

The Relationship Between Anxiety, Depression and Multiple Stigma Among HIV-Positive Men Who Have Sex with Men from the Intersectionality Theory Perspective: A Structural Equation Model Analysis

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Abstract

Objective Guided by intersectionality theory, this study examined sociodemographic, disease-related, and psychosocial factors associated with anxiety and depression among HIV-positive MSM and explored their potential pathways using structural equation modeling.

Methods A questionnaire survey was conducted among 417 HIV-positive MSM. Sociodemographic characteristics, psychosocial variables, and mental health indicators were collected. Univariate analyses, multiple regression analyses, and structural equation modeling were performed to analyze the data.

Results Anxiety and depression were positively correlated with HIV-related stigma ($r = 0.571$) and internalized homophobia ($r = 0.542$), and negatively correlated with perceived social support ($r = -0.539$) and chronic disease self-efficacy ($r = -0.586$; all $p < 0.001$). Multiple linear regression analysis showed that HIV-related stigma, internalized homophobia, perceived social support, and chronic disease self-efficacy, together with ethnicity, self-rated health status, monthly income, time since HIV diagnosis, and viral load, were independently associated with the HADS total score (adjusted $R^2 = 0.555$). The structural equation model demonstrated acceptable fit ($\chi^2/df = 2.632$, CFI = 0.949, TLI = 0.933, RMSEA = 0.063). In the specified model, HIV-related stigma, internalized homophobia, and perceived social support showed indirect associations with psychological distress through chronic disease self-efficacy, while self-efficacy was negatively associated with psychological distress ($\beta = -0.910$, $p < 0.001$).

Conclusion Anxiety and depression among HIV-positive MSM were associated with multiple sociodemographic, clinical, and psychosocial factors. The findings suggest that chronic disease self-efficacy may represent an important psychological resource linking stigma-related and social factors to psychological distress. An intersectionality-informed approach to mental health care may therefore benefit from simultaneously addressing stigma-related stress, strengthening social support, and enhancing self-efficacy. Given the cross-sectional design and the presence of suppression-like patterns in some structural paths, the observed indirect associations should not be interpreted as establishing causal mediation.

Introduction

Although antiretroviral therapy (ART) has substantially improved survival rates and quality of life among people living with HIV, mental health problems remain a major concern. Research has shown that people living with HIV experience elevated levels of anxiety and depression, which are closely associated with chronic stress, social discrimination, and disease burden[1]. Depression is highly prevalent among people living with HIV and is associated with unhealthy behaviors and disease progression[2].

Men who have sex with men (MSM), a population at increased risk of HIV infection, also face stressors such as social prejudice and discrimination, which further increase their psychological burden[3]. HIV-related stigma and internalized homophobia are psychological stressors that may exacerbate anxiety and depression through their effects on social support and self-perception[4].

Social support and self-efficacy in managing chronic disease can help alleviate psychological distress and significantly reduce anxiety and depression, particularly among MSM[5,6].

Research on the factors influencing anxiety and depression among HIV-positive MSM and the underlying mechanisms remains limited. In particular, few studies have integrated variables such as stigma, social support, and self-efficacy into a unified analytical model. Therefore, this study used structural equation modeling to examine the effects of these factors on anxiety and depression among HIV-positive MSM, aiming to provide a theoretical foundation and empirical evidence to inform psychological intervention strategies.

1 Participants and Methods

Study Design

A cross-sectional questionnaire survey was conducted among HIV-positive MSM attending the infectious diseases outpatient clinic of a Grade A tertiary hospital in Nanjing, China, from December 2025 to February 2026.

Study Participants and Sample Size

The inclusion criteria were as follows: (1) age ≥ 18 years; (2) male sex; (3) confirmed HIV infection according to the diagnostic criteria specified in the Guidelines for the Diagnosis and Treatment of HIV/AIDS; (4) Self-reported history of having had insertive or receptive anal/oral sex with men (meeting the definition of MSM); (5) residence in mainland China for ≥ 6 months; and (6) provision of informed consent.

The exclusion criteria were as follows: (1) inability to understand the study objectives or questionnaire content; (2) cognitive impairment, severe mental illness, or intellectual disability; and (3) inability to complete the survey due to an acute opportunistic infection or hospitalization.

The withdrawal and data exclusion criteria were as follows: (1) withdrawal from the study for personal or other reasons; and (2) incomplete or improperly completed questionnaire data.

A total of 31 variables were included in this study. The required sample size was estimated to be 5–10 times the number of variables[7]. After accounting for an anticipated 15% rate of invalid questionnaires and loss to follow-up, the required sample size was estimated to range from 183 to 365 participants. The study was approved by the Ethics Committee of Nanjing Hospital Affiliated with Nanjing University of Chinese Medicine (Approval No. 2025-LS-ky-119).

