

## Stress and Coping in Women Living with HIV: A Meta-Analytic Review

Roger C. McIntosh · Monica Rosselli

Published online: 21 March 2012  
© Springer Science+Business Media, LLC 2012

**Abstract** To examine effects between stressors and coping mechanisms on behavioral health outcomes a meta-analysis was conducted using forty empirical articles which sampled 7,602 adult women living with HIV/AIDS in the U.S. ( $M = 36.3$  years). Three independent reviewers conducted searches in abstract databases from 1997 to present day. Articles reporting effect sizes amongst psychosocial stressors and coping mechanisms with indices of behavioral/mental health were selected. The meta-analyses revealed that in a time frame characterized by the widespread availability of anti-retroviral medication, poor mental health outcomes were predicted, in a similar manner, by psychosocial stress and HIV/AIDS symptomatology. Significant effects were also observed with functional impairment, though to a lesser degree. Coping by avoidance and social isolation predicted more severe mental health outcomes. Spirituality and positive reappraisal predicted greater psychological adaptation than did social support seeking. Despite advancements in anti-retroviral treatment for women, HIV/AIDS symptoms and acute and/or chronic psychosocial stress pose the same threat to behavioral and mental health. In the face of these stressors, positive reframing appears to promote psychological

adaptation in a way which may lead to positive health outcomes in women living with HIV/AIDS.

**Keywords** Stress · Coping · Women · HIV · AIDS · Mental health · Disease adjustment

**Resumen** En este meta-análisis se examinó el efecto que el estrés y los mecanismos de adaptación tienen sobre el ajuste a la enfermedad; se utilizaron cuarenta artículos empíricos que incluyeron un total de 7.602 mujeres adultas que sufrían de VIH/SIDA ( $Medad = 36,3$  años). Tres revisores hicieron independientemente búsquedas en bases de datos de artículos publicados desde 1997 a la actualidad. Se escogieron artículos que describían el tamaño del efecto en el estrés psicosocial, en los mecanismos de adaptación con índices de salud mental o conductual. Tanto el estrés psicosocial como la sintomatología de HIV/AIDS predijeron una inapropiada salud mental. En menor grado se observaron alteraciones en el funcionamiento. El enfrentarse a la enfermedad a través del aislamiento social y la evitación predijeron el desajuste en la salud mental de HIV/AIDS. La espiritualidad y reevaluación positiva predijeron mejor el afecto positivo que la búsqueda de apoyo social. A pesar de los avances en la terapia HAART, el estrés psicosocial agudo y crónico asociado a los síntomas de HIV/AIDS, continúa contribuyendo a la psicopatología y a la presencia de conductas de salud desviadas en mujeres con HIV/AIDS. Estas mujeres emplean una multitud de mecanismos de adaptación para amortiguar los efectos del estrés.

Portions of this study will be presented at the Annual Meeting for the International Neuropsychological Society (INS) in Boston Massachusetts on February 5th 2011.

R. C. McIntosh (✉) · M. Rosselli  
Department of Psychology, Charles E. Schmidt College  
of Science, Florida Atlantic University, 2912 College Avenue,  
Davie, FL 33314, USA  
e-mail: rogermcintosh10@gmail.com

**Palabras clave** Estrés · Afrontamiento · Mujeres · VIH · SIDA · Salud mental · Ajuste a la enfermedad · Adaptación

## Introduction

Women demonstrate a biological susceptibility to infectious disease which makes them the fastest growing cross-section of persons living with the Human Immunodeficiency Virus (HIV) and subsequently Acquired Immune Deficiency Syndrome (AIDS) [1]. The lifetime odds for a woman to contract HIV/AIDS depends largely upon ethnic background. Whereas 1 in 32 African-American women and 1 in 106 Hispanic/Latina women will be diagnosed with HIV at some point in their lives, only 1 in every 526 Caucasian or Asian women will forego the same outcome [2]. Highly Active Antiretroviral Therapy (HAART) has helped extended reshaping what was previously considered a terminal diagnosis to a chronic yet manageable disease. Despite these advancements, disparities in disease management exist. AIDS related complications are the leading cause of death in African American women aged 25–34 and the fourth leading cause of death for Hispanic women aged 35–44 [3]. These demographic trends in progression from HIV to AIDS may reflect differences in acculturation, HIV-risk, and socioeconomic status [4]. In light of these findings, a general concern has arisen regarding disparate disease outcomes within ethnic minority communities, and how this may relate to the appraisal of non-disease related environmental stressors. To better quantify these effects, theoreticians have developed psychosocial transactions models amongst stressors, coping methods, and a multitude of psychological and behavioral outcomes [5–9]. Here, we look to describe the psychological, social, and biological milieu of women living with HIV/AIDS.

A large body of HIV/AIDS research in women has been amassed from the fields of psychology, social epidemiology, and behavioral medicine to help shape our understanding of the many factors related to disease management. The summative power of meta-analysis has provided a useful tool for ascertaining predictors of behavioral and psychological health in persons with HIV. Meta-studies consisting of large male and female cohorts have been useful in identifying outcome moderators. Moscowitz et al. [10] found gender to moderate the effect of higher-order coping mechanisms on specific disease-related outcomes such as self-report ratings of positive and negative affect. These findings suggest maladaptive ways of coping i.e. avoidance have more deleterious effects for women than do men. Longitudinal meta-analyses also provide great resolution into mechanisms of disease progression, and have likewise shown stark gender differences in the magnitude of effect for both environmental and symptom-based stressors [11, 12]. These summative findings suggest that interactions between stress, coping and outcomes must be taken within the context of gender.

Female gender is one of the most significant predictors of distress in HIV-infected persons [13–15]. The myriad of psychosocial archetypes observed in women living with

HIV/AIDS may pose a seemingly greater challenge for clinical case management [4]. When stressors are encountered they can precipitate a cascade of adrenal and sympathetic nervous system activity known to compromise immune function [14]. These stressors are thought to follow a hierarchy in which chronic strains and major life events pose greater long-term effects on psychopathology than more subtle forms of stress i.e., acute daily hassles [13, 14]. For example, life events such as bereavement can leave a post-traumatic effect which if unimpeded may lead to symptoms of depression and anxiety [16–18]. Chronic strains and daily hassles which are commensurate with socioeconomic conditions i.e., financial burden, unemployment, crime/victimization, and access to child/health care, can also compound stress levels and deplete coping resources thus compounding HIV/AIDS prognosis [4–6, 19–22].

Internal physical symptoms are another source of stress for those living with chronic disease. The relationship between the physical burdens of HIV/AIDS and quality of living may be quantified in several ways. Although CD4 count and viral load are frequently compared to measures of disease adjustment, their utility in predicting psychological and behavioral outcomes are debated [23–25]. An alternative approach to using biological markers as a predictive measure is the utilization of self-report inventories [26–28]. This form of assessment allows researchers to examine stressors relevant to women of childbearing age (e.g., menstrual abnormalities, cervical dysplasia, increased susceptibility to sexually transmitted infections, amenorrhea, as well as mother–child transmission of the disease) [29–32].

Stress appraisals can lead to the mobilization of a coping response. These responses may be considered innate traits or learned behaviors that are recruited to manage the specific external and/or internal demands of an event appraised as taxing or exceeding individual resources [7–9, 33–35]. Furthermore, they may be classified as adaptive or maladaptive depending on the positive/negative valence of short and long-term mental effects [6–9]. Epochs of psychological adaptation observed in HIV/AIDS are dependent on whether an individual utilizes approach, (e.g., positive reappraisal and seeking social support) or avoidant (e.g., social isolation and denial) coping styles [36–45]. Although both strategies may lead to short term relief the consensus across these studies holds that long-term consequences of avoidant coping result in further immune compromise and emotional distress.

Along with the broad categorizations mentioned afore, hundreds of sub-ordinate coping mechanisms have been identified in the literature [33]. For example, spiritual perspective or religious-based practices such as prayer are shown to provide psychological relief from aversive experiences in women living with HIV/AIDS [46–51].

Larger effects are noted when this mechanism is reportedly used by women of African descent [52, 53]. Seeking Social Support (SSS) is also employed to alleviate physical and emotional distress associated with adverse environmental conditions. This construct may be quantified (a) the source of support (e.g., partner, family, or extended social network) (b) indication of the type of support (e.g., tangible or informational), and (c) perception of the level or quality of support received [54, 55].

### Current Study

The HIV/AIDS epidemic impacts the lives of women in a unique way precipitates the integration of a host of strategies to face a range of stressors within and outside the biological context of the disease. HAART regimens have done much to change the perception of life expectancy [56], however, maladaptive coping contaminant with aversive socioeconomic factors and oscillating immune response increasingly and disparately jeopardize disease adjustment in women [57–60]. The current meta-analysis examines women being treated for HIV with the aim of comparing the magnitude of effect amongst various stressors i.e., psychological, physical, and functional; ensuing coping mechanisms i.e., approach, spirituality, positive reappraisal, seeking social support, avoidance, denial, and social isolation; and specific indices of psychological and behavioral adjustment.

