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A Case-Controlled Study of Successful Aging in Older Adults with HIV

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Abstract

OBJECTIVES—There is a growing public health interest in the aging HIV-infected (HIV+) population, although there is a dearth of research on successful aging with HIV. This study aimed to understand the risk and protective factors associated with self-rated successful aging (SRSA) with HIV.

DESIGN—Cross-sectional, case-controlled.

SETTING—HIV Neurobehavioral Research Program and the Stein Institute for Research on Aging at University of California, San Diego.

PARTICIPANTS—Eighty-three community-dwelling HIV+ and 83 demographically matched HIV-uninfected (HIV–) individuals, enrolled between 12/1/11 and 5/10/12, mean age of 59 years, primarily Caucasian males, 69% with AIDS, who had been living with an HIV diagnosis for 16 years. Diagnostic criteria for HIV/AIDS was obtained through a blood draw.

MEASUREMENTS—Participants provided ratings of SRSA as part of a comprehensive survey which included measures of physical and emotional functioning and positive psychological traits. Relationships between how the different variables related to SRSA were explored.

RESULTS—While SRSA was lower in the HIV+ individuals than their HIV– counterparts, 66% of adults with HIV reported scores of 5 or higher on a 10-point scale of SRSA. Despite worse physical and mental functioning and greater psychosocial stress among the HIV+ participants, the two groups had comparable levels of optimism, personal mastery, and social support. SRSA in HIV+ individuals was associated with better physical and emotional functioning and positive psychological factors, but not HIV disease status or negative life events.

CONCLUSION—Successful psychosocial aging is possible in older HIV+ individuals. Positive psychological traits such as resilience, optimism, and sense of personal mastery have stronger

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relationship with SRSA than duration or severity of HIV disease. Research on interventions to enhance these positive traits in HIV+ adults is warranted.

Keywords

HIV/AIDS; successful aging; physical function; emotional function; positive psychological factors; depression

INTRODUCTION

The number of people 50 and over ¹ who are HIV-infected (HIV+) is growing due to the success of antiretroviral therapy (ART) and consequent decreased mortality as well as an increase in incident HIV infection among older adults ². It is estimated that by 2015 half of the HIV+ individuals in the US will be >50 years old ¹. From a public health perspective, the US and the rest of the world are not well prepared to manage and treat a rapidly aging population with HIV ³. Healthcare professionals are still learning to optimize ART treatment as well as determining how to best address the increased medical comorbidities ⁴ that occur among older HIV+ persons.

Old age is associated with a complexity of physical, emotional, and societal changes and adaptations ⁵. Individuals living with HIV are at a high risk at a younger age for medical comorbidities typically associated with old age, including cancer ⁶, cardiovascular ⁷ and liver diseases ⁸, and osteoporosis ⁹. These medical illnesses are believed to be related to persistent inflammation, and possibly side effects of ART ¹⁰, and it is these medical illnesses, and not the HIV disease *per se*, that are increasingly responsible for mortality in older HIV+ adults ¹¹. Additionally, quality of life among individuals aging with HIV is impacted by stigma and discrimination, and these factors in turn have been associated with limited familial and social support, social isolation leading to increased depression, suicidal ideation, and additional mental health problems (e.g., anxiety, loneliness) ¹². Nonetheless, there is a growing body of literature that suggests the possibility of successful aging in individuals with HIV ^{13–15}, and understanding HIV in the context of successful aging may help identify individual factors related to better well-being.

There is a growing amount of objective evidence, in the form of biological, genetic, and neurological data, for the validity of subjective measures of well-being ^{16–19}. Self-rated successful aging (SRSA) has been defined as a holistic, multi-dimensional assessment of one's overall physical and mental health, and is a separate construct from merely absence of disease, freedom from disability, independent living, positive psychological factors and psychosocial functioning ^{20;21}. Indeed, psychosocial factors were emphasized more strongly than physical factors (including absence of disease and disability, longevity, genetics, and independent living) in qualitative studies on older adults' perceptions of successful aging ^{22;23}. The measure of SRSA used in this study is based on participants' subjective definition of successful aging, and the rationale for this decision has been previously described in detail ^{20;21;24}. In HIV-uninfected (HIV-) older adults, Vahia and colleagues ²⁵ developed an empirically based multi-dimensional model of successful aging in which physical functioning and positive psychological factors appeared to have a direct effect on SRSA. In a sample of 1,006 community-dwelling HIV- adults aged 50–99, a multivariate model of SRSA included greater resilience, lower levels of depression, better physical health, and older age (in that order), and the associations with SRSA and resilience and depression were comparable to the effect size between SRSA and physical health ²⁰. Based on these findings, it can be inferred that resilience and depression play as significant a role on SRSA as physical health, highlighting an important role for psychiatry and aging.

