

Spiritual well-being may buffer psychological distress in patients with implantable cardioverter defibrillators (ICD)

Journal:	<i>Journal of Evidence-Based Complementary & Alternative Medicine</i>
Manuscript ID:	JEBCAM-2012-03-0013
Manuscript Type:	Original Manuscript
Date Submitted by the Author:	09-Mar-2012
Complete List of Authors:	Salmoirago-Blotcher, Elena; University of Massachusetts Medical School, Medicine Crawford, Sybil; University of Massachusetts, Medicine Tran, Chau; University of Massachusetts, Goldberg, Robert; University of Massachusetts, Rosenthal, Lawrence; University of Massachusetts, Medicine Ockene, Ira; University of Massachusetts, Medicine
Keywords:	spirituality, cardioverter defibrillators, prevention
Abstract:	<p>Background Psychological distress is common in patients with implantable cardioverter defibrillators (ICDs) and has been associated with a worse prognosis. We examined whether spiritual wellbeing is associated with reduced psychological distress in patients with ICDs.</p> <p>Methods We used the Functional Assessment of Chronic Illness Therapy-Spiritual Wellbeing (FACIT-SWB) questionnaire and the Hospital Anxiety and Depression Scale (HADS) to measure spiritual wellbeing and overall psychological distress. Multivariate linear regression was used to explore the relationship between these variables.</p> <p>Results The study sample included 46 ICD outpatients (32 M, 14 F; age range 43-83). We found an inverse association between HADS and FACIT-SWB scores, persisting after adjustment for demographics, anxiety/depression, medications, therapist support, and functional status ($F = 0.001$; $\beta = -0.31$, CI: -0.44, -0.19).</p> <p>Conclusion Spiritual wellbeing was independently associated with lower psychological distress in ICD outpatients. Spiritual wellbeing may act as a protective factor against psychological distress in these high-risk patients.</p>

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

SCHOLARONE™
Manuscripts

For Peer Review

ABSTRACT

Background Psychological distress is common in patients with implantable cardioverter defibrillators (ICDs) and has been associated with a worse prognosis. We examined whether spiritual wellbeing is associated with reduced psychological distress in patients with ICDs.

Methods We used the Functional Assessment of Chronic Illness Therapy-Spiritual Wellbeing (FACIT-SWB) questionnaire and the Hospital Anxiety and Depression Scale (HADS) to measure spiritual wellbeing and overall psychological distress. Multivariate linear regression was used to explore the relationship between these variables.

Results The study sample included 46 ICD outpatients (32 M, 14 F; age range 43-83). We found an inverse association between HADS and FACIT-SWB scores, persisting after adjustment for demographics, anxiety/depression, medications, therapist support, and functional status ($F = 0.001$; $\beta = -0.31$, CI: -0.44, -0.19).

Conclusion Spiritual wellbeing was independently associated with lower psychological distress in ICD outpatients. Spiritual wellbeing may act as a protective factor against psychological distress in these high-risk patients.

KEY WORDS: prevention; spirituality; heart failure; cardioverter defibrillators

INTRODUCTION

Primary and secondary prevention trials have consistently shown the efficacy of implantable cardioverter defibrillators (ICDs) in preventing sudden cardiac death and life-threatening arrhythmias compared to anti-arrhythmic agents alone. According to guidelines published in 2008,[1] the ICD is now the treatment of choice not only for patients with documented life-threatening arrhythmias, but also for patients with impaired cardiac function (ejection fraction <35%), regardless of previous arrhythmic episodes.

However, as an increasing number of patients have received ICDs, several device-related problems have surfaced.[2] Although most patients adapt fairly well to living with an ICD over time, a significant proportion of patients will experience psychological problems, with estimates reaching up to 38% for clinically significant anxiety.[3] Young age (<50 years), female gender, poor device understanding, and experiencing multiple ICD shocks are important risk factors for the development of psychological problems in these patients.[3]

Psychological and emotional well-being in ICD patients is important for several reasons. Anxiety and depression may contribute to cardiovascular mortality and morbidity of patients with coronary heart disease[4, 5] and emotional[6, 7] and mental[8] stress may have a detrimental effect on cardiac perfusion and function. Reduced heart rate variability,[9, 10] impaired baro-reflex control,[11, 12] and alterations in the coagulation system[13] have been considered as possible mechanisms for the negative effect of anxiety and depression on cardiac outcomes.