## Methods

### Selection of Studies

A search was conducted of relevant abstract databases i.e., PsycINFO, PubMed, and Science Direct for peer-reviewed articles published from January of 1997–2011. This period was selected to depict seropositive women living in an era with widespread availability of HAART. Only studies published in English within the United States were considered. Independent reviewers searched for articles using the terms: “coping” [and] “stress” [and] “stressors” [and] “mental health” [and] “health behaviors” individually paired with “women with HIV/AIDS”. Published meta-analyses, reviews, and empirical studies were also searched for citations referencing articles from the post-HAART era. Inclusion criteria for this meta-analysis required the study to have: (a) an exclusively female sample, (b) participants recruited within post-HAART era, (c) construct validated stressors and/or coping indices with similarly validated measures as recommended by Cohen [61], (d) appropriate measure of effect size i.e., zero-order bivariate correlation or beta coefficient [62], and (e) published in a peer-review journal. When information was reported incompletely or in

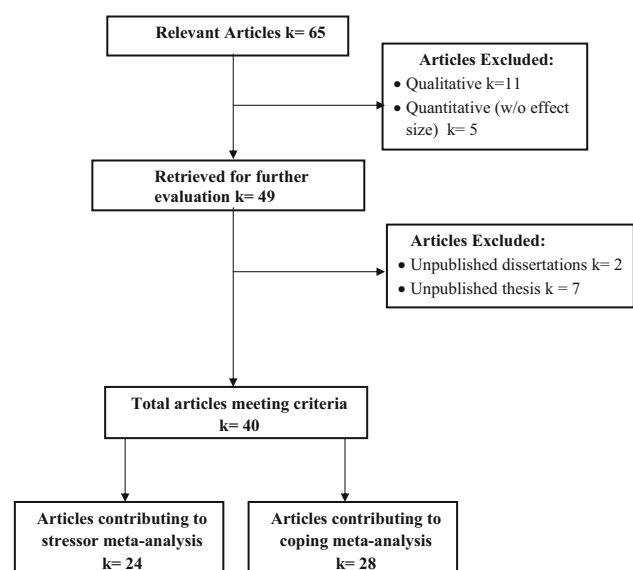
an irretrievable format, a written request was forwarded to the corresponding author of the article. Seven authors were contacted for data retrieval with 2 out of 7; 29% being retained for the meta-analysis. A final count of 40 studies met the above criteria (Fig. 1). Methodological quality of each study was determined by two independent reviewers through the use of the STROBE checklist [63]. The percentage of “yes” responses out of the total number of applicable items ranged from 81.7 to 100 with a mean rating of 94.8 on a 100 point scale. The Kappa statistic was used to determine consistency among raters. A near perfect agreement for interrater reliability was found  $Kappa = .97$  ( $p < 0.001$ ), 95% CI (0.953, 0.981). Attempts were not made to obtain unpublished data.

### Coding

Demographic (e.g., ethnicity, age) and methodological (e.g., type of coping) information was coded for each study. To ensure that the same constructs and relationships were interpreted across studies, each article was distributed to and reviewed separately by three researchers. Each reviewer coded the study in a separate database. Before the meta-analysis was conducted, an inter-rater analysis of the descriptive data was examined and reconciled for discrepancies by the first author.

### Stressor Classifications

A review of the HIV/AIDS literature suggested physical, functional, and psychological stressors were most commonly reported (see Table 1). The construct of stress



**Fig. 1** Flow-chart for selection of studies used in meta-analysis

**Table 1** Stressor categorization

Stressor	Type	Sample item(s)
Perceived	Appraisal	In the last month, how often have you felt nervous and “stressed”?
	Chronic burden	Does someone in your household have a problem with drugs/alcohol?
	Major event	Has someone close to you died suddenly or unexpected (e.g., murder/suicide)?
	Interpersonal	I have a hard time keeping pace with my friends.
Functional	Appraisal	How much does your health limit the kind and amount of activity you can perform?
	Physical/role	Have you had difficulty taking care of other people such as family members?
Physical	Symptom #	Frequency of menstrual abnormalities, cervical dysplasia, STI, menopausal issues.
	Stage of illness	CD4 count, CD8 count, viral load
	Appraisal	Physical & sexual functioning, medical interactions

differed amongst categories as perceived stress and functional impairment were measured in terms of their psychological impact while HIV symptomology was indexed by frequency of occurrence. Physical symptom-based stressors that contributed to the meta-analysis included: frequency of symptoms [64–66] and physical symptom burden [67]. Functional limitation-based stressors included perceived limits of functioning [68], and physical/role functioning [69, 70]. Measures of psychological stress included: chronic burden [71, 72], major/traumatic life events [73, 74], perceived stress [64, 75], and interpersonal conflict [76].

#### Coping Classifications

We categorized the coping scales reported in each study using the definitions and strategies provided by Ways of Coping [77] and the COPE scales [78]. Measures developed by authors were assigned to a Ways of Coping or COPE subscale to which it was most closely matched. Coping mechanisms were then placed in hierarchical categories of approach or avoidance (see Table 2). Approach-based coping included positive reappraisal [77–81], spirituality [78, 79, 82–86], and seeking social support [63, 77, 78, 85, 86]. A measure of general active/approach coping [77, 80, 85] was also included in the meta-analysis. Avoidance measures included denial/distancing

[78, 86], social isolation [86], and a general measure of avoidance [63, 85, 87].

#### Outcome Classifications

Study outcomes were grouped based upon recommendations by Moskowitz et al. [10] into the categories of positive affect, negative affect, and health behaviors. The five sub-measures of positive affect included: locus of control/perceived control [88, 89], mastery [90, 91], positive affect [92], quality of life [68, 93], self-esteem [92], and stress-related growth [89]. Data was entered so that larger correlations indicated a positive relationship with positive affect and psychological adjustment.

Negative affect included eight sub-categories: anger [88], anxiety [94–96], depression [88, 96–98], emotional/psychological distress [88, 99], loneliness [100], mood disturbance [88], and suicidal ideation [101]. Data was entered so that higher more positive correlations indicated a stronger effect on psychopathology and negative affect.

Health behaviors included adherence/non-adherence [102, 103] in addition to disclosure distress, substance abuse, and managing illness (see Table 3). Data was entered so that positive correlations indicated a stronger relationship with the maladaptive behavior. In some cases, the scales and

**Table 2** Coping categorizations

Coping measures	Sample item(s)
Approach	Acceptance, confrontive, direct action, fighting spirit, planning, positive reappraisal, seeking social support, self-blame, self-controlling, spirituality
Avoidance	Alcohol/drug disengagement, behavioral disengagement, distancing, escape/avoidance, social isolation
Distancing	I went on as if nothing happened
Positive reappraisal	I looked for something good in what is happening
Seeking Social Support	I talked to someone to find out more about the situation/I talked to someone about how I was feeling
Social Isolation	I avoided others
Spirituality	I sought God’s help

**Table 3** Stress, coping, and outcome information for studies included in the meta-analysis

Author	Notable inclusion criteria	Stressor instrument (s)	Coping instrument	Coping type (s)	Outcome instrument (s)
Blaney [107]	Prenatal; low SES	PSI; SDA	B-Cope	EA; Ac	CES-D
Braxton [108]	Low SES; low Edu	n.r.	WOC	Sp(.78); Av(.76)	CES-D(.92); QoL(.89)
Burns [42]	Maternal; low SES	HS(.92); PCQ(.77); SSQ6(.86)	B-Cope	Av(.84); Ac(.72)	BSI(.96)
Catz [38]	HIV; low SES	SRRS; ISEL(.87)	WOC	PS; EA	CES-D; STAI
Cooperman [114]	HIV/AIDS	BSI(.97)	SSI	Sp(.96); SSS(.90)	BSI(.97); HASS(.95)
Dalmida [109]	Gay/bisexual/lesbian	n.r.	SWB	Sp(.85)	CES-D(.88); AGAS(.75)
Gray [19]	HIV	IRPI(.86); MOS(.77)	SPS	Sp(.94)	MSI(.97)
Gurung [110]	Longitudinal study		COPE	Av(.85); PF(.80); SSS(.78)	CES-D(.92); LOT(.72)
Hayayneh [43]	AIDS; low SES	n.r.	COPE	Ac(.70); PR(.70); SSS(.71)	MOS-HIV(.75)
Hough [113]	Mothers/caregivers	HAT-R(.86); FPRQ(.76); CBCL(.87)	DII	Pr(.75); Ac(.75)	POMS(.82)
Jones [131]	Low SES; African American	PSI(.91); LSC			HRSD(.97)
Jones [115]	AIDS; low SES	SDA	COPE	De; Av	AMS
Latham [45]	HIV/AIDS; single	FAS(.86); EOVI(.74)	SDA [86]	Av(.77); SSS(.82); Sp(.84); PR(.74)	LSS(.88)
Martinez [119]	Low SES; PTSD	LSC; PCL-C	MOSSQ	SSS	PCL-C
Moneyham [40]	HIV/AIDS; low-SES	MOS-SF-36(.90)	[86]	Av(.79); SSS(.88); Sp(.85)	SDA(.90)
Moneyham [111]	HIV/AIDS; rural sample	MOS-SSS(.96); FSQ(.94)	FCPS	SSS(.67); Is(.69); Sp(.76); Av(.66)	CES-D(.90)
Morse [46]	Mothers hetero/bisexual; lesbian	HSI	SDA; SPS	Sp; SSS(.92)	SDA BDI(.85)
Mosack [120]	Military; high SES	ISEL(.92)	CV	Av; PF	ULS-20(.94); POMS
Nannis [104]	HIV/AIDS; low-SES		FCS	SC(.81); PF(.73); PR(.89)	RSES(.86); CES-D(.91); ZAS(.84)
Neff [37]	Sampled from S.A.	SDA # of stress	B-Cope	Sp, De,	CD4
Olley [117]	Sampled from UK	N/A	WOC-s	SSS	CD4
Onwumere [121]	Mothers; low-SES	DLC	B-Cope	Ac(.69); SSS(.84); Av(.82); Sp(.74)	BSI(.93)
Prado [41]	Low SES	PSS(.86); ACTG(.85)		Sp(.74)	BDI(.89)
Remeien [143]	Caregivers; low SES	DEQ(.95); TLEQ			MOS-HIV(.83)
Rose [122]	Caregivers; alcohol abuse	SDA	PNCs	PF(.87); Av(.72)	SR-AAAS
Sanchez [116]	Low-SES; Christian		SIWB	Sp(.29)	
Scarinci [118]	Symptomatic HIV	HOPES(.84); HLFS(.72)	MOS-HIV	Op(.83)	HADS(.91)
van Servellen [123]	HIV/AIDS	SDA: symptoms	WOC	PR(.73)	PTS(.95); CES-D(.84); RSES(.86)
Siegel [124]	HIV/AIDS	SDA	WOC	Av(.69)	CES-D(.90); POMS-SF(.96)
Simoni [105]	HIV/AIDS	SDA	WOC	Av(.75)	CES-D(.92)
Simoni [112]	HIV/AIDS; low SES	N/A	WOC	Sp(.73); SSS	CES-D(.90)
Simoni [44]	HIV/AIDS; low SES	SAS(.83)	SS	Sp(.91)	MS(.62); RSES(.79); CES-D(.84)
Simoni [39]	HIV/AIDS; single mothers	SDA; HIV-symptoms	SA	Sp	MOS-36; CES-D
Sowell [49]	African American	SDA			BDI
Sublette [79]		AAWSS(.87)	JCS	Av(.71); PF(.68)	MOS-36(.90); CES-D(.87)