In HIV+ individuals two models of successful aging have been proposed^{26,27}. Kahana and Kahana's model²⁶ is based on factors related to quality of life, including affective states, and maintenance of valued activities and relationships. The second model, proposed by Vance and colleagues²⁷, includes interactions between eight components of successful aging: length of life, biological and mental health, cognitive efficiency, social competence, productivity, personal control, and life satisfaction. However, to date neither model has been empirically validated, nor is it clear how these models relate to models of successful aging we have previously used. Furthermore, SRSA not yet been compared between HIV+ and HIV- individuals.

There is a pressing need to understand the risk and protective factors associated with aging with HIV. The NIH Office of AIDS Research (OAR) Working Group on HIV and AIDS has identified a priority research area to study the mechanisms of successful aging in older HIV + adults²⁸. Per the OAR Working Group, one of the important challenges to identifying unique characteristics and biomarkers related to individuals with HIV relates to difficulties in identifying appropriate well-matched comparison groups. The specific mechanism of successful aging the present study chose to explore is the relationships between domains previously identified as being predictive of SRSA among HIV- persons and compare differences in these domains between demographically matched HIV+ and HIV- older adults. We proposed two hypotheses: 1) HIV+ participants would report worse SRSA, physical functioning, emotional functioning, and positive psychosocial factors than the HIV - group, and 2) In both groups, physical and emotional functioning, as well as positive psychological factors, would be associated with SRSA.

METHODS

Sample

This study was approved by the University of California, San Diego (UCSD) Institutional Review Board, and all the participants signed a written informed consent. Participants included 83 HIV+ and 83 demographically matched HIV- individuals. The present study represented a joint effort involving the HIV Neurobehavioral Research Program (HNRP) and the Stein Institute for Research on Aging (Stein Institute) at UCSD.

HIV+ participants were recruited from ongoing studies at the HNRP. 150 questionnaire packets were mailed out to current participants in one or more studies at the HNRP, and we obtained a response rate of 58%. Accordingly, the specific inclusion criteria were: fluent in English, active status at the HNRP, and having completed a blood draw with certain blood-based biomarker data (including CD4 counts and plasma viral load) available within the past two years. An emphasis was placed on including participants who were older (e.g., over 50 years of age) in order to try and have a comparable sample to the Stein Institute existing data. Exclusion criteria were: a diagnosis of serious mental illness (e.g., schizophrenia), major neuromedical comorbidities (e.g., seizure disorders, brain trauma with loss of consciousness for > 30 minutes), or any other cognitive impairment that could be definitively attributed to factors other than HIV illness.

Once the HIV+ sample was identified, an HIV- comparison group was selected from the ongoing Successful AGing Evaluation (SAGE) Study at the Stein Institute. The SAGE Study used a multi-cohort longitudinal design to randomly select 1,300 community-dwelling adults of San Diego County, aged >50 years. Participants were included in the SAGE study if they had a telephone in the home, were physically and mentally able to participate in both a phone interview and paper and pencil mail survey, and fluent in English. Exclusion criteria were: residing in a nursing home or skilled nursing facility, and an existing diagnosis of dementia or a terminal illness. Participants from SAGE were matched, one-to-one, with the

HIV+ subjects on the following variables (in order of importance): age, gender, education, and race/ethnicity. All of the HIV+ participants were mailed a self-report survey of successful aging largely similar to the one we had used in our prior studies of HIV– population^{29–31}. The survey contained two copies of a consent form to participate in the study, a demographics worksheet, fifteen scales, and a pre-addressed and stamped return envelope.

Measures

The survey questionnaire included the following measures:

Self-Rated Successful Aging—The participants were asked to rate themselves in terms of “successful aging” on a single-item, 10-point scale with 1 being the least successful and 10 being the most successful²¹. It was left to the individual participant to define successful aging for himself or herself.

Physical Functioning—Physical Component score on the Medical Outcome Study 36 Item Short-Form version 1.0 (MOS-SF-36)³². The physical component is comprised of the following subscales: physical functioning, role-physical, bodily pain, and general health.

