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Prevalence of Tuberculosis–HIV Coinfection, Drug Adherence, and Associated Factors among TB Patients in Specialist Hospital, Sokoto, Nigeria

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ABSTRACT

Background: Tuberculosis (TB) and Human Immunodeficiency Virus (HIV) remain closely intertwined epidemics in sub-Saharan Africa. HIV-associated immunosuppression increases the risk of active TB and may complicate treatment outcomes, while poor adherence to anti-TB therapy undermines disease control. **Aim:** This study determined the prevalence of TB–HIV coinfection, the level of anti-TB drug adherence, and associated factors among TB patients attending the Specialist Hospital, Sokoto, Nigeria. **Materials and Methods:** A hospital-based cross-sectional study was conducted among 187 adult TB patients receiving treatment at the Specialist Hospital, Sokoto. Participants were selected using systematic sampling. Data were collected using a structured, interviewer-administered questionnaire and a review of clinical records. Descriptive statistics, chi-square tests, and multivariate logistic regression analyses were performed using IBM SPSS version 25, with statistical significance set at $p<0.05$. **Results:** The prevalence of TB–HIV coinfection was 19.0%. Coinfection was significantly associated with male sex, non-Hausa ethnicity, formal education, Christianity, and urban residence ($p<0.05$). Independent predictors included male sex (aOR=2.56; 95% CI: 1.01–6.49), non-Hausa ethnicity (aOR=0.20; 95% CI: 0.07–0.54), and rural residence (aOR=0.43; 95% CI: 0.20–0.93). Overall, 58.8% of participants demonstrated low adherence to anti-TB medications. Drug adherence was significantly associated with family structure, ethnicity, educational status, perceived social support, mood disorders, and coping strategies. Predictors of better adherence included non-formal education (aOR=2.38; 95% CI: 1.12–5.08), monogamous family structure (aOR=2.10; 95% CI: 1.00–4.42), strong perceived family support (aOR=0.45; 95% CI: 0.23–0.88), and active coping strategies. **Conclusion:** TB–HIV coinfection remains a significant burden among TB patients in Sokoto, while adherence to anti-TB therapy is suboptimal. Strengthening adherence support and addressing key sociodemographic and psychosocial determinants may improve treatment outcomes and enhance TB control efforts.

Keywords: Tuberculosis–HIV co-infection, Drug adherence, Anti-TB treatment, Prevalence, Nigeria

INTRODUCTION

Tuberculosis (TB) remains a major global public health challenge and a leading cause of morbidity and mortality worldwide. Despite advances in diagnosis and treatment, TB continues to rank among the top ten causes of death globally and was the second leading infectious killer after COVID-19 in 2020, accounting for approximately 1.5 million deaths annually.[1–4] The burden of TB is disproportionately concentrated in low- and middle-income countries, where socioeconomic disadvantage, malnutrition, overcrowded living conditions, and weak health systems contribute to sustained transmission and adverse outcomes.[5]

Globally, an estimated 10 million people developed TB in 2018, resulting in about 1.4 million deaths, including substantial mortality among individuals living with Human Immunodeficiency Virus (HIV).[6] Men are also reported to experience higher rates of pulmonary TB and TB-related mortality than women in many regions of the world.[7] Sub-Saharan Africa bears a particularly high burden of TB, largely driven by the HIV epidemic. Approximately one-third of the world's population is infected with *Mycobacterium tuberculosis*, with the highest prevalence occurring in regions heavily affected by HIV infection.[8]

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In this context, Nigeria is among the countries with the greatest TB burden globally and ranks among those accounting for the majority of cases worldwide.[8] HIV infection significantly contributes to the TB epidemic by increasing susceptibility to active TB disease, complicating diagnosis and treatment, and worsening clinical outcomes, including treatment failure and mortality.[9] Early detection and prompt initiation of anti-tuberculosis therapy remain critical strategies for reducing transmission, morbidity, and mortality associated with TB.[9]

The interaction between TB and HIV represents one of the most significant syndemics affecting global health. Individuals living with HIV are approximately 30 times more likely to develop active TB compared with HIV-negative individuals.[10] Consequently, HIV infection has contributed substantially to the persistence of the TB epidemic, particularly in regions with high HIV prevalence.[11] Globally, TB–HIV coinfection is associated with considerable morbidity and mortality, and the African region has consistently recorded the highest rates of coinfection.[12] This dual epidemic has important implications for health systems, given the need for integrated prevention, diagnosis, and treatment services.