Although it is uncertain whether spirituality may have a positive impact on physical health in patients with cardiovascular disease,[14] current evidence suggests that it may protect these patients from emotional distress and improve their quality of life. Spiritual well-being

1
2
3 appears to have a protective effect on depression in patients with heart failure,[15] and faith can
4 play a role in the emotional health of individuals recovering from a stroke[16, 17] or with severe
5 chronic disabilities.[18] In addition, pilot spiritual interventions and holistic rehabilitation
6 programs addressing the spiritual needs of cardiac patients have shown promising results in
7 improving the quality of life and psychological well-being of these patients.[19-21]

8
9
10
11
12
13
14
15 However, little is known about the possible role of spiritual well-being in buffering
16 psychological distress in patients with ICDs, despite several indications that the spiritual
17 dimension has often been neglected in these patients. Although ICD carriers are often survivors
18 of a cardiac arrest, have advanced heart failure and have to face difficult end-of life decisions,
19 the educational material provided to ICD patients typically addresses only the
20 technical/educational aspects of the ICD experience while ignoring its emotional and spiritual
21 dimensions.[22] Clinicians are often pressed for time and they are often not forthcoming in the
22 discussion of end-of-life issues with their patients.[23]

23
24
25
26
27
28
29
30
31
32
33
34 The purpose of this study was to evaluate whether better overall spiritual well-being may
35 be associated with lower psychological distress in a group of outpatients who underwent ICD
36 implantation.

37 38 39 40 41 METHODS

42 43 *Design and population*

44
45 We conducted a cross-sectional analysis on baseline data collected from 46 patients
46 screened for participation in a pilot study of a mindfulness-based intervention for patients with
47 ICDs. The study was conducted at the University Campus of the UMass Memorial Medical
48 Center in Worcester, MA. All consecutive patients scheduled for an ICD related procedure at the
49 catheterization lab were screened for study eligibility within a month of the ICD procedure.
50
51
52
53
54
55
56
57
58
59
60

1
2
3 Patients were eligible if they were >21 years old, able to understand and speak English, and had
4
5 access to a telephone; exclusion criteria included inability/unwillingness to give informed
6
7 consent; signs of cognitive impairment; New York Heart Association functional class>III or
8
9 otherwise clinically unstable; pending coronary bypass or heart transplantation; co-morbid life-
10
11 threatening conditions; and ongoing severe depression or psychosis. The Blessed Orientation
12
13 Memory and Concentration test[24] was used to screen patients for cognitive impairment and
14
15 subjects with scores ≥ 10 were excluded. Screening for ongoing depression and psychosis was
16
17 based on DSM criteria of major depressive disorder or psychosis as documented by the physician
18
19 in the patient's chart at the time of the most recent medical evaluation. All eligible patients
20
21 received a letter inviting them to participate in the study and once they expressed interest, a
22
23 screening visit was scheduled. After confirmation of study eligibility and provision of informed
24
25 consent, patients completed a series of self-administered questionnaires. The study protocol was
26
27 approved by the Committee for the Protection of Human Subjects at the University of
28
29 Massachusetts Medical School.
30
31
32
33
34
35

36 *Psychological distress*

37
38 Psychological distress (outcome variable) was assessed using the Hospital Anxiety and
39
40 Depression Scale (HADS). [25] This is a 14-item self-administered questionnaire with two sub-
41
42 scales measuring anxiety and depression, with higher scores indicating greater psychological
43
44 morbidity. The use of the HADS questionnaire has been validated in cardiac patients [26] and is
45
46 particularly useful in these patients since it focuses on cognitive symptoms of psychological
47
48 distress instead of physical symptoms, which may be similar to those resulting from the
49
50 underlying cardiac disease. A cut-off of 8 is used for the two subscales, while a cut-off score of
51
52
53
54
55
56
57
58
59
60

1
2
3 10 is usually recommended for the total score. Total HADS scores of 10 or higher indicate the
4
5 presence of psychological distress.
6
7

8 *Spiritual well-being*

9
10 The primary predictor variable was overall spiritual well-being, assessed using the
11
12 Functional Assessment of Chronic Illness Therapy-Spiritual Well Being (FACIT-SWB). This is
13
14 a 12 item self-reported measure of spiritual well-being that has shown high internal consistency,
15
16 reliability, and convergent validity with other measures of religion/spirituality in individuals with
17
18 chronic diseases.[27] This instrument includes two subscales measuring different domains of
19
20 spiritual well-being – a meaning/peace subscale assessing to what extent an individual
21
22 experiences peace, harmony, and a sense of meaning, and a faith subscale evaluating the extent
23
24 to which a patient finds strength or comfort in his religious beliefs. The range for the total score
25
26 is 0-48, with higher scores indicating greater spiritual well-being.
27
28
29
30

