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Supplementary material

Supplementary Table 1. Study characteristics of all included published articles that met study eligibility criteria

Authors and Publication Year	Study design	Study sample (age and size)	Comparison group used	BSI study findings	BSI scales administered	BSI score(s) used	BSI variable type (mean vs. cutoff score)	BSI norms used	Term(s) to describe sample age
Anaya et al., 2005[1]	Cross-sectional	321; ages 13-23	None	No significant differences in BSI scores between abused and non-abused youth.	All BSI subscales	GSI	No cutoff published; means published	Not provided	Youth, adolescent, and YLH
Batterham et al., 2005[2]	Cross-sectional	Two cohorts of 351 and 253; ages 13-24	None	Higher BSI scores observed in the post-HAART group were related to the increased severity of illness.	All BSI subscales	GSI	No cutoff published; means published	Not provided	YPLH; youth; and adolescent
Brown et al., 2015[3]	Cross-sectional	2032; ages 12-24	Youth not living with HIV	17.5% of youth reported psychological symptoms that met caseness on the GSI. This was significantly greater in youth with behaviorally acquired versus perinatally acquired HIV, and in those not taking ART.	All BSI subscales	GSI and all BSI subscales	Cutoff = 63; no means published	Adolescent non-patient	Youth, adolescents, and young adults
Bruce et al., 2018[4]	Cross-sectional	688; ages 12-26	None	Condomless anal intercourse was associated with having greater depressive symptoms	All BSI subscales	Depression and Anxiety subscales	No cutoff published; means published	Not provided	Young men who have sex with men (YMSM), young persons
Bruce et al., 2015[5]	Cross-sectional	1921; ages 12-26	None	Hostility was significantly associated with both current and daily cannabis use, but depression and anxiety were not.	All BSI subscales	GSI, anxiety, depression, and hostility subscales	No cutoff published; means published	Not provided	YLH and youth
Comulada et al.,	Cross-	281; ages	None	HAART users and	All BSI	GSI,	No cutoff	Adolescent	YPLH; adolescents; and youth

2003[6]	sectional	14-29		non-users had similar rates of mental health problems (74%). This sample had significantly higher overall BSI scores compared to adolescent non-patient norms, except for participants under 20 years old.	subscales	anxiety, and depression	published; means published	non-patient	
Cook et al., 2015[7]	Cross-sectional	991; ages 12-24	None	There is a strong association between depression and sexual risk behavior among HIV-positive YMSM.	Not reported	Depression subscale	No cutoff published; means published	Not provided	Young men who have sex with men (YMSM), youth
Craker et al., 2019[8]	Randomized controlled trial	66; ages 16-26	None	Participants had an average amount of psychological distress as measured by the GSI.	BSI-18 subscales	GSI from BSI-18	No cutoff published; means published	Not provided	YPLH and youth;
Dinaj-Koci et al., 2018[9]	Cross-sectional	822; ages 13-24	Youth not living with HIV	Increased symptoms of depression, anxiety, and somatization were associated with lower social support and self-efficacy, and higher substance abuse and viral load.	BSI-18 subscales	GSI and all subscales from BSI-18	No cutoff published; no means published	not provided	Adolescents, youth, and young adults
Dowshen et al., 2016[10]	Cross-sectional	2200; ages 12-24	None	There was no significant difference in depression between YTW and other behaviorally infected youth. Predicted probabilities of detectable viral load increased with depression and other psychosocial variables.	Not reported	Depression subscale	Cutoff =63; no means published	not provided	HIV+ young transgender women (YTW), male-to-female transgender youth
Dowshen et al., 2009[11]	Cross-sectional	42; ages 16–24	None	Total stigma scale score and self-esteem score were significantly and	BSI-18 subscales	Depression subscale	No cutoff published; no means published	Not provided	Young men who have sex with men (YMSM)