Research Instruments

General Demographic and Behavioral Characteristics Questionnaire

A self-designed questionnaire was used, covering age, educational level, marital status, employment status, monthly income, duration since infection, disclosure of sexual orientation, and other relevant characteristics.

Berger HIV Stigma Scale

The abbreviated version of the Berger HIV Stigma Scale[8, 9] was used. It consists of 10 items covering four dimensions: personalized stigma, disclosure concerns, negative self-image, and concern with public attitudes toward people living with HIV. Each item is rated on a 4-point Likert scale, with total scores ranging from 10 to 40. Higher scores indicate higher levels of perceived HIV-related stigma. The Cronbach's α coefficient was 0.831.

Internalized Homophobia Scale

The Internalized Homophobia Scale (IHS)[10] was used to assess individuals' negative attitudes toward their own sexual orientation. The scale comprises 9 items covering dimensions such as identity-related shame, fear of social discrimination, and social interaction. Each item is rated on a 6-point Likert scale, with total scores ranging from 9 to 54. Higher scores indicate greater levels of internalized stigma. The Cronbach's α coefficient was 0.936.

Perceived Social Support Scale

The Perceived Social Support Scale (PSSS)[11, 12] was used to assess perceived social support across three dimensions: family support, friend support, and support from significant others. The scale consists of 12 items, each rated on a 7-point Likert scale, with total scores ranging from 12 to 84. Higher scores indicate higher levels of perceived social support. The Cronbach's α coefficient was 0.919.

Hospital Anxiety and Depression Scale

The Hospital Anxiety and Depression Scale (HADS)[13] was used to assess anxiety and depressive symptoms. It comprises two 7-item subscales: the Anxiety subscale (HADS-A) and the Depression subscale (HADS-D). Each subscale is scored from 0 to 21, with higher scores indicating greater symptom severity. For the univariate, correlation, and multiple linear regression analyses, the HADS-A and HADS-D subscale scores were summed to obtain a HADS total score ranging from 0 to 42, with higher scores indicating greater overall anxiety and depressive symptom burden. In the structural equation model, the HADS-A and HADS-D subscale scores were entered separately as observed indicators of the latent anxiety and depression construct. The Cronbach's α coefficient for the HADS was 0.909.

Chronic Disease Self-Efficacy Scale

The Chronic Disease Self-Efficacy Scale (CDSES)[14] was used to assess self-efficacy in chronic disease management. It comprises two dimensions: self-efficacy for disease management and self-efficacy for managing common problems associated with chronic illness. The scale uses a 10-point Likert response format, with higher scores indicating greater self-efficacy. The Cronbach's α coefficient was 0.784.

Survey Procedure

Data were collected using paper-based questionnaires, with two trained graduate students providing guidance to participants during completion. All participants provided written informed consent before completing the questionnaire. The questionnaires were collected anonymously to ensure the authenticity of the information provided and to protect participants' privacy. A total of 430 questionnaires were distributed, of which 417 were valid, yielding a valid response rate of 96.98%.

Statistical Analysis

Data were analyzed using SPSS version 27.0. Categorical variables were described as frequencies and percentages [n (%)], while normally distributed continuous variables were expressed as mean $\pm$ standard deviation. Between-group differences were assessed using independent-

samples t tests and one-way analysis of variance (ANOVA), as appropriate. Pearson correlation analysis was used to examine correlations between variables, and multiple linear regression analysis was performed to identify factors associated with anxiety and depression. For the univariate analyses, Pearson correlation analyses, and multiple linear regression analyses, the HADS total score was used as the outcome measure. Structural equation modeling (SEM) was conducted using AMOS version 27.0. In the SEM, the HADS-A and HADS-D subscale scores were modeled separately as observed indicators of the latent anxiety and depression construct. A two-sided p value < 0.05 was considered statistically significant.

2 Results

2.1 Common Method Bias Test

Harman's single-factor test was conducted to assess the potential for common method bias. Nine factors with eigenvalues greater than 1 were extracted, and the first factor accounted for 34.09% of the total variance, which was below the commonly used threshold of 40%. These findings suggest that substantial common method bias was unlikely to be present in the current data.

2.2 General Characteristics

Among the 417 participants, the mean age was 38.15 ± 11.30 years. A total of 277 participants (66.43%) were unmarried, 87 (20.86%) were married, and 53 (12.71%) were divorced or widowed. Detailed demographic characteristics are presented in Table 1.

Table 1 Comparison of Anxiety and Depression Scores Among HIV-Positive MSM With Different Characteristics

Note: Superscript ^a indicates comparisons for which the assumption of homogeneity of variances was violated; for these comparisons, the F statistic from Welch's ANOVA is reported.

2.3 HIV-Related Stigma, Internalized Homophobia, Perceived Social Support, Chronic Disease Self-Efficacy, Anxiety, and Depression Among HIV-Positive MSM

Among HIV-positive MSM, the mean ± SD scores for HIV-related stigma, internalized homophobia, perceived social support, chronic disease self-efficacy, and the HADS total score were 27.26 ± 5.02, 32.88 ± 9.32, 47.63 ± 14.04, 37.66 ± 6.56, and 12.95 ± 7.04, respectively.