**Table 3** continued

Author	Notable inclusion criteria	Stressor instrument (s)	Coping instrument	Coping type (s)	Outcome instrument (s)
Underlaff [125]	Low SES	SDA			CES-D(.93); LOT(.73)
Townsend [126]	HIV/AIDS; rural	MOS-SSS(.97)	FCPS	SSS(.67); Av(.66); Is(.69)	AABQ(.95)
Vyavaharkar [127]	Prescribed HAART	PSS(.70); ACTG(.85)	COPE	PR(.73), De(.76), Sp(.70)	HAT-QoL(.91)
Weaver [20]	HIV		COPE	Sp(.92)	BDI(.92); STAI(.88);

This table does not reflect the complete battery of scales used in each study, but rather the scales which provided effect size data used in the meta-analysis. Coping Scales

diagnostic questionnaires of stress, coping, and disease outcomes were developed by the authors [104–127].

### Effect-Size Analysis

The most frequently reported measure of effect in this meta-analysis was the correlation coefficient. When two outcomes in a single study were classified as the same outcome type (e.g., anxiety and depression for negative affect), we used the arithmetic mean of the two outcomes with each predictor. Some studies did not report a correlation coefficient, but rather a value for beta ( $\beta$ ). Because the relationship between beta ( $\beta$ s) and product moment correlation ( $r$ s) is seemingly independent of sample size and number of predictor variables, standardized regression (beta) coefficients within the interval  $\pm .50$  were imputed based upon the statistical recommendations of Peterson and Brown [128]. This approach was favored so as to lower the sampling error and produce more accurate estimates of population effect-size. Since the data was collected from a restricted portion of the entire population of studies (women in the post-HAART era), no attempt was made to generalize beyond the studies included [129]. Thus, a fixed-effects model was selected for data input and analysis based upon the assumption that there is one true effect size shared by all studies as it relates to a specific disease outcome. A random effects model was not selected because reported effects are considered highly biased when the number of studies within a meta-analysis are 10 or fewer [130], as was often the case for the current study.

Data was structured in accordance with general linear modeling (GLM). We reported the following results: (a) total heterogeneity ( $Q_t$ ) of the sample tested against the  $\chi^2$  distribution, (b) resultant p-value, (c) cumulative mean effect size ( $E$ ) and standard error, (d) 95% confidence intervals surrounding  $E$ , and (e) fail-safe number (see Tables 4, 5, 6, 7, 8).

Cumulative effect size represents the overall magnitude of the effect present within the studies; this value is considered to be significantly different from zero if the associated confidence limits do not bracket zero.  $Q$ -total was used to determine whether a set of effect sizes are homogenous, thus total heterogeneity of a sample must be tested against a Chi-square distribution with  $n - 1$  degrees of freedom. The null hypothesis for this test is that all effect sizes are equal. A significant  $Q_t$ -statistic would indicate that the variance among effect sizes is greater than expected by that of pure sampling error.

Publication bias is a common concern when conducting reviews from amassed literature. Most commonly, we observe the tendency for journals, especially those regarding critical diagnoses such as HIV/AIDS, to published studies with statistically significant results. Publication bias may be caused by the selective process of excluding non-published studies. Fail-safe  $N$ s are the most commonly used method of

**Table 4** Stressors and positive affect

Stressor type	No. of studies	<i>N</i>	Mean <i>R</i>	<i>p</i>	95% confidence		<i>Q</i> -total	<i>Q</i> ( <i>p</i> )	Fail safe ( <i>N</i> )
					Lower	Upper			
Perceived stress	4	580	-.26 (.044)	<i>p</i> < .05	-.68	-.05	6.5	<i>p</i> = .25	50
HIV symptoms	3	597	-.19 (.041)	<i>p</i> < .001	-.10	-.28	8.07	<i>p</i> < .05	20
Functional imp.	2	264	-.213 (.062)	<i>p</i> > .05	-.78	-.79	8.69	<i>p</i> = .41	0

**Table 5** Stressors and negative affect

Stressor Type	No. of studies	<i>N</i>	Mean <i>R</i>	<i>p</i>	95% confidence		<i>Q</i> -total	<i>Q</i> ( <i>p</i> )	Fail safe ( <i>N</i> )
					Lower	Upper			
Perceived stress	13	2897	.53 (.019)	<i>p</i> < .001	.49	.58	70.0	<i>p</i> < .001	20
HIV Symptoms	8	2799	.49 (.019)	<i>p</i> < .001	.44	.54	23.6	<i>p</i> < .01	10
Functional Imp.	3	508	.33 (.045)	<i>p</i> < .001	.25	.41	.76	<i>p</i> = .68	30

**Table 6** Coping and positive affect

Coping mechanism	No. of studies	<i>N</i>	Mean <i>R</i>	<i>p</i>	95% confidence		<i>Q</i> -total	<i>Q</i> ( <i>p</i> )	Fail safe ( <i>N</i> )
					Lower	Upper			
Positive reappraisal	3	575	.32 (.04)	<i>p</i> < .001	.14	-.50	3.93	<i>p</i> = .14	60
Seek social support	3	667	.24 (.03)	<i>p</i> < .001	.07	-.41	3.16	<i>p</i> = .21	40
Spirituality	5	911	.32 (.03)	<i>p</i> < .001	.22	-.41	2.93	<i>p</i> = .57	160

**Table 7** Coping and negative affect

Coping mechanism	No. of studies	<i>N</i>	Mean <i>R</i>	<i>p</i>	95% confidence		<i>Q</i> -total	<i>Q</i> ( <i>p</i> )	Fail safe ( <i>N</i> )
					Lower	Upper			
Approach (active)	3	824	-.17 (.04)	<i>p</i> < .001	-.32	-.02	6.12	<i>p</i> = .047	20
Positive reappraisal	3	317	-.17 (.06)	<i>p</i> < .001	-.41	.078	1.19	<i>p</i> = .55	30
Seek social support	7	1855	-.05 (.02)	<i>p</i> < .001	-.11	.01	43.51	<i>p</i> < .001	10
Spirituality	13	2300	-.12 (.02)	<i>p</i> < .001	-.16	-.07	77.46	<i>p</i> < .001	210
Avoidance	4	847	.64 (.03)	<i>p</i> < .001	.52	.74	33.73	<i>p</i> < .001	40
Distancing/denial	3	678	.30 (.04)	<i>p</i> < .001	.13	.47	3.95	<i>p</i> = .13	60
Social isolation	2	587	.56 (.04)	<i>p</i> < .001	.02	1.08	.02	<i>p</i> = .87	130

**Table 8** Coping and health behaviors

Coping mechanism	No. of studies	<i>N</i>	Mean <i>R</i>	<i>p</i>	95% confidence		<i>Q</i> -total	<i>Q</i> ( <i>p</i> )	Fail safe ( <i>N</i> )
					Lower	Upper			
Positive reappraisal	3	670	-.18 (.04)	<i>p</i> < .001	-.35	-.01	6.63	<i>p</i> = .04	20
Seek social support	2	408	-.07 (.05)	<i>p</i> < .001	-.71	.56	.24	<i>p</i> = .62	0
Spirituality	3	671	-.16 (.04)	<i>p</i> < .001	-.33	.001	.55	<i>p</i> = .76	20
Avoidance	2	454	.18 (.05)	<i>p</i> < .001	-.42	.78	2.69	<i>p</i> = .10	10

determining, with publication bias, whether the result of a meta-analysis can be treated as a reliable estimate of the true effect [130]. This calculation reflects the number of studies which must be added to the analysis in order change the results from significance to that of non-significance. Using Rosenthal's criterion ( $N < 5k + 10$ ), when the number is relatively large compared to the observed amount of studies, the data can be treated as a reliable index of effect. Another classic case of publication bias is depicted by the funnel plot. Large studies tend to be included regardless of their treatment effect, whereas small studies are more likely to be included when they show a relatively large treatment effect. Under these circumstances there will be a significant rank order correlation (Kendall's tau b) between treatment effect and the standard error.

## Results

Meta-analyses were conducted using effect size data from 24 and 28 of the 40 studies which met the criteria for the stressor and coping analyses respectively (see Fig. 1). Data was provided from a total of 7,602 adult women (*Age* = 36.3 years) sampled between January 1997 and January 2011. The majority of the sample (67%) was African-American followed by Hispanic (19%), Caucasian (5%), and other (9%). Clinical status was identified in 54% of the reported sample; serostatus had a near even distribution within the sample (34% asymptomatic-HIV, 29% symptomatic-HIV, and 36% AIDS diagnosis) at time of study.

