37 (74%)	71 (71%)

Urban	16 (32%)	13 (26%)	29 (29%)
Illiterate	18 (36%)	22 (44%)	40 (40%)
Literate	32 (64%)	28 (56%)	60 (60%)

Most participants were in the age group 20–39 years (54%), with males predominating (72%). Majority were married (86%) and from rural background (71%). Illiteracy was observed in 40% of patients.

Table 2: Clinical Manifestations

Symptom/Sign	Reactive (n=50)	Non-Reactive (n=50)	Total (N=100)
Cough	48 (96%)	50 (100%)	98 (98%)
Expectoration	46 (92%)	49 (98%)	95 (95%)
Dyspnea	42 (84%)	34 (68%)	76 (76%)
Chest Pain	26 (52%)	9 (18%)	35 (35%)
Fever	41 (82%)	48 (96%)	89 (89%)
Weight Loss	38 (76%)	20 (40%)	58 (58%)
Weakness	38 (76%)	10 (20%)	48 (48%)
Lymphadenopathy	17 (34%)	2 (4%)	19 (19%)

Cough (98%) and expectoration (95%) were almost universal. Chest pain was significantly higher among HIV-TB cases (52% vs 18%, $p<0.001$). Fever (89%), weight loss (58%) and weakness (48%) were frequent, with anorexia, weight loss and weakness strongly associated with HIV co-infection. Lymphadenopathy was significantly more common among HIV-TB patients (34% vs 4%).

Table 3: Investigation Findings

Investigation	Reactive (n=50)	Non-Reactive (n=50)	Total (N=100)
BMI <18.5	48 (96%)	41 (82%)	89 (89%)
Mantoux Positive	16 (32%)	40 (80%)	56 (56%)
Sputum AFB Positive	36 (72%)	42 (84%)	78 (78%)
Far-advanced Lesions	21 (42%)	10 (20%)	31 (31%)
Bilateral Involvement	29 (58%)	31 (62%)	60 (60%)
Upper Zone Lesions	1 (2%)	18 (36%)	19 (19%)
Mid & Lower Zone Lesions	38 (76%)	23 (46%)	61 (61%)

Undernutrition was very common, with 89% of patients having BMI <18.5, significantly higher in HIV-TB cases (96%). Mantoux positivity was markedly lower in HIV-TB (32% vs 80%, $p<0.001$). Far-advanced lesions were more common in HIV-TB (42%), while upper-zone involvement predominated in TB-only cases (36%).

Discussion

In this study, HIV-TB co-infected patients were predominantly young, male, and from rural backgrounds, similar to observations from other Indian and African studies[1,3,9]. Illiteracy and farming/laborer occupation were common determinants, highlighting socio-economic vulnerability. Clinically, cough and expectoration were universal, but chest pain, weakness, weight loss, and lymphadenopathy were significantly more common in HIV-TB patients. This aligns with previous findings that HIV alters typical TB presentation, leading to atypical or disseminated disease[7,10,15]. Fever was more common in TB-only cases, supporting the hypothesis that HIV-associated immunosuppression blunts febrile responses[4,8].

Mantoux positivity was markedly reduced in HIV-TB, consistent with anergy in immunocompromised states[2,6]. Radiologically, HIV-TB patients often showed mid/lower lung involvement and far-advanced lesions, whereas TB-only patients had classical upper-zone lesions, similar to patterns reported in earlier studies[9,14].

Our findings reinforce that socio-demographic disadvantage, altered symptomatology, and atypical radiographic features must alert clinicians to possible HIV-TB co-infection.

Conclusion

HIV-TB co-infected patients in Southern Rajasthan were mostly young, rural males from low socio-economic groups, presenting with atypical clinical and radiological features compared to TB-only patients. Early suspicion, prompt diagnosis, and integrated TB-HIV management are essential to improve outcomes in this high-burden region.

Limitations

The study was limited by its single-center design and modest sample size. CD4 counts were assessed but not correlated with detailed clinical outcomes. Future multicentric studies with larger cohorts are needed for stronger generalizability.

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Conflict of Interest

The authors declare no conflict of interest.

Ethical Considerations

The study was conducted after obtaining approval from the Institutional Ethics Committee of R.N.T. Medical College, Udaipur, Rajasthan. Written informed consent was obtained from all participants prior to enrollment, and confidentiality of patient data was strictly maintained.

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