2.4 Univariate Analysis of Anxiety and Depression Among HIV-Positive MSM

Univariate analyses showed statistically significant differences in anxiety and depression scores across groups defined by age, place of household registration, ethnicity, marital status, educational level, employment status, self-rated health status, monthly income, time since HIV diagnosis, HIV viral load, CD4+ T-lymphocyte count, and disclosure status (all P<0.05).

2.5 Correlations of Anxiety and Depression With HIV-Related Stigma, Internalized Homophobia, Perceived Social Support, and Chronic Disease Self-Efficacy Among HIV-Positive MSM

Pearson correlation analysis showed that anxiety and depression scores were positively correlated with HIV-related stigma (r=0.571, P<0.001) and internalized homophobia (r=0.542, P<0.001), and negatively correlated with perceived social support (r=-0.539, P<0.001) and chronic disease self-efficacy (r=-0.586, P<0.001). Further details are presented in Table 2.

Table 2 Correlation Analysis of Anxiety and Depression With HIV-Related Stigma, Internalized Homophobia, Perceived Social Support, and Chronic Disease Self-Efficacy Among HIV-Positive MSM

Variable	Anxiety and Depression	HIV-related stigma	Internalized homophobia	Perceived social support	Chronic disease self-efficacy
Anxiety and Depression	1				
HIV-related stigma	0.571**	1			
Internalized homophobia	0.542**	0.716**	1		
Perceived social support	-0.539**	-0.596**	-0.424**	1	
Chronic disease self-efficacy	-0.586**	-0.554**	-0.538**	0.429**	1

2.6 Multivariable Analysis of Anxiety and Depression Among HIV-Positive MSM

因变量	自变量	人数/例数/%	均数±标准差	t/F值	P值	The HADS total score, calculated as the sum of the HADS-A and HADS-D subscale scores, was entered as the dependent variable. Variables that were
Age (years)	18~25	378.97%	16.27±8.95	4.474 ^a	0.005	
	26~40	23656.59%	11.88±6.35			
	41~55	9823.50%	13.77±7.40			
	≥56	4611.03%	14.04±6.86			
Place of household registration	Rural	13632.61%	14.68±7.94	3.278	0.001	
	Urban	28167.39%	12.12±6.40			
Ethnicity	Han ethnicity	39694.96%	12.63±6.78	-3.163	0.005	
	Ethnic minority	215.04%	18.95±9.02			
Religious affiliation	No	39995.68%	12.85±6.97	-1.436	0.152	
	Yes	184.32%	15.28±8.26			
Marital status	Unmarried	27766.43%	12.28±7.07	4.277	0.015	
	Married	8720.86%	14.71±6.43			
	Divorced/Widowed	5312.71%	13.58±7.37			
Family structure	Only child	23957.31%	12.76±7.11	-0.640	0.522	
	Not an only child	17842.69%	13.21±6.94			
Educational level	Primary school or below	102.40%	19.70±7.06	4.851 ^a	0.005	
	Junior high school	8119.42%	14.36±7.74			
	Senior high school/ Junior college	16740.05%	12.71±7.10			
	Bachelor's degree or above	15938.13%	12.07±6.28			
Employment status	Employed	34883.45%	12.16±6.53	8.029 ^a	<0.001	
	Unemployed	204.80%	19.40±7.82			
	Retired	286.71%	14.79±6.64			
	Student	215.04%	17.48±9.68			
Method of payment for medical expenses	Out-of-pocket payment	7217.27%	12.14±6.55	-1.078	0.281	
	Medical insurance	34582.73%	13.12±7.13			
Self-rated health status	Very good	4410.55%	10.98±4.52	10.128 ^a	<0.001	
	Good	17441.73%	11.87±7.37			
	Fair	11627.82%	12.78±6.90			
	Poor	6816.31%	16.43±6.84			
	Very poor	153.60%	16.87±4.44			
Monthly income (yuan)	<2000	296.95%	20.31±7.94	19.246 ^a	<0.001	
	2000~5000	6916.55%	16.16±7.77			
	5000~10000	18043.17%	12.19±6.73			
	>10000	13933.33%	10.81±5.10			
Time since HIV diagnosis (years)	≤5	16339.09%	14.31±7.31	4.728	0.003	
	6~10	15035.97%	12.34±6.72			
	11~15	9121.82%	11.23±6.47			
	≥16	133.12%	15.08±7.87			
Receipt of antiretroviral therapy	Yes	41699.76%	12.93±7.03	-1.146	0.253	