Emotional Functioning—General emotional well-being was assessed with the following scales: Mental Health Component score from the MOS-SF-36³², which is comprised of vitality, social functioning, role-emotional, and mental health subscales. Happiness: Center for Epidemiologic Studies Depression Scale (CES-D)-Happiness Scale³³. The CES-D Happiness Scale consists of four items from the original CES-D asking participants to describe how experienced feelings over the previous week (e.g., “I enjoyed life”). Scores on this scale range from 1 = *rarely or none of the time* to 4 = *most or all of the time*, with high scores indicating greater happiness.

Different depression inventories were administered to the HIV+ and HIV– groups due to variations in the surveys administered to the two samples. For the HIV+ group, the Beck Depression Inventory-2 (BDI-2)³⁴ was administered. The BDI-2 contains 21 questions asking participants about multiple depressive symptoms (e.g., sadness, guilt, increases and decreases in sleep) answered on a scale from 0 to 3, with higher scores indicating greater depressive symptoms. The HIV– group completed the Patient Health Questionnaire-9 (PHQ-9)³⁵. The ten-items of the PHQ-9 overlap considerably with the BDI-II, and include items such as, “Little interest in doing things” and “trouble concentrating.” Items are rated on a scale from 0 = *not difficult at all* to 3 = *extremely difficult*. Anxiety: Brief Symptom Inventory – Anxiety Scale (BSI-A)³⁶. The six questions on this scale ask participants to indicate how anxious they have felt during the past week on items such as “nervousness,” “panic” from 1 = *not at all* to 5 = *extremely*, which higher scores indicating greater symptoms of anxiety. Stressful life events (e.g., deaths, divorce, move) in past year: Life Event Scale³⁷. Participants are asked to report whether a stressful life event occurred (2–4 = *yes* or 1 = *no*), and if yes, how much it upset them, from 2 = *not too much* to 4 = *very much*.

Positive Psychosocial Factors—The following measures for resilience, optimism, perceived stress, spirituality, social support, personal mastery, and attitudes toward own aging were included: Resilience: Connor Davidson Resilience Scale (CD-RISC-10)³⁸. Items include statements such as, “I can do just about anything I really set my mind to do,” and are recorded on a Likert-type scale from 1 = *not true at all* to 5 = *true nearly all the time*. Optimism: Lifetime Orientation Test-Revised (LOT-R)³⁹. The LOT-R consists of six items (e.g., “Overall, I expect more good things to happen to me than bad”) which are recoded from 1 to 5 in which 1 = *strongly disagree* to 5 = *strongly agree*. Amount of perceived stress:

ten-item Perceived Stress Scale (PSS⁴⁰). The PSS has participants respond on a five-point scale ranging from 1 = *never* to 5 = *often* to items such as “How often, in the past month, have you felt nervous or “stressed”?” Social Interactions: Duke Social Support Index Social Interaction subscale (DSSI⁴¹). This four time questionnaire aims to quantify how often (within the past week) the participant spent time visiting or talking with people or groups (e.g., “How often did you go to meetings or clubs, religious meetings, or other groups that you belong to in the past week?”). Responses range from 1 = *none* to 8 = *seven or more times*. Personal mastery: seven-item Personal Mastery Scale (PMS⁴²). Participants respond to respond on a continuum ranging from 1 to 4 with 1 = *agree* or 4 = *disagree* to statements such as, “I can do just about anything I really set my mind to do.” Lastly, information on participants feelings towards own aging was measured using the five-item Philadelphia Geriatric Morale Scale, Attitudes subtest (PGMS⁴³). The PGMS asks participants whether they *agree* or *disagree* to statements such as, “Things keep getting worse as I get older.”

Data Analysis

Data were examined for normality and two sets of analyses were conducted. First, because of heterogeneity of variance on many of the measures, Man-Whitney U tests were employed to determine group differences on all variables. Next, Spearman correlations were computed to explore relationship of SRSA with variables in the following domains: i) physical, ii) emotional, and iii) positive psychosocial factors. To control for familywise Type I error, we used an adjusted alpha of $p < 0.01$ for group comparisons and Bonferroni-adjusted alpha of 0.003 (0.05/17 total comparisons) for correlational analyses.