In Nigeria, several studies have documented varying prevalence rates of TB–HIV coinfection across different regions. Reported prevalence among TB patients ranges from 6.1% in Jos and 9.2% in Ilorin to 28.1% in Ibadan, 35.1–41.2% in Benue, and 25% in Port Harcourt.[13–16] Additional studies have reported prevalence rates of 10.8% in Irrua, 6.4% in Imo, 16.7% in Enugu, 19.8% in Benin City, and 32.8% in Edo State, with a national median prevalence estimated at approximately 17%.[17–19] These variations reflect differences in epidemiological patterns, healthcare access, and underlying socioeconomic conditions across regions.

The relationship between TB and HIV is bidirectional and synergistic. HIV-induced immunosuppression increases the risk of progression from latent to active TB infection, while TB accelerates the progression of HIV disease through chronic immune activation.[20] Several factors have been associated with TB–HIV coinfection, including socioeconomic deprivation, poor nutrition, overcrowded living conditions, substance misuse, and mental health disorders.[7,21] Sociodemographic characteristics such as age, sex, educational status, marital status, and place of residence have also been implicated as potential determinants of coinfection in different populations.

Effective management of TB, particularly in individuals with HIV coinfection, relies heavily on adherence to long-term treatment regimens. Patients with TB–HIV coinfection often receive complex therapeutic combinations, including anti-tuberculosis drugs and antiretroviral therapy, which may increase pill burden and the likelihood of adverse drug reactions.[22] Poor adherence to treatment is associated with unfavorable outcomes such as treatment failure, relapse, and the emergence of drug-resistant TB.[22] Accurate assessment and improvement of medication adherence, therefore, remain essential components of TB control programs.

Adherence to TB treatment is a multifaceted phenomenon influenced by socioeconomic conditions, health system characteristics, treatment-related factors, disease-related factors, and patient-related behaviors.[22,23] These interacting determinants often create barriers to sustained adherence, particularly in resource-limited settings where social support systems and access to healthcare services may be constrained.[23] Understanding these determinants is crucial for designing targeted interventions aimed at improving treatment outcomes.

Although several studies have investigated TB–HIV coinfection in Nigeria, most have been conducted in the southern and central regions of the country, with relatively limited data available from northern Nigeria.[16] In Sokoto State, evidence regarding the prevalence of TB–HIV coinfection and patterns of drug adherence among TB patients remains scarce. Generating such data is essential for informing context-specific interventions aimed at improving adherence, strengthening integrated TB–HIV care, and optimizing treatment outcomes. Therefore, this study assessed the prevalence of TB–HIV coinfection, the level of drug adherence, and associated factors among TB patients receiving care at the Specialist Hospital, Sokoto, Nigeria.

MATERIALS AND METHODS

Study Design, Population, and Area

This was a hospital-based cross-sectional study conducted among adult tuberculosis (TB) patients (≥18 years) receiving treatment at the Specialist Hospital, Sokoto, Nigeria, between April 2021 and May 2022. Specialist

Hospital, Sokoto, is a tertiary healthcare facility that provides comprehensive TB and Human Immunodeficiency Virus (HIV) care services, including diagnosis, treatment, and follow-up under the national TB control programme. All eligible TB patients attending the facility during the study period who provided informed consent were considered for enrollment.

Sample Size Estimation and Sampling Techniques

The sample size was estimated at 196 using the Cochran formula for sample size estimation in cross-sectional studies[24], based on the 21.6% HIV prevalence[15] among TB patients reported in a previous Nigerian study, a 5% margin of error, and an anticipated 95% response rate. Of the 1,504 TB patients receiving treatment during the study period, eligible participants were selected using a systematic sampling technique until the required sample size was reached.

Data Collection

Data were collected using a structured interviewer-administered questionnaire and clinical record review forms. The questionnaire consisted of five sections designed to obtain information on participants' sociodemographic characteristics, HIV status, and patterns of adherence to anti-tuberculosis medications. The study instrument was reviewed by senior researchers in the Department of Community Health, Usmanu Danfodiyo University, Sokoto, Nigeria, to ensure content validity. Five trained research assistants supported the data collection process. They were trained on the study objectives, eligibility criteria, participant selection procedures, and administration of the survey instruments. The questionnaire was pretested among 20 TB patients with HIV coinfection attending another TB treatment centre within Sokoto metropolis to identify potential ambiguities and ensure clarity of the questions. Necessary modifications were made to the instrument following the pretest before the commencement of the main study.