31 *Demographic characteristics and other covariates*

32
33
34 Information was collected at baseline on patient demographic characteristics and medical
35
36 history. Demographic characteristics were collected by means of self-reported questionnaires and
37
38 included age, gender, income, marital status, education, and racial/ethnic background.
39
40 Information on cardiac diagnosis, previous diagnosis of anxiety or depression, current use of β -
41
42 blockers, anti-arrhythmics, anxiolytics and antidepressants, indication for ICD implantation
43
44 (primary vs. secondary prevention), type and time since ICD procedure, prior ICD shocks, New
45
46 York Heart Association class, and ejection fraction (EF: End diastolic volume - End systolic
47
48 volume/End diastolic volume from an echocardiogram or a ventriculogram) was gathered from
49
50 the Medical Record. Functional status was measured using the physical limitation subscale of the
51
52 Seattle Angina Questionnaire.[28] Patients were also asked to report the number of times they
53
54
55
56
57
58
59
60

1
2
3 engaged in physical exercise and whether they met with any therapist or spiritual counselor
4
5 during the previous four weeks.
6

7 8 *Statistical analysis* 9

10 We conducted a preliminary analysis to evaluate the appropriateness of the model's
11 assumptions, and assess correlations between covariates to avoid collinearity in the multivariate
12 model. The distribution of baseline demographic and clinical characteristics were compared
13 between patients with high ($\geq 50^{\text{th}}$ percentile for this population) and low ($\geq 50^{\text{th}}$ percentile)
14 spiritual well-being using t-test (or Wilcoxon) for continuous variables and two-tailed Fisher
15 exact test to compare proportions.
16
17
18
19
20
21
22
23

24 The association between psychological distress and spiritual well-being was assessed
25 using linear regression models. Variables that may confound the association between spiritual
26 well-being and psychological distress (age, gender, income, education, marital status, prior
27 depression or anxiety, use of antidepressants or anxiolytics, cardiovascular disease severity, and
28 functional status) showing an association with the outcome ($p \leq 0.10$) were included in a
29 multivariate linear regression model. Results are presented as unadjusted and adjusted beta
30 coefficients (with confidence intervals), where the null hypothesis was that $\beta_1 = 0$. P values
31 < 0.05 were considered to be statistically significant. All analyses were performed using STATA
32 10 (2007) statistical software (StataCorp, LP; College Station, TX).
33
34
35
36
37
38
39
40
41
42
43
44
45

46 RESULTS 47

48 Forty-six outpatients (32 M, 14 F) aged 43-83 years (mean, 65 years) completed a series
49 of questionnaires at the initial screening visit (Table 1). Eighty-five percent of the study sample
50 was in New York Heart Association class II or higher and the mean ejection fraction was 0.3 (SD
51 0.13). Half of the participants had total HADS scores higher than 10, the threshold indicating the
52
53
54
55
56
57
58
59
60

1
2
3 presence of psychological distress. Mean FACIT-SWB scores were 35 ± 8 (scale range 0 - 48). No
4
5 patient reported to have met a spiritual counselor during the previous month, and 13% reported
6
7 meeting with a therapist or social worker.
8
9

10 Patients with FACIT-SWB scores above the 50th percentile (Table 2) had significantly
11
12 lower HADS scores as well as a lower prevalence of psychological distress compared to patients
13
14 with FACIT-SWB scores below the 50th percentile. Although most differences were not
15
16 statistically significant due to the relatively small sample size, they were also older, more
17
18 frequently married, less educated, and had a lower prevalence of a prior diagnosis of anxiety or
19
20 depression and of use of antidepressants or anxiolytics, while the severity of clinical conditions
21
22 did not differ between groups as indicated by similar mean ejection fraction values and
23
24 prevalence of prior cardiac arrest and ICD shocks.
25
26
27
28

29 Table 3 shows the results of the unadjusted and adjusted linear regression models.
30
31 Psychological distress scores were significantly and inversely associated with FACIT-SWB
32
33 scores (Figure 1). In multivariate models, spiritual well-being was significantly associated with
34
35 lower psychological distress independently of demographics (model 2); of a previous diagnosis
36
37 of anxiety or depression, use of anxiolytics or antidepressants and counseling (model 3); and of
38
39 physical exercise or functional status (model 4).
40
41
42
43

