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The Moderating Role of Social Support and HIV Stigma on the Association Between Depression and ART Adherence among Young Thai Men Who Have Sex with Men

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Abstract

In Thailand, antiretroviral therapy (ART) programs still have difficulties reaching and promoting adherence among a key population - young men who have sex with men (YMSM) living with HIV. As such, we sought to examine potential psychosocial barriers that may contribute to suboptimal levels of ART adherence for this population. Data were drawn from a study of 214 YMSM living with HIV from Bangkok, Thailand. Linear regression models tested the association between depression and ART adherence, and whether social support and HIV-related stigma moderated that relationship. Multivariable models demonstrated social support was significantly associated with higher levels of ART adherence, and that there was a three-way interaction between depression, social support, and HIV-related stigma on ART adherence. These results further our understanding of the role of depression, stigma, and social support in ART adherence among Thai YMSM living

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Linda Mireles: Conceptualization, Formal Analysis, Validation, Writing – Original Draft Preparation. **Keith Horvath:** Conceptualization, Resources, Supervision, and Writing – Reviewing and Editing. **Thomas Guadamuz:** Project Administration, Methodology, Resources, Investigation, and Writing – Reviewing and Editing. **Worawalan Waratworawan:** Project Administration, Methodology, Resources, Investigation, and Writing – Reviewing and Editing. **Yamol Kongjareon:** Project Administration, Methodology, Resources, Investigation, and Writing – Reviewing and Editing. **Stephanie Meyers-Pantele:** Conceptualization, Supervision, Validation, and Writing – Reviewing and Editing.

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The authors declare that they have no conflicts of interest.

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All study procedures were approved by the Mahidol University IRB.

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All study participants provided informed consent prior to enrollment.

with HIV, and that additional supports for YMSM with depression and HIV-related stigma are needed.

Keywords

MSM; Thailand; ART Adherence; Depressive Symptoms; HIV Stigma; Social Support

1. Introduction

Thailand has substantially improved its HIV treatment program in the past 30 years and, through the country's universal health care policy, antiretroviral therapy (ART) is available to all persons diagnosed with HIV infection, regardless of CD4 count (1). Currently in Thailand, approximately 80% of those living with HIV are receiving treatment, with more adherence support programs concentrated in large cities like Bangkok (2). Despite these advancements, however, men who have sex with men (MSM) - a key population that comprised 44% of all new HIV infections in Asia and the Pacific for 2019 (3) - still have inadequate ART adherence (i.e., taking all ART doses as prescribed) and retention in ART programs (i.e., efforts to engage and retain individuals in HIV care), which has important implications for HIV disease progression and transmissibility for this population (4, 5). For example, national data from Thailand found that only 79.5% of those who initiated ART treatment in 2012 were still retained in treatment one year later and, in limited observational data, only 47% of Thai MSM self-rated their past 3-month ART adherence as "very good" or "excellent" (4, 5). Further, the subpopulation of young men who have sex with men (YMSM; aged 18–24 years old) have been found to be disproportionately impacted by the HIV epidemic in Thailand (6, 7). As such, in order to successfully improve ART adherence among these key populations, and to meet UNAIDS 95–95–95 goals [which sets three goals to be achieved by 2030: (1) 95% of all persons with HIV know their status, (2) 95% of those diagnosed are on ART, and (3) 95% of those on ART are virally suppressed (e.g., a viral load <200 copies of HIV RNA/mL)] (8), it is important to understand potential factors that influence ART adherence so that tailored and effective interventions can be developed for young Thai MSM living with HIV.

Depression, HIV-Related Stigma, & ART Adherence

A systematic review of 11 studies from low- and high-income countries estimated that people living with HIV (PLWH) are twice as likely to be diagnosed with depression than those in the general population (9). Furthermore, studies show that MSM living with HIV face more mental health challenges, including depression, than heterosexual individuals living with HIV (10–12). This is of concern given that past research has found depression to be associated with suboptimal ART adherence for PLWH and MSM living with HIV (13–15). Furthermore, HIV stigma, defined as a social devaluing or discrediting of individuals based on their HIV status (16), has been found to further exacerbate mental health challenges, like depression (17). Additionally, research has highlighted specific manifestations of stigma, like internalized HIV stigma (i.e., endorsement of negative beliefs and feelings about oneself because of one's HIV-positive status) and enacted HIV stigma

(i.e., experiences of rejection or discrimination as a result of one's HIV-positive status) (18) to be strongly associated with greater depressive symptoms (18, 19).

