

Relationship Between Spiritual Coping and Survival in Patients with HIV

Gail Ironson, MD, PhD, Heidemarie Kremer, MD, PhD, PhD, and Aurelie Lucette, MS

Department of Psychology, University of Miami, Coral Gables, FL, USA.

BACKGROUND: Studies of spirituality in initially healthy people have shown a survival advantage, yet there are fewer research studies in the medically ill, despite the widespread use of spirituality/religiousness to cope with serious physical illness. In addition, many studies have used limited measures such as religious service attendance.

OBJECTIVE: We aimed to examine if, independent of medication adherence, the use of spirituality/religiousness to cope with HIV predicts survival over 17 years.

DESIGN: This was a longitudinal study, started in 1997. Study materials were administered semi annually.

PARTICIPANTS: A diverse sample of 177 HIV patients initially in the mid-stage of disease (150–500 CD4-cells/mm³; no prior AIDS-defining symptoms) participated in the study.

MAIN MEASURES: Participants were administered a battery of psychosocial questionnaires and a blood draw. They completed interviews and essays to assess current stressors. Spiritual coping (overall/strategies) was rated by qualitative content analysis of interviews regarding stress and coping with HIV, and essays.

KEY RESULTS: Controlling for medical variables (baseline CD4/viral load) and demographics, Cox regression analyses showed that overall positive spiritual coping significantly predicted greater survival over 17 years (mortality HR = 0.56, $p = 0.039$). Findings held even after controlling for health behaviors (medication adherence, substance use) and social support. Particular spiritual coping strategies that predicted longer survival included spiritual practices (HR = 0.26, $p < 0.001$), spiritual reframing (HR = 0.27, $p = 0.006$), overcoming spiritual guilt (HR = 0.24, $p < 0.001$), spiritual gratitude (HR = 0.40, $p = 0.002$), and spiritual empowerment (HR = 0.52, $p = 0.024$), indicating that people using these strategies were 2–4 times more likely to survive.

CONCLUSIONS: To our knowledge this is the first study showing a prospective relationship of spiritual coping in people who are medically ill with survival over such a long period of time, and also specifically identifies several strategies of spirituality that may be beneficial.

KEY WORDS: spiritual coping; survival; HIV; spiritual practices; spiritual reframing; spirituality.

J Gen Intern Med 31(9):1068–76

DOI: 10.1007/s11606-016-3668-4

© Society of General Internal Medicine 2016

INTRODUCTION

Growing data support an association between Spirituality/Religiousness (S/R) and health outcomes. However, there is a relative paucity of studies in the medically ill as opposed to those initially healthy, despite the fact that many people use spirituality to cope with medical illness. Furthermore, there is evidence that use of spirituality to cope improves mental and physical adjustment to illness.¹ In addition, many studies have focused on church attendance, though there is diversity and controversy on how best to measure S/R. We expanded the measurement to S/R coping qualitatively derived from patient interviews, and conducted a sustained effort to examine the role of S/R coping in a population of sick (rather than healthy patients). This study reports a 17-year follow-up on a cohort of medically ill patients with HIV and provides more granular insight into which of aspects of S/R coping are associated with survival. The relevant literature is reviewed below.

Literature on S/R and Survival in Healthy and in the Medically Ill

Although a major meta-analysis of the relationship between spirituality/religiousness and survival found an 18 % mortality reduction (hazard ratio, HR = 0.82) in *initially healthy* people, there was no significant link to mortality among people *who were already ill*. An exception to this was two studies that applied multi-modal S/R measures (e.g., beyond religious service attendance), which did find a significant prediction (HR = 0.50, $p = 0.004$).² There were only a few other studies we were able to find examining the link between S/R and mortality in the medically ill. Among 596 medically ill elderly patients, religious struggle was associated with higher 2-year mortality (HR = 1.06).³ In 166 end-stage renal disease patients, 4-year survival was associated with spirituality (HR = 0.49) and social support (HR = 0.48), but not with religious involvement/coping.⁴ Three studies found that the absence of spirituality or religiosity have been linked to increased mortality in women with breast cancer,⁵ patients who had recently undergone a hematopoietic stem cell transplant,⁶ and those who were recovering from cardiac surgery.⁷ However, as noted in the meta-analysis above, findings are somewhat inconsistent. Studies with nonsignificant findings focused primarily on religiosity variables (church attendance, public religiosity, and religious activities and connections), thus ignoring other

Received September 8, 2015

Revised January 15, 2016

Accepted March 7, 2016

Published online May 5, 2016

facets of spirituality that might have a significant impact on survival, such as spiritual coping.

Literature in HIV

The primary aim of this study was to examine these questions in HIV-seropositive people, since a majority use S/R to cope with their illness,⁸ and 85 % consider spirituality to be important to them.⁹ In addition, individuals living with HIV have exceptionally stressful lives to cope with, and, as reviewed in Ironson and Kramer,¹⁰ the use of spirituality to cope might reduce the felt harm of the stressor (for example, believing that there is a divine purpose in what happened), as well as enhance the ability of a person to handle the situation (for example, by believing that God is with you, or maintaining calm even in the face of stress through spiritual practices). In the two prior studies on spirituality and HIV survival, spiritual coping measurements were limited. One study ($N=907$) found that engagement in spiritual activities predicted 1-year survival ($HR=0.4$), independent of baseline disease stage, alcohol/nicotine use, and income; but only among those not on medication. Another study ($N=147$) found that individuals with prior Spiritual Transformation were 5.35 times more likely to survive 3 to 5 years past assessment, controlling for baseline disease stage, substance use, sociodemographics, and medication adherence.¹¹