RESULTS

Sample Characteristics of HIV+ and HIV– Groups

Demographic and clinical characteristics for both the HIV+ and HIV– groups are presented in Table 1. Mean age of the participants was 59-years-old (HIV+; range: 48–84 years old) and 60-years-old (HIV–; range: 51–83). The proportion of subjects currently married or living in a marriage-like relationship was much lower (29.8%) among HIV+ than in HIV– (69.9%) individuals. Approximately two-thirds of the HIV+ participants had a diagnosis of AIDS, as based on 1993 CDC classification¹. As a group the HIV+ participants were stable on antiviral treatment (% on ART = 86.7), had well-controlled HIV disease (median CD4 count = 558.0 [357–796.5] cells/mL; median log plasma = 1.7 [IQR 1.6,1.7]) and had a mean HIV infection duration from date of positive HIV test of 16 years. Seventy percent of the HIV+ participants identified their primary risk factor for contraction of HIV as homosexual contact. Other stated primary risk factors were: 19% heterosexual contact, 6% intravenous drug use, and 5% other or unknown manners of contraction. Forty-nine percent met criteria for a lifetime substance abuse or dependence diagnosis. Employment data was available on 74 HIV+ participants, of which 20% were employed full time and 15% were employed part time.

Sixty-six percent of the HIV+ participants reported SRSA scores of >5 ($M = 6.7$, $SD = 2.0$, $Md = 7.0$) on a scale from 1 (least successful) to 10 (most successful). A greater proportion (84%) of the HIV– group reported SRSA scores of >5 ($M = 7.5$, $SD = 1.9$, $Md = 8.0$; Figure 1) and mean SRSA scores significantly differed between the two groups (Table 1). A cut-off of >5 was chosen to compare the groups on this measure, as SRSA was designed with vague anchors and without cut-off values²¹. Scores on SF-36 Physical and Mental Health components, as well as measures of happiness, resilience and attitudes toward own aging, were significantly lower among HIV+ than HIV– participants whereas negative life events, anxiety and perceived stress were significantly higher among HIV+ participants (Table 1). The two groups were similar on levels of optimism, social support, and personal mastery.

Spearman correlations between SRSA and other relevant variables indicated that neither age nor HIV disease status was associated with SRSA (Table 2). In both groups higher SRSA was significantly associated with better physical and mental functioning (on the SF-36), as well as lower depressive symptoms, greater happiness, resilience, optimism, and personal mastery, better attitudes toward own aging, and lower perceived stress. Social support was related to SRSA only in the HIV– group.

DISCUSSION

In our sample of HIV+ community-dwelling adults who had been living with HIV for 16 years and two-thirds of whom had AIDS, 66% of the participants rated themselves in the upper half (6 to 10) on a 10-point scale of SRSA, despite being an older sample and having a chronic medical condition. As expected, the HIV+ subjects had worse SRSA as well as physical and mental health along with greater perceived stress, number of negative life events, and lower happiness than demographically matched HIV– participants. Remarkably, however, the two groups did not differ on levels of optimism, personal mastery, and social support. There is a possibility that the high levels of social support in the HIV+ group are related to the cohesive San Diego gay community, although this possibility is merely speculation at this time. Furthermore, similar moderate-to-strong associations between SRSA and physical, emotional, and positive psychological factors were found in both groups. Strikingly, SRSA in HIV+ subjects was not related to HIV disease status (duration or severity, as measured by CD4 count) or negative life events.

Depp and Jeste⁴⁴ conducted a review of the aging literature, and found 90% of quantitative studies to define successful aging as an absence of medical illness and disability. Our study provides evidence for a definition of successful aging that is broader than one based on absence of disease. Indeed, in the past few years several clinical researchers have adopted a multi-dimensional model of successful aging that incorporates factors such as self-rated physical and mental health, social engagement, resilience, optimism, and satisfaction with life^{25;45;46}. While the literature on successful aging in the context of HIV is limited, Vance and colleagues^{14;15;47} have advocated for a multiple-factor model that demonstrates adults with HIV can still age well despite physical, social, and economic losses. The results of this study support the multidimensional model of successful aging theory which emphasizes an integration of positive attitudes toward self and aging and attainment and maintenance of life goals and social interconnectedness²⁴.