Stigmatizing experiences have also been shown to negatively impact health-seeking behaviors, including the initiation and continuation of ART for PLWH in the United States and Thailand (13, 20, 21). Evidence shows that anticipated HIV-related stigma (expectations of rejection or discrimination due to one's HIV-positive status) and perceived HIV-related stigma (an individual's expectations of preexisting HIV-related stigma in a community) may be important factors in willingness to receive treatment because of PLWH's fear of revealing their HIV status to the people around them (1, 22). Young Thai MSM, specifically, frequently report fear of peer judgement (i.e., anticipated stigma), even after their initial engagement in an HIV care appointment, and the potential for others discovering their status during clinic visits, as deterrents from repeat visits to address ART adherence (18, 23). In response to the detrimental impact of HIV stigma on the HIV care cascade, the Ministry of Public Health of Thailand is working to eliminate the stigma experienced by MSM living with HIV, and has set a target of reducing HIV-related discrimination in healthcare settings by 90% (1). Greater research is needed, however, to more fully understand how HIV stigma and depression interact to impact ART adherence among Thai YMSM.

Social Support & ART Adherence

Systematic reviews of the literature on ART adherence note that higher levels of social support have been consistently associated with improved HIV health outcomes (23), including higher ART adherence (24–27). Social support may improve ART outcomes in several ways. First, family and peer support can help PLWH by taking them to treatment appointments, reminding them to take their medication, and by playing a role in promoting coping strategies (1, 28). Patients have identified informational and instrumental sources of support as important to maintaining ART adherence, including tangible resources in the form of educational materials, medication, housing and transportation vouchers, and food pantry access (29). Finding and connecting with peers living with HIV via LGBT organizations has also been shown to help MSM living with HIV establish resilience and cope with their own HIV infection (30). In resource limited settings, this relationship between social support and ART adherence has the potential to make a substantial impact in accomplishing UNAIDS 95–95–95 goals (8), particularly for difficult to reach MSM living with HIV in rural areas of Thailand where scaling-up other interventions to increase ART adherence may be impractical given a lack of healthcare providers and access to community programs (30).

The Current Study

Past research has found negative associations between depression, HIV stigma, and ART adherence for MSM living with HIV, and has demonstrated that social support may be particularly beneficial for PLWH. However, little research on the potentially moderating impact of both HIV-related stigma and social support on the association between depressive symptoms and ART adherence outcomes in the specific population of Thai YMSM living with HIV is available. As such, the purpose of the current study was twofold: (1) to assess the association between depression and ART adherence among young Thai MSM living

with HIV, and (2) to determine if social support and HIV-related stigma moderates the relationship between depression and ART adherence. With further understanding of the roles of HIV stigma and social support in the relationship between depression and ART adherence among MSM living with HIV, national programs may be able to develop more effective interventions to address these issues.

2. Methods

Survey data for this study were drawn from a baseline assessment of a prospective cohort study of YMSM living with HIV in Bangkok, Thailand. A total of 214 YMSM living with HIV were recruited with the assistance of community-based organization (CBO) partners, the Poz Home Center Foundation and Rainbow Sky Association of Thailand (RSAT). Self-reported eligibility criteria included: (1) male sex at birth, (2) having had anal intercourse with a man in the past 6 months, (3) ability to speak Thai, (4) Thai nationality, (5) having lived in Bangkok for at least 6 months, (6) being between 15–29 years of age, (7) reporting an HIV positive status, and (8) consenting to be followed up online every four months for a total period of 12 months.