Our previous work found that a general measure of spiritual coping did predict faster disease progression in HIV (as measured by changes in CD4 and viral load [VL] over 4 years).¹² In fact, those with negative spiritual coping lost their CD4 cells 2.25 times faster than those with positive spiritual coping. This finding is consistent with another study ($N=429$), which found that spiritual struggles predicted CD4 change over 12–18 months.¹³ This paper extends this examination of overall spiritual coping predicting to mortality (and over 17 years), as well as determining which of 17 aspects of spiritual coping identified in our qualitative analysis of essays and interviews written¹⁴ as part of this longitudinal study of stress and coping with HIV predict survival.¹⁵

METHODS

The present article reports the impact of spiritual coping on long-term survival based on a longitudinal study of stress and coping with HIV (approved by an Institutional Review Board), including psychosocial and S/R factors related to physical health and HIV disease progression.¹⁵

Sample and Overall Design

Shortly after the advent of successful antiretroviral medication treatment, we recruited (from 1997 to 2000) 177 HIV-seropositive people at mid-stage disease (150–500 CD4-cells/mm³; no prior AIDS-defining symptoms) via flyers, newspaper ads, community events (such as gay pride, AIDS

walk), service organizations, physician offices, and word of mouth. Exclusion criteria included dementia (Mini Mental State Test), active substance use dependence, and/or psychosis (Structured Clinical Interview for DSM-III-R Disorders [SCID]).¹⁶ At entry to the study (baseline) and every 6 months (through 2008), participants provided informed consent, blood samples, completed interviews, essays, and questionnaires, receiving \$50 per assessment.

Measures

Spiritual coping (SC) was rated on a scale from very negative (−4: severe spiritual struggle, conflict, anger) to very positive (+4: spiritual growth/transformation as a central component of life), based on directed qualitative content-analysis of participants' interviews/essays on coping with HIV and stressful life events^{12,14,15}. Further description of this rating scale can be found in Kremer and Ironson,¹⁴ as well as the results section of this paper. In addition, 17 strategies of spiritual coping emerged and were coded for presence/absence (see Table 1). In addition, in order to compare overall spiritual coping to these other dichotomous strategies, it was also dichotomized (+2 to +4 vs. −4 to +1) at the median and labeled positive spiritual coping.

Inter-rater reliability between two raters was established by independent ratings of 20 interviews by two raters, yielding chance-corrected Kendall's tau B = 0.81, $p < 0.001$ for spiritual coping and Kappa coefficients ranging from 0.60 to 0.95 for the 17 strategies. It is important to note that each of the spiritual coping strategies was only coded if it was based on S/R and not secular coping. For example, positive spiritual reframing was only coded as present if it involved S/R in order to minimize any confounding with secular cognitive reframing. After reliability of the rating/coding agenda was established, all 177 transcripts were rated and coded by at least two independent researchers and consensually agreed upon.

It should be noted that, although excellent validated questionnaires of spiritual/religious coping developed by Pargament¹⁷ are available, the present study utilized qualitative ratings of narratives, which has the advantage of (presumably) avoiding the priming of people to think about spiritual/religious coping by asking them Likert-type questions on these variables. Another advantage of qualitative analysis is that it permits uncovering new strategies that are individually relevant but not part of predefined questionnaires.

Primary control measures comprised sociodemographics (self-reported age, sex, education, ethnicity, sexual orientation) and sero-markers of initial disease/treatment status, namely absolute CD4-cells/mm³ (applying Beckman/Coulter® whole-blood, four-color direct immunofluorescence flow cytometry) and VL detection (using Roche Amplicor® RT/PCR assay sensitive to 400–750,000 copies/ml).

Secondary control measures encompassed self-reported adherence, substance use, and social support. The interviewer-administered AIDS Clinical Trial Group adherence measure¹⁸

Table 1. Definitions and Frequencies of Spiritual Coping Strategies

Spiritual Coping Strategy	Definition	Frequency
Connectedness	Feeling connected to a higher presence (e.g., God, transcendent state)	92 %
Spiritual practices	Activities associated with cultivating spirituality (e.g., religious services, prayer, meditation)	73 %
Spiritual comfort	The extent to which spirituality provides comfort/peace	51 %
Spiritual empowerment	Perception that spirituality enables one to cope with stressors	46 %
Spiritual growth or transformation	Long-lasting positive changes in spirituality, accompanied by attitudes, beliefs, behavior and/or self-views (Spiritual transformation = drastic changes in all four areas)	45 %
Spiritual gratitude	Thankfulness/appreciation linked to a higher presence/spirituality	40 %
Spiritual meaning	Discovering greater meaning or purpose in life through spirituality	28 %
Spiritual community	Experiencing spiritual connection support through community (e.g., church membership without connection experience is not sufficient)	27 %
Surrender	Giving up one's own will and subject to the ideas/teachings of a higher presence/God as the central driving force that influences most aspects of the person's life	25 %
Spiritual conflict	Disagreeing with, or breaking rules/doctrines dictated by spiritual (mostly religious) belief systems despite spiritual connectedness	22 %
Positive spiritual reframing	Using spirituality to interpret the reason for a situation or to facilitate a more positive outlook on one's ability to handle stress	18 %
Spiritual struggle	Encompasses questioning about a higher presence/God, disengagement from spiritual practices or beliefs	15 %
Spiritual guilt	Negative self-judgment resulting from perception that a higher presence/God is displeased with one's behavior	12 %
Respect for own body	Engenders a greater respect for one's own body and greater care-taking behavior due to spirituality	11 %
Spiritual anger	Frustration, outrage or hostility expressed towards a higher presence/God, spiritual communities or religious institutions	11 %
No spiritual coping	A discussion of spirituality is totally absent	7 %
Spiritual disengagement	Involves no longer searching for a connectedness to a higher presence or God (goes beyond disengaging in spiritual practices)	7 %

yielded the percentage of missed antiretroviral medications over three pre-assessment days (averaged over the first 5 years). The SCID¹⁶ identified substance use disorder onset/relapse within 3 years since study entry. Higher scores on the seven-item ENRICH Social Support Instrument¹⁹ (averaged over the first 5 years) indicated greater social support.