Differences have been found in regard to disability status, social networks, symptoms of anxiety and depression, and attitudes toward aging in that those recently diagnosed appear to be coping more successfully with the diagnosis than those who have aged with HIV^{14;48}. However, we did not find an association between SRSA and duration or severity of HIV infection. Perhaps a survivorship effect occurred among our cohort of older HIV+ individuals in that they saw themselves as more resilient because they been living with HIV for some time and have likely survived beyond their expectations. There could also be a mediation effect of age, with older people being more prone to accept chronic illness as part of the aging process⁴⁹. Our results might have differed if our sample had been younger or had consisted of older adults infected with HIV later in life.

This study has several limitations. Our participants were relatively well-educated and primarily Caucasian men who were mostly middle-aged and older, and therefore, these results may not generalize to younger, less educated groups, women, and ethnic minorities. Additionally, there may have been a sampling bias toward successful aging HIV+ adults given that active status in the HNRP was part of the inclusion criteria for this study. It should be noted, however, the HNRP is part of a community-based outpatient clinic so

participants in this study likely reflect a broad range of HIV+ adults. Another limitation is that the data were cross-sectional, and inferences of causality cannot be made. Our measures were all self-report in nature and we did not receive any collateral reports from caregivers or others. It may be argued that self-reports are biased by a tendency to give socially desirable responses. However, in an earlier study of 1,860 community-dwelling older women (probably most were HIV-), using the Marlowe – Crowne Social Desirability Scale, there was no evidence for a social desirability effect on most of the self-report measures of successful aging including SRSA and physical function⁵⁰. Nonetheless, longitudinal studies are needed with larger sample sizes, different age groups, and greater sample diversity (including more ethnic/racial minorities, women, broader range of education), to obtain information regarding change in these factors over time. The interrelationships among different components of successful aging are likely just as important as the individual factors, and multivariate analyses with larger sample sizes are needed to better characterize a model of successful aging with HIV infection. Furthermore, these studies would benefit from the inclusion of clinically relevant biomarkers, as well as assessments of sleep, fatigue, and pain, all of which might influence functioning, which in turn impacts SRSA. Other limitations to this study include different the depression measures across groups, so group differences in depressive symptoms could not be explored, and limitations to the Holmes-Rahe Life Event Scale, which assigns an absolute number of points to life stressors without allowing for individual variation. Lastly, we did not include a neuropsychological test battery to evaluate neurocognitive functioning in order to examine a possible link between cognition and SRSA. Neurocognitive impairment has been found to be more common in older HIV+ adults than older HIV- adults⁵¹, so the influence of neurocognitive functioning in a multi-dimensional model of SRSA in HIV+ adults may be different than its influence in HIV- samples²⁵.

Notwithstanding its limitations, our work demonstrates the potential for successful aging in HIV+ individuals. It also shows that HIV infection does not appear to impact the relationship between positive psychological factors and SRSA. What is even more encouraging is that factors outside of a person's control, including negative life events and HIV disease severity, were not related to successful aging. Depression and other mental health issues continue to remain a significant problem in people living with HIV²⁷, and there is an urgent need for identifying factors that could help protect against the multiple comorbidities and complexities associated with aging and HIV infection. A number of studies have demonstrated a link between positive psychological traits and improved mental and physical health and decreased mortality. For example, resilience and optimism have been found to be potentially amenable to intervention, as resilience training was effective in breast cancer survivors⁵² and optimism was malleable to intervention in HIV+ women⁵³. Social engagement has been found to have a protective buffering effect against both mental health and physical health problems, including depressive symptoms, cardiovascular health, cancer recovery, and dementia⁵⁴⁻⁵⁶. Our findings that HIV+ adults had comparable levels of social engagement and positive psychological traits indicate that interventions designed to improve these factors in HIV- adults may be relevant to HIV+ adults as well. This study is a first step in developing an empirical understanding of the factors involved in successful aging with HIV. Overall, the potential public health significance of improving functional outcomes and quality of life in older HIV+ individuals has been highlighted by the NIH²⁸. Facilitating the development of effective interventions aimed at promoting well-being and optimizing clinical outcomes (e.g., treat depression, increase social engagement, lower levels of perceived stress) in the rapidly growing population of aging HIV+ adults will be productive areas for future research.

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Clinical Points

1. HIV+ adults give high ratings of successful aging, although their ratings are somewhat lower than HIV– adults.
2. Self-rated successful aging in HIV+ adults is related to better physical and mental health functioning, increased happiness, greater resilience, optimism, personal mastery, and attitudes toward aging, fewer depressive symptoms, and less perceived stress.
3. Clinicians can potentially help improve well-being in HIV+ adults by focusing on interventions to enhance positive psychological traits.