Between January and February 2018, project staff sent a URL to eligible participants that led to the web-based survey using Qualtrics software. For this analysis, we excluded participants who had not begun antiretroviral therapy. As such, a total of 169 participants were retained for the current study. Upon completion of the survey, participants received 500 baht (17 USD) as compensation for their time. Some participants were referred to mental health professionals if they wished to discuss personal concerns such as substance use and violence. All participants provided informed consent prior to enrollment and Mahidol University Institutional Review Board reviewed and approved all study procedures (COA 2017/078.2803).

Measures

Sociodemographic Characteristics—At study baseline, participants were asked to self-report the following sociodemographic characteristics: age (in years), employment status (unemployed, full-time, and part-time), monthly income (less than 5,000 baht, 5,001–15,000 baht, more than 15,000 baht), and living situation (at home with parents or guardians, student accommodation, renting with others, renting alone, and temporary accommodation).

Depression—Participants' past 7 day depression symptomology was assessed by self-report using the Center for Epidemiologic Studies Short Depression Scale (CES-D-R 10) (31). The scale consists of 10 items that are summed to create a total depression score, with possible scores ranging from 0 to 30. Any score equal to or above 10 indicates elevated depressive symptoms. Previous estimates of internal consistency for the CES-D-R-10 have been high ($\alpha = 0.98$) (32). For this sample, both the internal consistency ($\alpha = .81$) and the test–retest reliability (intraclass correlation coefficient = 0.85) for this scale were high (33).

HIV Stigma—HIV Stigma was measured using the 12-item short version of the HIV Stigma Scale with 3 items each from 4 subscales: personalized stigma (e.g. *I have lost friends by telling them I have HIV*; $\alpha = .88$), disclosure concerns (e.g. *I work hard to keep*

my HIV a secret; $\alpha = .84$), concerns with public attitudes (e.g. *People with HIV are treated like outcasts*; $\alpha = .81$) and negative self-image (e.g. *I feel guilty because I have HIV*; $\alpha = .88$) (34). For this sample, the overall measure demonstrated adequate internal consistency ($\alpha = .78$). Responses (ranging from 1 “strongly disagree” to 4 “strongly agree”) across items were summed to calculate a total HIV stigma score, with a possible range of 12–48, and higher scores reflecting a higher level of HIV-related stigma.

Social Support—Social support was measured using a modified version of the Social Provisions Scale (SPS) (35). The scale provides 6 subscale scores: reliable alliance (tangible support), attachment (security from emotional bonds formed with other individuals), nurturance (the support one can provide for others), social integration (feeling of belonging in a group with shared hobbies and interests), reassurance of worth (an understanding of the individual’s abilities and skills determined by others), and guidance (advice or information) (35). The scale uses a 4-point Likert-type rating scale with a total score range of 12–48. Higher scores indicate greater levels of social support. For this sample, this scale demonstrated excellent internal consistency ($\alpha = .91$), similar to previous literature with Thai youth living with HIV ($\alpha = .90$) (35).

ART Adherence

ART adherence was measured as participants’ self-reported percentage of taking ART medications as prescribed over the past 7-days, from 0–100% in 1% increments. Based on literature demonstrating that ART adherence levels as low as 80–90% may be adequate for viral suppression (36), low adherence was defined as anything less than 90% adherence and high adherence was defined as anything at or above 90% adherence.

Statistical Analyses

Descriptive analyses were conducted to summarize the sociodemographics of the sample, as well as depressive symptoms, HIV-related stigma, social support, and ART adherence. Chi-squared and t-tests were conducted to assess the relationship between sociodemographic factors, depressive symptoms, HIV-related stigma scores, social support, and dichotomized ART adherence (low vs. high). Those sociodemographic factors found to be associated with ART adherence ($p < .05$) were identified for potential inclusion as controls in the multivariable analyses. Subsequently, multivariable linear regression models were conducted to examine the associations between depressive symptoms, HIV-related stigma scores, social support, and ART adherence, while controlling for covariates found to be associated with ART adherence in the bivariate analyses (Model 1). In order to examine the potential moderating effects of social support and HIV-related stigma on the relationship between depressive symptoms and ART adherence, the multivariable analysis was repeated with two interaction terms added to the model: depressive symptoms by social support, and depressive symptoms by HIV-related stigma (Model 2). A third three-way interaction term was then added to the model: depressive symptoms by social support by HIV-related stigma (Model 3). Further, the change in R^2 was evaluated for Models 1, 2, and 3 to assess the whether the added variables and interaction terms significantly contributed to our explanation of the variance in ART adherence. Significant interaction terms were visualized using the Graph Builder function in SPSS and were further probed using simple slopes tests to compare