Five categorical meta-analyses were conducted; two comparing forms of stress with positive and negative affect and three comparing ways of coping with positive affect, negative affect and health behaviors. The cumulative effect and level of significance reflects the average of the raw correlations reported for each analysis (*r*). In order to account for possible publication bias of publishing more significant effects, it is custom to report the mean effect-size (*R*: presented in Tables 4, 5, 6, 7, 8) which accounts for the sample size from which each raw effect (*r*) was reported. Raw effects were converted to z-scores using Fisher's *Z* to *r* transformation before the data was analyzed.

### Stressors

The meta-analysis of perceived stress ( $r = -.26$ ) and positive affect was significant, suggesting that interpersonal conflict and overall perceived stress from daily hassles and/or chronic strains predict lower reports of optimism and quality of life (see Table 4). HIV-symptoms ( $r = -.19$ ) and functional impairment ( $r = -.21$ ) evinced smaller magnitudes of effect, suggesting the stress appraised from physical limitations of the disease were not as great of barrier to

positive psychological adaptation in women living with HIV/AIDS. Though all measures of effect were significant, sufficient homogeneity was observed only within the analysis of HIV/AIDS related symptoms.

Table 5 reports effect-sizes found between various forms of stress and measures of negative affect. Small to moderate effect sizes for degree of functional impairment ( $r = .33$ ), HIV-related symptoms ( $r = .49$ ), and perceived psychological stress ( $r = .53$ ) were observed. The findings suggest women with HIV/AIDS report comparable levels of anxiety, depression, and psychological distress from physical symptoms associated with HIV/AIDS, as do they from the burden of major life events, chronic strains, and acute daily hassles. Sufficient homogeneity was observed within each analysis with the exception of functional impairment ( $p > .05$ ), suggesting inconsistency of report.

### Coping

Table 6 reports cumulative effects from a small to moderate range between the use of various coping mechanisms and indices of positive affect. Comparable effect sizes were observed amongst positive reappraisal ( $r = .32$ ), seeking social support ( $r = .24$ ), and spirituality based coping ( $r = .32$ ), all of which significantly predicted positive psychological adaptation. This suggests women who practice the cognitive and spiritual reframing of stress report greater levels of perceived control and stress-related growth than those who turn to outside sources for support relief. Tests for homogeneity of report were null across all three coping measures, suggesting consistency between studies.

Table 7 reports significant effect sizes amongst a host of coping mechanisms and negative mental health outcomes. Most effect sizes were in the small to medium range with social isolation ( $r = .56$ ) and avoidance coping mechanisms ( $r = .64$ ) demonstrating the largest positive associations. Large effects of this nature suggest poorer mental health outcomes in women living with HIV/AIDS i.e., depression and anxiety are mainly attributed to the practice of maladaptive coping styles. Despite the robust effect sizes sufficient homogeneity was not observed ( $p < .001$ ). Smaller effect-sizes within the range of  $r = -.17$  to  $r = -.25$  were reported for positive reappraisal, spirituality, approach, and problem-focused coping, suggesting these strategies have a significant buffering effect on the development of psychopathology.

To determine whether any publication bias exists, fail-safe *N*s were calculated for each meta-analysis (see Tables 4, 5, 6, 7, 8). Overall, Rosenthal's criterion ( $N < 5k + 10$ ) was met for 10 out of 20; 50% of the studies. Based upon this criterion, associations with sufficient heterogeneity (*Q*-total) that may also be considered



for publication bias included that of HIV-symptoms, psychological stress, approach coping, and seeking social support with negative affect. In contrast, the association observed with negative affect between spirituality and avoidance evinced sufficient heterogeneity free of publication bias. The Begg and Mazumdar Rank Correlation Test for funnel plot asymmetry suggested marginal significance for publication bias for the analysis of spirituality and negative affect ( $p = .04$ ) but not avoidance ( $p = .15$ ), perceived stress ( $p = .41$ ), HIV-symptoms ( $p = .35$ ), seeking social support ( $p = .15$ ), and approach coping ( $p = .15$ ). The test also was not significant for the analysis of positive reappraisal and negative health behaviors ( $p = .50$ ). It should be noted that non-significant correlation may be the result of low statistical power, and cannot be taken as evidence that bias is absent, whereas significant correlations suggests that bias exists but not the implications thereof.

## Discussion

An unexpected findings from these meta-analyses was that acute and chronic forms of psychosocial stress had a comparable magnitude of effect on the development of psychopathology as did the physical burden of disease management. Previous studies have suggested that internal physical symptoms contribute only partially to the psychological stability in women living with HIV/AIDS [10, 131–135]. It is very likely that disparities in income, access to education, and accessibility of health-related services interact to alter the intensity and frequency of life stress compounding the negative impact on disease outcomes [16–18]. One likely barrier directly related to socioeconomic status is dependency within the household environment i.e., the burden of being a caregiver living with chronic illness may tax tangible and intangible resources in a way which might compound the level of difficulty for disease adjustment [136–138].

Despite treatment advancements in HAART physical stress resulting from HIV-related symptomology is still a significant predictor of adverse psychological consequence in women. Studies predating the U.S. era of HAART availability suggested that seropositive women attributed greater distress to disease symptomology and often expressed stronger negative views of self-health than do their male counterparts [13–15]. Intuitively, modern expectations of HAART effectiveness may lead to more negative appraisals of oscillating immune status and treatment-related side effects currently observed in response to anti-retroviral treatment [26–29, 56].

Functional impairment was also found to significantly predict negative affect, suggesting one's incapacity to meet

daily occupational demands may have a considerable impact on overall mood. Daily hassles and other acute stressors derived from functional disease-related limitations are known to impact setting and accomplishment of daily goals resulting in marked changes in motivation and affect [139]. Research has also found that cognitive dysfunction, in the memory and motor domains can predict the severity of functional limitation in ADLs as well as the probability of returning to work for HIV+ persons [140].

Though coping responses are typically characterized as buffers or moderators in the stress response, this study examined the direct effects of a host of coping mechanisms on mental and behavioral health outcomes. Spirituality and allied religious activities were the most frequently reported coping mechanism across affect and behavioral outcome categories. Despite small effect sizes across these domains, the construct of spiritual-based coping is considered by some to be an integral component of psychological well-being in ethnic minority women coping with chronic illnesses [141–146]. It is likely that the positive reframing associated with spiritual/religious activities (e.g. search for meaning and prayer) plays a substantial role in reshaping the appraisal of HIV-related life stressors [147]. It is possible that larger effect sizes were not observed because effectiveness of spirituality/religious-based interventions are thought to be attributed to: (1) whether or not the construct was in place before onset of the major life event, and (2) the availability of religious resources to the individual pursuant to the event [44, 148].

Positive reframing, outside the context of spirituality and religion, may also predict enhanced psychological health. Unlike response-focused coping mechanisms (e.g. avoidance) which allow for the resurfacing of negative events, positive reappraisal facilitates reinterpretation of the stressor in a way which may buffer the impact of subsequent exposures to the same stimuli [149, 150]. Reappraisal has been implicated in cognitive behavioral therapy (CBT) and mindfulness training (MT) for HIV-positive persons with the goal of modifying views and behaviors related to drugs, diet, treatment regimens, and other facets of disease management [151–153].

In the context of social support seeking women are classically depicted as more likely to tend to and befriend others as a primary coping mechanism compared to their male counterparts [154]. Despite this stereotype, our meta-analysis found higher reports of support seeking did not predict a mental health advantage compared to other adaptive coping mechanisms. One possibility is lack of attractiveness for this option for persons living with HIV/AIDS. To this day, HIV/AIDS is associated with levels of stigma unparalleled by other common infectious or non-communicable diseases. This factor is shown to be a significant predictor in the delay of HIV-disclosure and subsequent management of

healthcare options [136]. Cultural factors too i.e., language barrier and level of acculturation have been reported by some as major limitations in the access of essential health and social support services [155–157].

Coping mechanisms such as avoidance, denial, and social isolation were found especially maladaptive from a psychological and behavioral standpoint. It is quite evident that when these mechanisms are put in place, patterns of chronic stress develop [55]. HIV-positive women who report greater use of avoidant coping mechanisms are less inclined to seek assistance from health and social service providers and are more likely to delay initiation of anti-retroviral drug regimen [20, 79]. Our meta-analysis also revealed that avoidance coping predicts substance abuse and non-adherence to HAART. More adaptive devices, namely coping skills training and group processing of personal issues, result in added gains for disease adjustment [158].

### Limitations

One possible shortcoming of our study occurred in the preliminary data retrieval stages. The phrase “women with HIV/AIDS” in combination with other key terms was used as the initial search strategy. The use of phrases compared to single terms could have possibly resulted in the omission of relevant studies from abstract databases. To test this limitation we performed a posthoc analysis comparing the number of studies extracted from PsycINFO, PubMed, and Science Direct using the term “stress” and the phrase “women with HIV/AIDS” to the number of studies which show using the terms “women”, “HIV/AIDS” and “stress” separately; the analysis revealed identical search results within the three literature databases ruling out the omission of relevant articles using the afore mentioned strategy. Another possible shortcoming was the homogeneity of inclusion criteria across the various articles. A diverse array of criteria was observed across studies with participants screened on the basis of CDC classification, sexual orientation, ethnicity, and maternal status, in conjunction with random sampling methods. Also, the manner in which the stress/coping-outcome associations are mediated by disease progression could not be determined, as nearly half of the studies failed to report serostatus and in some instances provided immune markers i.e. viral load and CD4 count to describe the sample (see Table 9). This review may also suffer from publication bias since no efforts were made to include unpublished data. Non-significant findings are less likely to appear in published vs. unpublished literature [159]. Some tests for publication were confirmatory suggesting readers should be cautious when interpreting findings on spirituality and negative affect. There are also several contextual variables not accounted for in the design of the meta-

analysis. For instance, Moskowitz and colleagues [10] tested for time since diagnoses as a moderator for ways of coping and disease outcome. This is of great relevance to psychosocial processes in women as the frequency and intensity of stressors plus strategy selection are likely to change as the patient progresses from the initial diagnosis [53].

