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Intimate Partner Physical and Mental Health After Sudden Cardiac Arrest and Receipt of an Implantable Cardioverter Defibrillator

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Abstract

The purpose of this study was to describe the physical and mental health of the intimate partners of persons receiving an implantable cardioverter defibrillator (ICD). A prospective longitudinal repeated measures design was used, with data collected at hospital discharge, and at 1, 3, 6, and 12 months after implantation. Intimate partners' physical health, symptoms, and depression significantly declined over the first year. Although anxiety was significantly reduced over time, it remained elevated in partners after 1 year. The impact of implantation of the ICD on the intimate relationship and care demands was most dramatic at hospital discharge. Health care use was low throughout the year. Intimate partners could benefit from an intervention that would assist in their psychological adjustment and provide strategies for dealing with caregiving demands at home.

Keywords

sudden cardiac death; ICD; partner; psychological; physical health; description

The shift of health care to the ambulatory care setting has resulted in a dramatic increase in the amount of care that is provided by families in the home. The responsibilities of caregiving or caregiver burden after a cardiac illness, specifically after receipt of an implantable cardioverter defibrillator (ICD), have not been well described. Caregiving affects caregivers' physical and mental health, family relationships, employment, and financial circumstances (Gaugler, Kane, & Langlois, 2000; Pearlin, Mullan, Semple, & Skaff, 1990). Family members often accept responsibility for the care of those with health needs. Typically they do so for emotional or economic reasons, not because they are proficient at or feel comfortable with the care required (Kasuya, Polgar-Bailey, & Takeuchi, 2000).

Family members often are expected to assume the role of caregiver without regard for the possible consequences to themselves. The needs of caregivers do not come to the attention of health care providers until the caregiver begins to experience burnout. Investigators focusing on other cardiac conditions have suggested that recovery from life-threatening illness occurs within a family context in which the intimate partners' experience influences

those of recovering patients (Brecht, Dracup, Moser, & Riegel, 1994). The current health status of the intimate partner at the time of a patient's life threatening event will influence the partner's ability to offer the support needed for the patient's recovery (Carlson, Bultz, Specia, & St. Pierre, 2000).

Few investigators have addressed the impact of cardiac arrest and ICD implantation on intimate partners and family members. What little is known about caregiving after a cardiac illness has been focused on the experiences of spouses following acute myocardial infarction or coronary artery bypass surgery (Gortner et al., 1988; Hilgenberg, Liddy, Standerfer, & Schraeder, 1992; Miller, Wikoff, Garrett, McMahon, & Smith, 1990). Attending to the needs of the family after a cardiac illness is important because patients' psychological adjustment has been linked to family function (Miller & Wikoff, 1989); patient adherence to risk factor modification has been linked to spousal anxiety and marital function (Miller, Wikoff, McMahon, Garrett, & Ringel, 1990); and caregiver strain and marital quality have been linked to increased mortality in older caregivers (Coyne et al., 2001; Schultz & Beach, 1999).

Researchers have demonstrated that surviving sudden cardiac arrest and receiving an ICD results in significant changes in the individual's physical, social, and psychological functioning over the first year (Bainger & Fernsler, 1991; Sears, Todaro, Lewis, Sotile, & Conti, 1999; Vlay, Olson, Fricchoine, & Friedman, 1989). These patient responses affect family members and spouses as well (Brecht et al. 1994; Pycha, Calabrese, Gullledge, & Maloney, 1990). Both patients and their intimate partners are anxious about what the ICD will do, how to live with it successfully, and how to incorporate a serious cardiac diagnosis into their lives. Many adjustments need to occur at home. Patients sometimes cannot care for themselves independently, and partners are not sure what will be most helpful to patients during ICD recovery. Data suggest that intimate partners may become exhausted, excessively overprotective, burdened, anxious, and suffer ill health effects (Doolittle & Sauve, 1995; Sneed & Finch, 1992).

Two recent reports point to the concerns regarding spousal physical and mental health after ICD implantation. Spouses of patients participating in the Amiodarone Versus Implantable Defibrillator (AVID) trial (Jenkins et al., 2007) showed a decline in physical health by a mean 2.5 points from baseline ICD insertion to 12 months later. Mental health improved by a mean 3.0 points over the same period. Physical health was lower declined with partner's older age and more disease burden. Mental health declined in those whose partner had experienced an ICD shock. Partners had fewer concerns about the patient over the 12 month period, with reported improvements in their enjoyment of life, their satisfaction with life, and less worry about the patient dying. In a second report, anxiety and marital adjustment were examined in patient-partner pairs within 30 months of ICD implantation, Sowell, Sears, Walker, Kuhl, and Conti (2007) found no statistical differences in anxiety or marital adjustment between the patient and partner groups. Spouses, however, reported higher shock anxiety than patients.