44 DISCUSSION

45
46 Despite indications that spirituality is an important component of the psychological well-
47
48 being of patients with severe chronic diseases,[29-31] a limited number of studies have
49
50 examined its characteristics in patients with cardiovascular disease.[15, 16, 32] A possible
51
52 explanation for the limited interest in this topic in the cardiology literature is that spirituality is
53
54 an elusive concept, encompassing both subjective dimensions that are difficult to define and
55
56
57
58
59
60

1
2
3 operationalize, and more easily measurable, objective dimensions such as frequency of spiritual
4 activities or spiritual/religious affiliation.[33]
5
6

7
8 This is the first paper describing the characteristics associated with spiritual well-being in
9 patients living with an ICD and investigating the possible impact of spiritual well-being on the
10 self-reported psychological health of these patients. In our study, patients with higher spiritual
11 well-being had significantly less psychological distress and a lower prevalence of concurrent
12 psychiatric morbidity and psychotropic drug use compared to patients with lower spiritual well-
13 being. On the other hand, clinical conditions and functional status were similar between the two
14 groups, suggesting that differences in psychological well-being were independent from the
15 severity of the cardiac condition. There was an inverse linear relationship between psychological
16 distress scores and spiritual well-being scores that persisted after taking into account a number of
17 possible confounding variables.
18
19
20
21
22
23
24
25
26
27
28
29
30

31
32 The limited data currently available describing the role of spiritual well-being in patients
33 with chronic cardiovascular disease is typically based on patients with advanced heart failure.
34 These studies, usually qualitative or cross-sectional in nature, have shown the centrality of
35 spirituality in the life of patients and caregivers alike [34, 35] and its association with better
36 quality of life [36] and adjustment to advanced heart failure.[37]
37
38
39
40
41
42

43
44 Our results are consistent with those of a cross-sectional analysis showing a strong
45 inverse association between spiritual well-being and depression in 60 patients with heart failure,
46 independent of gender, income, social support, physical symptoms, and health status.[15] This is
47 not surprising, considering that ICD patients usually have concomitant heart failure and, in fact,
48 85% of our patients were in NYHA class II or III. One important addition of our paper to the
49 current literature is that we adjusted for other important confounders such as co-morbid
50
51
52
53
54
55
56
57
58
59
60

1
2
3 depression or anxiety, psychotropic medications, and ongoing psychosocial support.

4
5 Furthermore, patients with ICDs are somewhat unique among patients with heart failure, in that
6
7 they often have experienced a cardiac arrest (21% of our population) and usually have more
8
9 severe cardiac conditions.
10
11

12
13 Several limitations need to be kept in mind in interpreting the results of the present study.
14
15 The first concerns our choice of the instrument to assess spiritual well-being. The FACIT-SWB
16
17 is a measure of spiritual well-being, and not of spirituality, and has been criticized because of the
18
19 overlap with measures of psychological well-being.[30, 38] However, the finding of an inverse
20
21 association between spiritual well-being and psychological distress has been consistently
22
23 reported in various populations using different measures of spirituality and psychological
24
25 distress.[30, 39] Furthermore, in our analysis the association between spiritual well-being and
26
27 psychological distress was still evident after we accounted for psychological co-morbidity, use of
28
29 psychotropic medications, and support from therapists, thus suggesting that spiritual well-being
30
31 may uniquely contribute to reducing overall psychological distress. An additional limitation is
32
33 that we limited our assessments to one dimension of spirituality, namely its emotional aspects,
34
35 while we did not address other components such as affiliation or frequency of spiritual practice.
36
37 Moreover, due to the cross-sectional nature of this study, resulting in the assessment of spiritual
38
39 well-being and psychological distress at the same point in time, we cannot draw conclusions
40
41 about the direction of this association. We also cannot exclude the possibility of selection bias,
42
43 since this analysis was conducted on data collected as part of the baseline assessments of patients
44
45 screened for participation in a pilot randomized clinical trial. The prevalence of anxiety and
46
47 depression in our study, however, are consistent with that reported in similar studies of ICD
48
49 outpatients. [3, 40] The vast majority of our study population was white, and our findings may
50
51
52
53
54
55
56
57
58
59
60

1
2
3 not be generalizable to minority populations in which dimensions of spirituality other than
4
5 spiritual well-being, such as attendance at worship services or spiritual beliefs, could be more
6
7 relevant.
8
9

10 In conclusion, spiritual well-being was independently associated with lower
11
12 psychological distress in a group of outpatients with ICDs. These findings need to be confirmed
13
14 in larger and diverse populations and in prospective studies. In consideration of the possible
15
16 unique contribution of spiritual well-being to the overall psychological well-being and quality of
17
18 life of patients with ICDs, the spiritual-existential dimension of the experience of living with an
19
20 ICD should probably receive more attention in the care of these patients.
21
22
23
24
25
26