When scales purporting to measure a construct (e.g. coping) contain items that measure another construct (e.g., distress), statistical tests of their association will be biased [4, 160]. This is an inherent flaw of all meta-analyses comparing antecedents, intervening variables, and disease outcomes. For example, scales reporting fatigue, a commonly reported symptom in HIV/AIDS, may be rather ambiguous considering the antecedents of such symptoms are shown to stem comorbidly from natural prognosis, pre-existing mood disorder, as well as HIV-associated cognitive dementia [161–163].

Finally, variables inherent to personal background such as substance abuse and mental health history introduce a great deal of unaccounted variance in measured effects. For some women, drug abuse history renders them more vulnerable to stress, while for others the recovery process can promote mastery and help to inoculate them from exposure to future stressors [42]. One common finding related to chemical dependency and coping is that persons at greatest risk for substance abuse adapt escape-avoidant strategies as a way to manage their anxiety/distress, thus creating an added barrier against psychological adjustment disease management [148]. Many women seeking treatment for HIV/AIDS also suffer from psychopathology. The adverse effects of pre-existing mental health conditions such as anxiety and depression are an additional concern as they may contribute to immune compromise [151]. Immune suppression stemming from opportunistic infection and neoplasias often leads to repeated outbreaks in persons chronically living with HIV/AIDS. Psychosocial variables are known to contribute to some of the variability in immune parameters such as CD4+ count, viral load, and preservation of natural killer (NK) cells. Specifically, maladaptive responses to stress or one’s efficacy in coping with that stress are associated with more rapid progression from HIV to AIDS in both men and women [153].

### Conclusion

This meta-analytic review brings to light the contextual factors associated with stress, coping, and disease adjustment for women living with HIV/AIDS in the HAART era. It is quite evident that women, particularly those of ethnic minority background, face unique challenges related to the disease in the 21st century. There remains a tremendous amount of work to be done in order to elucidate the

**Table 9** Demographics of studies included in the meta-analysis

Author	Year	<i>N</i>	Largest % ethnicity	Mean age	% symptomatic or AIDS
Blaney [107]	2004	307	71% Black	28.6	NR
Braxton [108]	2007	308	100% Black	35.1	NR
Burns [42]	2008	265	100% Black	35.4	NR
Catz [38]	2002	100	84% Black	31	23%
Cooperman [114]	2005	207	44% Black	39.5	55%
Dalmida [109]	2009	129	91% Black	42	NR
Gray [19]	2002	80	50% White	35.8	NR
Gurung [110]	2004	221	39% Black	30.81	NR
Hayayneh [43]	2009	162	62% Black	35	NR
Hough [113]	2002	147	86% Black	36.1	42%
Jones [131]	2003	72	100% Black	31.8	NR
Jones [115]	2003	174	54% Black	37	NR
Lathman [45]	2001	275	81% Black	31.2	39%
Martinez [119]	2002	47	51% Black	41.8	NR
Moneyham [40]	1998	184	85% Black	34	68%
Moneyham [111]	2005	280	84% Black	39.8	NR
Morse [46]	2000	104	100% Black	30.3	NR
Mosack [120]	2009	960	61% Black	40.8	NR
Nannis [104]	1997	58	57% White	30.8	NR
Neff [37]	2003	32	100% Latina	32.75	NR
Olley [117]	2006	105	100% Black	28.6	50%
Onwumere [121]	2002	56	100% Black	35	NR
Prado [41]	2004	252	100% Black	35.3	NR
Remeien [143]	2006	978	61% Black	41	NR
Rose [122]	2006	40	100% Black	40.9	NR
Sanchez [116]	2010	216	100% Latina	39.2	NR
Scarinci [118]	2009	83	63% Black	43.3	NR
van Servellen [123]	1998	44	52% Black	34.6	100%
Siegel [124]	2005	138	38% Black	37	86%
Simoni [105]	2003	142	100% Latina	42.8	58%
Simoni [112]	2000	230	47% Latina	39.5	57%
Simoni [44]	2002	230	47% Latina	39.5	60%
Simoni [39]	2000	143	74% Black	38.6	64%
Sowell [49]	2000	184	75% Black	34	68%
Sublette [79]	2008	80	100% Black	33.21	NR
Underlaff [125]	2002	189	48% Black	37	NR
Townsend [126]	2007	33	100% Black	44	100%
Vyavaharkar [127]	2007	224	82% Black	39.8	NR
Weaver [20]	2004	90	85% Black	37	100%
Woods [106]	1999	33	100% Black	31.7	100%

interaction of certain cross-sections such as mothers/care-givers, intravenous drug-users, women of color and those of varying sexual orientation. Some culturally-sensitive scales have already been developed to address poverty, acculturation, racism, access to care, maternal stress, relationship conflict and other agents relevant to disease management [164, 165].

These psychosocial variables can now be directly implicated in CD4 count and viral load slope within longitudinal female cohorts [166]. Clinicians and social/healthcare providers should be aware of these disparities and encourage the use of adaptive stress-resistant resources so as to keep pace with treatment regimens focused on decelerating disease progression and increasing quality of

life for women living with HIV/AIDS in the twenty-first century.

**Acknowledgments** The authors are grateful to Kristen Eddinger, Tamara Hochman, and Julieth Hoyos for their diligence in the preparation of this manuscript. The authors would also thank the Sheryl Catz, Benjamin Olley, Monica Sanchez, Jane Simoni, and Richard Sowell whom provided supplemental information for the meta-analysis.

## References

- UNAIDS. Report on the Global AIDS Epidemic; 2010.
- Centers for Disease Control and Prevention. Atlanta, GA: Centers for Disease Control and Prevention; c2011. [http://www.thebody.com/index/whatis/women\\_living.html?ic=sa](http://www.thebody.com/index/whatis/women_living.html?ic=sa).
- Hoy-Ellis CP, Fredriksen-Goldsen KI. Is AIDS chronic or terminal? The perceptions of persons living with AIDS and their informal support partners. *AIDS Care*. 2007;19(7):835–43.
- Jenkins S, Coons H. Psychosocial stress and adaptation processes for women coping with HIV/AIDS. In: Women and AIDS, O'Leary A, Jemmot LS, editors. Coping and care. New York: Penguin; 1996. p. 33–71. doi:10.1007/0-306-47140-X\_2.
- Pearlin LI, Lieberman MA, Menaghan EG, Mullan JT. The stress process. *J Health Soc Behav*. 1981;22(4):337–56.
- Pearlin LI, Schooler C. The structure of coping. *J Health Soc Behav*. 1978;19:2–21.
- Lazarus RS, DeLongis A, Folkman S, Gruen R. Stress and adaptational outcomes. The problem of confounded measures. *Am Psychol*. 1985;40(7):770–85.
- Lazarus RS. Psychological stress and the coping process. New York: McGraw-Hill; 1966.
- Lazarus RS, Folkman S. Stress, appraisal, and coping. New York: Springer; 1984.
- Moskowitz JT, Hult JR, Bussolari C, Acree M. What works in coping with HIV? A meta-analysis with implications for coping with serious illness. *Psychol Bull*. 2009;135:121–41.
- Chida Y, Vedhara K. Adverse psychosocial factors predict poorer prognosis in HIV disease: a meta-analysis review of prospective investigations. *Brain Behav Immun*. 2009;23:434–45. doi:10.1016/j.bbi.2009.01.013.
- Zorrilla EP, McKay JR, Luborsky L, Schmidt K. Relation of stressors and depressive symptoms to clinical progression of viral illness. *Am J Psychiatry*. 1996;153:626–35.
- Kennedy CA, Skurnick JH, Foley M, et al. Gender differences in HIV-related psychological distress in heterosexual couples. *AIDS Care*. 1995;7(Suppl 1):338. doi:10.1080/09540129550126803.
- Franke GH, Jager H, Thomann B, Beyer B. Assessment and evaluation of psychological distress in HIV-infected women. *Psychol Health*. 1992;6:297–312.
- McGrath E, Keita GP, Strickland BR, Russo NF. Women and depression: risk factors and treatment issues: final report of the American Psychological Association's national task force on women and depression. Washington, DC: American Psychological Association; 1990.
- Paykel ES. Stress and affective disorders in humans. *Semin Clin Neuropsychiatry*. 2001;6(1):4–11.
- Faravelli C, Pallanti S. Recent life events and panic disorder. *Am J Psychiatry*. 1989;146:622–6.
- Finlay-Jones R, Brown GW. Types of stressful life events and the onset of anxiety and depressive disorders. *Psychol Med*. 1981; 11:803–15. doi:10.1017/S0033291700041301.
- Gray J, Cason C. Mastery over stress among women with HIV/AIDS. *J Assoc Nurses AIDS Care*. 2002;13(4):43–57. doi:10.1016/S1055-3290(06)60370-1.
- Weaver KE, Antoni MH, Lechner SC, Durán REF, Penedo F, Fernandez MI, et al. Perceived stress mediates the effects of coping on the quality of life of HIV-positive women on highly active antiretroviral therapy. *AIDS Behav*. 2004;8:175–83. doi:10.1023/B:AIBE.0000030248.52063.11.
- Cummings EM. Security, emotionality, and parental depression: a commentary. *Dev Psychol*. 1995;31(3):425–7.
- Cummings EM, Davies PT. Maternal depression and child development. *J Child Psychol Psychiatry*. 1994;35(1):73–112.
- Kalichman SC, Difonzo K, Austin J, Luke W, Rompa D. Prospective study of emotional reactions to changes in HIV viral load. *AIDS Patient Care STDs*. 2002;16(3):113–20.
- Rabkin JG, Ferrando S, Lin SH, Sewell M, McElhiney M. Psychological effects of HAART: a 2-year study. *Psychosom Med*. 2000;62(3):413–22.
- Perry S, Fishman B. Depression and HIV: how does one affect the other? *JAMA*. 1993;270(21):2609–10.
- Halloran J. Increasing survival with HIV: impact on nursing care. *AACN Clin Issue*. 2006;17(1):8–17.
- Kassutto S, Maghsoudi K, Johnston MN, et al. Longitudinal analysis of clinical markers following antiretroviral therapy initiated during acute or early HIV type I infection. *Clin Infect Dis*. 2006;42(7):1024–31.
- Kremer H, Sonnenberg-Schwan U, Arendt G, Brockmeyer NH, et al. HIV or HIV-therapy? Causal attributions of symptoms and their impact on treatment decisions among women and men with HIV. *Eur J Med Res*. 2009;14(4):139–46.
- Ammassari A, Murri R, Pezzotti P, Trotta M, et al. Self-reported symptoms and medication side effects influence adherence to highly active antiretroviral therapy in persons with HIV infection. *J Acquir Immune Defic Syndr*. 2001;28:445–9.
- Johnson MO, Stallworth T, Neilands TB. The drugs or the disease? Causal attributions of symptoms held by HIV-positive adults on HAART. *AIDS Behav*. 2003;7:109–17. doi:10.1023/A:1023938023005.
- Banyard VL, Graham-Bermann SA. A gender analysis of theories of coping with stress. *Psychol Women Q*. 1993;17:303–18. doi:10.1111/j.1471-6402.
- Cejtin H. Gynecologic issues in the HIV-infected woman. *Obstet Gynecol Clin North Am*. 2003;30:711–29. doi:10.1016/j.idc.2008.05.006.
- Skinner EA, Edge K, Altman J, Sherwood H. Searching for the structure of coping: a review and critique of category systems for classifying ways of coping. *Psychol Bull*. 2003;129: 269–316. doi:10.1037/0033-2909.129.2.216.
- Carver C, Scheier M, Weintraub J. Assessing coping strategies: a theoretically based approach. *J Pers Soc Psychol*. 1989;56: 267–83. doi:10.1037//0022-3514.56.2.267.
- Folkman S, Lazarus RS. An analysis of coping in a middle-aged community sample. *J Health Soc Behav*. 1980;21:219–39. doi:10.2307/2136617.
- Hudson AL, Lee KA, Miramontes H, et al. Social interactions, perceived support and level of distress in HIV-positive women. *J Assoc Nurses AIDS Care*. 2001;12:68–76. doi:10.1016/S1055-3290(06)60218-5.
- Neff J, Amodei N, Valescu S, Pomeroy E. Psychological adaptation and distress among HIV+ Latina women: adaptation to HIV in a Mexican American cultural context. *Soc Work Health Care*. 2003;37(3):55–74. doi:10.1300/J010v37n03\_04.
- Catz S, Gore-Felton C, McClure J. Psychological distress among minority and low-income women living with HIV. *Behav Med*. 2002;28:53–60. doi:10.1080/08964280209596398.