In a study conducted two decades ago, cardiac arrest was found to contribute to marital strain and reduced sexual frequency between couples. Spouses of ICD patients noticed increased anxiety, anger, irritability, and dependency in their mates. Both spouses and patients desired more information from health care professionals concerning cardiac arrest at the time that it had occurred (Vlay et al., 1989). In a longitudinal investigation following cardiac arrest, Dougherty (1994) found that family members experienced the greatest anxiety, depression, and stress at the time of hospitalization, with reactions decreasing throughout the first year. Dyadic adjustment over the first year following ICD implantation remained within normal ranges, but worsened as the year progressed. Spouses reported less

marital satisfaction than ICD patients. Family social support was noted to be especially low throughout the first year after ICD implantation. Doolittle and Sauve (1995) found differences between spouses' and patients' perceptions of ICD recovery. Spouses who had witnessed the cardiac arrest had a greater degree of protectiveness toward the patient, creating conflicts between the couple. In the most severe instances, spousal protectiveness led to entrapment of the ICD patient, resulting in a decrease in social activities for the patient, altered communication between the spouse and patient, and feelings of anger and frustration toward the spouse's restrictions.

Distinctive experiences of intimate partners of ICD patients, when compared to patients with other cardiac conditions, include the partner witnessing the cardiac arrest event and participating in resuscitation, partner uncertainty about patient cognitive function after resuscitation, having to deal with driving restrictions on the patient for 6 months after receipt of an ICD, and fear of leaving the patient alone because of the possibility of recurrent cardiac arrest and ICD shocks (Dickerson, Posluszny, & Kennedy, 2000; Pycha et al., 1990). As with other cardiac conditions, partners of ICD recipients also experience the burden of fulfilling family and financial roles without help from the patient, dealing with the patient's psychological responses and fear of death, and disruption in sexual relationships (Steinke, 2003).

Because intimate partners provide essential physical and psychological support to patients receiving ICDs, it is important that the intimate partner's own physical and psychological health be addressed. The purpose of this study was to describe the intimate partner's physical functioning (general health and symptoms), psychological adjustment (anxiety, depression, mental health), healthcare utilization (ER visits, outpatient visits, and hospitalizations), and impact on the intimate relationship (mutuality, dyadic adjustment, caregiver burden) in the first year after ICD implantation.

Methods

We used a prospective longitudinal repeated measures design with data collected from intimate partners at hospital discharge, and at 1, 3, 6, and 12 months after ICD implantation. Patients received an ICD between 1999 and 2001, and data were collected between 1999 and 2002.

Participants

Intimate partners were defined as the spouse, lover, or significant other living in the same household as the patient at study enrollment. Intimate partners were recruited from 10 hospitals in the Pacific Northwest after the patient received an ICD. All recruitment procedures and Institutional Review Board approvals were completed before data collection began. Written informed consent was obtained before data collection. Inclusion criteria for the partner included the ability to read, speak, and write English; availability for telephone contact; willingness to be followed for 1 year; and ICD patient planning to return home after ICD implantation. Exclusion criteria were significant clinical co-morbidities that severely impaired cognitive function and age < 21 years.

One hundred sixty-eight patients received an ICD during the recruitment period, and 127 had an intimate partner. Of these 127, 110 agreed to participate in data collection. Reasons for declining to participate included the partners not wanting to complete questionnaires, having significant health problems of their own, or the patient not wanting the intimate partner to participate. The attrition rate for intimate partners was 9.1% (10/110) over 12 months, leaving the data from 100 partners available for analysis at all time points. The 10 partners who did not complete all time points terminated their participation in the study

because the patient who received the ICD died, the partner died, or the partner no longer was willing to complete questionnaires. There were no differences in demographic characteristics between partners who did or did not participate in the study. The intimate partners were 60.96 ± 12.87 years of age, 82% female, 96.9% Caucasian, 29.6% college graduates, and 33.3% employed outside the home in clerical or managerial positions. The average annual household income for 44% of the sample was $> \$49,999/\text{year}$.