Data Analysis

The returned questionnaires were cross-checked for completeness and consistency before data entry. Data were analyzed using IBM SPSS version 25. Quantitative variables were summarized using mean and standard deviation, while categorical variables were presented as frequencies and percentages. The chi-square test was used to assess associations between sociodemographic characteristics and the outcomes of interest. Multivariate logistic regression analysis was performed to identify independent predictors of TB–HIV coinfection and drug adherence among the study participants. Statistical significance was set at $p < 0.05$.

Ethical Consideration

Ethical approval for the study was obtained from the Health Research and Ethics Committee of the Specialist Hospital, Sokoto, Nigeria. The purpose and procedures of the study were explained to all participants, and confidentiality of the information provided was assured. Participation was voluntary, and written informed consent was obtained from each participant prior to data collection.

RESULTS

Sociodemographic characteristics of participants

A total of 187 participants completed the questionnaire and were included in the analysis. The largest proportion of respondents was aged 30–39 years (47; 25.0%), followed by those aged 20–29 years (23.5%). More than half of the participants were male (106; 56.7%). The majority practiced Islam (164; 87.7%), belonged to the Hausa ethnic group (158; 84.5%), and had Qur'anic education (63; 33.7%). Most respondents were married (118; 63.1%), predominantly in monogamous unions (112; 59.9%), and self-employed (79; 42.2%) [Table 1].

Prevalence and factors associated with TB-HIV coinfection among participants

Of the 187 participants with complete HIV status data, 35 (19.0%) were coinfected with TB and HIV [Figure 1]. TB–HIV coinfection was significantly more prevalent among male participants (26; 24.5%) compared with females (9; 11.1%) ($p < 0.05$). A markedly higher prevalence was observed among Christians (14; 56.5%) compared with Muslims (22; 13.4%) ($p < 0.05$). Coinfection was also significantly more common among non-Hausa ethnic groups (14; 48.3%) compared with Hausa participants (21; 13.3%), among respondents with formal education (21; 30.4%) compared with those with non-formal education (14; 11.9%), and among those residing in urban areas (23; 25.0%) compared with rural residents (12; 12.6%) ($p < 0.05$ for all). No statistically significant differences were observed in the distribution of TB–HIV coinfection across age group, marital status, type of marriage, or occupation ($p > 0.05$) [Table 2].

Table 1: Sociodemographic characteristics of participants

Variables	Frequency (%) n = 187
Age group (years)	
10-19	15 (8.0)
20-29	44 (23.5)
30-39	47 (25.2)
40-49	41 (21.9)
50-59	25 (13.4)
≥60	15 (8.0)
Sex	
Male	106 (56.7)
Female	81 (43.3)
Level of education	
No formal education	41 (21.9)
Quranic school only	63 (33.7)
Primary	14 (7.5)
Secondary	46 (24.6)
Tertiary	23 (12.3)
Marital status	
Single	55 (29.4)
Married	118 (63.1)
Separated	5 (2.7)
Divorced	6 (3.2)
Widowed	3 (1.6)
Type of marriage	
Monogamous	112 (59.9)
Polygamous	75 (40.1)
Tribe	
Hausa	158 (84.5)
Yoruba	18 (9.6)
Igbo	7 (3.7)
Others (e.g., Ibira, Nupe, etc.)	4 (2.1)
Religion	
Islam	164 (87.7)
Christianity	23 (12.3)
Occupation	
Civil servant	24 (12.8)
Self employed	79 (42.2)
Unemployed	24 (12.8)
Student	25 (13.4)
Housewife	22 (11.8)
Retired	13 (7.0)
Type of settlement	
Rural	92 (49.2)
Urban	95 (50.8)

Predictors of TB-HIV coinfection among participants

Multivariate logistic regression analysis identified male sex, ethnicity, and place of residence as significant predictors of TB–HIV coinfection. Male participants had approximately 2.6-fold higher odds of TB–HIV coinfection compared with females (aOR = 2.56; 95% CI: 1.01–6.49; p = 0.047). In contrast, participants of Hausa ethnicity were significantly less likely to have TB–HIV coinfection compared with other ethnic groups (aOR = 0.20; 95% CI: 0.07–0.54; p = 0.001). Similarly, rural residents had lower odds of TB–HIV coinfection compared with urban residents (OR = 0.43; 95% CI: 0.20–0.93; p = 0.033) [Table 3].