Survival data was obtained by consulting data linked to the Social Security Administration (SSA).²⁰ The Death Master File (DMF) is a publicly available data source that reflects all deaths reported to the SSA. Updated weekly, it covers deaths that occurred from 1935 to present. To identify any deaths that might not have been reported to the SSA, obituaries were also searched in a web browser using participants' birth dates, first and last names. The current analyses include deaths that occurred before 30 April 2014.

Statistical Analysis

Statistical analysis with SPSS® version 22 excluded missing data (one participant's interviews/essays lacked reliable information to rate spiritual coping, adherence measures were not applicable in 22 participants who were not prescribed antiretroviral medications, and six missed SCIDs).

Descriptive statistics depicted spiritual coping and control measures. We used Cox proportional hazards regression to examine whether spiritual coping predicted survival. To calculate the HR for spiritual coping (nine-point scale), presence/absence of positive spiritual coping and each of the 17 strategies, we controlled in block 1 for baseline CD4-cells/mm³ and baseline presence/absence of undetectable VL. In block 2, we controlled for sociodemographic characteristics, including

age, sex (male/female), ethnicity (presence/absence of African American and non-Latino White ethnicity), education (seven degrees ranging from below high school to post-graduate), and sexual orientation (five-categorical range between homosexual and heterosexual). Running a separate analysis per variable, spiritual coping was entered last (block 3), to examine the additional effect of spiritual coping (and each strategy above and beyond the control variables). Additional analyses controlled for antiretroviral medication adherence, absence of substance use disorder and social support (all entered as additional variables in block 2). Kaplan-Meier plots were generated for descriptive purposes to depict survival curves across different profiles of spiritual coping.

RESULTS

The sociodemographically diverse sample (age $M=37.49 \pm 8.88y$, 70 % male; 36 % African American/31 % non-Latino White; 41 % homosexual/45 % heterosexual; 18 % < below high school/14 % high school/41 % trade school or some college/19 % college graduate/9 % graduate degree) had good treatment access. Most (76 %, 134/177) were prescribed antiretroviral medications at baseline, a proportion that increased to 90 % within 2 years from study entry. Initial treatment success was low. Only 29 % achieved an undetectable VL within the first 2 years of the study (37 % of those taking antiretroviral therapy [ART] at baseline), which may reflect our selection criteria of 150–500 CD4-cells/mm³ ($M=308.68 \pm 114.52$), and the observation that the powerful antiretroviral medications (e.g., protease inhibitors) had only

just become available shortly before the study started in 1997. As antiretroviral medication therapy improved, by year 7 of the study, 55 % had achieved an undetectable VL. Nevertheless, only 26 % of participants reported <95 % adherence. A prior history of substance use disorder was common (31 %, 54/173). Within 3 years since study entry, 29 % experienced substance use disorder relapse/onset. Survival up to 17 years post-baseline was 66 %. Overall spiritual coping varied ($M=1.72 \pm 1.71$); 65 % reported positive spiritual coping. Table 1 presents definitions and frequencies of spiritual coping strategies.

Whereas lower CD4-cells/mm³ were related to mortality (HR=0.997, 95 % CI=0.994–0.999, $p<0.001$), undetectable VL was only marginally associated (HR=0.57, 95 % CI=0.31–1.08, $p<0.09$). Older age was the only sociodemographic characteristic linked with mortality (HR=1.05, 95 % CI=1.02–1.08, $p<0.001$).

Beneficial spiritual coping (9-point scale) predicted mortality above and beyond initial disease/treatment stage and sociodemographic characteristics (HR=0.86, 95 % CI=0.75–0.97, $p=0.017$). This association held even after adjusting for substance use disorder relapse/onset (HR=0.83, 95 % CI=0.73–0.96, $p=0.010$), adherence (HR=0.87, 95 % CI=0.752–0.998, $p=0.046$) or social support (HR=0.85, 95 % CI=0.75–0.97, $p=0.016$). As Fig. 1 depicts, the survival trajectory was worst for negative spiritual coping (SC=-4 to -2), closely followed by minimal use of spiritual coping (SC=-1 to +1); and best for transformational positive spiritual coping (SC=+3 to +4), which was distinct from

nontransformational positive spiritual coping (SC=+2). Nontransformational positive SC occurs (+2) when a participant uses SC in a way that is helpful (for example, perceives benefit from spiritual practices and connectedness) without growth, or a life transforming quality that is present in +3 or +4. Transformational SC (+3 or +4) includes the component of meaning or growth/transformation. Spiritual transformation occurs when there is a dramatic change in spiritual beliefs along with major changes in behavior, self-view and attitudes. The highest rating (+4) occurs when spiritual beliefs are the driving force in one's life.