27 ACKNOWLEDGEMENTS

28
29 We would like to thank all participants for their contribution to this study; and Mary Stanley,
30
31 MS, NP, and Karen Rose, MS, NP, for their help with recruitment.
32
33
34

35 Authors contributions: Elena Salmoirago-Blotcher designed the study, collected the data,
36
37 conducted the data analysis, and wrote the manuscript draft; Sybil Crawford provided statistical
38
39 advice and revised the manuscript; Chau Tran contributed to the study design and data
40
41 collection; Robert Goldberg, Ira Ockene and Lawrence Rosenthal revised the manuscript. All
42
43 authors approved the final version of the manuscript for publication.
44
45
46
47

48 Presentations: This study has been accepted as a poster presentation at the annual conference of
49
50 the Society of Behavioral Medicine (New Orleans April 2012
51
52

53 Conflicting interests: none. No honorarium, grant, or other form of payment was given to anyone
54
55 to produce the manuscript.
56
57
58
59
60

1
2
3 Financial disclosures/funding: This study was partially supported by a grant of the National
4
5 Center of Complementary and Alternative Medicine (F32AT005048). Elena Salmoirago-
6
7 Blotcher is funded by a grant from the National Center for Complementary and Alternative
8
9 Medicine (NCCAM F32AT005048)
10
11

12
13
14 Ethical Approval: The study protocol and all study materials were approved by the Committee
15
16 for the Protection of Human Subjects at the University of Massachusetts Medical School (Docket
17
18 H-13078).
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

References

1. Epstein AE, DiMarco JP, Ellenbogen KA, et al. ACC/AHA/HRS 2008 Guidelines for Device-Based Therapy of Cardiac Rhythm Abnormalities: A Report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (Writing Committee to Revise the ACC/AHA/NASPE 2002 Guideline Update for Implantation of Cardiac Pacemakers and Antiarrhythmia Devices). Developed in collaboration with the American Association for Thoracic Surgery and Society of Thoracic Surgeons. *J Am Coll Cardiol* 2008;51(21):e1-e62.
2. Bostwick JM, Christopher LS. An updated review of implantable cardioverter/defibrillators, induced anxiety, and quality of life. *Psychiatr Clin North Am* 2007;30(4):677-688.
3. Sears SF, Jr., Conti JB. Quality of life and psychological functioning of ICD patients. *Heart* 2002;87(5):488-93.
4. Barefoot JC, Helms MJ, Mark DB, et al. Depression and long-term mortality risk in patients with coronary artery disease. *Am J Cardiol* 1996;78(6):613-617.
5. Lesperance F, Frasure-Smith N, Talajic M, Bourassa MG. Five-year risk of cardiac mortality in relation to initial severity and one-year changes in depression symptoms after myocardial infarction. *Circulation* 2002;105(9):1049-1053.
6. Ironson G, Taylor C, Boltwood M, et al. Effects of anger on left ventricular ejection fraction in coronary artery disease. *Am J Cardiol* 1993;70(3):281-285.
7. Wittstein IS, Thiemann DR, Lima JAC, et al. Neurohumoral features of myocardial stunning due to sudden emotional stress. *New Engl J Med* 2005;352(6):539-548.
8. Rozanski A, Bairey C, Krantz D, Friedman J. Mental stress and the induction of silent myocardial ischemia in patients with coronary artery disease. *N Engl J Med* 1988;318(16):1005-1012.