	No	100.24	21.00		
Detectable HIV viral load	Yes	31475.30	11.96±6.70	-5.154	<0.001
	No	10324.70	15.96±7.23		
CD4 ⁺ T-lymphocyte count	<200	286.71	15.07±6.55	6.987	<0.001
	200~349	5312.71	15.89±7.93		
	350~499	8319.90	13.89±6.91		
	≥500	25360.67	11.79±6.68		
Number of comorbidities	0	23055.16	12.27±6.94	1.524	0.194
	1	12329.50	13.40±6.93		
	2	4611.03	14.48±6.94		
	3	122.88	14.83±9.07		
	≥4	61.44	14.67±7.89		
Disclosure status	Yes	31074.34	12.05±6.87	-4.536	<0.001
	No	10725.66	15.55±6.88		

statistically significant in the univariate analyses, together with HIV-related stigma, internalized homophobia, perceived social support, and chronic disease self-efficacy, were included as independent variables in a multiple linear regression model. The coding of variables is presented in Table 3.

The variance inflation factors (VIFs) ranged from 1.130 to 2.866, all below 5, and all tolerance values were greater than 0.1, suggesting no evidence of problematic multicollinearity. Multiple linear regression analysis showed that ethnicity, self-rated health status, monthly income, time since HIV diagnosis, HIV viral load, HIV-related stigma, internalized homophobia, perceived social support, and chronic disease self-efficacy were independently associated with anxiety and depression scores (all $P < 0.05$). The model explained 55.5% of the variance in anxiety and depression scores. Detailed results are presented in Table 4.

Table 3 Coding of Independent Variables

Independent variable	Coding scheme
Ethnicity	1 = Han ethnicity, 2 = Ethnic minority
Self-rated health status	1 = Very poor, 2 = Poor, 3 = Fair, 4 = Good, 5 = Very good
Monthly income	1 = < 2,000, 2 = 2,000–5,000, 3 = 5,000–10,000, 4 = > 10,000
Time since HIV diagnosis	1 = ≤5 years, 2 = 6–10 years, 3 = 11–15 years, 4 = ≥16 years
Detectable HIV viral load	1 = Yes, 2 = No
HIV-related stigma	Entered as the original score
Internalized homophobia	Entered as the original score
Perceived social support	Entered as the original score
Chronic disease self-efficacy	Entered as the original score

Table 4 Results of Multiple Linear Regression Analysis of Anxiety and Depression Among HIV-Positive MSM

Independent variable	Unstandardized Coefficients		Standardized Coefficients	<i>t</i>	<i>P</i>	TOL	VIF
	<i>B</i>	<i>SE</i>	β				
Ethnicity	3.261	1.117	0.101	2.918	0.004	0.885	1.130
Self-rated health status	-1.163	0.281	-0.165	-4.136	<0.001	0.674	1.484
Monthly income	-1.073	0.428	-0.134	-2.504	0.013	0.371	2.696
Time since HIV diagnosis	-0.726	0.304	-0.088	-2.388	0.017	0.792	1.262
Detectable HIV viral load	1.508	0.585	0.093	2.579	0.010	0.830	1.204
HIV-related stigma	0.169	0.078	0.120	2.175	0.030	0.349	2.866
Internalized homophobia	0.144	0.038	0.191	3.837	<0.001	0.432	2.312
Perceived social support	-0.131	0.023	-0.261	-5.775	<0.001	0.525	1.905
Chronic disease self-efficacy	-0.371	0.046	-0.346	-8.132	<0.001	0.590	1.694

Note: $R^2 = 0.575$, adjusted $R^2 = 0.555$, $F = 28.291$, $p < 0.001$.

2.7 Structural Equation Model of Anxiety and Depression Among HIV-Positive MSM

2.7.1 Model Specification

Guided by intersectionality theory, chronic disease self-efficacy was specified as the primary mediating variable in the structural equation model. Intersectionality theory was used as a conceptual framework to interpret the combined influence of multiple social, disease-related, and psychosocial disadvantages; the present analysis did not directly model statistical interactions between social identities.

In the SEM, HIV-related stigma, internalized homophobia, perceived social support, and chronic disease self-efficacy were modeled as latent variables using their respective dimension scores as observed indicators. Specifically, personalized stigma, disclosure concerns, negative self-image, and concern with public attitudes were used as indicators of HIV-related stigma. Identity-related shame, fear of social discrimination, and social interaction were used as indicators of internalized homophobia. Family support, friend support, and support from significant others were used as indicators of perceived social support. Self-efficacy for disease management and self-efficacy for managing common problems associated with chronic illness were used as indicators of chronic disease self-efficacy. Psychological distress was modeled as a latent construct, with the HADS-A and HADS-D subscale scores specified as two observed indicators. In contrast, the summed HADS total score was used as the observed outcome variable in the preceding univariate, correlation, and multiple linear regression analyses.