Table 2 reports the proportional hazard ratios for each coping strategy, as well as the presence/absence of positive spiritual coping (dichotomized for ease of comparison to other coping strategies). In particular, positive spiritual coping (SC=+2 to +4) was significantly associated with mortality independent of CD4/VL and sociodemographics. In addition, five of the 17 coping strategies (spiritual practices, empowerment, gratitude, reframing, and guilt) predicted reduced mortality, adjusting for the effects of initial disease/treatment stage and sociodemographics. Hazard ratios for these strategies varied between 0.24 and 0.56, demonstrating a substantial survival advantage for those utilizing those strategies. Additional analyses controlling for the individual impact of substance use, social support, and adherence (all $p<0.05$) maintained significance with the exception of empowerment, which was significant only on a one-tailed test after controlling for adherence (see Table 3). The predictors of survival with the strongest statistical significance were

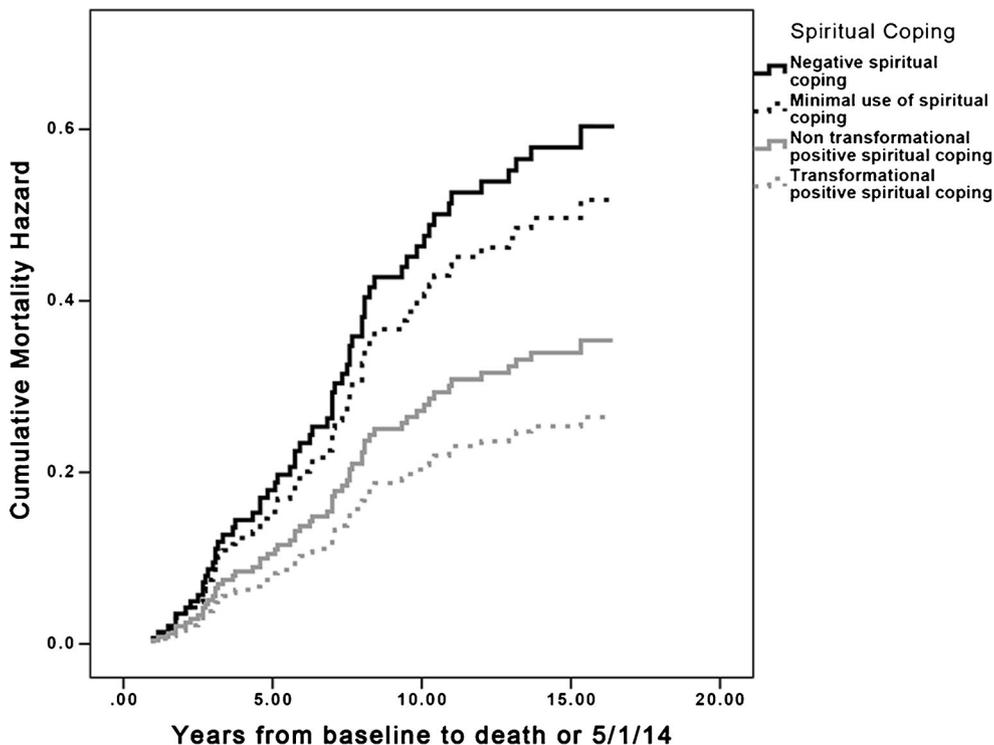


Figure 1. Time to mortality by spiritual coping (SC) categories controlling for baseline disease status (CD4 and VL), and demographics (age, gender, education, and ethnicity).

Table 2 Cox Regression Analysis to Predict the Impact of Spiritual Coping Variables on Survival Among People Living with HIV

	Hazard Ratio	p-value	95 % CI
Positive spiritual coping ¹	0.56*	0.039	0.32–0.97
Connectedness	0.75	0.598	0.25–2.21
Spiritual practices	0.26***	<0.001	0.14–0.50
Spiritual comfort	0.77	0.329	0.45–1.31
Spiritual empowerment	0.52*	0.024	0.29–0.92
Spiritual growth	0.66	0.133	0.39–1.13
Spiritual gratitude	0.40**	0.002	0.22–0.72
Spiritual meaning	0.55†	0.056	0.29–1.02
Spiritual community	0.62	0.156	0.39–1.20
Surrender	0.60	0.125	0.31–1.15
Spiritual conflict	0.72	0.318	0.38–1.37
Positive spiritual reframing	0.27**	0.006	0.11–0.69
Spiritual struggle	0.60	0.242	0.26–1.41
Overcoming spiritual guilt	0.24**	0.008	0.09–0.69
Respect for own body	0.78	0.592	0.31–1.94
Spiritual anger	0.90	0.798	0.40–2.03
No spiritual coping	1.67	0.346	0.58–4.85
Spiritual disengagement	1.04	0.945	0.35–3.05

¹ Positive spiritual coping is a dichotomous variable that was created based on the nine-item scale of spiritual coping by contrasting participants who exhibited positive coping (+2 to +4) to all other participants (-4 to +1)
N = 176; † p < 0.10; * p < 0.05; ** p < 0.01; *** p < 0.001; Models controlled for CD4 and VL at baseline, age, gender, education, ethnicity, sexual orientation

spiritual practices and spiritual reframing, which are depicted in Figs. 2 and 3.

Because of the counter-intuitive result that spiritual guilt conferred a survival advantage, we re-examined our coding of spiritual guilt in more depth. Retrospectively, we distinguished participants who had overcome spiritual guilt (57 %, 12/21) from those who did not. All the transcripts and essays and interviews of participants who had previously reported spiritual guilt were re-read and coded by one of the coauthors to ensure consistency. Participants who had overcome feelings of spiritual guilt were identified as those who expressed that they no longer felt guilt (e.g., more self-acceptance of their behavior and no longer feeling like God was displeased). Post-hoc cox regression analysis revealed that the survival advantage applied exclusively to overcoming spiritual guilt, when compared to everyone else (HR = 0.19 [95 % CI = 0.04–0.79], p = 0.023). A parallel analysis applied to those who did not overcome spiritual guilt was not significant.