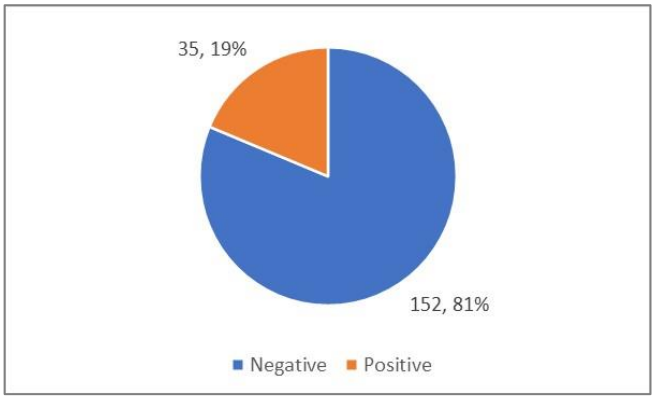

Figure 1: Prevalence of TB-HIV coinfection among participants

Prevalence of drug adherence among participants

Among the 187 respondents assessed for treatment adherence, the majority, 110 (58.8%), had low adherence to anti-tuberculosis medication. Seventy-two (38.5%) demonstrated moderate adherence, while only 5 (2.7%) achieved high adherence to treatment [Figure 2].

Sociodemographic factors associated with drug adherence among participants

Drug adherence was significantly associated with family structure, ethnicity, and educational status [Table 4]. Participants in monogamous marriages were more likely to demonstrate better adherence compared with those in polygamous marriages (47.3% vs 32.0%; $\chi^2 = 4.353$; p = 0.037). Similarly, Hausa participants had higher levels of adherence than respondents from other ethnic groups (44.3% vs 24.1%; $\chi^2 = 4.114$; p = 0.043). Respondents with non-formal education exhibited significantly better adherence compared with those with formal education (49.2% vs 27.5%; $\chi^2 = 8.399$; p = 0.004). However, age, sex, marital status, and occupation were not significantly associated with treatment adherence (p > 0.05).

Psychosocial factors associated with drug adherence among participants

Several psychosocial factors were significantly associated with adherence to TB treatment [Table 5]. Participants with strong perceived family social support demonstrated significantly higher adherence compared with those with weak family support (51.0% vs 30.3%; $\chi^2 = 8.238$; $p = 0.004$). The presence of mood disorders was also associated with adherence, with respondents reporting mood disorders showing higher adherence levels than those without mood disorders (50.6% vs 34.0%; $\chi^2 = 5.258$; $p = 0.022$). Similarly, respondents who reported active coping strategies were more likely to adhere to treatment compared with those without such strategies (33.3% vs 53.4% high/medium adherence; $\chi^2 = 7.417$; $p = 0.006$). In contrast, communication with health workers was not significantly associated with treatment adherence ($p > 0.05$).

Predictors of drug adherence among participants

Multivariate logistic regression analysis identified several independent predictors of better adherence to TB treatment [Table 6]. Participants with non-formal education had approximately 2.4-fold higher odds of good adherence compared with those with formal education (aOR = 2.38; 95% CI: 1.12–5.08; $p = 0.025$). Respondents in monogamous marriages were also more likely to demonstrate better adherence than those in polygamous unions (aOR = 2.10; 95% CI: 1.00–4.42; $p = 0.050$). Perceived family social support emerged as a protective factor: participants reporting weak family support were less likely to adhere to treatment than those with strong support (aOR = 0.45; 95% CI: 0.23–0.88; $p = 0.020$). Although active coping strategies were associated with improved adherence in bivariate analysis, the association did not reach statistical significance after adjustment (aOR = 1.91; 95% CI: 0.94–3.90; $p = 0.075$). Also, other variables, including age, sex, religion, occupation, marital status, ethnicity, settlement type, and mood disorders, were not significant predictors in the multivariate model.