Intimate partners had a number of health concerns of their own at the time of cardiac arrest in the patient. The most common health problems were hypertension 38%, osteoarthritis 36%, and thyroid disease 15%. The average Charlson co-morbidity score was 2.27, meaning partners were dealing with an average of two chronic health conditions at the time they entered the study. The most common medication being taken by partners was for hypertension. The average number of medications taken was 2.96 ± 2.65 per person (Table 1).

Procedures

Intimate partners of sudden cardiac arrest survivors were approached for participation at hospital discharge of the ICD patient. If partners were interested in the study, they were screened for eligibility criteria, completed a health history and were mailed questionnaires at the designated time periods. Intimate partners were asked to complete sets of questionnaires independently and return them to the study office without help from the patient. Demographic and health history information was collected by telephone interview at baseline. Charlson co-morbidity scores were calculated from health records at study entry. Health care utilization data were collected by telephone at the same time points as the questionnaires.

Measures

Key outcome variables representing partners' physical functioning, psychological adjustment, health care utilization, and relationship impact were collected at each time period.

Physical functioning—Physical functioning was measured as overall general health and physical symptoms. General health-related quality of life was assessed using the Short Form Health Survey (SF-12), a 12-item shortened version of the SF-36 that assessed physical and mental health concepts affected by disease and treatment (Ware, 1987; Ware, Kosinski, & Keller, 1995). Two component summary scales of physical and mental health (PCS and MCS) were calculated. In our study Cronbach's alphas for SF-12 PCS and MCS scales were .83 and .85, respectively. Possible scores range from 0–100, with higher scores representing better general health.

The Physical Symptom sub-scale from the Demands of Illness-Partner (DOI-P) scale (Haberman, Woods, & Packard, 1990; Woods, Haberman, & Packard, 1993) is a 14-item measure of the presence or absence of symptoms reported by spouses when caring for a loved one with an acute illness. The DOI-P has been validated with individuals and families dealing with diabetes, cancer, and fibrocystic breast disease. Alpha reliability on the scale in our study was .87. Higher scores reflect more demands or more symptoms.

Psychological adjustment—Psychological adjustment was measured as anxiety, depression, and mental health. Anxiety was measured using the State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1970), a widely used 20-item assessment of both state and trait anxiety. Only the state anxiety questions were used in this study because they capture change in anxiety over time. In our study internal consistency

reliability was .95 for the state scale. The STAI has been used extensively in cardiovascular populations, in patients with hypertension, coronary artery disease, and sudden cardiac arrest (Bloom, 1979). It has been found to be sensitive to change. A higher score represents more anxiety, with a cut-off score ≥ 40 indicating severe anxiety.

Depression was assessed using the Center for Epidemiologic Studies Depression (CES-D) Scale (Radloff, 1977), a 20-item measure of depressive symptomatology in the general population. Internal consistency reliability for the scale in our study was .91. Field testing has been completed with a large number of normal and patients samples, with normative values available for diverse populations. A higher score represents more depressive symptoms, with a cut-off score of > 16 representing significant depression.

Mental health was measured using the MCS score of the SF-12 general health measure, described above.

Healthcare utilization—Healthcare utilization was measured using the number of partners' emergency room (ER) visits, hospitalizations, and outpatient clinic visits that were obtained by self-report data. Hospital discharge diagnoses were verified with hospital discharge records. Outpatient clinic visits and ER visits were summarized for total number over each 3-month period.

Relationship impact—Relationship impact was measured as mutuality, dyadic adjustment, and caregiver burden with the Mutuality and Interpersonal Sensitivity (MIS) scale (Lewis & Hammond, in review), a 32-item Likert self-report scale. It measures the couple's shared meanings, attitudes, and orientation in living with an ICD. The 16 Mutuality items address the extent to which couples think similarly about the ICD. The 13 Interpersonal Sensitivity items address the extent to which the partner is sensitive and attends to the perceptions of the patient. Higher scores reflect more mutuality and sensitivity between couples. Internal consistency reliability for the total scale was .88.

The Demands of Caregiving Inventory (Wallhagen, 1992) is a 26-item self-report scale that was used to assess demands of caregiving in chronic illness. The scale measures responsibilities in the areas of activities of daily living, instrumental activities of daily living, and behavioral care demands. The number of times a task or need has to be completed for a care recipient and the difficulty in completing the task are assessed with the scale. The scale has been validated in frail elderly, dementia, and cancer populations. Higher scores indicate greater demands and higher level of difficulty in completing the task for the care recipient. Internal consistency reliabilities for the subscales in our study were .73–.82.