- 1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
9. Carney RM, Blumenthal JA, Freedland KE, et al. Low heart rate variability and the effect of depression on post-myocardial infarction mortality. *Arch Intern Med* 2005;165(13):1486-1491.
10. Kawachi I, Sparrow D, Vokonas PS, Weiss ST. Decreased heart rate variability in men with phobic anxiety (data from the Normative Aging Study). *Am J Cardiol* 1995;75(14):882.
11. Watkins LL, Blumenthal JA, Carney RM. Association of anxiety with reduced baroreflex cardiac control in patients after acute myocardial infarction. *Am Heart J* 2002;143:460-6.
12. Watkins LL, Grossman P. Association of depressive symptoms with reduced baroreflex cardiac control in coronary artery disease. *Am Heart J* 1999;137(3):453.
13. Von Kanel R, Mills PJ, Fainman C, Dimsdale JE. Effects of psychological stress and psychiatric disorders on blood coagulation and fibrinolysis: a biobehavioral pathway to coronary artery disease? *Psychosom Med* 2001;63(4):531-544.
14. Feinstein M, Liu K, Ning H, et al. Burden of cardiovascular risk factors, subclinical atherosclerosis, and incident cardiovascular events across dimensions of religiosity: The Multi-Ethnic Study of Atherosclerosis. *Circulation* 2010;121(5):659-66.
15. Bekelman DB, Dy SM, Becker DM, et al. Spiritual well-being and depression in patients with heart failure. *J Gen Intern Med* 2007;22(4):470-7.
16. Giaquinto S, Spiridigliozzi C, Caracciolo B. Can faith protect from emotional distress after stroke? *Stroke* 2007;38(3):993-7.
17. Johnstone B, Franklin KL, Yoon DP, et al. Relationships among religiousness, spirituality, and health for individuals with stroke. *J Clin Psychol Med Settings* 2008;15(4):308-13.
18. Johnstone B, Yoon DP. Relationships between the Brief Multidimensional Measure of Religiousness/Spirituality and health outcomes for a heterogeneous rehabilitation population. *Rehabil Psychol* 2009;54(4):422-31.

- 1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
- 19.** Delaney C, Barrere C, Helming M. The influence of a spirituality-based intervention on quality of life, depression, and anxiety in community-dwelling adults with cardiovascular disease: a pilot study. *J Holist Nurs* 2010;29(1):21-32.
- 20.** Warber SL, Ingerman S, Moura VL, et al. Healing the heart: a randomized pilot study of a spiritual retreat for depression in acute coronary syndrome patients. *Explore (NY)* 2011;7(4):222-33.
- 21.** Kreikebaum S, Guarneri E, Talavera G, et al. Evaluation of a holistic cardiac rehabilitation in the reduction of biopsychosocial risk factors among patients with coronary heart disease. *Psychol Health Med* 2011;16(3):276-90.
- 22.** Bolse K, Johansson I, Stromberg A. Organisation of care for Swedish patients with an implantable cardioverter defibrillator, a national survey. *J Clin Nurs* 2010;20(17-18):2600-8.
- 23.** Goldstein NE, Lampert R, Bradley E, et al. Management of implantable cardioverter defibrillators in end-of-life care. *Ann Intern Med* 2004;141(11):835-8.
- 24.** Katzman R, Brown T, Fuld P, et al. Validation of a short Orientation-Memory-Concentration Test of cognitive impairment. *Am J Psychiatry* 1983;140(6):734-739.
- 25.** Zigmond A, Snaith RP. The hospital anxiety and depression scale. *Acta Psychiatr Scand* 1983;67(6):361-370.
- 26.** Stafford L, Berk M, Jackson HJ. Validity of the Hospital Anxiety and Depression Scale and Patient Health Questionnaire-9 to screen for depression in patients with coronary artery disease. *General Hosp Psychiatry* 2007;29(5):417-424.
- 27.** Peterman AH, Fitchett G, Brady MJ et al. Measuring spiritual well-being in people with cancer: the functional assessment of chronic illness therapy--Spiritual Well-being Scale (FACIT-Sp). *Ann Behav Med* 2002;24(1):49-58.

- 1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60
- 28.** Spertus JA, Winder JA, Dewhurst TA, et al. Development and evaluation of the Seattle Angina questionnaire: A new functional status measure for coronary artery disease. *J Am Coll Cardiol* 1995;25(2):333-341.
- 29.** Breitbart W. Spirituality and meaning in supportive care: spirituality- and meaning-centered group psychotherapy interventions in advanced cancer. *Support Care Cancer* 2002;10(4):272-80.
- 30.** McClain CS, Rosenfeld B, Breitbart W. Effect of spiritual well-being on end-of-life despair in terminally-ill cancer patients. *Lancet* 2003;361(9369):1603-7.
- 31.** Koenig HG, George LK, Titus P. Religion, spirituality, and health in medically ill hospitalized older patients. *J Am Geriatr Soc* 2004;52(4):554-562.
- 32.** Giaquinto S, Sarno S, Dall'Armi V, Spiridigliozzi C. Religious and spiritual beliefs in stroke rehabilitation. *Clin Exp Hypertens* 2010;32(6):329-34.
- 33.** Koenig H, McCullough M, Larson D. Handbook of religion and health. New York: Oxford University Press, 2001.
- 34.** Murray SA, Kendall M, Boyd K, et al. Exploring the spiritual needs of people dying of lung cancer or heart failure: a prospective qualitative interview study of patients and their carers. *Palliat Med* 2004;18(1):39-45.
- 35.** Groleau D, Whitley R, Lesperance F, Kirmayer LJ. Spiritual reconfigurations of self after a myocardial infarction: Influence of culture and place. *Health Place* 2010;16(5):853-60.
- 36.** Beery TA, Baas LS, Fowler C, Allen G. Spirituality in persons with heart failure. *J Holist Nurs* 2002;20(1):5-25.
- 37.** Westlake C, Dracup K. Role of spirituality in adjustment of patients with advanced heart failure. *Prog Cardiovasc Nurs* 2001;16(3):119-25.