DISCUSSION

This study assessed the prevalence of TB–HIV coinfection, treatment adherence, and associated factors among patients with pulmonary tuberculosis attending the Specialist Hospital, Sokoto, Nigeria. The prevalence of TB–HIV coinfection in this study was 19.0%, which is comparable to reports from Maiduguri (19%), Benin City (19.8%), and Enugu (16.7%), and closely aligns with the Nigerian national median prevalence of approximately 17%.[13,19] However, the prevalence observed in this study is lower than figures reported in Edo (32.8%), Benue (41.2%), and Ibadan (28.1%), as well as in other African countries such as Chad, Tanzania, and Ethiopia, where prevalence rates of 33.2%, 43.6%, and 57.1%, respectively, have been reported.[13,14,19,25] Variations in TB–HIV coinfection prevalence across settings may reflect differences in HIV epidemiology, access to antiretroviral therapy (ART), and the implementation of integrated TB–HIV control programs.26 Geographic variations in HIV prevalence across African populations may also contribute to these differences.[16,19]

Conversely, the prevalence observed in this study is higher than that reported in several other settings, including Kano (10.5%), Ilorin (9.2%), Ethiopia (7.5%), Iraq (10.3%), India (0.13%), and Pakistan (4.39%).[13,27–29] Such differences may reflect variations in patient characteristics and the quality and accessibility of TB and HIV care services across health systems.[30] In generalized HIV epidemics, the prevalence of HIV among TB patients has been considered an indicator of the maturity of the HIV epidemic and a predictor of the future burden of tuberculosis at the population level.[31] TB–HIV coinfection in this study was significantly more common among male participants, with males having approximately 2.6-fold higher odds of coinfection than females. This finding is consistent with reports from Nigeria and the Democratic Republic of Congo.[6,16,32] The higher prevalence among men has been attributed to biological and behavioral factors influencing exposure risk, health-seeking behavior, and disease detection.[6]

Educational status was also significantly associated with coinfection, with participants with formal education showing a higher prevalence than those without. This finding contrasts with previous studies that reported lower coinfection rates among individuals with higher educational attainment, possibly due to improved health literacy and health-seeking behavior.[33–35] Differences in study settings and population characteristics may partly explain this discrepancy. Place of residence was another significant determinant of TB–HIV coinfection, with urban residents showing higher prevalence than rural residents. Similar observations have been reported in other studies linking urban residence with increased vulnerability to infectious diseases due to environmental and socioeconomic factors.

Table 2: Factors associated with HIV-TB coinfection among participants

Variables	HIV-TB coinfection test		Test of significance
	Positive, n(%)	Negative, n(%)	
Age group (years)			
10-39 (n=105)	20 (19.0)	85 (81.0)	χ^2= 0.017
≥40 (n = 82)	15 (18.3)	67 (81.7)	p=0.896
Sex			
Male (n=106)	26 (24.5)	80 (75.5)	χ^2= 5.433
Female (n=81)	9 (11.1)	72 (88.9)	p=0.020*
Religion			
Islam (n=164)	22 (13.4)	142 (86.6)	χ^2= 24.638
Christianity (n=23)	13 (56.5)	10 (43.5)	P<0.001*
Marital status			
Single (n=55)	11 (20.0)	44 (60.0)	χ^2= 0.084
Married/separated/divorced/widowed (n=132)	24 (18.2)	108 (81.8)	p=0.771
Type of marriage			
Monogamous (n=112)	25 (22.3)	87 (77.7)	χ^2= 2.385
Polygamous (n=75)	9 (6.9)	65 (86.7)	p=0.122
Tribe			
Hausa (n=158)	21 (13.3)	137 (86.7)	χ^2= 19.713
Other tribes (n=29)	14 (48.3)	15 (51.7)	p<0.001*
Education			
Non-formal (n=118)	14 (11.9)	104 (88.1)	χ^2= 9.870
Formal (n=69)	21 (30.4)	48 (69.6)	p=0.002*
Occupation			
Employed (n=103)	23 (22.3)	80 (77.7)	χ^2= 1.968
Unemployed (n=84)	12 (14.3)	72 (85.7)	p=0.161
Settlement			
Rural (n=95)	12 (12.6)	83 (87.4)	χ^2= 4.700
Urban (n=92)	23 (25.0)	69 (75.0)	p=0.030*

χ^2: Pearson's chi square test; *Statistically significant (p<0.05)