Family Functioning was measured using the family functioning subscale of the Demands of Illness-Partner (DOI-P), as described previously. The total scale contains 125 items, with the family functioning scale consisting of 24 items that address the negative impact of illness on the family as a whole, and family changes related to the illness experience. Cronbach's alpha reliability for the scale in our study was .91. The DOI-P has been validated with individuals and families dealing with diabetes, cancer, and fibrocystic breast disease (Haberman et al., 1990; Woods et al., 1993). Higher scores reflect more areas of family functioning adversely affected by illness.

Analysis

Patterns of response across study variables for the group by time were identified using descriptive statistics, plots, and Pearson product-moment correlations. Cronbach's internal consistency reliability was calculated for questionnaires at Time 1 measurement. Analysis of variance with repeated measures (ANOVA) was used to examine patterns of change in

responses across time from baseline through the 12 month measures. In preparation for the single-group analyses, we examined the data for violations of the statistical assumptions (independence, normality, sphericity) underlying the repeated measures ANOVA. Although some variables revealed small deviations from normality, ANOVA with repeated measures is robust with respect to violation of normality, with skewness and kurtosis having little impact on the power of the test (Stevens, 2001). This is particularly so with samples greater than 50, as in this study. Baseline scores, age, sex, and ethnicity were used as control variables in the analysis. Scales containing lists of symptoms or concerns were ranked and calculated as a percentage. Unadjusted paired t-tests were computed to determine statistical differences across time when main effects were observed. Significance was established at $p < .05$. All statistical analyses were performed using SPSS 15.0.

Results

Physical Functioning

Intimate partners of ICD patients reported that their general physical health (SF-12 PCS) declined over 1 year, $p = .007$. Physical symptom frequency ($p = .04$) in the partner also declined in the year after cardiac arrest. The decline in SF-12 PCS health averaged 3 points, similar to that reported by Jenkins et al. (2007). PCS-physical health scores in individuals with chronic illnesses has been reported to be an average of 37.75 in heart disease, 38.28 in diabetes, 36.03 in arthritis, and 37.03 in respiratory illness (Rijken, Kerkhof, Dekker, & Schellevis, 2005). Our intimate partners reported slightly higher values for physical health than those of persons with chronic illness in the general population. Post-hoc analyses revealed that baseline-to-3 month ($p = .002$) and baseline-to-12 month ($p = .002$) PCS scores significantly declined in the partner.

The number of physical symptoms reported by partners declined over time, with hospitalization of the patient being the time when partners reported the largest number of physical symptoms. The average number of symptoms reported at hospital discharge was 3.17 ± 2.96 , which was reduced to 2.20 ± 3.07 at 12 months. The top 5 physical symptoms reported by partners included feeling rundown (62%), headaches (36%), low back pain (33%), nausea and upset stomach (28%), and soreness of muscles (26%). Throughout the 12-month period, feeling rundown remained the top symptom reported. Post-hoc comparisons revealed that the greatest reductions in symptom frequency were baseline to 6 months ($p = .007$) and baseline to 12 months ($p = .002$). See Table 2.

Psychological Adjustment

General mental health (SF-12 MCS) in intimate partners improved from hospital discharge throughout 1 year ($p = .03$). MCS mental health scores in individuals with chronic illnesses has been reported to be an average of 46.98 in heart disease, 47.89 in diabetes, 46.59 in arthritis, and 47.13 in respiratory illness (Rijken et al., 2005). Our intimate partners reported similar levels of MCS mental health as the general chronically ill population. Improvement in MCS scores over 1 year averaged 3 points between hospital discharge and 12 months. Post-hoc comparisons demonstrated significant improvements in MCS mental health from baseline to all four follow-up periods ($p < .05$), without significant changes noted between the other time periods.

Anxiety and depression scores in intimate partners decreased during the first year, with anxiety ($p = .002$) and depression ($p = .001$) scores significantly reduced over time. Levels of anxiety reported by intimate partners at hospital discharge were relatively high ($M = 39.91 \pm 12.81$), with a cut-off score of 40 on the STAI reflecting severe anxiety. At the end of 12 months, intimate partners still reported significantly elevated anxiety

($M=35.6\pm12.47$). Post-hoc comparisons between baseline and all follow-up periods demonstrated anxiety to be statistically significantly reduced from baseline.