				positively correlated with the BSI depression score.					
Fair et al., 2012[12]	Cross-sectional	40; ages 15-21	None	Few participants reported clinically meaningful symptoms of depression (10%) and anxiety (12.5%).	Depression and anxiety subscales	Depression and anxiety subscales	No cutoff published; no means published	Not provided	Adolescents living with perinatally acquired HIV (PHIV); youth; and teen
Fernández et al., 2015[13]	Cross-sectional	1712; ages 12-24	None	BSI score was associated with high-risk substance use, high-risk sexual behavior, and past pregnancy risk.	All BSI subscales	GSI	No cutoff published; no means published	not provided	Youth, YLH, adolescents, and young men who have sex with men (YMSM)
Gamarel et al., 2016[14]	Cross-sectional	2216; ages 12-26	None	31.2% of participants had a GSI score at or above the clinical cutoff	All BSI subscales	GSI	Cutoff = 63; means published	Not provided	YLH and HIV-infected adolescents
Gamarel et al., 2018[15]	Longitudinal observational study linked with cross-sectional survey	820; ages 16-24	None	Daily/almost daily smokers reported significantly higher BSI scores compared to non-tobacco smokers. Participants who reported greater BSI scores had a decreased odd of sustained viral suppression.	BSI-18 subscales	GSI from BSI-18	No cutoff published; means published	Not provided	YLH and adolescents
Gamarel et al., 2019[16]	Cross-sectional	109; ages 18 to 29	None	Depressive symptoms were positively associated with smoking status and stigma. Anxious symptoms were positively associated with stigma and depressive symptoms. Both were negatively associated with future orientation.	Depression and anxiety subscales	Depression and Anxiety subscales	No cutoff published; means published	Not provided	Adolescents and young adults living with HIV (AYALWH)
Garofalo et al., 2016[17]	Randomized control trial	105; ages 16-29	Control group (not receiving daily text message	41% of the sample had high levels of depressive symptoms. Participants in the	Not reported	Depression subscale only	Cutoff = 63; means published	Not provided	HIV-positive adolescents and young adults; and YLH

			intervention)	intervention condition with both high levels of depressive symptoms and marijuana use (~32% of arm) had significantly lower ART adherence compared to those with neither condition.					
Gross et al., 2016[18]	Cross-sectional	387; ages 12-24	None	Psychological distress as well as factors such as cognitive belief systems, and substance abuse were among the most significant attributes associated with adherence behavior.	All BSI subscales	All BSI subscales, GSI, positive symptom distress index, and positive symptom total	No cutoff published; means published	Not provided	YLH, adolescents, and young adults
Hosek et al., 2018[19]	Two-group randomized repeated measures design	103; ages 16-24	Control group (receiving health education attention-controlled comparison condition)	There was a significant main effect of time on the GSI which declined across both groups over time.	All BSI subscales	GSI	No cutoff published; no means published;	Not provided	Youth newly diagnosed with HIV
Kahana et al., 2015[20]	Cross-sectional	2225; ages 12-26	None	Mental health and substance use were linked to decreased adherence to ART.	All BSI subscales	GSI	No cutoff published; no means published	Not provided	Youth, young people, and YLH
Kuhns et al., 2016[21]	Cross-sectional	212; ages 16-29	None	38% and 34% of the sample had high depressive and anxiety symptoms, respectively. There were significant positive correlations between HIV stigma, anxiety, and depressive symptoms, and significant negative correlations between adherence and HIV stigma,	Not reported	Depression and anxiety subscales	Cutoff = 63; medians published	Not provided	HIV-positive youth; YLH; adolescents; and young adults living with HIV