- 1
2
3 **38.** Murphy PE, Canada AL, Fitchett G, et al. An examination of the 3-factor model and
4 structural invariance across racial/ethnic groups for the FACIT-Sp: a report from the American
5 Cancer Society's Study of Cancer Survivors-II (SCS-II). *Psychooncology* 2010;19:264-272.
6
7
8
9
10 **39.** Bekelman DB, Parry C, Curlin FA, et al. A comparison of two spirituality instruments and
11 their relationship with depression and quality of life in chronic heart failure. *J Pain Symptom*
12 *Manage* 2010;39(3):515-26.
13
14
15
16
17 **40.** Kapa S, Rotondi-Trevisan D, Mariano Z, et al. Psychopathology in patients with ICDs over
18 time: results of a prospective study. *Pacing Clin Electrophysiol* 2010;33(2):198-208.
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

Table 1. Baseline demographic and clinical characteristics of the study sample*

n	46
Age (mean, SD)	65.0 (10.5)
Males	32 (69.6)
White-non Hispanic	43 (93.5)
Hispanic	2 (4.3)
Asian	1 (2.2)
High School	13 (28.3)
Some college	14 (30.4)
College graduate	10 (21.7)
Post graduate	9 (19.6)
Married or in committed relationship	35 (76.1)
Separated/divorced/single	11 (23.9)
How hard to pay for basics [†]	
Not at all hard	26 (56.5)
Somewhat hard	13 (28.3)
Very hard	6 (13.0)
Does not know	1 (2.2)
Coronary heart disease	29 (63.0)
Idiopathic dilated cardiomyopathy	9 (19.6)
Other	8 (17.4)
Prior cardiac arrest	10 (21.7)

Table 1 – Baseline demographic and clinical characteristics of the study sample (cont.)*

New ICD	27(58.7)
ICD upgrade	4 (8.7)
Battery change/lead revision	9 (19.6)
ICD shocks/storms	6 (13.0)
Months from ICD procedure (median (25 th -75 th percentile))	1.45 (0.56, 14.2)
Beta-blockers	40 (86.9)
Anxiolytics	10 (21.7)
Anti-depressants	11 (23.9)
Ejection fraction (mean (SD))	0.30 (0.13)
New York Heart Association class	
I	7 (15.2)
II	16 (56.6)
III	13 (28.2)
FACIT-SWB score (mean, SD)	35.4 (8.6)
Prior diagnosis of depression	11(23.9)
Prior diagnosis of anxiety	9 (19.6)
Total HADS score>10	23 (50)
Have seen a spiritual counselor ‡ during past month	0 (0)
Have seen a therapist§ during past month	6 (13.0)
Physical exercise at least 30 min/week during previous months	21 (45.7)

1
2
3 * Values are n (%) unless otherwise indicated
4

5
6 † Food, housing, medical care and heating
7

8 ‡ Priest, minister, rabbi or spiritual guide
9

10 § Psychologist, psychiatrist, or clinical social worker
11

12 ICD = Implantable cardioverter Defibrillator; HADS= Hospital Anxiety and Depression Scale;
13

14 FACIT-SWB = Functional Assessment of Chronic Illness Therapy-Spiritual Well Being
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51
52
53
54
55
56
57
58
59
60

For Peer Review

Table 2. Baseline sample characteristics according to spiritual well-being status