39. Simoni JM, Demas P, Mason HRC, Drossman JA, Davis ML. HIV disclosure among women of African descent: associations with coping, social support, and psychological adaptation. *AIDS Behav.* 2000;4:147–58.
40. Moneyham L, Hennessy M, Sowell R, Demi A, Seals B, Mizuno Y. The effectiveness of coping strategies used by HIV-seropositive women. *Res Nurs Health.* 1998;21:351–62. doi:[10.1002/\(SICI\)1098-240X\(199808](https://doi.org/10.1002/(SICI)1098-240X(199808)
41. Prado G, Feaster DJ, Schwartz SJ, Pratt IA, Smith L, Szapocznik J. Religious involvement, coping, social support, and psychological distress in HIV-seropositive African American mothers. *AIDS Behav.* 2004;8(3):221–35.
42. Burns M, Feaster D, Mitrani V, Ow C, Szapocznik J. Stress processes in HIV-positive African American mothers: moderating effects of drug abuse history. *Anxiety Stress Coping.* 2008; 21(1):95–116. doi:[10.1080/10615800701695131](https://doi.org/10.1080/10615800701695131).
43. Hayajneh FA, Al-Hussami M. Predictors of quality of life among women living with human immunodeficiency virus/AIDS. *J Hospice Pall Nurs.* 2009;11:255–61.
44. Simoni JM, Kerwin JF, Martone MM. Spirituality and psychological adaptation among women with HIV/AIDS: implications for counseling. *J Couns Psychol.* 2002;49:139–47. doi:[10.1037//0022-0167.49.2.139](https://doi.org/10.1037//0022-0167.49.2.139).
45. Lathan B, Sowell R, Phillip K, Murdaugh C. Family functioning and motivation for childbearing among HIV-infected women at increased risk for pregnancy. *J Fam Nurs.* 2001;7:345–70. doi:[10.1177/107484070100700403](https://doi.org/10.1177/107484070100700403).
46. Morse EV, Morse PM, Klebba KE, Stock MR, Forehand R, Panayotova E. The use of religion among HIV-infected African American women. *J Relig and Health.* 2000;39(3):261–76.
47. Potts RG. Spirituality and the experience of cancer in an African American community: implications for psychosocial oncology. *J Psychosoc Oncol.* 1996;14:1–19.
48. Haase JE, Britt T, Coward DD, Leidy NK, Penn PE. Simultaneous concept analysis of spiritual perspective, hope, acceptance, and self-transcendence. *J Nurs Scholarsh.* 1992;24:141–7.
49. Sowell R, Moneyham L, Hennessy M, Guillory J, Demi A, Seals B. Spiritual activities as a resistance resource for women with Human Immunodeficiency Virus. *Nurs Res.* 2000;49: 73–82. doi:[10.1097/00006199-200003000-00003](https://doi.org/10.1097/00006199-200003000-00003).
50. Barroso J. Reconstructing my life: becoming a long-term survivor of AIDS. *Qual Health Res.* 1997;7:57–74. doi:[10.1177/104973239700700104](https://doi.org/10.1177/104973239700700104).
51. Rabin BS. Stress, immune function, and health: the connection. New York: Wiley-Liss & Sons; 1999.
52. Spilka B, Hood RW, Gorsuch RL. The psychology of religion: an empirical approach. Englewood Cliffs, NJ: Prentice Hall; 1997.
53. Jackson JS, Neighbors HW, Gurin G. Findings from a national survey of Black mental health: implications for practice and training. In: Miranda MR, Kitano HHL, editors. Mental health research and practice in minority communities: development of culturally sensitive training programs. Washington, DC: US Government Printing Office; 1986. p. 91–116.
54. Thoits PA. Conceptual, methodological, and theoretical problems in studying social support as a buffer against life stress. *J Health Soc Behav.* 1982;23:145–59. doi:[10.2307/2136511](https://doi.org/10.2307/2136511).
55. Thoits PA. Stress, coping, and social support processes: where are we? What next? *J Health Soc Behav.* 1995(Special No.); 53–79. doi:[10.2307/2626957](https://doi.org/10.2307/2626957).
56. Siegel K, Schrimshaw EW. Stress, appraisal, and coping: a comparison of HIV-infected women in the pre-HAART and HAART eras. *J Psychosom Res.* 2005;58:225–33. doi:[10.1016/j.jpsychores.2004.09.002](https://doi.org/10.1016/j.jpsychores.2004.09.002).
57. Weiss E, Rao GG. Bridging the gap: addressing gender and sexuality in HIV prevention. Washington DC: International Center for Research on Women; 1999. p. 1–7.
58. Gupta GR, Weiss E. Women's lives and sex: implications for AIDS prevention. *Cult Med Psychiatry.* 1993;17(4):399–12.
59. Hellinger FJ. The use of health services by women with HIV infection. *Health Serv Res.* 1993;28:543–61.
60. Kalichman SC, Hunter TL, Kelly JA. Perceptions of AIDS susceptibility among minority and nonminority women at risk for HIV infection. *J Consult Clin Psychol.* 1992;60(5):725–32.
61. Cohen J. Statistical power analysis for the behavioral sciences. 2nd ed. Hillsdale, NJ: Lawrence A Erlbaum Associates; 1988.
62. Schmidt FL, Oh IS, Hayes TL. Fixed- versus random-effects models in meta-analysis: model properties and an empirical comparison of differences in results. *Br J Math Stat Psychol.* 2009;62:97–128.
63. Von Elm E, Altman DG, Egger M, Pocock SJ, Gøtzsche PC, et al. The strengthening the reporting of observational studies in epidemiology (STROBE) statement: guidelines for reporting observational studies. *PLoS Med.* 2007;4(10):e296. doi:[10.1371/journal.pmed.0040296](https://doi.org/10.1371/journal.pmed.0040296).
64. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. *J Health Soc Behav.* 1983;24(4):385–96.
65. Barnard KE. Difficult life circumstances (DLC). Washington: NCAST; 1989. <http://www.icpsr.umich.edu/icpsrweb/childcare/resources/8728>.
66. Ganz PA, Schag CA, Kahn B, Petersen L, Hirij K. Describing the health-related quality of life impact of HIV infection: findings from a study using the HIV overview of problems-evaluation system (HOPEs). *Qual Life Res.* 1993;2(2):109–19.
67. Nokes KM, Wheeler K, Kendres J. Development of an HIV assessment tool. *Image J Nurs Sch.* 1994;26(2):133–8.
68. Stewart AL, Hays RD, Ware JE. Short-form general health survey. Reliability and validity in a patient population. *Med Care.* 1988; 26(7):724–35.
69. Ware JE Jr. Sherbourne CD. The MOS 36-item short form survey (SF-36): I. Conceptual framework and item selection. *Med Care.* 1992;30(6):473–83.
70. Marin G, VanOss Marin B. Applied social research methods series: vol. 23. Research with Hispanic populations. Newbury Park: Sage; 1991.
71. Hinkle Y, Antoni M. A measure of perceived control (technical report). Miami, FL: Center for Family Studies, University of Miami; 1991.
72. Watts-Jones D. Towards a stress scale for African-American women. *Psychol Women Q.* 1990;14(2):271–5.
73. DeLongis A, Folkman S, Lazarus RS. The impact of daily stress on health and mood: psychological and social resources as mediators. *J Pers Soc Psychol.* 1988;54(3):486–95.
74. Kubany ES, Leisen MB, Kaplan AS, Watson SB, Haynes SN, Owens JA, et al. Development and preliminary validation of a brief broad-spectrum measure of trauma exposure: the Traumatic Life Events Questionnaire. *Psychol Assess.* 2000;12(2):210–24.
75. Barnard KE. Difficult life circumstances (DLC). Washington: NCAST; 1989. <http://www.icpsr.umich.edu/icpsrweb/childcare/resources/8728>.
76. Cohen S, Mermelstein R, Kamarck T, Hoberman H. Measuring the functional components of social support. In: Sarason IG, Sarason BR, editors. Social support: theory, research, and application. The Hague: Martinus Nijhoff; 1985. p. 73–94.
77. Folkman S, Lazarus RS. Ways of coping questionnaire: sampler set, manual, test booklet, scoring key. Palo Alto, CA: Consulting Psychologists Press; 1988.
78. Carver CS, Scheier MF, Weintraub JK. Assessing coping strategies: a theoretically based approach. *J Pers Soc Psychol.* 1989;56(2): 267–83.
79. Sublette N. Predictors of depressive and anxiety symptoms among African American HIV-positive women. *ProQuest.* 2008; 1–167.