The theoretical framework underlying the model proposes that multiple forms of marginalization experienced by HIV-positive MSM may be associated with poorer mental health partly through the depletion of psychological resources. Self-efficacy was considered a key internal psychological resource because it showed the strongest correlation with the HADS total score ($r = -0.586$) and the largest absolute standardized regression coefficient ($\beta = -0.346$) in the multiple linear regression analysis. In the initial SEM, the direct paths from HIV-related stigma, internalized homophobia, and perceived social support to the latent psychological distress construct were not statistically significant, whereas the direct path from chronic disease self-efficacy was statistically significant ($p < 0.001$). This pattern supported further examination of indirect pathways through self-efficacy rather than being interpreted as evidence of causal or complete mediation.

Five demographic and clinical variables identified as statistically significant covariates were also included in the model to account for potential confounding. Because several fit indices of the initial model did not meet conventional criteria for acceptable model fit, model modification was undertaken with reference to modification indices ($MI > 20$) and theoretical plausibility. Modifications were restricted to residual covariances between indicators considered conceptually related, without altering the prespecified structural paths or introducing additional predictive paths. Following these modifications, the chi-square-to-degrees-of-freedom ratio decreased and the overall model fit improved. The CFI and TLI met commonly used criteria, and the RMSEA indicated acceptable fit. The modified model therefore provided an acceptable representation of the observed data and was used for subsequent examination of structural paths and indirect effects. The final model is shown in Figure 1, and model fit indices are presented in Table 5.

2.7.2 Path Analysis

The structural equation model showed that ethnicity, self-rated health status, monthly income, time since HIV diagnosis, and detectable HIV viral load were directly associated with the latent psychological distress construct among HIV-positive MSM (all $p < 0.05$). HIV-related stigma, internalized homophobia, and perceived social support showed indirect associations with psychological distress through chronic disease self-efficacy in the specified model. Detailed structural path coefficients are presented in Table 6.

The standardized path coefficient from HIV-related stigma to chronic disease self-efficacy exceeded an absolute value of 1 ($\beta = -1.267$). In addition, the conditional path directions involving internalized homophobia and perceived social support differed from their corresponding bivariate associations. Given the relatively strong correlations among the psychosocial predictors, these findings may reflect statistical suppression arising from their simultaneous inclusion in the structural model and should therefore be interpreted cautiously.

Effect decomposition showed negative total effects for self-rated health status (total effect = -0.286), monthly income (total effect = -0.179), time since HIV diagnosis (total effect = -0.092), and chronic disease self-efficacy (total effect = -0.910), whereas ethnicity (total effect = 0.101) and detectable HIV viral load (total effect = 0.109) showed positive total effects. HIV-related stigma, internalized homophobia, and perceived social support contributed to psychological distress through indirect effects in the specified model. The standardized indirect effect estimate for HIV-related stigma was 1.153 ; however, this estimate should be interpreted cautiously because the corresponding standardized path from HIV-related stigma to chronic disease self-efficacy exceeded an absolute value of 1, suggesting possible statistical suppression among correlated psychosocial predictors. Accordingly, the magnitudes and directions of the standardized indirect effects should not be interpreted in isolation or solely as indicators of effect strength.

For chronic disease self-efficacy, the direct effect was equal to the total effect (-0.910), consistent with its role as the primary mediating variable in the specified model. Detailed direct, indirect, and total effects are presented in Table 7.

Table 5 Model Fit Assessment

Fit Index	Recommended Cutoff	Fit Before Modification	Fit After Modification	Model Fit Evaluation
χ^2/df	<3	5.479	2.632	Excellent
CFI	>0.90	0.844	0.949	Excellent
IFI	>0.90	0.845	0.949	Excellent
TLI	>0.90	0.816	0.933	Excellent
RMSEA	<0.08 acceptable <0.05 good	0.104	0.063	Acceptable

Table 6 Structural Equation Model Path Estimates

Path Relationship	B	β	SE	t	P
Chronic disease self-efficacy←HIV-related stigma	-3.534	-1.267	0.651	-5.429	<0.001
Chronic disease self-efficacy←Internalized homophobia	0.224	0.314	0.103	2.186	0.029
Chronic disease self-efficacy←Perceived social support	-0.099	-0.251	0.048	-2.058	0.040
Anxiety and depression←Ethnicity	1.446	0.101	0.509	2.842	0.004
Anxiety and depression←Self-rated health status	-0.916	-0.286	0.150	-6.105	<0.001
Anxiety and depression←Monthly income	-0.640	-0.179	0.131	-4.886	<0.001
Anxiety and depression←Time since HIV diagnosis	-0.339	-0.092	0.134	-2.530	0.011
Anxiety and depression←Detectable HIV viral load	0.793	0.109	0.264	3.004	0.003
Anxiety and depression←Chronic disease self-efficacy	-1.285	-0.910	0.100	-12.807	<0.001

Table 7 Direct, Indirect, and Total Effects on Anxiety and Depression Among HIV-Positive MSM

Dependent Variable	Effect Decomposition	Ethnicity	Self-rated health status	Monthly income	Time since HIV diagnosis	Detectable HIV viral load	HIV-related stigma	Internalized homophobia	Perceived social support	Chronic disease self-efficacy
Anxiety and Depression	Total Effect	0.101	-0.286	-0.179	-0.092	0.109	1.153	-0.286	0.229	-0.910
	Direct Effect	0.101	-0.286	-0.179	-0.092	0.109	0.000	0.000	0.000	-0.910
	Indirect Effect	0.000	0.000	0.000	0.000	0.000	1.153	-0.286	0.229	0.000

Note: Standardized indirect effects should be interpreted cautiously because the standardized path coefficient from HIV-related stigma to chronic disease self-efficacy exceeded an absolute value of 1, potentially reflecting suppression among correlated predictors.