DISCUSSION

Despite widespread use of spiritual coping to deal with serious illness, there is scarce evidence examining its relationship with survival beyond the effects of illness severity and treatment success. Our prospective 17-year observation of HIV patients beginning at the mid-stage of disease showed that the effect of spiritual coping on long-term survival went beyond the contributions of antiretroviral medications, adherence, abstinence from substance abuse, and social support. However, this link was masked in many prior studies that reduced spirituality to religious service attendance,² not capturing the diversity of the strategies of spiritual coping. In addition to overall spiritual coping, in the present study, specific strategies conferring a significant survival advantage were spiritual practices, positive spiritual reframing, empowerment, gratitude, and overcoming guilt. In fact, the hazard ratios indicate that people with these strategies had a twofold to fourfold survival advantage.

A few other studies have found that *spiritual practices* outside of organized religious activities confer health benefits. For instance, prayer and yoga were associated with a cardiovascular health advantage in initially healthy men.²¹ In HIV-seropositive people, frequency of relaxation practices predicted slower progression to AIDS,²² and regular self-defined spiritual activities (prayer, meditation, affirmations, psychic healing, visualizations) predicted reduced 1-year mortality; however, only in those not on medication.²³ The present study evidenced a survival advantage attributed to spiritual practices even in those receiving medication and over a substantial period of time.

Positive spiritual reframing (e.g., viewing HIV as divine plan to make a positive life change) also conferred a survival advantage. To the extent that positive spiritual reframing may be viewed as related to cognitive restructuring, our result is consistent with a prior study showing that this skill taught as a part of a stress management intervention in HIV predicted better viral load control.²⁴ Also potentially relevant to our understanding of this novel result, finding meaning in the loss of a partner predicted lower rates of AIDS-related mortality.²⁵ Finding meaning was also linked to lower 5-year mortality in HIV-seropositive women in conjunction with positive affect

Table 3. Cox Regression Analysis to Predict Survival from Spiritual Coping Variables Among HIV-Infected Patients After Controlling for CD4, VL, and Demographics, Substance Use, Medication Adherence, and Social Support

	Base model Hazard Ratio	Substance use control Hazard Ratio	Adherence control Hazard Ratio	Social support Hazard Ratio
Sample size	176	170	155	176
Spiritual reframing	0.27**	0.30*	0.33*	0.26**
Spiritual guilt	0.24**	0.20**	0.31*	0.24**
Spiritual practices	0.26***	0.23***	0.29**	0.26***
Spiritual empowerment	0.52*	0.52*	0.60†	0.51*
Spiritual gratitude	0.40**	0.41**	0.42**	0.40**
Spiritual meaning	0.55†	0.52†	0.58	0.55†

The base model controlled for CD4 and VL at baseline, gender, age, education, ethnicity, sexual orientation. Additional controls were added individually above the base model because the sample size changes as indicated in the first line of the table
† p < 0.10; * p < 0.05; ** p < 0.01; *** p < 0.001



Figure 2. Time to mortality depending on the presence/absence of spiritual practices after controlling for baseline disease status (CD4 and VL), and demographics (age, gender, education, and ethnicity).

and positive HIV expectancy.²⁶ Park suggests that meaning in life may serve as a primary motivator for maintaining physical

and mental well being, and has demonstrated its protective nature for mental and physical health in Congestive Heart

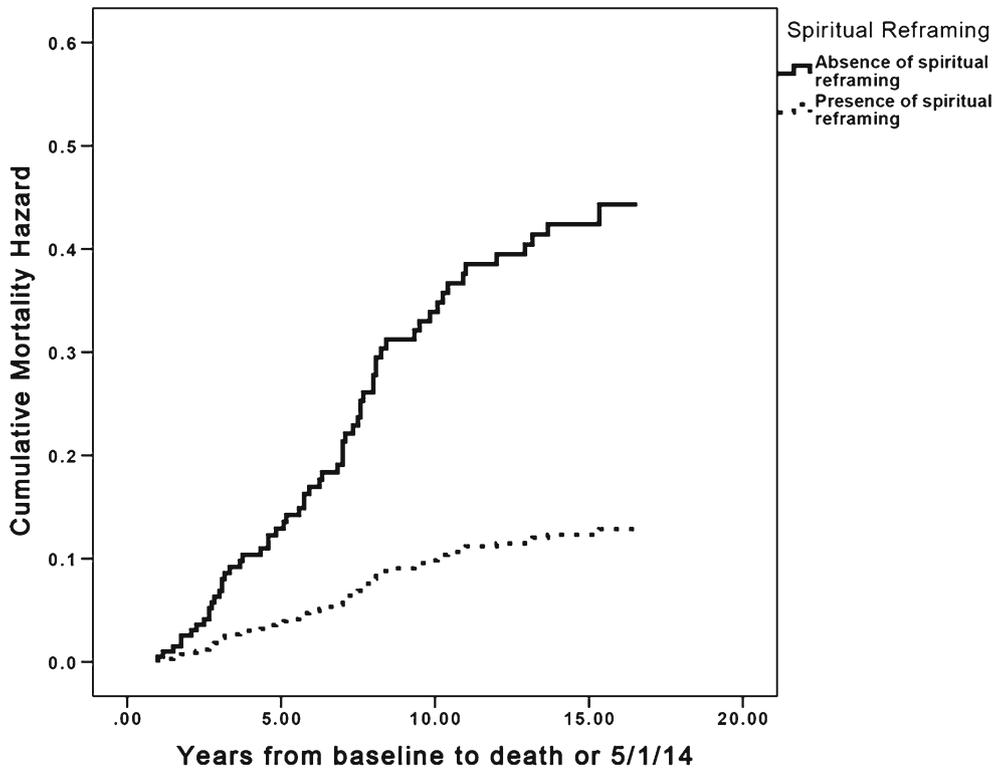


Figure 3. Time to mortality depending on the presence/absence of positive spiritual reframing, after controlling for baseline disease status (CD4 and VL), and demographics (age, gender, education, and ethnicity).