Table 3: Predictors of HIV-TB coinfection among participants

Variables	aOR	95% CI		p-value
		Lower	Upper	
Age group (years)				
(10-39 versus ≥40)	1.256	0.461	3.424	0.656
Sex				
(Males versus Females)	2.562	1.012	6.487	0.047
Marital status				
(Single versus Married/Separated/Divorced/Widowed)	1.124	0.389	3.248	0.829
Type of marriage				
(Monogamous versus Polygamous)	1.113	0.447	2.770	0.819
Tribe				
(Hausa versus Other tribes)	0.198	0.073	0.537	0.001
Education				
(Non-formal versus Formal)	0.478	0.204	1.121	0.090
Occupation				
(Employed versus Unemployed)	1.558	0.648	3.745	0.322
Settlement				
(Rural versus Urban)	0.434	0.201	0.934	0.033

aOR: adjusted Odds Ratio, CI: Confidence Interval

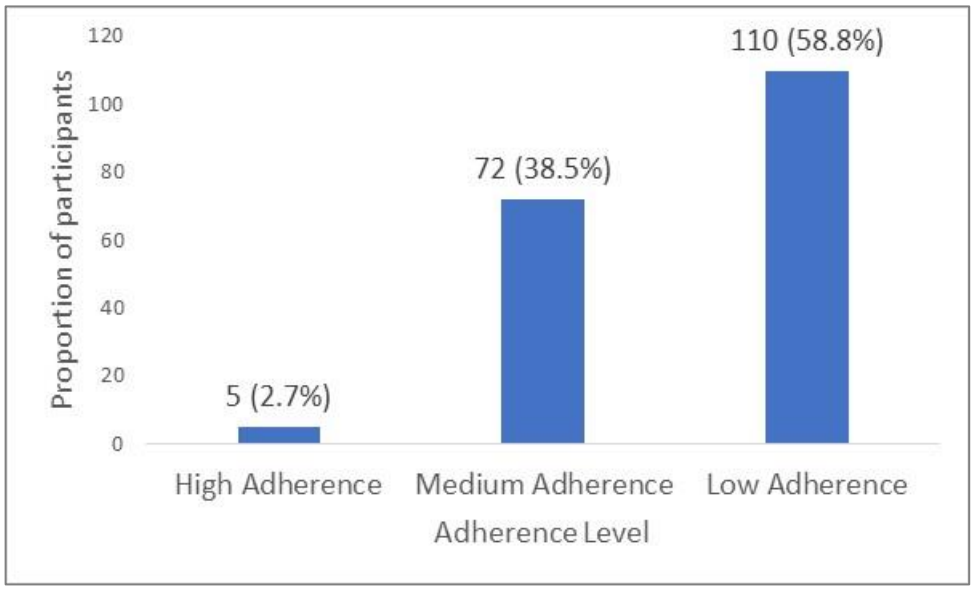

Figure 2: Prevalence of adherence among participants

Table 4: Sociodemographic factors associated with adherence among participants

Variables	Adherence level		Test of significance
	High/Medium, n(%)	Low, n(%)	
Age group (years)			
10-39 (n=105)	4 (41.4)	61 (58.1)	χ^2= 0.052
≥40 (n = 82)	33 (40.2)	49 (59.8)	p=0.819
Sex			
Male (n=106)	42 (39.6)	64 (60.4)	χ^2= 0.244
Female (n=81)	35 (43.2)	46 (56.8)	p=0.621
Marital status			
Single (n=55)	25 (45.5)	30 (54.5)	χ^2= 0.589
Married/separated/divorced/widowed (n=132)	30 (22.7)	102 (77.3)	p=0.443
Type of marriage			
Monogamous (n=112)	53 (47.3)	59 (52.7)	χ^2= 4.353
Polygamous (n=75)	24 (32.0)	51 (68.0)	p=0.037*
Tribe			
Hausa (n=158)	70 (44.3)	88 (55.7)	χ^2= 4.114
Other tribes (n=29)	7 (24.1)	22 (75.9)	p=0.043*
Education			
Non-formal (n=118)	58 (49.2)	60 (50.8)	χ^2= 8.399
Formal (n=69)	19 (27.5)	50 (72.5)	p=0.004*
Occupation			
Employed (n=103)	43 (41.7)	60 (58.3)	χ^2= 0.031
Unemployed (n=84)	34 (40.5)	50 (59.5)	p=0.861

χ^2: Pearson's chi square test; *Statistically significant (p<0.05)