the association between depressive symptoms and past 7-day ART adherence at high (1 Standard Deviation [SD] above the mean) and low (1 SD below the mean) levels of the moderators of interest (i.e., social support and HIV-related stigma). All statistical analyses were performed in SPSS v.26, and further examination of the three-way interaction was performed using PROCESS, a regression-based macro for SPSS (37).

3. Results

Overall, 169 Thai YMSM participated in the baseline survey, with an average age of 24.3 years (range = 19–29, SD = 2.7). Most participants reported currently working full-time (55.6%), a monthly income of 5,001 – 15,000 baht (47.3%), and their living situation as renting with friends/boyfriends/regular partners/others (36.7%). The average ratings of social support were 37.9 (range = 12–48, SD = 5.5), HIV-related stigma was 33.4 (range = 13–48, SD = 6.8), and depressive symptoms was 10.4 (range = 0–23, SD = 5.2). The average past 7-day ART adherence rate was 96.5% (SD = 10.2%). See Table 1 for a summary of participant characteristics.

Bivariate Results

ART adherence was dichotomized (low adherence vs. high adherence) and bivariate chi-squared and t-test analyses were conducted to examine potential sociodemographic covariates for inclusion in multivariable models. No significant differences in age ($t[167] = 0.36, p = .7174$), employment status ($\chi^2[2] = 1.97, p = .3742$), monthly income ($\chi^2[2] = 0.25, p = .8847$), and living situation ($\chi^2[4] = 2.33, p = .6752$) across ART adherence groups were identified, and therefore these variables were not included in the multivariable models. Additionally, correlation analyses were conducted to assess for potential multicollinearity among the independent variables of interest (i.e., depressive symptoms, HIV stigma, and social support). Given that all correlation values were small (i.e., $r < 0.40$), no multicollinearity was identified as a potential issue for these analyses.

Multivariable Results

Models 1 and 2.—Both of the overall multivariable linear regression models for Model 1 (depressive symptoms, HIV-related stigma, and social support, but no interaction terms) and Model 2 (with two interaction terms added [depressive symptoms x HIV-related stigma; depressive symptoms x social support]) only explained 4–5% of the variance in past 7-day ART adherence and did not produce any significant changes in R^2 ($p > .05$). Social support, however, was positively associated with past 7-day ART adherence rate in both models (Model 1: $\beta = 0.18$, [95% Confidence Interval [CI]: .02, .34], $p = .02$; Model 2: $\beta = 0.19$, [95% CI: .03, .36], $p = .02$; See Table 2).

Model 3.—The multivariable linear regression model including the three-way interaction term (depressive symptoms x HIV-related stigma x social support), however, showed a significant three-way interaction ($\beta = -.01$, [95% CI: $-.02, -.01$], $p < .001$) that explained 15.1% of the variance in ART adherence and produced a significant change in R^2 , $F = 4.10$, $p < .001$ (See Figure 1 for a graphical visualization of the three-way interaction). This model also produced three significant main effects (for depression, HIV-related stigma, and social

support) and two significant two-way interactions (depressive symptoms x HIV-related stigma; depressive symptoms x social support). Follow-up simple slope analyses for the three-way interaction demonstrated that under conditions of low social support (1 SD below the mean) and low HIV-related stigma (1 SD below the mean), depressive symptoms were negatively associated with past 7-day ART adherence ($b = -.44$, $t = -2.24$, $p = .03$). No significant association was found, however, between depressive symptoms and past 7-day ART adherence under the conditions of low social support and high HIV-related stigma (1 SD above the mean; $b = .18$, $t = 1.22$, $p = .23$). Similarly, no significant association was found between depressive symptoms and past 7-day ART adherence under the conditions of high social support (1 SD above the mean) and low HIV-related stigma ($b = -.09$, $t = -0.06$, $p = .95$). Lastly, at high levels of social support and high HIV-related stigma, depressive symptoms were not significantly associated with past 7-day ART adherence ($b = -.27$, $t = -1.94$, $p = .05$).