3 Discussion

3.1 Multiple Factors Associated With Anxiety and Depression From an Intersectionality-Informed Perspective

Using intersectionality theory as an interpretive framework, this study found that anxiety and depression among HIV-positive MSM were associated with a combination of sociodemographic, disease-related, and psychosocial factors rather than a single determinant. Univariate analyses showed that age, place of household registration, ethnicity, marital status, educational level, employment status, self-rated health, monthly income, time since HIV diagnosis, viral load, CD4 + T-lymphocyte count, and disclosure status were all associated with anxiety and depression. These findings suggest that the mental health of HIV-positive MSM may reflect the interplay of social circumstances, disease burden, and identity-related stress.

Previous meta-analytic evidence has shown that depressive symptoms are common among HIV-positive MSM and that their psychological burden may be greater than that observed among MSM in general[16]. From an intersectionality perspective, multiple marginalized statuses and disadvantages, including HIV infection, sexual minority status, and limited social and economic resources, may intersect and compound psychological vulnerability[17, 18]. Accordingly, the mental health of HIV-positive MSM should be understood within a broader context that incorporates social structural conditions, stigmatizing environments, and access to disease-management resources.

3.2 HIV-Related Stigma and Internalized Homophobia as Key Psychosocial Stressors

Both correlation and multivariable regression analyses showed that HIV-related stigma and internalized homophobia were positively associated with anxiety and depression and remained independently associated with these outcomes after adjustment for other factors. These findings suggest that psychological distress among HIV-positive MSM may reflect not only the burden associated with HIV infection itself but also negative social evaluations directed toward people living with HIV and sexual minority populations.

HIV-related stigma may undermine psychological security through perceived rejection, concerns about disclosure, and negative self-appraisal, thereby contributing to greater vulnerability to anxiety and depression[17, 19]. Internalized homophobia may similarly manifest as identity-related shame, social withdrawal, and reduced willingness to seek help[20, 21]. Previous studies among HIV-positive MSM in China have also reported associations between HIV-related stigma and adverse mental health outcomes, including depression and suicidal ideation, while sexual minority stress may further intensify the psychological burden associated with HIV-related stigma[21, 22].

These findings are consistent with the central premise of intersectionality theory that overlapping stigmatized identities and social disadvantages may jointly contribute to psychological vulnerability. Clinical assessment and nursing interventions should therefore consider HIV-related stigma, sexual orientation-related stigma, internalized homophobia, and disclosure-related stress concurrently rather than addressing these factors in isolation.

3.3 Perceived Social Support and Chronic Disease Self-Efficacy as Potential Protective Factors

In this study, both perceived social support and chronic disease self-efficacy were negatively associated with anxiety and depression, with chronic disease self-efficacy showing the larger absolute standardized coefficient. This finding suggests that self-efficacy may represent an important psychological resource associated with better mental health among HIV-positive MSM. Social support may provide emotional and informational resources that help individuals cope with the stress associated with concealing their HIV status or sexual identity[23], while also reducing feelings of loneliness and shame and strengthening confidence in disease management and treatment adherence.

Higher levels of chronic disease self-efficacy were associated with lower levels of anxiety and depression, suggesting that greater confidence in managing one's illness may be linked to less psychological distress. Previous studies have indicated that social support may contribute to self-management partly through self-efficacy[24, 25]. These findings suggest that psychological interventions should extend beyond symptom reduction and incorporate strategies aimed at strengthening disease-management capacity and self-efficacy, such as health education, skills training, and peer support.

3.4 Self-Efficacy as a Central Mediating Mechanism

The structural equation model indicated that HIV-related stigma, internalized homophobia, and perceived social support were associated with psychological distress primarily through indirect pathways involving chronic disease self-efficacy. This pattern suggests that self-efficacy may represent an important psychological mechanism linking psychosocial stressors and supportive resources to anxiety and depression among HIV-positive MSM. Chronic disease self-efficacy also showed a strong negative direct association with the latent psychological distress

construct, supporting its potential role as an important psychological resource. Previous research has suggested that greater self-efficacy may attenuate the adverse association between stigma and quality of life among people living with HIV[26].

