

# Appearance Concerns and Psychological Distress Among HIV-Infected Individuals with Injection Drug Use Histories: Prospective Analyses

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## Abstract

Morphologic alterations in body composition are common among HIV-infected individuals, and these changes are associated with increased appearance concerns. Previous cross-sectional data indicate that appearance concerns among HIV-infected individuals are related to increased levels of psychological distress. However, to date, no known prospective data have been published on these relationships. The purpose of the current study was to address the temporal prediction of appearance concerns on depression and anxiety severity. Data were culled from a prospective, randomized controlled trial of cognitive behavioral therapy for depression and medication adherence in individuals with a history of injection drug use (IDU). Participants were 89 HIV-infected individuals who were randomized to either a cognitive behavioral therapy or treatment as usual condition. Linear mixed-level modeling revealed elevated levels of appearance concerns were prospectively related to increased depression and anxiety, as rated by both clinician-administered and self-report measures. Appearance concerns among depressed, IDU, HIV-infected individuals are associated with changes in psychological distress. Psychosocial interventions should consider the role of appearance as it relates to psychological functioning.

## Introduction

**H**IV-INFECTED INDIVIDUALS face numerous psychosocial stressors, including alterations in body fat composition.<sup>1,2</sup> There are potentially numerous causes for such changes, with lipodystrophy—fat atrophy (e.g., in the face, arms, legs, and/or buttocks) and/or fat hypertrophy (e.g., stomach, back of the neck, and/or breasts)—being one common factor. Lipodystrophy has been linked with HIV disease progression itself<sup>2</sup> and also with adherence to highly active antiretroviral therapy (HAART) over an extended period of time.<sup>1,3–5</sup> This condition is also prevalent among HIV-infected individuals, with 55–60% diagnosed with moderate or severe levels.<sup>6,7</sup> Lipodystrophy has been associated with appearance concerns in both men and women<sup>3,4,8,9</sup>; accordingly, appearance concerns among this population are high.<sup>3,10,11</sup>

Changes in adiposity impose deleterious consequences for body image and quality of life in HIV-infected individuals, including social and emotional functioning.<sup>7,12,13</sup> However, relatively few studies sampling an HIV-infected population have investigated the relationship between ap-

pearance concerns and clinical sequelae such as anxiety and depression. Negative body image in HIV-infected individuals has been linked cross-sectionally with self-reported and clinician-assessed depression,<sup>4,9,10,14</sup> as well as self-reported anxiety.<sup>3</sup>

The current study seeks to expand upon the above findings in exploring the relationship between appearance concerns in HIV-infected individuals with an IDU history and depressive and anxious symptomatology. To date, research on these associations have been exclusively cross-sectional in nature, thus temporal influence cannot be inferred. The current study addresses this limitation in the literature by exploring the prospective relationship between appearance concerns and depression and anxiety. Second, most studies have relied on self-report measures of depression, whereas the current study features two clinician-rated measures of depression (in addition to self-report measures of depression and anxiety). Commensurate with previous cross-sectional findings, it is hypothesized that higher levels of appearance concerns will be prospectively related to increased levels of depression and anxiety.

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## Methods

### Participants

Participants included 89 HIV-infected individuals between the ages of 18 and 65 with comorbid depression who were in treatment for opioid dependence. Participants were enrolled between July of 2005 and October 2008 as part of a randomized controlled efficacy trial investigating the use of cognitive behavioral therapy (CBT) for treating depression and maximizing medication adherence in those with HIV. All participants were diagnosed with current or subsyndromal depressive disorder and randomized either to a CBT treatment condition or control condition. Additional inclusion criteria were a prescription of antiretroviral therapy, history of injection drug use, and current enrollment in opioid treatment for the past month (for a more exhaustive record of inclusion/exclusion details, please see Safren et al.<sup>15</sup>). Recruitment occurred at methadone treatment clinics and community outreach and HIV clinics in the greater Boston area. Sample characteristics are portrayed in Tables 1 and 2.

TABLE 1. SOCIODEMOGRAPHIC CHARACTERISTICS OF PARTICIPANTS

Variable	n	%
Gender		
Male	54	61
Female	35	39
Race		
African American/black	26	33
White	38	48
Native American	2	3
Ethnicity		
Hispanic or Latino	23	30
Sexual Orientation		
Exclusively heterosexual	60	79
Bisexual	5	7
Exclusively homosexual	2	3
Employment		
Full-time work or school	3	4
Part-time work or school	8	10
Neither work nor school	17	22
On disability	53	67
Education level		
Eighth grade or lower	12	15
Partial high school	21	26
High school graduate/GED	23	29
College graduate	6	8
Psychiatric comorbidity		
At least one additional <i>DSM-IV</i> diagnosis	55	62
Two or more additional <i>DSM-IV</i> diagnoses	37	42
Additional <i>DSM-IV</i> diagnoses		
Panic disorder	17	30
Generalized anxiety disorder	10	18
Social anxiety disorder	8	14
	M	SD
Age	46.85	7.15

Percentages do not always sum to 100 due to overlap or some participants reporting more than one demographic category.