The level of depression reported by intimate partners was not significantly elevated at any time during the first year, with a cut-off CES-D score of 16 reflecting clinical depression. Post-hoc comparisons between baseline and all follow-up periods demonstrated depression to be statistically significantly reduced from baseline.

Relationship Impact

Impact on family functioning after ICD implantation was the greatest at hospital discharge with improvement over time ($p = .001$). Family functioning was affected the most in the following areas at baseline: patient needed to be protected from stress (77%), patient needed help with treatments (69%), worry about the patient responding to therapy (68%), need for greater sensitivity to mood changes in the patient (67%), and need for more emotional support in the patient (64%). At 12 months, the demands on family functioning were reduced in the following areas: patient needed to be protected from stress (74%), worry about the patient responding to therapy (65%), need for greater sensitivity to mood changes in the patient (64%), need for more emotional support in the patient (62%), and the frequency of sexual activity between partners had changed (62%). Partners no longer reported that the patient needed help in performing medical treatments at home at 12 months. Post-hoc comparisons revealed that levels of family functioning were significantly improved between baseline and 3 months ($p=.006$), baseline and 6 months ($p=.003$), and baseline and 12 months ($p=.005$). Significant improvements were also found between 1 and 3 months ($p=.004$), 1 month and 6 months ($p=.007$), and 1 month and 12 months ($p=.013$).

Both mutuality ($p = .01$) and interpersonal sensitivity ($p = .001$) increased significantly over time. For mutuality at hospital discharge, partners related that they most often tried to keep a positive attitude and a hopeful outlook about the patient's recovery. In addition, keeping communication open, supporting each other, and being comfortable sharing feelings with one another were endorsed as important in supporting the recovery of the ICD patient. At 12 months, partners reported that keeping a positive attitude and maintaining a hopeful outlook, supporting each other, and seeing the lighter side of illness were most important. Post-hoc comparisons showed significant improvements from baseline to all four follow-up periods ($p \leq .05$).

For interpersonal sensitivity at hospital discharge, partners related that they confided in one another, checked in with each other about how each was doing, skipped over negative feelings about the ICD, and did not talk about the sadness that the ICD brought to their lives. At 12 months, partners related that they were still confiding in one another about the ICD and checking in with each other, but talked much less about the ICD and did not talk about sadness that the ICD brought to their lives. Post-hoc comparisons revealed a similar pattern to that of mutuality, with improvements noted from baseline to all four follow-up periods ($p = .05$).

Behavioral care demands of the patient were the highest at the time of ICD implantation, then declined over the first year (2.28 ± 0.76 to 1.86 ± 0.79 , $p = .001$). At hospital discharge, the number of care demands of the patient that needed to be fulfilled by the partner was an average of 2 per day. This was reduced to an average of 1.7 per day at 12 months. The top five individual care demands at both baseline and 12 months included preparing meals, having the patient constantly on one's mind, shopping and making appointments for the patient, checking on the patient during the night, and managing family finances. Of these care demands, 43% were new tasks that were performed by the intimate partner. The level of difficulty in performing care demands was reported as an average of 1.7 on a difficulty scale

of 1 to 5. This level of difficulty was reduced with time. The post-hoc comparisons for behavioral care demands demonstrated significant reductions in demands from baseline to all four follow-up periods ($p \leq .05$). In addition, behavioral care demands were lower between 1 month and 3 months ($p=.01$) and 1 month and 12 months ($p=.003$).

Healthcare Utilization

The number of ER visits and hospitalizations reported by intimate partners over 12 months did not change significantly across time. Few ER visits and hospitalizations were reported over the 1 year period. Outpatient clinic visits for partners increased with time ($p = .001$), averaging 1.32 ± 1.87 visits per partner/year.

Discussion

Our study is one the first to describe patterns of health response in the intimate partners of persons after cardiac arrest and implantation of an ICD. Our findings suggest that the most challenging time for partners is during or right after hospital discharge through 3 months. The greatest improvements in partner outcomes occurred during the initial three months. Intimate partners reported a decline in their physical health. Psychological adjustment, care demands, and impact on the relationship improved over the first year. Intimate partners reported stable ER and hospital visits during the first year after an ICD; outpatient clinic visits averaged 1.3 visits/partner/year.