However, several path estimates warrant cautious interpretation. In particular, the standardized path coefficient from HIV-related stigma to chronic disease self-efficacy exceeded an absolute value of 1 ($\beta = -1.267$), and the corresponding standardized indirect effect on psychological distress was 1.153. In addition, the conditional path directions involving internalized homophobia and perceived social support differed from their bivariate associations. These patterns may reflect statistical suppression arising from the relatively strong correlations among the psychosocial predictors when they were entered simultaneously into the structural model. Accordingly, the magnitudes of these standardized indirect effects should not be interpreted solely as indicators of effect strength, and the observed path directions should be regarded as conditional associations within the specified model rather than as straightforward causal effects.

From an intersectionality-informed perspective, the findings are compatible with the view that multiple forms of stigma, social disadvantage, and psychological resources may coexist and jointly shape mental health vulnerability. However, the present study did not directly test statistical interactions among social identities or include a specific measure of intersectional stigma. Therefore, the SEM findings should be interpreted as an intersectionality-informed representation of interrelated psychosocial pathways rather than as a direct statistical test of intersectional mechanisms.

The unexpected directions of some indirect pathways should also not be interpreted as indicating that internalized homophobia is protective or that perceived social support increases psychological distress. Instead, the SEM results should be considered together with the bivariate correlations, multivariable regression findings, and the theoretical framework. Future studies using longitudinal designs, independent samples, latent interaction models, and bootstrap-based indirect-effect estimates are needed to determine whether these pathways are robust and to further clarify their temporal and psychological meaning.

3.5 Implications for Clinical Nursing and Psychological Intervention

The findings suggest that mental health interventions for HIV-positive MSM should adopt a comprehensive approach encompassing four domains: symptom screening, stigma reduction, resource enhancement, and strengthening of self-management. Routine screening for anxiety and depression should be incorporated into outpatient and community-based care, with particular attention to individuals with low income, unemployment, poor self-rated health, virological abnormalities, limited social support, or high levels of stigma.

Interventions addressing HIV-related and sexual minority stigma may include cognitive behavioral approaches, acceptance and commitment therapy, peer-support groups, and affirmative psychological counseling to reduce negative self-appraisal and disclosure-related stress. Social support may be strengthened through peer navigation, family communication guidance, online support communities, and the development of trusting patient–provider relationships. Given the prominent role of self-efficacy observed in this study, interventions should also focus on medication management, symptom recognition, emotional regulation, and stress-coping skills to enhance confidence in disease management.

Previous reviews have highlighted the syndemic and co-occurring nature of HIV-related and mental health problems among MSM, suggesting that future service models should promote greater integration of HIV care and mental health services [27].

3.6 Limitations and Future Directions

Several limitations should be considered when interpreting the findings of this study. First, the cross-sectional design precludes determination of temporal ordering and causal direction among HIV-related stigma, internalized homophobia, perceived social support, self-efficacy, and psychological distress. Although structural equation modeling was used to examine theoretically specified pathways, the observed indirect associations should not be interpreted as evidence of causal mediation. Longitudinal studies are needed to clarify the temporal relationships among these variables.

Second, participants were recruited from a single region and clinical setting, which may limit the generalizability of the findings to HIV-positive MSM in other geographic, cultural, and healthcare contexts. In addition, some subgroups were relatively small, particularly the ethnic minority group, and findings involving these subgroups should therefore be interpreted cautiously.

Third, all major study variables were assessed using self-report measures and may have been influenced by social desirability bias, recall bias, and common method variance. Although Harman's single-factor test did not suggest substantial common method bias, this procedure cannot completely exclude the possibility of shared-method effects.

Fourth, although intersectionality theory informed the conceptual framework and interpretation of the study, the statistical models did not directly test interactions among multiple social identities or include a specific measure of intersectional stigma. Accordingly, the findings should be interpreted as intersectionality-informed rather than as a direct statistical test of intersectional mechanisms.

Fifth, several structural path estimates warrant caution. In particular, the standardized coefficient for the pathway from HIV-related stigma to chronic disease self-efficacy exceeded an absolute value of 1 ($\beta = -1.267$), and some conditional path directions involving internalized homophobia and perceived social support differed from their corresponding bivariate associations. These patterns may reflect statistical suppression arising from correlations among the psychosocial predictors or other model-specific effects. Therefore, the magnitudes and directions of the standardized indirect effects should not be interpreted in isolation and require replication in independent samples.

Finally, although the modified structural equation model demonstrated acceptable overall fit, the model structure and indirect pathways should be further validated in multicenter and cross-cultural samples. Future studies should incorporate longitudinal follow-up, bootstrap-based indirect-effect estimation, latent interaction models, dedicated measures of intersectional stigma, qualitative interviews, peer-network analyses, and intervention studies to more directly examine the temporal and intersectional mechanisms underlying psychological distress among HIV-positive MSM. Such studies should also evaluate whether interventions targeting self-efficacy, stigma coping, and social support can improve mental health outcomes in this population.