TABLE 2. CLINICAL CHARACTERISTICS OF PARTICIPANTS

Variable	M	SD
Years living with HIV diagnosis	13	6
Years on HAART	10	5
Baseline CD4 count, #/mm <sup>3</sup>	450	263
Baseline HIV RNA load, copies/mL (raw) <sup>a</sup>	3599	13511
	n	%
Participants with viral suppression	60	69
Participants with detectable viral loads	27	31
HAART medication category <sup>b</sup>		
Participants taking NRTIs	77	87
Participants taking NNRTIs	28	32
Participants taking unboosted PIs	13	15
Participants taking boosted PIs	43	48

<sup>a</sup>For HIV RNA load,  $n=87$  due to missing data.

<sup>b</sup>One participant did not have data available for ART regimen. One participant was also taking an Integrase Inhibitor.

M, mean; SD, standard deviation. Percentages sum to greater than 100 due to overlap and participants taking more than one type of antiretroviral therapy (ART). NRTIs, nucleoside reverse transcriptase inhibitors; NNRTIs, non-nucleoside reverse transcriptase inhibitors.

### Procedure

All participants received a complete description of the study and provided written informed consent. All study procedures were Institutional Review Board-approved (for an overview of the parent study's full procedures, see Safren et al.<sup>15</sup>). Participants were seen for four major assessment visits over the course of the study, a baseline assessment (T1), 3 months from baseline (T2), 6 months from baseline (T3), and 12 months from baseline (T4). At each of these visits, participants completed both self-report and clinician-administered assessments of depression, anxiety, and physical symptoms related to HIV infection.

### Measures

**Depression.** At each assessment point, clinicians administered the Montgomery-Asberg Depression Rating Scale (MADRS), a semistructured interview of the frequency over the past week of 10 common symptoms of depression in which higher scores indicate more severe depression.<sup>16</sup> In addition, clinicians provided the Clinical Global Impression (CGI) for severity, a rating of distress and impairment for depression on a scale from 1 (not ill) to 7 (extremely ill).<sup>17</sup> In order to preserve measure validity, both MADRS and CGI scores were reviewed consistently during audiotape supervision meetings with another clinician.

Depressive symptoms were also assessed with the Beck Depression Inventory–Short Form (BDI-SF), a widely utilized measure that has been shown to be a valid assessment for those with comorbid medical conditions due to its emphasis on cognitive rather than somatic symptoms of depression.<sup>18,19</sup> Higher scores on the BDI denote more severe depressive symptomatology. For the current sample, internal consistency was  $\alpha=0.88$ .

**Anxiety.** Anxiety was measured by the Beck Anxiety Inventory (BAI) self-report form.<sup>20</sup> Higher scores on this measure indicate greater anxiety. The BAI differentiates

anxiety symptoms from depression symptoms despite commonly shared characteristics and has a strong history of psychometric reliability and validity. For the current sample, internal consistency was  $\alpha = 0.92$ .

**Appearance-related HIV symptoms.** At each visit, a clinician administered the 20-item ACTG Symptoms Distress Module,<sup>21</sup> which assesses symptoms commonly reported among those on antiretroviral regimens and asks participants to indicate whether they have each symptom and to what extent it bothers them on a five-point scale (i.e., “0—I do not have this symptom”; “4—I have this symptom and it bothers me a lot”). For the current sample, internal consistency was  $\alpha = .76$ . Three of these items are appearance-related and assess weight gain, weight loss, and hair loss. These items were extracted and combined to create a total score reflective of distress related to appearance-related changes.

### Statistical analyses

The main analyses of the current study, examining appearance concerns as longitudinal predictors of anxiety and depression severity, were conducted via linear mixed-effects modeling in SPSS (MIXED Procedure). The time variable provided the structure to the model with four waves of data (baseline, 3, 6, and 12 months postbaseline), and was entered as both a fixed and random effect. Random intercepts and slopes were also entered, which allow participants to have unique growth trajectories. Time variant values of appearance concerns were entered into the model, as fixed effects, to predict changes in the outcomes variables over time. The autoregressive covariance structure was chosen based on the best goodness-of-fit (as evaluated by the Akaike Information Criterion—AIC), compared to competing covariance structures. The restricted maximum likelihood—REML—estimation method was chosen in lieu of maximum likelihood (ML) estimation, as the former approach tends to result in unbiased estimates of the variances and covariances. This linear mixed-effects approach was conducted separately for each outcome variable. Furthermore, mixed-effects models were adjusted for salient variables which have been found to be related to appearance concerns and/or depressive/anxiety symptoms. Thus, all models presented below were adjusted for age, gender, HIV disease progression (i.e., CD4 count and viral load), and study condition (CBT versus TAU). It should be noted that results did not significantly vary between adjusted versus unadjusted models.

### Results

When analyzing self-reported symptoms of anxiety as the outcome variable, there was a significant effect of appearance concerns,  $\gamma_{202.1} = 2.2$ , 95% confidence interval [CI; 0.96, 3.5], standard error (SE) = 0.65,  $t = 3.4$ ,  $p = 0.001$ . Results indicated that a one unit increase in appearance concerns was prospectively associated with a 2.2 increase in self-reported anxiety symptoms.