Table 5: Psychosocial factors associated with adherence among participants

Variables	Adherence level		Test of significance
	High/Medium, n(%)	Low, n(%)	
Perceived Social Support from family			
Weak (n=89)	27 (30.3)	62 (69.7)	χ^2= 8.238
Strong (n = 98)	50 (51.0)	48 (49.0)	p=0.004*
Communication with health workers			
Poor (n=2)	0 (0)	2 (100)	Fe = 1.415
Good (n=185)	77 (41.6)	108 (58.4)	p=0.513
Had mood disorders			
No (n=106)	36 (34.0)	70 (66.0)	χ^2= 5.258
Yes (n=81)	41 (50.6)	40 (49.4)	p=0.022*
Had active coping strategies			
No (n=114)	38 (33.3)	76 (66.7)	χ^2= 7.417
Yes (n=73)	39 (53.4)	34 (46.6)	p=0.006*

χ^2: Pearson's chi square test; Fe: Fisher's exact test; *Statistically significant (p<0.05)

Table 6: Predictors of drug adherence among participants

Variables	aOR	95% CI		p-value
		Lower	Upper	
Age group (years)				
(10-39 versus ≥40)	1.091	0.486	2.446	0.833
Sex				
(Males versus Females)	0.881	0.437	1.775	0.723
Marital status				
(Single versus Married/Separated/Divorced/Widowed)	1.633	0.682	3.907	0.271
Type of marriage				
(Monogamous versus Polygamous)	2.101	0.999	4.416	0.050
Tribe				
(Hausa versus Other tribes)	1.344	0.258	6.991	0.725
Education				
(Non-formal versus Formal)	2.380	1.115	5.080	0.025
Occupation				
(Employed versus Unemployed)	0.733	0.353	1.525	0.406
Settlement				
(Rural versus Urban)	1.579	0.790	3.154	0.196
Perceived social support from family				
(Weak versus Strong)	0.453	0.232	0.882	0.020
Mood disorders				
(Yes versus No)	0.630	0.321	1.236	0.179
Active coping strategies				
(Yes versus No)	1.913	0.937	3.903	0.075

aOR: adjusted Odds Ratio, CI: Confidence Interval

No statistically significant differences were observed in the distribution of TB–HIV coinfection across age group, marital status, type of marriage, or occupation. This differs from some reports suggesting that individuals within the productive age group (10–49 years) bear the greatest burden of TB–HIV coinfection. [36]

Regarding treatment adherence, the present study revealed that 58.8% of participants had low adherence to anti-tuberculosis medication, while only a small proportion achieved high adherence. This finding is consistent with reports from other developing countries, including studies conducted in Ethiopia and Uganda. [37,38]

TB–HIV coinfected patients often face the challenge of managing multiple treatment regimens simultaneously, which may contribute to suboptimal adherence.[21] Poor adherence in such patients can compromise treatment outcomes and increase the risk of disease progression. Several sociodemographic factors were significantly associated with treatment adherence. Participants in monogamous marriages, those belonging to the Hausa ethnic group, and those with non-formal education demonstrated higher adherence to TB treatment.

Psychosocial factors also influenced adherence behavior. In particular, participants with strong perceived family social support were significantly more likely to adhere to treatment. This finding is consistent with evidence from Eritrea demonstrating that family and community support play a critical role in improving adherence to tuberculosis therapy.[39] Overall, the findings highlight the influence of demographic and psychosocial factors on both TB–HIV coinfection and adherence to anti-tuberculosis treatment. Strengthening integrated TB–HIV services and promoting supportive social environments may contribute to improved treatment adherence and better clinical outcomes in similar resource-limited settings.

STUDY LIMITATIONS

The findings of this study should be interpreted in light of certain limitations. Treatment adherence and related factors were assessed using self-reported data, which may be affected by recall error and social desirability bias, potentially leading to overestimation of adherence or underreporting of undesirable behaviors. In addition, cultural and religious sensitivities within the study setting may have influenced participants' responses, potentially leading to misclassification of adherence behaviors and related factors. Nevertheless, the study offers valuable insights into the prevalence of TB–HIV coinfection and the determinants of treatment adherence among tuberculosis patients in this setting.

CONCLUSION

This study found a moderate prevalence of TB–HIV coinfection (19.0%) among patients with pulmonary tuberculosis attending the Specialist Hospital, Sokoto. Coinfection was significantly associated with male sex, non-Hausa ethnicity, and urban residence, whereas age, marital status, type of marriage, and occupation were not. Treatment adherence was generally low. Better adherence was independently associated with non-formal education, monogamous marital structure, and strong perceived family support. These findings highlight the need for strengthened adherence-support strategies and improved integration of TB–HIV services to enhance treatment outcomes in similar settings.

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Nil.

Conflict of interest

None declared.

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