4. Discussion

The purpose of this study was to investigate the relationships between HIV-related stigma, social support, depressive symptoms, and ART adherence among Thai YMSM living with HIV. While previous studies across diverse geographic locations (e.g., China, Thailand, and Uganda) demonstrate that depression is a reliable and strong predictor of suboptimal ART adherence among adults living with HIV (11, 13, 38, 39), this study examined this relationship among an understudied group, Thai YMSM living with HIV, and tested whether the association between depression and ART adherence may be moderated by social support and HIV stigma.

We found that social support was positively associated with past 7-day ART adherence in multivariable analyses, indicating that those with higher levels of social support had higher rates of ART adherence. This confirms global research that has found higher levels of social support are associated with greater levels of ART adherence (24–27). This protective association implies that YMSM living with HIV who possess some forms of social support may be less vulnerable to suboptimal ART adherence outcomes and that family, peers, or other resources of support may offer emotional relief or act as a “buffer” for the challenges that accompany HIV diagnosis. In addition, some of the challenges in accessing and maintaining HIV care may be better handled with the physical resources social support provides (e.g., transportation, housing, medication reminders), which in turn may promote better overall ART adherence for this population. This finding is important because, despite ongoing efforts to reduce stigma and provide comprehensive sexuality education, negative attitudes towards sexual behavior, YMSM, and PLWH are still prevalent in Thai culture (40, 41). Given the current homonegative context young Thai MSM face (40), there could potentially be significant gaps in social support this population. As such, this study provides more evidence supporting the incorporation of social support into pre-existing interventions targeting ART adherence among Thai MSM living with HIV.

In contrast to previous research, neither depressive symptoms nor HIV-related stigma were significantly related to past 7-day ART adherence in Models 1 and 2 of the multivariable analyses (13–15, 21, 25, 42). The main effects of depressive symptoms and

HIV-related stigma, however, were significant in Model 3 when the three-way interaction term (depressive symptoms x HIV-related stigma x social support) was included. This could potentially indicate that participants reporting depressive symptoms are already accessing mental health or other services that help buffer against the negative association between depressive symptoms and ART adherence (43). Further, for HIV-related stigma, Thailand has established a national stigma and discrimination reduction program, with a new e-learning curriculum to train workers at health-facilities (44). The Ministry of Public Health launched the Thailand Partnership for Zero Discrimination initiative in 2019 to build upon existing national and local systems to develop strategies in the workplace and education system to end HIV-related stigma and discrimination (44). As a result, it is possible that these strategies have served to lessen the potential for HIV stigma to act as a barrier to accessing and maintaining HIV treatment within health care services, as evidenced by the overall low HIV stigma levels reported by participants. Alternatively, it is possible that individuals in our sample had not yet disclosed their HIV status, and thus had not felt the effects of public or personalized stigma that come with having one's HIV status known by others. This would be aligned with previous studies that have shown that disclosure concerns often arise in collectivist countries like Thailand (45, 46). However, given that the main effects of depressive symptoms and HIV-related stigma were significant, and that our results showed a significant three-way interaction between HIV-stigma, social support, and depressive symptoms on ART adherence, it is possible that the effects of these variables on ART adherence are interdependent and should not be evaluated in isolation. As such, these findings present a more nuanced picture of how depressive symptoms, HIV-related stigma, and social support may impact adherence behaviors.

In our study we found a significant three-way interaction between depressive symptoms, social support, and HIV-related stigma in predicting 7-day ART adherence. Specifically, participants in the low social support and low HIV-related stigma group showed lower ART adherence with higher depressive symptoms. Compared to this group, participants in the high social support and low HIV-related stigma group showed no significant difference in ART adherence with increasing depressive symptoms, suggesting that social support may be especially important for YMSM living with HIV and may serve to buffer against the negative effects of depression on ART adherence.