80. Namir S, Woolcott DL, Fawzy FI, Alambaugh MJ. Coping with AIDS: Ppsychological and health implications. *J Appl Soc Psychol*. 1987;17(3):309–28.
81. Folkman S, Chesney M, Pollack L, Coates T. Stress, control, coping, and depressive mood in human immunodeficiency virus-positive and -negative gay men in San Francisco. *J Nerv Ment Dis*. 1993;181(7):409–16.
82. Somlai AM, Kelly JA, Kalichman SC, Mulry G, Sikkema KJ, Multhau K, Davantes B. An empirical investigation of the relationship between spirituality, coping, and emotional distress in people living with HIV infection and AIDS. *J Pastoral Care*. 1996;50(2):171–9.
83. Daaeleman TP, Frey BB. The spirituality index of well-being: a new instrument for health-related quality-of- life research. *Ann Fam Med*. 2004;2(5):499–503.
84. Quinn Griffin MT, Salman A, Lee Y, Seo Y, Marin PA, Fitzpatrick JJ. A beginning look at the spiritual practices of older adults. *J Christ Nurs*. 2008;25(2):100–102.
85. Carver CS. You want to measure coping but your protocol's too long: consider the Brief COPE. *Int J Behav Med*. 1997;4(1):92–100.
86. Demi A, Moneyham L, Sowell R, Cohen L. Coping strategies used by HIV-infected women. *Omega (Westport)*. 1997;35(4):377–91.
87. Folkman S, Lazarus RS. The ways of coping questionnaire. Palo Alto: Consulting Psychologists Press; 1988.
88. McNair DM, Lorr M, Droppelman LF. Manual for the profile of mood states. San Diego: Educational and Industrial Testing Service; 1971.
89. Abraido-Lanza AF, Guier C, Colon RM. Psychological thriving among latinas with chronic illness. *J Soc Issues*. 1998;54(2):405–24.
90. Younger JB. Development and testing of the mastery of stress instrument. *Nurs Res*. 1993;42(2):68–73.
91. Pearlin LI, Schooler C. The structure of coping. *J Health Soc Behav*. 1978;19(1):2–21.
92. Rosenberg M. Society and the adolescent's self-image. Princeton: Princeton University Press; 1965.
93. Holmes WC, Shea JA. A new HIV/AIDS—targeted quality of life (HAT-QoL) instrument: development, reliability, and validity. *Med Care*. 1998;36(2):138–54.
94. Zung W. A rating instrument for anxiety disorders. *Psychosomatics*. 1971;12(6):371–9.
95. Spielberger C. Manual of the state-trait anxiety inventory. Palo Alto: Consulting Psychologists Press; 1983.
96. Zigmond AS, Snaith RP. The hospital anxiety and depression scale. *Acta Psychiatr Scand*. 1983;67(6):361–70.
97. Radloff LS. The CES-D scale: a self-report depression scale for research in the general population. *Appl Psychol Meas*. 1977;1(3):385–401.
98. Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J. An inventory for measuring depression. *Arch of Gen Psych*. 1961;4:561–71.
99. Derogatis LR. Brief symptom inventory: administration, scoring, and procedures manual. Minneapolis: National Computer Systems; 1993.
100. Hays R, Dimatteo M. A short-term measure of loneliness. *J Pers Assess*. 1987;51(1):69–81.
101. Harkavy Friedman J, Asnis G. Assessment of suicidal behavior: a new instrument. *Psychiatr Ann*. 1989;19(7):382–7.
102. Chesney MA, Folkman S. Psychological impact of HIV disease and implications for intervention. *Psychiatr Clin North Am*. 1994;17(1):163–82.
103. Chesney M, Ickovics J. For the recruitment, adherence and retention Committee of the ACTG. Presented at the annual meeting of the AIDS clinical trials group. Washington, DC; 1997.
104. Nannis ED, Patterson TL, Semple SJ. Coping with HIV-disease among seropositive women: psychosocial correlates. *Women Health*. 1997;25:1–22. doi:10.1300/J013v25n01\_01.
105. Simoni JM, Ortiz MZ. Mediational models of spirituality and depressive symptomatology among HIV-positive Puerto Rican women. *Cult Divers Ethnic Minority Psychol*. 2003;9:3–15. doi:10.1037//1099-9809.9.1.3.
106. Woods TE, Antoni MH, Ironson GH, Kling DW. Religiosity is associated with affective status in symptomatic HIV-infected African American women. *J Health Psychol*. 1999;4:317–26. doi:10.1177/135910539900400302.
107. Blaney N, Fernandez M, Ethier K, Wilson T, Walter E, Koenig L. Psychosocial and behavioral correlates of depression among HIV-infected pregnant women. *AIDS Patient Care STDS*. 2004;18:405–15. doi:10.1089/1087291041518201.
108. Braxton N, Lang D, Sales J, Wingood G, DiClemente R. The role of spirituality in sustaining the psychological well-being of HIV-positive black women. *Women Health*. 2007;46(2):113–29. doi:10.1300/J013v46n02\_08.
109. Dalmdida S, Holstad M, Diiorio C, Laderman G. Spiritual well-being, depressive symptoms, and immune status among women living with HIV/AIDS. *Women Health*. 2009;49:119–43. doi:10.1080/03630240902915036.
110. Gurung R, Taylor S, Kemeny M, Myers H. HIV is not my biggest problem: the impact of HIV and chronic burden on depression in women at risk for AIDS. *J Soc Clin Psychol*. 2004;23(4):490–511. doi:10.1521/jscp.23.4.490.40305.
111. Moneyham L, Murdaugh C, Phillips KD, Jackson K, Tavakoli A, Boyd M, Jackson N, Vyavaharkar M. Patterns of risk for depressive symptoms among HIV+ women in the southeastern United States. *J Assoc Nurses AIDS Care*. 2005;16:25–38. doi:10.1016/j.jana.2005.05.005.
112. Simoni J, Ng M. Trauma, coping, and depression among women with HIV/AIDS in New York City. *AIDS Care*. 2000;12:567–80. doi:10.1080/095401200750003752.
113. Hough ES, Brumitt G, Templin T, Saltz E, Mood D. A model of mother-child coping and adjustment to HIV. *Soc Sci Med*. 2003;56:643–55. doi:10.1016/S0277-9536(02)00061-8.
114. Cooperman N, Simoni J. Suicidal ideation and attempted suicide among women living with HIV/AIDS. *J Behav Med*. 2005;28(2):149–56. doi:10.1007/s10865-005-3664-3.
115. Jones DL, Ishi M, LaPerriere A, et al. Influencing medication adherence among women with AIDS. *AIDS Care*. 2003;15:463. doi:10.1080/0954012031000134700.
116. Sanchez M, Rice E, Stein J, Milburn N, Rotheram-Borus M. Acculturation, coping styles, and health risk behaviors among HIV positive Latinas. *AIDS Behav*. 2010;0214:401–9. doi:10.1007/s10461-009-9618-y.
117. Olley B. Psychological distress in the first year after diagnosis of HIV infection among women in South Africa. *Afr J AIDS Res*. 2006;5(3):207–15. doi:10.2989/16085900609490381.
118. Scarinci E, Griffin M, Grogoriu A, Fitzpatrick J. Spiritual well-being and spiritual practices in HIV-infected women: A preliminary study. *J Assoc Nurses AIDS Care*. 2009;20(1):69–76. doi:10.1016/j.jana.2008.08.003.
119. Martinez B, Israelski D, Walker C, Koopman C. PPosttraumatic stress disorder in women attending human immunodeficiency virus outpatient clinics. *AIDS Patient CARE and STDs*. 2002;16(6):283–91.
120. Mosack KE, Weinhardt LS, Kelly JA, Gore-Felton C, McAuliffe TL, Johnson O, et al. Influence of coping, social support and depression on subjective health status among hiv-positive adults with different sexual identities. *J Behav Med*. 2009;34:133–44.