				anxiety, and depressive symptoms.					
Lam et al., 2007[22]	Cross-sectional	66; ages 16-25	None	50% of youth had clinically significant BSI scores. Lower social support, higher viral load, HIV-status disclosure to acquaintances, and being gay/lesbian/ bisexual were all correlated with BSI score.	All BSI subscales	GSI	Cutoff = 63; no means published	Adolescent non-patient	HIV-positive youth and adolescents
Lee et al., 2007[23]	Cross-sectional	413; ages 11-18	None	Depression score was associated with higher parental depression score, parental HIV disclosure, conduct problems, and negative social support and was inversely related to higher self-esteem, being male, and a positive living situation.	Depression subscale	Depression subscale	No cutoff published; means published	Not provided	Adolescents
Lightfoot et al., 2005 (Epi and Social Sci)[24]	Cross-sectional	217; ages 15-24	None	BSI score was not significantly different between sexual partner type, risk status, or normative data.	All BSI subscales	GSI	No cutoff published; means published	Not provided	Young men living with HIV/AIDS; adolescents; and youth
Lightfoot et al., 2005 (Am J HB)[25]	Cross-sectional	349; ages 13-24	None	YLH in the post-HAART cohort were significantly more likely to be clinically distressed than were YLH in the pre-HAART cohort.	All BSI subscales	GSI, depression, and anxiety subscales	No cutoff published; means published	Adolescent non-patient	YLH; adolescents; and young adults
Lightfoot et al., 2007[26]	Randomized control trial	175; ages 16-29	Three intervention conditions:	BSI was a significant modifier of the fraction of protected sex acts with all partners. The change in the number of sex	All BSI-18 subscales	GSI and all BSI-18 subscales	No cutoff published; means published	Not provided	YPLH and YLH

				partners over time between intervention conditions was modified by GSI score for all partners. YPLH reported lower GSI and anxiety levels in the in-person condition compared to the delayed condition, and for the telephone condition compared to the delayed condition.					
MacDonell et al., 2009[27]	Cross-sectional	104; ages 16-24	None	Non-heterosexual youth scored higher on the BSI and GSI than those who identified as heterosexual. Overall, BSI was not found to be associated with any particular outcome.	All BSI subscales	GSI	No cutoff published; means published	Not provided	Youth, adolescents, and young adults
MacDonell et al., 2013[28]	Cross-sectional	1707; ages 12-24	None	Behaviorally infected participants had a higher percentage that were at or above the cutoff for mental distress than those perinatally infected.	All BSI subscales	GSI	Cutoff = 63; means published	Not provided	Youth, adolescents, and young adults
MacDonell et al., 2016[29]	Cross-sectional	2213; ages 12-24	None	41.9% of participants showed clinically significant psychological distress. Symptoms were associated with lower social support, lower self-efficacy, and greater rates of substance abuse.	All BSI subscales	GSI	Cutoff = 63; means published	not provided	Youth, adolescents, and young adults
Murphy et al., 2010[30]	Cross-sectional	186; ages 16-24	None	The association between health literacy and GSI score was of borderline significance in the adjusted model.	All BSI subscales	GSI	No cutoff published; no means published	Not provided	HIV-infected adolescents and youth

				Increased reading comprehension was associated with increased GSI, with only modest fit.					
Mustanski et al., 2007[31]	Cross-sectional	310; ages 16-24	None	HIV serostatus was not significantly related to psychological distress. There was a potential elevation in psychological distress within the sample.	All BSI-18 subscales	GSI from BSI-18	Cutoff: t > 62; means published	Not provided	Young men and youth
Naar-King et al., 2006 (in AIDS care)[32]	Cross-sectional	64; ages 16-25	None	Almost half the sample scored above the clinical cutoff for the BSI. Emotional distress was associated with general social support.	All BSI subscales	GSI	No cutoff published; no means published	Not provided	Youth
Naar-King et al., 2006 (in AIDS Pt care and STDs)[33]	Cross-sectional	88; ages 16-25	None	More than half the sample was above the clinical cutoff for psychological distress. Adherence was significantly correlated with psychological distress.	All BSI subscales	GSI	No cutoff published; no means published	Not provided	Youth
Naar-King et al., 2010 (in AIDS care)[34]	Cross-sectional	186; ages 16-24	None	Psychological distress was associated with lower self-efficacy, more pros of substance use, and less readiness to avoid cannabis.	All BSI subscales	GSI	Cutoff = 65; no means published	Not provided	Youth
Naar-King et al., 2010 (in J Adol. Health)[35]	Cross-sectional	186; ages 16-24	Control group (multidisciplinary specialty care)	The treatment group receiving up to four session motivation interventions showed significant improvements in depression compared to the control group.	Not reported	Depression subscale	Cutoff = 65; means published	Not provided	Youth and adolescents
Nichols et al., 2016[36]	Cross-sectional	182; ages 18-24	None	No BSI results reported; GSI used as	All BSI subscales	GSI	No cutoff published; no	Not provided	Youth