Surprisingly, in the low social support and high HIV-related stigma group, we observed no significant association between depressive symptoms and ART adherence. Following previous research, we anticipated high HIV-related stigma, high depressive symptoms, and low social support would be associated with suboptimal ART adherence (20, 22, 47, 48). Our results could potentially indicate that YMSM living with HIV that report higher HIV stigma, lower social support, and higher depressive symptoms may be able to access and adhere to their ART medication without the worry of concealing medications from their social networks or needing to find HIV-related resources covertly, common barriers to HIV care PLWH report (45, 46, 49, 50) and/or that this most vulnerable group are already accessing mental health or other support services that provide necessary resources for maintaining ART adherence (43). However, given that no associations between depressive symptoms and ART adherence were found among other groups (e.g., the high social support and low HIV-related stigma group), and these analyses were potentially underpowered,

further research with larger samples of Thai YMSM living with HIV is needed to fully explore the underlying reasons for this finding in the current study.

Limitations

There were a number of limitations for the current study. Data were collected from Thailand's capital, Bangkok. Compared to other parts of Thailand, Bangkok has greater availability of services, with an estimated 91 public and private hospitals, not including HIV research clinics (51). Further, participants were recruited from health centers (indicating they had access to health services), were willing to disclose their HIV-positive status to community-based organization partners and study staff, and were already taking ART. Therefore, the results of this study may not be generalizable to YMSM living with HIV in more rural areas outside of Bangkok and/or those with access to fewer services. This study also used self-reported ART adherence over a brief 7-day period. While self-report data may introduce bias, the short recall period of one week may improve validity (52). Additionally, our measure of depression (the CES-D-R 10) is limited to only measuring "elevated" depressive symptoms and cannot be used as a diagnostic tool for clinical depression. However, the CES-D-R 10 has been widely used in other studies and is a psychometrically strong measure of depressive symptoms (31). Lastly, in the study analyses, total composite scores for HIV-related stigma and social support were used instead of individual subscales for each construct (e.g., enacted HIV stigma or emotional social support). It is, therefore, unclear what interactions these subscales may have with depressive symptoms and further research is needed in order to assess the associations between HIV stigma subscales, social support subscales, depression, and ART adherence.

5. Conclusion

The results from these analyses indicate there are potential opportunities to improve outcomes for Thai YMSM living with HIV and reporting depressive symptoms through tailored interventions promoting social support and targeting HIV-related stigma. Specifically, providers may be able to implement resources to directly address social support and HIV-related stigma throughout all stages of the HIV treatment cascade, such as prior to initiating ART (e.g. providing a list of resources for community and clinic-based social support, assessing and addressing any HIV-related cultural beliefs or misinformation that might detract from ART adherence), at ART initiation (e.g. promoting social support, appropriate disclosure, and the involvement of chosen ART adherence partners, peers, family members, and friends) and during long term maintenance of ART adherence (facilitating sharing successful strategies among patients or partnering with community organizations) (53). Additionally, the results of this study may serve to lay the foundation to inform future research for investigating methods for improving outcomes among YMSM living with HIV in Thailand, and for further examining the relationship between depression, HIV stigma, social support, and ART adherence among larger, more diverse groups of YMSM living with HIV.

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Availability of Data, Material, and Code:

The datasets generated and analyzed during the current study are not publicly available but are available from the corresponding author on reasonable request.