121. Onwumere J, Holttum S, Hirst F. Determinants of quality of life in Black African Women with HIV living in London. *Psychol Health Med*. 2002;7(1):61–74.
122. Rose RC, House AS, Stepleman LM. Intimate partner violence and its effects on the health of African American HIV-positive women. *Psychol Trauma*. 2010;2(4):311–7.
123. Van Servellen G, Sarna L, Nyamathi A, Padilla G, Brecht M, Jablonski KJ. Emotional distress in women with symptomatic HIV disease. *Issues Ment Health Nurs*. 1998;19:173–89.
124. Siegel K, Schrimshaw EW, Pretter S. Stress-related growth among women living with HIV/AIDS: examination of an explanatory model. *J Behav Med*. 2005;28(5):403–14. doi:[10.1007/s10865-005-9015-6](https://doi.org/10.1007/s10865-005-9015-6).
125. Updegraff JA, Taylor SE, Kemeny ME, Wyatt GE. Positive and negative effects of HIV infection in women with low socioeconomic resources. *Pers Soc Psychol Bull*. 2002;28(3):382–94.
126. Townsend TG, Hawkins SR, Batts AL. Stress and stress reduction among African American Women: A Brief Report. *J Prim Prev*. 2007;28:569–82. doi:[10.1007/s10935-007-0111-y](https://doi.org/10.1007/s10935-007-0111-y).
127. Vyavaharkar M, Moneyham L, Tavakoli A, Phillips KD, Murdaugh C, Jackson K et al. Social support, coping, and medication adherence among HIV-positive women with depression living in rural areas of the Southeastern United States. *AIDS Pat Care and STDs*. 2007;21(9):667–80. doi:[10.1089/apc.2006.0131](https://doi.org/10.1089/apc.2006.0131).
128. Peterson RA, Brown SP. On the use of beta coefficients in meta-analysis. *J Appl Psychol*. 2005;90(1):175–81.
129. Hedges LV, Vevea JL. Fixed and random effects models in metaanalysis. *Psychol Meth*. 1998;3:486–504.
130. Rosenthal R. The “file drawer problem” and tolerance for null results. *Psychol Bull*. 1979;86:638–41.
131. Jones DJ, Beach SR, Forehand R, Foster SE. Self-reported health in HIV-positive African American women: the role of family stress and depressive symptoms. *J Behav Med*. 2003;26:577–99.
132. Semple SJ, Patterson TL, Temoshok LR, et al. Identification of psychobiological stressors among HIV-positive women. *Women Health*. 1993;20:15–36.
133. Burg MM, Seeman TE. Families and health: the negative side of social ties. *Ann Behav Med*. 1994;16:109–15.
134. Evans DL, Leserman J, Perkins DO, et al. Severe life stress as a predictor of early disease progression in HIV infection. *Am J Psychiatry*. 1997;154:630–4.
135. Siegel K, Schrimshaw EW, Pretter S. Stress-related growth among women living with HIV/AIDS: examination of an exploratory model. *J Behav Med*. 2005;28:403–14. doi:[10.1007/s10865-005-9015-6](https://doi.org/10.1007/s10865-005-9015-6).
136. Greenwood D, Szapocznik J, McIntosh S, et al. African American women, their families, and HIV/AIDS. In: Resnick R, Rozensky R, editors. *Health psychology through the lifespan: practice and research opportunities*. Washington, DC: APA; 1996. p. 349–59. doi:[10.1037/10220-021](https://doi.org/10.1037/10220-021).
137. Belle D. Gender differences in the social moderators of stress. In: Barnett RC, Biener L, Baruch GK, editors. *Gender and Stress*. New York: The Free Press; 1987. p. 257–77.
138. Emmons RA. Personal strivings, daily life events, and psychological and physical well-being. *J Pers*. 1991;59(3):453–72.
139. Locke EA, Latham GP. Building a practically useful theory of goal setting and task motivation. A 35-year odyssey. *Am Psychol*. 2002;57(9):705–17.
140. Heaton RK, Marcotte TD, Mindt MR. The impact of HIV-associated neuropsychological impairment on everyday functioning. *J Int Neuropsychol Soc*. 2004;10(3):317–31.
141. Kalichman SC, Difonzo K, Austin J, Luke W, Rompa D. Prospective study of emotional reactions to changes in HIV viral load. *AIDS Patient Care STDs*. 2002;16:113–20.
142. Schwartzberg SS. Struggling for meaning: How HIV-positive gay men make sense of AIDS. *Prof Psychol Res Pract*. 2003;24(4):483–90.
143. Remien RH, Rabkin JG, Williams JB, Katoff L. Coping strategies and health beliefs of AIDS long-term survivors. *Psychol Health*. 1992;6:335–45.
144. Nelson CJ, Rosenfeld B, Breitbart W, Galietta M. Spirituality, religion, and depression in the terminally ill. *Psychosomatics*. 2002;43(3):213–20.
145. Ironson G, Solomon GF, Balbin EG, et al. The ironson-woods spirituality/religiousness index is associated with long survival, health behaviors, less distress, and low cortisol in people with HIV/AIDS. *Ann Behav Med*. 2002;24(1):34–48.
146. Biggar H, Forehand R, Devine D, et al. Women who are HIV infected: the role of religious activity in psychosocial adjustment. *AIDS Care*. 1999;11(2):195–9.
147. Hall BA. Patterns of spirituality in persons with advanced HIV disease. *Res Nurs & Health*. 1998;21(143–53):151.
148. Gutterman L. A day treatment program for persons with AIDS. *Am J Occup Ther*. 1990;44:234–7.
149. Gross JJ. The emerging field of emotion regulation: an integrative review. *Rev Gen Psychol*. 1998;2:271–99. doi:[10.1037/1089-2680.2.3.271](https://doi.org/10.1037/1089-2680.2.3.271).
150. Gross JJ, John OP. Individual differences in two emotion regulation processes: implications for affect, relationships, and well-being. *J Pers Soc Psychol*. 2003;85:348–62. doi:[10.1037/0022-3514.85.2.348](https://doi.org/10.1037/0022-3514.85.2.348).
151. Simons A, Garfield S, Murphy G. The process of change in cognitive therapy and pharmacotherapy: changes in mood and cognition. *Arch Gen Psychiatry*. 1984;41:45–51.
152. Folkman S, Chesney M, McKusick L, et al. Translating coping theory into intervention. In: Eckenrode J, editor. *The Social Context of Stress*. New York: Plenum; 1991. p. 239–60.
153. Antoni MH. Stress management and psychoneuroimmunology in HIV infection. *CNS Spectr*. 2003;8:40–51.
154. Taylor SE, Stanton AL. Coping resources, coping processes, and mental health. *Ann Rev Clin Psychol*. 2007;3:377–401.
155. Nyamathi A, Bennett C, Leake B, Lewis C, Flaskerud J. AIDS-related knowledge, perceptions, and behaviors among impoverished minority women. *Am J Public Health*. 1993;83:65–71. doi:[10.1002/nur.4770160104](https://doi.org/10.1002/nur.4770160104).
156. Kessler R, McLeod J. Sex differences in vulnerability to undesirable life events. *Amer Soc Rev*. 1984;49:620–31.
157. Coyne JC, Downey G. Social factors and psychopathology: stress, social support and coping processes. *Annu Rev Psychol*. 1991;42:401–25.
158. Lechner S, Antoni M, Lydston D, et al. Cognitive-behavioral interventions improve quality of life in women with AIDS. *J Psychosom Res*. 2003;54:253–61.
159. Rothstein HR, Hopewell S. The grey literature. In: Cooper H, Hedges L, Valentine J, editors. *The handbook of research synthesis*. New York: Russell-Sage; 2007.
160. Sandler IN, Miller P, Short J, Wolchik SA. Social support as a protective factor for children in stress. *Children’s social networks and social supports*. In: Belle D, editor. *Wiley series on personality processes*. New York: Wiley; 1989. p. 277–307.
161. Stanton AL, Kirk SB, Cameron CL, Danoff-Burg S. Coping through emotional approach: scale construction and validation. *J Pers Soc Psychol*. 2000;78(6):1150–69.
162. Cohen R. The changing face of hiv-associated cognitive and neuropsychiatric disturbance. 2009;456:133–86. doi:[10.1007/978-1-59745-434-6\\_8](https://doi.org/10.1007/978-1-59745-434-6_8).
163. Cummings JL. The neuropsychiatric inventory: assessing psychopathology in dementia patients. *Neurology*. 1997;48:510–6.
164. Watts-Jones D. Toward a stress scale for African-American Women. *Psychol Women Q*. 1990;14(2):271–5.

165. Cervantes RC, Padilla AM, Salgado de Snyder N: The Hispanic stressinventory: a culturally relevant approach to psychosocial assessment. *Psychol Assess.* 1991;33:438–47.
166. Ironson G, O’Cleirigh C, Fletcher MA, et al. Psychosocial factors predict CD4 and viral load change in men and women in the era of HAART. *Psychosomat Med.* 2005;67:1013–21.