				a time-varying covariate			means published		
Nugent et al., 2010[37]	Cross-sectional	122; ages 16-24	None	87% of distressed YLH reported significantly more past-month ARV non-adherence and were more likely to have unprotected sex under the influence than non-distressed youth.	All BSI subscales	GSI	Cutoff = 63; no means published	Adolescent non-patient	Youth
Outlaw et al., 2010 (Brief Report)[38]	Prospective study	82; ages 16-24	None	This sample did not report high psychological distress, and distress was unrelated to appointment adherence.	All BSI subscales	GSI and depression subscale	No cutoff published; means published	Not provided	Adolescents, young adults; and youth
Outlaw et al., 2010 (AIDS Educ Prev)[39]	Cross-sectional	186; ages 16-24	None	Over 35% of the sample scored at or above the clinical cutoff for the GSI. Age was positively related to emotional distress. Emotional distress and social support for safer sex were significantly correlated with motivational readiness, self-efficacy for safer sex, and decisional balance. Emotional distress significantly predicted decisional balance and self-efficacy for safer sex.	All BSI subscales	GSI	No cutoff published; means published	Adolescent non-patient	Young people, young adulthood, and youth
Parsons et al., 2013[40]	Cross-sectional	188, ages 18-29	None	Mental health moderated the relationship between partner type and condom use. Anxiety and depression were associated with	Anxiety and depression subscales	Combined anxiety and depression scores	No cutoff published; no means published	Not provided	Young men and youth

				increased odds of using condoms with main partners and not with casual partners.					
Quinn et al., 2016[41]	Cross-sectional, described as an analytic study	98; ages 18-29	None	Young Black MSM who experienced greater community violence had nearly five times the odds of reporting feelings of psychological distress.	All BSI-18 subscales	GSI from BSI-18	Cutoff: t > 62; no means published	Not provided	Adolescents and youth
Rotheram-Borus et al., 1999[42]	Cross-sectional	338, under 18	People who have never used amphetamines	Lifetime users of amphetamines tended to score higher on the BSI, but there was no significant difference between current users and never-users.	All BSI subscales	GSI	No cutoff published; means published	Not provided	Youth and youths living with HIV
Rotheram-Borus et al., 2001[43]	Longitudinal cohort	310, ages 13-24	Control condition (standard care)	There were no significant differences in emotional distress between the intervention and the control conditions.	All BSI subscales	GSI	No cutoff published; means published	Not provided	Youths living with HIV and HIV-infected youths
Rowe et al., 2015[44]	Longitudinal	292, age 16-24	None	Trans female youth with symptoms of psychological distress were significantly more likely to use heavy drugs	All BSI-18 subscales	GSI from BSI-18	Cutoff: t > 62; no means published	Not provided	Youth and trans female youth
Saberi et al., 2015[45]	Cross-sectional	1317; ages 12-24	None	Lower mean GSI was associated with higher odds of reporting 100% adherence.	All BSI subscales	GSI and any 2 BSI subscales meeting cutoff	Cutoff: t ≥ 63; means published	Not provided	Youth
Sayegh et al., 2018[46]	Cross-sectional	37; ages 15-24	None	Cell phone support helped participants report fewer depressive symptoms, but this was not sustained after cell phone support concluded.	Not reported	Depression subscale	No cutoff provided; means provided	Not provided	Youth, young adults, and minors
Song et al., 2006[47]	Cross-sectional	208, ages 13-24	None	¼ of YPLH were diagnosed with	All BSI subscales	GSI	No cutoff published; no	Not provided	Youth and young people