Failure.²⁷ However, it should be noted that in the present study, finding meaning itself was only predictive of survival on a one-tailed test.

While positive spiritual reframing focuses on the primary appraisal of stressor (viewing the stressor as less detrimental as a result of spirituality), *spiritual empowerment* focuses on the secondary appraisal of one's ability to cope with the stressor.^{10,14} According to the present study, the survival advantage of spiritual empowerment may be partially attributed to better medication adherence (indicated by the loss of significance after controlling for adherence).

We could not find any other studies on *gratitude* and mortality. However, gratitude towards God and dispositional gratitude have been previously associated with *self-reported physical health* in large samples of adults.^{28,29} Potential mediators suggested by prior studies include better mental health, health behaviors, and willingness to seek help for health concerns.²⁹ Interestingly, our study found that spiritual gratitude was related to longer survival independent of salient health behaviors and social support.

To our knowledge, this is also the first study demonstrating the link between *overcoming spiritual guilt* and survival. Individuals who overcame spiritual guilt reported changes in behaviors that they had previously identified as contrary to their spiritual/religious beliefs (e.g., promiscuous sex, drugs), reconnecting with religion (e.g., returning to church) and changes in beliefs (e.g., from a punishing to a forgiving God). Interestingly, guilt construed as an enduring personality trait has been recently associated with increased all-cause mortality over 41 years (however, only in a subgroup of 173 women age 18–25 years).³⁰ Yet, our results highlight the importance of making the distinction between overcoming guilt and lasting guilt: survival was solely linked to overcoming spiritual guilt. Thus a dynamic process of adjustment and life changes may be important in examining spiritual coping.

Potential Mechanisms

People with HIV have indicated that spirituality gives them hope, provides meaning to life, empowers them, fosters a feeling of connectedness both to their community and to a higher presence, creates a sense of peace, and ameliorates their suffering.^{10,27,31} Spirituality could then facilitate coping by decreasing the perceived harm of the stressor and strengthening one's felt ability to handle it.¹⁰ Beyond this, how would S/R translate into better physical health? Health behaviors (adherence to medications, less risky sex, and substance use)^{32–34}; and biological processes (stress hormones, psychoneuroimmunological pathways including natural killer cells) are the two major pathways that have been posited to link psychosocial variables (including S/R) to illness in general and HIV disease progression.¹⁰ Aldwin et al.³⁵ suggested that spirituality may be more likely than religiousness to impact health through increasing positive psychological states and decreasing depression. Depression, in turn, has been shown to negatively

impact immune factors in HIV.³⁶ Mounting evidence suggests that higher stress hormones, including norepinephrine and cortisol, are correlated with less spirituality and faster disease progression.³⁷

Limitations and Future Studies

First, although we carefully confined our coding to the involvement of S/R when coding for the spiritual coping strategies, since we did not code for secular coping strategies, this study does not allow us to examine how much spiritual coping adds above and beyond secular coping strategies. Second, these findings need to be replicated, both in HIV and other medical populations. Third, although effective antiretroviral medication combinations were available during the course of the study, antiretroviral medications have improved, so that it is not possible to know whether these findings would still hold today. Currently, a higher percentage of those adhering to medical care achieve an undetectable VL level due to these improved antiretroviral medications. However, a large proportion of people living with HIV do not follow up with medical care, and we did control for antiretroviral medications available over the course of the study, so our findings may still be applicable. Fourth, while this study provides a window into which coping strategies might be most helpful, there are other aspects of S/R that could be studied.³⁸ Fifth, the re-coding of spiritual guilt was conducted by one person who was aware of the fact that guilt was associated with survival before the reanalysis was done. Finally, it is notable that intervention studies incorporating spirituality into them have improved outcomes. A meta-analysis of 46 studies showed that patients in S/R psychotherapies showed greater improvement than those in alternate secular psychotherapies both on psychological ($d = 0.26$) and on spiritual ($d = 0.41$) outcomes.³⁹ Another review showed that S/R interventions evidenced an 18 % reduction in mortality compared with other health interventions.⁴⁰ This compares favorably to fruit and vegetable consumption and statin therapy. Whether incorporating our findings into an intervention related to clinical practice would result in improved medical outcomes remains to be determined.

Clinical Implications

Given the potential usefulness of spirituality to cope with medical illness, how would one bring up this controversial issue sensitively in practice? While studies have suggested that many patients are comfortable with their physicians bringing up spirituality,⁴¹ others may not be, and some believe doctors should not be discussing this topic with patients. There are clearly ethical issues involved (for example, people may be concerned about religious discrimination, or they might not want to reveal deeply held personal religious/spiritual beliefs in a medical setting). Ironson et al.⁴² suggested that asking a patient how they are coping with their diagnosis and illness might be a way to start. A follow-up question might be

whether they are using spirituality or religion to cope, which will allow for a discussion to develop (or may indicate a patient is not interested). Based on the patient's response, the doctor can normalize the use of spirituality and note there is evidence it may be helpful, or can refer them out (for example, if they believe this illness is a punishment from God, or are experiencing spiritual struggles). Whether incorporating this into clinical practice may have an impact on mortality remains, however, to be studied.