Similar results were revealed when self-reported symptoms of depression (i.e., BDI) was entered as the outcome variable. A significant effect of appearance concerns emerged,  $\gamma_{226.6} = 1.4$ , 95% CI [0.58, 2.1], SE = 0.40,  $t = 3.5$ ,  $p = 0.001$ . These findings indicated that a one unit increase in appearance

concerns was prospectively associated with a 1.4 increase in self-reported depression.

Two clinician-rated measures of depression severity (MADRS and CGI) were also examined as outcome variables. With the MADRS as the outcome variable, a significant effect of appearance concerns was revealed,  $\gamma_{270.2} = 2.4$ , 95% CI [1.2, 3.6], SE = 0.60,  $t = 4.0$ ,  $p < 0.0001$ . These findings indicated that a one unit increase in appearance concerns was prospectively associated with a 2.4 increase in clinician-rated depressive severity (i.e., MADRS). Analogous results were revealed when CGI-depression was entered as the outcome variable, with a significant effect of appearance concerns,  $\gamma_{283.1} = 0.31$ , 95% CI [0.16, 0.46], SE = 0.08,  $t = 4.1$ ,  $p < 0.0001$ . These findings indicated that a one unit increase in CGI was prospectively associated with a 0.31 increase in CGI.<sup>a</sup>

### Discussion

Appearance concerns are common among HIV-infected individuals, as the progression of the illness, and the treatment thereof, can confer morphologic alterations of the body. The findings from the current study revealed that among a depressed, opioid-dependent sample of HIV-infected men and women, concerns related to appearance-related HIV symptomatology were prospectively related to increased depression and anxiety severity. These findings cut across both self-report and clinician-administered measures. Previous research in this area has relied exclusively on cross-sectional data, primarily with self-report instruments, and the current study adds to the literature by providing longitudinal models and by utilizing both self-report and clinician administered measures.

Despite the additions to the literature the current study presents, it is not without limitations. Given that the sample consisted of HIV-infected individuals who were depressed and opioid dependent, findings may not generalize to non-depressed or nonsubstance using individuals living with HIV. However, both depression and substance use are common among HIV-infected samples (e.g.,<sup>22</sup>; for a review of substance use see Gonzalez et al.<sup>23</sup>), and cross-sectional studies that sampled diverse HIV-infected populations show a consistent association of appearance concerns and distress.<sup>3,4,9</sup> It should also be noted that not all HIV-infected individuals with morphologic alterations of the body develop psychological distress; given that, as stated above, the current sample exclusively included individuals with psychopathology, thus limiting the ability to capture individuals without significant levels of distress. It is also possible that these relationships may be moderated by gender; however, the data from the current study did not support this hypothesis (see footnote). Further, the current sample included relatively few men who have sex with men (MSM). Given that there are higher levels of appearance concerns among MSM,<sup>24,25</sup> these associations with psychological distress are worthy of investigation further with HIV-infected MSM.

<sup>a</sup>It should be noted that within each model a gender by appearance concerns interaction was tested; however, with each outcome variable non-significant effects were revealed, suggesting that the relationships between appearance concerns and psychological distress outcomes did not vary as a function of participant gender.

The results from the current study have the potential to inform clinical interventions. Appearance concerns among HIV-infected individuals are often neglected in clinical care and research, which is unfortunate given the temporal prediction elevated levels of these concerns have on salient psychosocial outcomes, such as depression and anxiety. Thus, interventions targeting body dissatisfaction amongst HIV-infected individuals would likely reap secondary benefits of indirectly reducing depressive and anxiety symptoms. Furthermore, there is emerging evidence that changes in body morphology, particularly abdominal hypertrophy, are related to HAART nonadherence.<sup>26</sup> Various HAART regimens may have differential impact on body morphology.<sup>7</sup> For instance, some NRTIs are strongly associated with lipoatrophy; however, most classes of HAART have been associated with abdominal hypertrophy.<sup>27</sup> Additionally, Blashill and Vander Wal<sup>10</sup> examined meditational models in regard to body dissatisfaction and HAART non-adherence among a HIV-infected sample. Results indicated that association between body dissatisfaction and HAART nonadherence were not only mediated by depression, but that elevated levels of body dissatisfaction also moderated the relationship between depression and HAART non-adherence. These findings suggest a complex relationship between appearance concerns, depression, and HAART adherence. Future interventions may benefit from adopting an integrated approach to addressing appearance concerns in the context of depression and HAART adherence, which could also have implications for secondary prevention efforts.<sup>28</sup>

### Acknowledgments

Funding from this project came from the National Institutes of Health (R01 DA018603 to S.A.S.). Some investigator time was supported by the National Institutes of Health (K24 MH094214 to S.A.S.) and the Harvard University Center for AIDS Research/National Institutes of Health (5P30 AI060354-08 to A.J.B.).

### Author Disclosure Statement

No competing financial interests exist.

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