				depression using the BSI in the past 3 months. The BSI was not significantly related to intervention attendance.			means published		
Starks et al., 2020[48]	Longitudinal randomized control trial	183, ages 16-24	None	Global polysubstance users experienced more mental health problems compared to the minimal illicit drug use group. GSI scores were positively associated with viral load.	All BSI-18 subscales	GSI from BSI-18	No cutoff published; no means published	Not provided	Youth and YLH
Stein et al., 2005[49]	Cross-sectional	248, ages 15-24	None	Sexual transmission risk behaviors were correlated with higher amounts of emotional distress.	All BSI subscales	Anxiety, obsessive/compulsive, and depression subscales	No cutoff published; means published	Not provided	Young males
Tanney et al., 2012[50]	Cross-sectional	186; ages not listed	None	More than half of the youth in this study scored at or above the clinical cutoff for depression. Behavioral infection, older age, more problem behaviors, and greater stigma each contributed to the prediction of higher depression scores.	Not reported	Depression subscale	Cutoff = 65; no means published	Not provided	Youth, young men, and young women
Tarantino et al., 2018[51]	Cross-sectional	2125; ages 12-24	None	18% of participants were above the cutoff for clinically significant symptoms. Female youth had worse symptoms than males.	All BSI subscales	GSI	Cutoff = 63; means published	Not provided	Youth and young person
van den Berg et al., 2017[52]	Cross-sectional	1728; ages 12-26	None	Condomless sex was significantly correlated with emotional distress.	All BSI subscales	GSI	No cutoff published; means published	Not provided	Youth, adolescents, and young adults

				The path from emotional distress through self-efficacy for risk-reduction and alternative risk-reduction attitudes and behaviors to condomless anal and vaginal sex was significant.					
van den Berg et al., 2020[53]	Cross-sectional	600, ages 13-24	None	There were no sufficient differences in self-efficacy related to mental health.	Depression and anxiety subscales	Depression and anxiety subscales	No cutoff published; means published	Not provided	Youth and YLH
Whiteley et al., 2014[54]	Cross-sectional	1706; ages 13-26	None	42.6% reported symptoms in the defined clinical range. There were no differences in mean item GSI scores by race/ethnicity.	All BSI subscales	GSI	No cutoff published; means published	Not provided	Youth, young adults, and adolescents
Whiteley et al., 2018[55]	Cross-sectional	61; ages 15-25	None	Participants reported an average level of distress on the GSI.	All BSI-18 subscales	GSI from BSI-18	No cutoff published; means published	Not provided	Youth and YLH
Wiener and Battles, 2006[56]	Cross-sectional	40; ages 13-24	None	35% of the sample met criteria for "caseness" on the BSI, but distress was not significantly associated with level of disclosure.	All BSI subscales	GSI and any 2 BSI subscales meeting cutoff	Cutoff: t ≥ 63; no means published	Not provided	Youth
Wright et al., 2007[57]	Cross-sectional	65; ages 16-25	None	Emotional distress was associated with stigma. Depression and anxiety positively correlated with personal (vs. public) effects of stigma.	All BSI subscales	GSI, anxiety, and depression subscales	No cutoff published; no means published	Not provided	Youth
HAART: highly active antiretroviral therapy; BSI: brief symptom inventory; HIV: human immunodeficiency virus; GSI: global severity index; YPLH: young people living with HIV; AIDS: acquired immunodeficiency syndrome; YLH: youth living with HIV; ART: antiretroviral treatment									

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