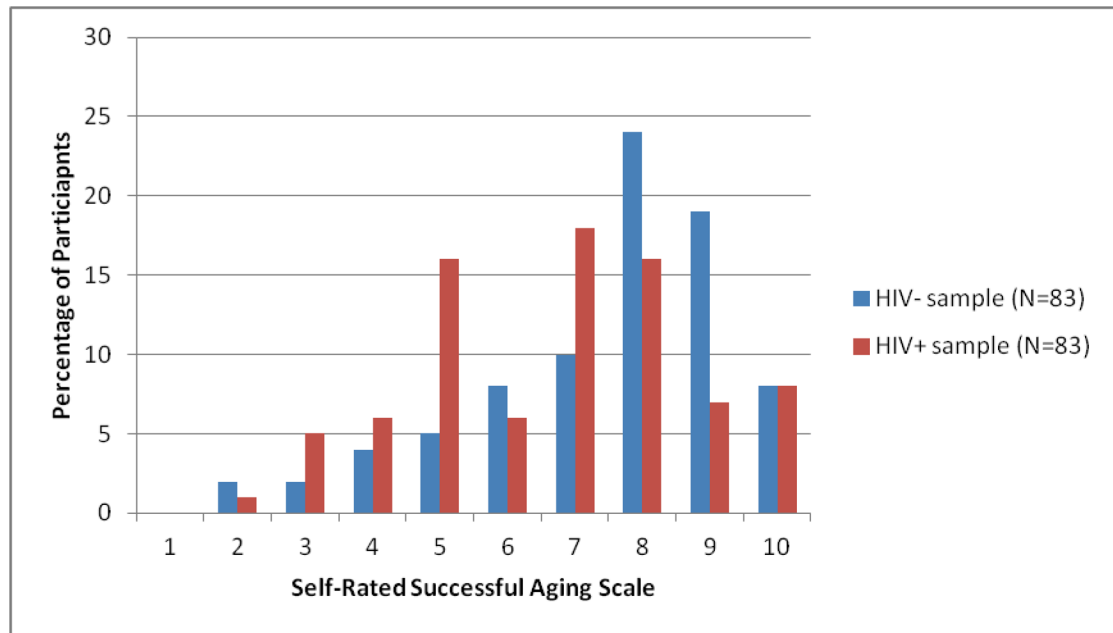


Figure 1. Comparison of HIV+ and HIV- Participants' SRSA Scores

Note:

SRSA = Self-Rated Successful Aging (range: 1=lowest to 10=highest)

Table 1

Comparison of HIV+ and HIV- Groups

	Possible Range of Scores	HIV- (N=83)		HIV+ (N=83)		Group Differences	p-value
		Mean (SD)	Median	Mean (SD)	Median	Mann-Whitney Test (z) or Chi-square ^a	
Demographics							
Age (Years)		60.4 (6.3)	60.2	59.3 (6.7)	58.7	NA	NA
Gender (N; % Male)		71 (85.5%)		71 (85.5%)		NA	NA
Race (N; % Caucasian)		74 (89.2%)		66 (79.5%)		2.24	0.14
Marital Status (N; % Currently Married or Living in a Marriage-Like Relationship)		58 (69.9%)		22 (29.8%)		23.65	<0.001 *
Education (N; %)							
1-12 years, High School Diploma or GED		8 (9.6%)		20 (24.1%)		5.20	0.02 *
13-15 years		39 (47%)		28 (33.7%)		2.50	0.11
Bachelor's Degree or Above		36 (43.4%)		35 (42.1%)		0.00	1.00
HIV Disease Status							
Duration of HIV Disease (years)	0-31	NA		15.2 (7.6)	15.9 (10.2-15.9)	NA	NA
Current CD4 (cells/ml)	26-1428	NA		600.1 (294.1)	558.0 (357-796.5)	NA	NA
Nadir CD4 (cells/ml)	1-720	NA		167.4 (158.0)	150.0 (40-250)	NA	NA
Plasma HIV RNA (log ₁₀ (N; Proportion undetectable)	1.6-4.9	NA		71 (81.7%)		NA	NA
AIDS (N; %)		NA		57 (68.7%)	NA	NA	
ART Status (N; % on ART)		NA		72 (86.7%)	NA	NA	
Self-Rated SA							
SRSA	1-10	7.5(1.9)	8.0	6.7(2.0)	7.0	-2.84	0.005 *
Physical							
Physical Component (SF-36-PC)	0-100	47.1(10.8)	50.7	42.1(11.3)	43.5	-2.99	0.003 *
Emotional							
Happiness (CESD-H)	0-12	10.2(2.9)	12.0	8.7(2.9)	8.0	-3.30	0.001 *
Mental Component (SF-36-MC)	0-100	52.9(9.5)	55.6	45.5(11.4)	45.8	-4.52	<0.001 *