An important caveat is that we do not yet know whether use of spirituality to cope has added value over secular coping. There seems to be little controversy in recommending positive coping strategies like positive reframing or overcoming guilt so long as the frame is left to the patient's own worldview, spiritual or otherwise. But if there is, in fact, some added value to distinctly *religious/spiritual* coping, the field would still need to address the question of whether recommending such can be done in a way that is ethically acceptable or effective (e.g., getting religion for the sake of health outcomes may not be the same thing as practicing religion for its own sake).

CONCLUSIONS

A finding that the use of spirituality to cope with medical illness predicts lower mortality, together with the vast literature showing that S/R has been related to lower rates of depression, faster recovery from depression, and lower anxiety suggests the potential helpfulness of this coping strategy to medical patients.¹ In addition to finding that the use of overall spiritual coping predicted greater survival, particular spiritual coping strategies that predicted longer survival were identified, and included spiritual practices, spiritual reframing, overcoming spiritual guilt, spiritual gratitude, and spiritual empowerment. People with HIV using these strategies were 2–4 times more likely to survive. Combining this with existing literature suggests that using spirituality to cope with illness may be beneficial for both psychological and physical health for many, but not all, people.

Acknowledgements: *The authors would like to thank the research participants for contributing invaluable information. We would also like to thank Annie George for conducting most of the interviews, Dr. Rick Stuetzle for helping with data management issues, and Tony Guerra and Marietta Suarez for help with the coding agenda.*

Corresponding Author: Gail Ironson, MD, PhD; Department of Psychology University of Miami, 5665 Ponce de Leon Blvd, Coral Gables, FL 33124-0751, USA (e-mail: gironson@aol.com).

Compliance with Ethical Standards:

Conflict of Interest: *The authors declare that they do not have a conflict of interest.*

Funders: *The parent study was funded by NIH: R01MH53791 and MH066697, (G. Ironson, PI) and the spiritual coping substudy was funded by the Templeton foundation (G. Ironson, PI; H. Kremer, Co-PI).*

REFERENCES

1. **Koenig HG.** Religion, spirituality, and health: the research and clinical implications. *Int Sch Res Not.* 2012;2012:1–33.
2. **Chida Y, Steptoe A, Powell LH.** Religiosity/spirituality and mortality. A systematic quantitative review. *Psychother Psychosom.* 2009;78:81–90.
3. **Pargament KI, Koenig HG, Tarakeshwar N, Hahn J.** Religious struggle as a predictor of mortality among medically ill elderly patients: a 2-year longitudinal study. *Arch Intern Med.* 2001;161:1881–5.
4. **Spinale J, Cohen SD, Khetpal P, Peterson RA, Clougherty B, Puchalski CM, et al.** Spirituality, social support, and survival in hemodialysis patients. *Clin J Am Soc Nephrol.* 2008;3:1620–7.
5. **Van Ness PH, Kasi SV, Jones BA.** Religion, race, and breast cancer survival. *Int J Psychiatry Med.* 2003;33:357–75.
6. **Pereira DB, Christian LM, Patidar S, Bishop MM, Dodd SM, Athanason R, et al.** Spiritual absence and 1-year mortality after hematopoietic stem cell transplant. *Biol Blood Marrow Transplant.* 2010;16:1171–9.
7. **Oxman TE, Freeman DH Jr, Manheimer ED.** Lack of social participation or religious strength and comfort as risk factors for death after cardiac surgery in the elderly. *Psychosom Med.* 1995;57:5–15.
8. **Cotton S, Tsevat J, Szafarski M, Kudel I, Sherman SN, Feinberg J, et al.** Changes in religiousness and spirituality attributed to HIV/AIDS: are there sex and race differences? *J Gen Intern Med.* 2006;21:S14–20.
9. **Lorenz KA, Hays RD, Shapiro MF, Cleary PD, Asch SM, Wenger NS.** Religiousness and spirituality among HIV-infected Americans. *J Palliat Med.* 2005;8:774–781.
10. **Ironson G, Kremer H.** Coping, spirituality, and health in HIV. In: Folkman S, ed. *The Oxford Handbook of Stress, Health, and Coping.* New York: Oxford University Press; 2011:289–18.
11. **Ironson G, Kremer H.** Spiritual transformation, psychological well-being, health, and survival in people with HIV. *Int J Psychiatry Med.* 2009;39:263–81.
12. **Kremer H, Ironson G, Kaplan L, Stuetzle R, Baker N, Fletcher MA.** Spiritual coping predicts CD4-cell preservation and undetectable viral load over four years. *AIDS Care.* 2015;27:71–9.
13. **Trevino KM, Pargament KI, Cotton S, Leonard AC, Hahn J, Caprini-Faigin CA, et al.** Religious coping and physiological, psychological, social, and spiritual outcomes in patients with HIV/AIDS: cross-sectional and longitudinal findings. *AIDS Behav.* 2010;14:379–89.
14. **Kremer H, Ironson G.** Longitudinal spiritual coping with trauma in people with HIV: implications for health care. *AIDS Patient Care STDs.* 2014;28:144–54.
15. **Ironson G, O'Cleirigh C, Fletcher MA, Laurenceau JP, Balbin E, Klimas N, et al.** Psychosocial factors predict CD4 and viral load change in men and women with human immunodeficiency virus in the era of highly active antiretroviral treatment. *Psychosom Med.* 2005;67:1013–21.
16. **Spitzer RL, Williams JB, Gibbon M, First MB.** The structured clinical interview for DSM-III-R (SCID). I: history, rationale, and description. *Arch Gen Psychiatr.* 1992;49:624–9.
17. **Pargament K, Koenig HG, Perez LM.** The many methods of religious coping: development and initial validation of the RCOPE. *J Clin Psychol.* 2000;56:519–543.
18. **Chesney MA, Ickovics JR, Chambers DB, Gifford AL, Neidig J, Zwickl B, et al.** Self-reported adherence to antiretroviral medications among participants in HIV clinical trials: the AACTG adherence instruments. Patient Care Committee & Adherence Working Group of the Outcomes Committee of the Adult AIDS Clinical Trials Group (AACTG). *AIDS Care.* 2000;12:255–66.
19. **Mitchell PH, Powell L, Blumenthal J, Nortén J, Ironson G, Pitula CR, et al.** A short social support measure for patients recovering from myocardial infarction: the ENRICH Social Support Inventory. *J Cardpulm Rehabil.* 2003;23:398–03.
20. U.S., Social Security Death Index, 1935-Current [Internet]. Provo, UT, USA: Ancestry.com Operations Inc, 2011. Available from www.ancestry.com. Accessed 02/05/2016
21. **Gupta R, Prakash H, Gupta VP, Gupta KD.** Prevalence and determinants of coronary heart disease in a rural population of India. *J Clin Epidemiol.* 1997;50:203–9.
22. **Ironson G, Friedman A, Klimas N, Antoni M, Fletcher MA, LaPerriere A, et al.** Distress, denial, and low adherence to behavioral interventions predic. *Int J Behav Med.* 1994;1:90–05.
23. **Fitzpatrick AL, Standish LJ, Berger J, Kim JG, Calabrese C, Polissar N.** Survival in HIV-1-positive adults practicing psychological or spiritual activities for one year. *Altern Ther Health Med.* 2007;13:18–20.