Partners reported declines in their physical health and had a number of physical symptoms. The most prevalent symptoms were fatigue and feeling rundown. Until last year, there were no published data relating to the physical health status of intimate partners following an ICD. Jenkins et al. (2007) reported declines in physical health in spouses in the AVID trial similar to those of our study. Investigators have identified fatigue, sleep disturbances, and loss of appetite as the main difficulties of spouses of patients recovering from acute myocardial infarction and coronary artery bypass surgery (Dickerson et al., 2000; Kettunen, Solovieva, Laamanen, & Santavirta, 1999; O'Farrell, Murray, & Hotz, 2000). They attributed physical difficulties to the stress in dealing with a cardiac event (spouse's fear of patient death and caregiving demands of the patient). Additionally, spouses may not have the time to address their own healthcare needs while caring for the patient with an ICD.

Intimate partner psychological adjustment after an ICD is similar to that of patients. In previous studies, intimate partners of persons after a cardiac event have reported over-protectiveness, stress, anxiety, fear, anger, depression, guilt, and despair (Doolittle & Sauve, 1995; Pycha et al., 1990; Sneed & Finch, 1992). Family members have reported the greatest anxiety, depression, and stress at the time of hospitalization, with reactions decreasing throughout the first year (Dougherty, 1994; Vlay et al. 1989). ICD shocks have been related to more psychological distress and reduced family adjustment in partners (Dougherty, 1995; Dunbar et al., 1999). Ocampo (2000) suggested that although the patient eventually accepts the device and lifestyle changes, family members may have a difficult time doing so. Pycha et al. reported that within 17 months after ICD implantation, 81% of partners felt that the ICD was a life extender, and 66% of partners felt the ICD was a source of security. Even though patients and partners expressed positive perceptions about the ICD, 94% reported increased preoccupation with the heart more than 1 year after ICD implantation. We also found that partners reported high levels of anxiety throughout the 1 year period after an ICD, but depression in partners was not consistently elevated.

The impact of cardiac arrest and an ICD on the intimate relationship indicated that marital strain and more care demands were common. Dyadic adjustment between couples in the first year following ICD implantation has been reported to remain within a normal range, but to

worsen as the year progressed (Dougherty, 1994). Family social support was noted to be especially low throughout the first year after implantation. Doolittle and Sauve (1995) found differences in perceptions about ICD recovery between spouses and patients. Spouses often discontinued their social activities with friends and outside family during the patient's recovery time. Our data suggest that as time passes, demands on the family are reduced as the patient recovers and takes back important family roles and responsibilities. Partners reported increasing sensitive communication and understanding of what the cardiac arrest and ICD meant for them as a couple as they adjusted to the ICD over time.

The use of healthcare resources in our study was low, especially ER visits and hospitalizations. Yet, outpatient clinic visits significantly increased with time. We found no data on healthcare use of intimate partners following an ICD implantation. Burton, Newsom, Schulz, Hirsch, and German (1997) reported that being a caregiver significantly increased the odds of not getting enough rest, having enough time to exercise or recuperating from illness, and forgetting to take prescription medications. Shaw et al. (1997) examined the risk for experiencing major health events in spousal caregivers of Alzheimer's Disease patients. A trend toward increased risk of caregivers having at least one major health event while providing assistance at home was noted. They surmised that caregivers were reluctant to schedule their own necessary medical care when their spouses had difficulties. We do not know if partners of patients in our study postponed important healthcare visits of their own in order to care for the patient. This would be important information to include in future investigations of the impact of cardiac arrest on partner health.

Limitations of Study

Our findings may not be generalizable to partners of patients who receive an ICD for primary prevention. The health concerns of our participants may be more severe than those expected in partners of patients who have not suffered cardiac arrest. Partners were asked to complete questionnaires in a private area of the home, without the help or input of the ICD patient. Yet, because we mailed questionnaires, we had no control over how the questionnaires were completed. Finally, caution should be exercised in interpreting significant differences across time among the study variables, given the numerous statistical tests that were performed. The *p* values shown are uncorrected for multiple comparisons.

Conclusions

Given family stresses caused by life-threatening illness and increased survival rates following cardiac arrest, it is imperative that interventions be developed that include intimate partners. Our findings suggest that partners could benefit from an intervention that would assist them in their psychological adjustment, manage the impact of ICDs on their relationship, and provide strategies for dealing with caregiving demands at home. Toward that end, how the experience of caregiving affects partners' health and healthcare use are important to address in future investigations.