	Possible Range of Scores	HIV- (N=83)		HIV+ (N=83)		Group Differences	
		Mean (SD)	Median	Mean (SD)	Median		
BDI	0-46	NA		11.3(10.6)	9.0	NA	NA
PHQ-9	0-25	3.29(4.4)		NA		NA	NA
Life Events (LES)	0-33	3.8(3.3)		3.0	5.6(4.5)	5.0	-2.71
Anxiety (BSI-A)	0-24	1.9(3.6)		1.0	4.1(4.3)	2.0	-4.20
Positive Psychosocial							
Resiliency (CD-RISC-10)	0-40	31.0(6.5)		31.0	27.9(7.5)	28.0	-2.72
Optimism (LOT-R)	1-30	22.4(4.3)		22.0	21.6(4.0)	22.0	-0.88
Perceived Stress (PSS)	0-40	12.0(5.6)		11.0	14.6(7.4)	14.0	-2.73
Social Interactions (DSSI)	4-12	8.3(3.3)		9.0	8.2(1.8)	8.0	-0.66
Personal Mastery (PMS)	1-28	13.3(3.7)		14.0	14.4(4.1)	14.5	-1.88
Attitudes Toward Aging (PGMS)	0-5	3.6(1.5)		4.0	2.9(1.8)	3.0	-2.60

Note:

NA = Not Applicable; ART = Antiretroviral Therapy; SRS-A = Self-Rated Successful Aging; SF-36 PC = Physical Component; CESD-H = Center for Epidemiological Studies Depression Scale Happiness Scale; SF-36 MC = Mental Component; BDI-2 = Beck Depression Inventory-2; PHQ-9 = Patient Health Questionnaire; LES = Life Events Scale; BSI-A = Brief Symptom Inventory Anxiety; CD-RISC-10 = Connor-Davidson Resilience Scale; LOT-R = Lifetime Orientation Test-Revised; PSS = Perceived Stress Scale; DSSI-SI = Duke Social Support Index-Social Interactions; PMS = Personal Mastery Scale; PGMS = Philadelphia Geriatric Morale Scale.

For all measures, higher scores indicate higher functioning except the PMS, in which lower scores indicate higher mastery.

* $p < 0.01$ (Adjusted alpha value for significance)

^a Mann-Whitney U Test for continuous variables; Chi-square tests for categorical variables

Table 2

Spearman's Correlations with Self-Rated Successful Aging (SRSA)

	SRSA	
	HIV- (N=83)	SRSA HIV+ (N=83)
Age (Years)	0.24	0.20
HIV disease status		
Duration of HIV Disease (years)	NA	-.05
Current CD4 (cells/ml)	NA	.08
Nadir CD4 (cells/ml)	NA	.04
Plasma HIV RNA (log ₁₀)	NA	-.09
AIDS	NA	0.06
Physical		
Physical Component (SF-36-PC)	0.50 *	0.46 *
Psychosocial		
Happiness (CESD-H)	0.47 *	0.67 *
Mental Component (SF-36-MC)	0.27	0.52 *
Depression (BDI-2)	NA	-0.42 *
Depression (PHQ-9)	-0.44 *	NA
Life Events (LES)	-0.09	-0.20
Anxiety (BSI-A)	-0.12	-0.27
Protective Psychosocial		
Resilience (CD-RISC-10)	0.50 *	0.51 *
Optimism (LOT-R)	0.50 *	0.50 *
Perceived Stress (PSS)	-0.37 *	-0.49 *
Social Interactions (DSSI)	0.37 *	0.22
Personal Mastery (PMS)	-0.38 *	-0.55 *
Attitudes Toward Aging (PGMS)	0.59 *	0.72 *

Note:

NA = Not Applicable. Please see the Note under Table 1 for spelling out all the abbreviations used.

For all measures, higher scores indicate higher functioning except the PMS, in which lower scores indicate higher mastery.

* $p < 0.003$ (Bonferroni-adjusted alpha value for significance)