4 Conclusion

Guided by intersectionality theory, this study identified multiple sociodemographic, clinical, and psychosocial factors associated with anxiety and depression among HIV-positive MSM. HIV-related stigma and internalized homophobia were positively associated with psychological distress, whereas perceived social support and chronic disease self-efficacy were negatively associated with these outcomes. The structural equation model further suggested that HIV-related stigma, internalized homophobia, and perceived social support were associated with anxiety and depression primarily through indirect pathways involving chronic disease self-efficacy.

These findings support an intersectionality-informed understanding of mental health among HIV-positive MSM, in which multiple forms of stigma, social disadvantage, and psychological resources may jointly shape psychological vulnerability. Chronic disease self-efficacy emerged as a potentially important psychological resource within the specified model. Accordingly, mental health interventions for HIV-positive MSM may benefit from simultaneously addressing stigma-related stress, strengthening social support, and enhancing self-efficacy in disease management. However, because of the cross-sectional design, the observed pathways should not be interpreted as establishing causal mechanisms. Longitudinal and intervention studies are needed to further clarify the temporal relationships among these factors and to evaluate the effectiveness of integrated psychosocial interventions.

Abbreviations

- HIV
- human immunodeficiency virus
- AIDS
- acquired immune deficiency syndrome
- MSM
- man who have sex with man

Declarations

Declarations

No applicable.

Clinical trial number

not applicable

Ethics approval and consent to participate

This study had been approved by the hospital Ethics committee (Ethics Number: 2025-LS-ky-119), and all respondents signed the informed consent form.

Consent for publication

All presentations of the data have consent for publication.

Conflict of interests

(Competing interests)

Fundings

Author Contribution

Mengya Wang contributed to the study conception and design, data collection, statistical analysis, and drafting of the manuscript. Rui Huang, Wenwen Yang, Yuhan Wu, Yuyun Tang, and Aiyi Yang contributed to data collection, data management, analysis, and critical revision of the manuscript. Yan Song contributed to the study conception and design, methodological guidance, supervision, and critical revision of the manuscript. All authors read and approved the final manuscript.

Availability of the data

and materials

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Figures

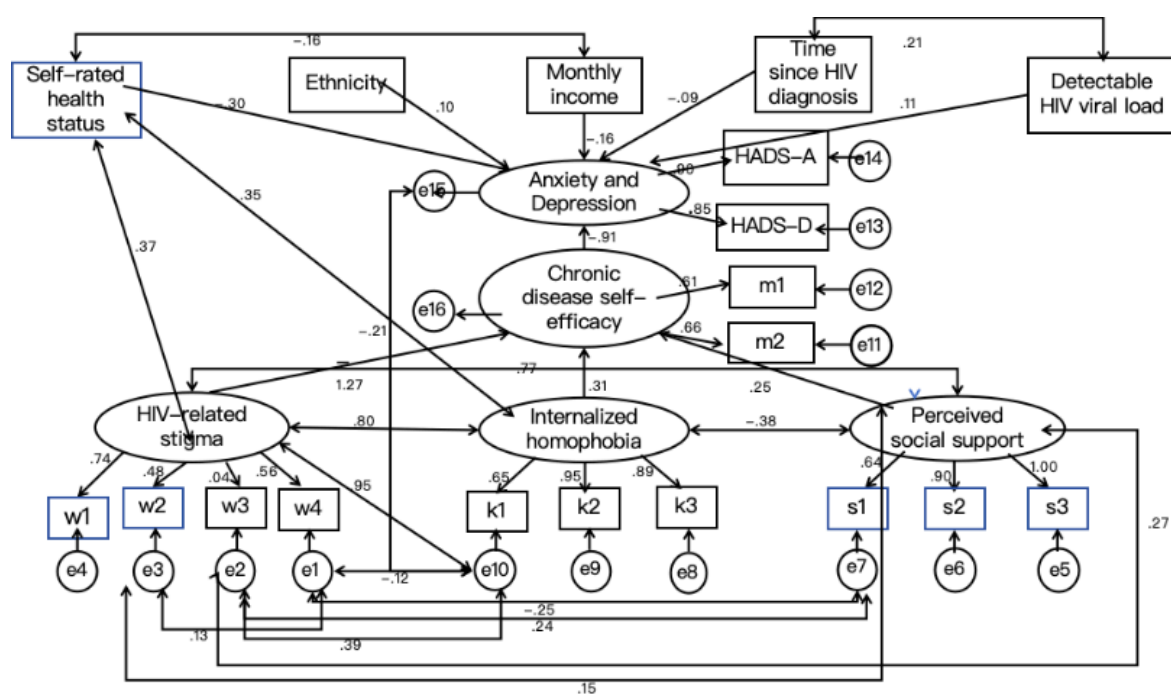


Figure 1

Structural Equation Modeling of Anxiety and Depression