24. **Antoni M, Carrico A, Duran R, Sptizer S, Penedo F, Ironson G, et al.** Randomized clinical trial of cognitive behavioral stress management on human immunodeficiency virus viral load in gay men treated with highly active antiretroviral therapy. *Psychosom Med.* 2006;68:143–51.
25. **Bower JE, Kemeny ME, Taylor SE, Fahey JL.** Cognitive processing, discovery of meaning, CD4 decline, and AIDS-related mortality among bereaved HIV-seropositive men. *J Consult Clin Psychol.* 1998;66:979–86.
26. **Ickovics JR, Milan S, Boland R, Schoenbaum E, Schuman P, Vlahov D.** Psychological resources protect health: 5-year survival and immune function among HIV-infected women from four US cities. *AIDS.* 2006;20:1851–60.
27. **Park CL.** Religiousness/spirituality and health: a meaning systems perspective. *J Behav Med.* 2007;30:319–28.
28. **Krause N.** Gratitude toward God, stress, and health in late life. *Res Aging.* 2006;28(2):163–83.
29. **Hill P, Allemand M, Roberts BW.** Examining the pathways between gratitude and self-rated physical health across adulthood. *Personal Individ Differ.* 2013;54(1):92–6.
30. **Lundin A, Stoetzer U, Modig K, Carlsson AC, Wändell P, Theobald H.** Personality measured as Murray's psychological needs and all-cause mortality: 41 years of follow-up of a population-based sample. *Personal Individ Differ.* 2014;68:32–6.
31. **McCormick DP, Holder B, Wetsel MA, Cawthon TW.** Spirituality and HIV disease: an integrated perspective. *J Assoc Nurses AIDS Care.* 2001;12:58–65.
32. **Oman D, Thoresen TE.** Do religion and spirituality influence health? In: Paloutzian RF, Park CL, eds. *Handbook of the Psychology of Religion and Spirituality.* New York: Guilford; 2005:435–59.
33. **Park J, Nachman S.** The link between religion and HAART adherence in pediatric HIV patients. *AIDS Care.* 2010;22(5):556–61.
34. **Montaner JS, Lima VD, Harrigan PR, Lourenco L, Yip B, Nosyk B, et al.** Expansion of HAART coverage is associated with sustained decreases in HIV/AIDS morbidity, mortality and HIV transmission: the "HIV Treatment as Prevention" experience in a Canadian setting. *PLoS One.* 2014;9. doi: 10.1371/journal.pone.0087872.
35. **Aldwin CM, Park CL, Jeong Y-J, Nath R.** Differing pathways between religiousness, spirituality, and health: a self-regulation perspective. *Psychol Relig Spiritual.* 2013;6(1):9–21.
36. **Leserman J.** Role of depression, stress, and trauma in HIV disease progression. *Psychosom Med.* 2008;70:539–45.
37. **Ironson G, O'Cleirigh C, Kumar M, Kaplan L, Balbin E, Kelsch CB, et al.** Psychosocial and neurohormonal predictors of HIV disease progression (CD4 Cells and Viral Load): A 4 years prospective study. *AIDS Behav.* 2015;18:1388–97.
38. **Hill PC, Hood RW.** *Measures of Religiosity.* Birmingham: Religious Education Press; 1999.
39. **Worthington EL, Hook JN, Davis DE, McDaniel MA.** Religion and spirituality. *J Clin Psychol.* 2011;67:204–14.
40. **Lucchetti G, Lucchetti AL, Koenig HG.** Impact of spirituality/religiosity on mortality: comparison with other health interventions. *Explore.* 2011;7:234–8.
41. **Kristeller JL, Rhodes M, Cripe LD, Sheets V.** Oncologist Assisted Spiritual Intervention Study (OASIS): patient acceptability and initial evidence of effects. *Int J Psychiatry Med.* 2005;35:329–47.
42. **Ironson G, Stuetzle R, Fletcher MA.** An increase in religiousness/spirituality occurs after HIV diagnosis and predicts slower disease progression over 4 years in people with HIV. *J Gen Intern Med.* 2006;21:62–8.