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Table 1

Demographics of Partner Sample (N=100)

Variable	N (or mean)	% (or SD)
Age	mean = 60.96	SD = 12.58
Charlson co-morbidity index	mean = 2.77	SD = 2.38
<u>Gender</u>	<u>N</u>	<u>%</u>
Male	16	16.3%
Female	82	83.7%
<u>Annual Income</u>		
<30,000	12	24%
30,000 to 49,999	17	34%
>49,999	21	44%
No answer	6	10.7%
<u>Ethnicity</u>		
Caucasian	95	96.9%
American Indian	1	1.1%
Mixed	1	1.1%
Not willing to answer	1	1.0
<u>Education</u>		
Some high school	4	4.1%
Graduated high school	29	29.6%
2 yrs college or vocational	13	13.2%
Graduated college	19	19.4%
Graduate school	10	10.2%
Other	22	22.4%
<u>Employment Status</u>		
Full-time	29	29.6%
Part-time	10	10.2%
Not employed	1	1.0%
Retired	45	45.9%
Full-time housewife	11	11.2%
Other (disabled)	1	1.0%
<u>Medical History</u>		
Diabetes	11	11.1%
Chronic Obstructive Pulmonary Disease	2	2%
Arthritis	36	36.4%
High blood pressure	38	38.4%
Claudication	0	0%
Heart Failure	2	2%
Carotid disease	3	3%

Variable	N (or mean)	% (or SD)
Cardiac arrhythmia	6	6.7%
Stroke	6	6.1%
Hypothyroidism	15	15.2%
Liver/kidney disease	5	5.1%
High cholesterol	14	14.1%
Valvular heart disease	2	2%
Depression	5	5.1%
Anxiety disorder	3	3.0%
Current smoker	12	12.1%
Heart disease	8	8.1%
<u>Total Number of Medications/day</u>		
0	17	17.2%
1	23	23.2%
2–4	34	34.3%
5–10	25	25.3%

Table 2

Partner Repeated Measures ANOVA: Baseline to 12 Months (N=100)

Occasion	Base line		1 month		3 months		6 months		12 months		Multivariate Time Effect		
Variable	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	df	F	p
<u>Physical Functioning</u>													
SF12 Physical Summary	48.3	10.44	46.3	10.93	46.10	10.75	47.28	10.55	45.65	10.58	4,94	3.78	0.007
DOI Physical Symptoms	3.17	2.96	2.80	3.19	2.56	3.44	2.20	2.94	2.20	3.07	4,94	2.65	0.038
<u>Psychological Adjustment</u>													
SF12 Mental Summary	47.95	11.02	50.14	11.39	51.32	9.53	51.10	10.43	50.94	10.25	4,94	2.87	0.027
STAI	39.91	12.81	37.05	13.29	35.16	12.55	34.62	12.72	35.65	12.47	4,92	4.68	0.002
CES-D	13.77	10.52	10.43	10.09	9.90	9.60	9.36	9.45	10.63	10.01	4,91	5.21	0.001
<u>Relationship Impact</u>													
DOI Family Functioning	14.45	7.75	14.10	8.03	12.91	7.74	12.76	8.11	12.82	8.23	4,97	4.12	0.004
MIS Interpers Sensitivity	37.31	6.24	43.03	8.97	42.77	9.49	41.86	9.23	40.82	9.62	4,93	8.06	0.001
MIS Mutuality	64.80	7.20	67.68	9.44	67.84	9.44	68.0	10.27	67.84	9.92	4,93	3.49	0.011
BCD Needs	2.28	0.76	2.07	0.73	1.92	0.79	1.95	0.78	1.86	0.79	4,89	7.37	0.001
BCD Difficulty	1.72	0.71	1.66	0.69	1.47	0.69	1.47	0.64	1.45	0.63	4,89	9.75	0.001
<u>Health Care Use</u>													
ER visits total	--	--	0.011	0.11	0.08	0.46	0.06	0.27	0.11	0.35	3,87	2.78	.046
Hospitalizations Total	--	--	0.03	.23	0.04	0.21	0.01	0.11	0.09	0.36	3,87	1.77	0.16
Outpatient visits total	--	--	0.433	0.70	0.78	1.07	0.99	1.15	1.43	1.87	3,87	9.18	0.001