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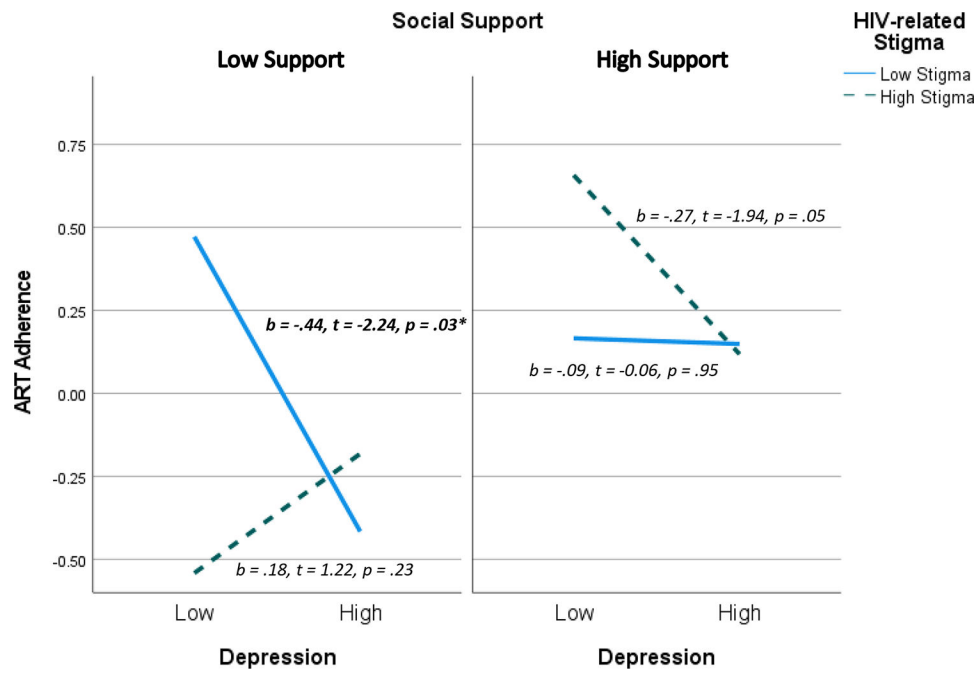


Figure 1. The three-way interaction between depressive symptoms, social support, and HIV-related stigma and its association with ART adherence for Thai YMSM living with HIV.

Table 1.

Demographic characteristics, past 7-day ART adherence, social support, HIV-related stigma, and depressive symptoms for Thai YMSM living with HIV ($n = 169$).

Demographic Variable	Overall sample n (%)
Age (mean, SD)	24.3 (2.7)
Employment status	
Not working/unemployed	38 (22.5)
Yes, full-time	94 (55.6)
Yes, part time	37 (21.9)
Monthly income	
5,000 baht (\$100 USD) or less	31 (18.3)
5,001 – 15,000 baht	80 (47.3)
More than 15,000 baht	58 (34.3)
Living situation	
At home with parents or guardians	47 (27.8)
Student accommodation/college or university dormitory	5 (3.0)
Renting (room/apartment/home) with friends / others / boyfriends / regular partner	62 (36.7)
Renting (room/apartment/home) alone	49 (29.0)
Temporary accommodation, no fixed address, or other	6 (3.6)
Adherence (mean, sd)	96.5 (10.2)
Social support (mean, sd)	37.9 (5.5)
HIV-related stigma (mean, sd)	33.4 (6.8)
Depressive symptoms (mean, sd)	10.4 (5.2)

Regression analysis assessing associations between depressive symptoms, HIV-related stigma, social support, and ART adherence among a sample of Thai YMSM living with HIV ($n = 169$)

Table 2.

Independent Variable	Dependent Variable: ART Adherence								
	Model 1			Model 2			Model 3		
	β	95% CI	<i>p</i>	β	95% CI	<i>p</i>	β	95% CI	<i>p</i>
Depressive symptoms	-.09	[-.25, .07]	.28	-.08	[-.13, .19]	.32	-16.62	[-27.10, -6.15]	<.01**
Potential moderators									
HIV-related stigma	.02	[-.15, .19]	.81	.01	[-.16, .19]	.88	-6.87	[-10.17, -3.58]	<.01***
Social support	.18	[.02, .34]	.02*	.19	[.03, .36]	.02*	-5.29	[-7.99, -2.60]	<.01***
Interaction									
Depression x HIV-related stigma	—	—	—	-.08	[-.21, .05]	.28	.41	[.15, .66]	<.01**
Depression x social support	—	—	—	.003	[-.16, .17]	.97	.17	[-.15, -.003]	<.01***
Depression x HIV-related stigma x social	—	—	—	—	—	—	-.01	[-.02, -.01]	<.01***
R ²		.04			.05			.15	
F for change in R ²		2.47			1.78			4.10***	

* $p < .05$

** $p < .01$

*** $p < .001$.

β : Standardized beta coefficient. CI: Confidence interval