	High spiritual well-being (FACIT-SWB \geq 36.5)	Low spiritual well-being (FACIT-SWB<36.5)	P value [†]
N	23	23	
Age (mean, CI)	69.2 (65.8, 72.6)	60.8 (56.1, 65.5)	0.0114
Females	50.0 (7)	50.0 (7)	1.00
College or post-graduate education	15.2 (7)	26.1 (12)	0.48
Married or in committed relationship	54.3 (19)	45.7 (16)	0.49
Not at all hard to pay for basics [‡]	42.3 (11)	57.7 (15)	0.36
Somewhat hard	69.2 (9)	30.8 (4)	
Very hard	50 (3)	50 (3)	
Does not know	1 (100)	0 (0)	
Coronary heart disease	55.2 (16)	44.8 (13)	0.70
Prior cardiac arrest	50 (5)	50 (5)	1.00
New ICD	48.2 (13)	51.8 (14)	0.52
ICD shocks/storms	50.0 (3)	50.0 (3)	0.66
Prior diagnosis of depression	27.3 (3)	72.7 (8)	0.16
Prior diagnosis of anxiety	44.4 (4)	55.6 (5)	1.00
Counselors	33.3 (2)	66.7 (4)	0.67
Beta-blockers	50 (20)	50 (20)	1.00
Anxiolytics	40.0 (4)	60.0 (6)	0.72

Anti-depressants	27.3 (3)	72.7 (8)	0.16
Ejection fraction (mean, CI)	0.29 (0.26, 0.33)	0.30 (0.23, 0.37)	0.69
Functional status (mean, CI)	64.4 (55.7, 73.0)	53.8 (42.7, 64.8)	0.17
Total HADS score (mean, CI)	6.7 (4.4, 9.0)	13.8 (11.4, 16.2)	0.0001
HADS score>10	21.7 (5)	78.3 (18)	0.0001
Physical exercise at least 30 minutes/week during past month	61.9 (13)	38.1 (8)	0.236

* Values are n (%) unless otherwise indicated

† Wilcoxon or 2-sided Fisher exact test

‡ Heating, groceries, and health insurance

ICD = Implantable cardioverter Defibrillator; HADS= Hospital Anxiety and Depression Scale;

FACIT-SWB = Functional Assessment of Chronic Illness Therapy-Spiritual Well Being

Table 3. Results of the unadjusted and adjusted linear regression models testing the association between total HADS scores and FACIT-SWB scores

	β	95% CI	R squared
Model 1	-0.32	-0.37, -0.13	0.44
Model 2	-0.30	-0.43, -0.17	0.56
Model 3	-0.32	-0.45, -0.20	0.67
Model 4	-0.31	-0.44, -0.19	0.69

Model 1: unadjusted

Model 2: adjusted for demographics (age, marital status, financial status)

Model 3: adjusted for variables included in model 2 + prior depression and anxiety, use of psychotropic drugs, counselors/therapists during past month

Model 4: adjusted for variables included in model 3 + functional status, and physical exercise

HADS= Hospital Anxiety and Depression Scale; FACIT-SWB = Functional Assessment of Chronic Illness Therapy-Spiritual Well Being

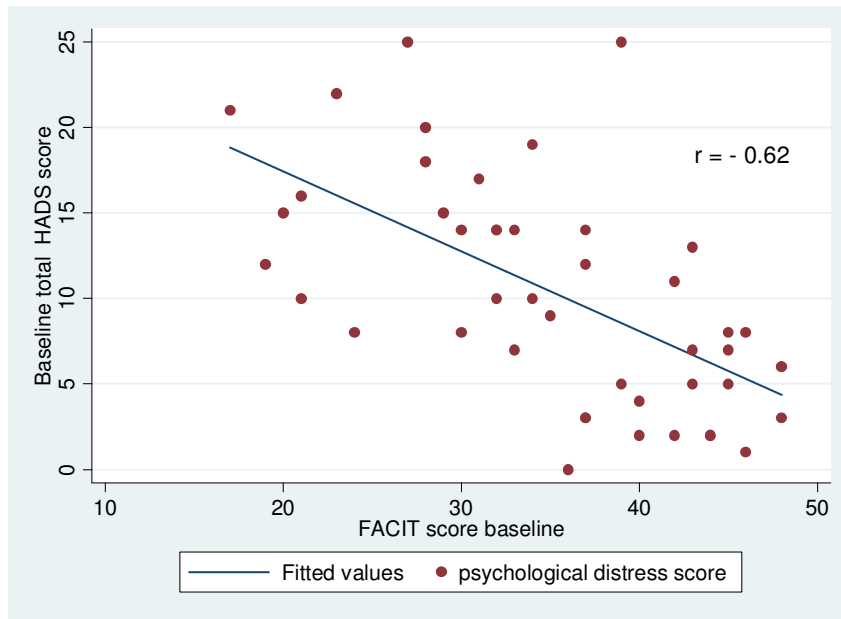


Figure 1. Unadjusted association between overall psychological distress and spiritual well-being