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Functional support and burden among out-of-home supporters of heart failure patients with and without depression

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Abstract

Objective: Over 20% of patients with heart failure (HF) experience clinical depression, which is associated with higher rates of mortality, morbidity, and hospitalization. Support from a family member or friend (i.e., “CarePartner” or CP) can lower the risk of these outcomes. We examined whether HF patients with depression received more or less assistance from CPs living outside their home. Further, we examined whether patients’ depression was associated with support related strain among out-of-home CPs.

Methods: We analyzed baseline survey data from 348 HF patients with reduced ejection fraction and their CPs. Patients’ with CESD-10 scores (≥ 10) were classified as having clinically significant depressive symptoms (depression). Outcomes included CP-reported hours per week helping with health care, talking with patients via telephone, and the Modified Caregiver Strain Index. Negative binomial regression models examined differences in the amount of in-person and telephone support for patients with and without depression, controlling for patients’ comorbidities, living alone, CPs’ geographic distance and CP emotional closeness to the patient.

Results: CPs provided more in-person support to HF patients with depression ($M=3.64$ hours) compared to those without depression ($M=2.60$ hours per week, $IRR=1.40$, $p=.019$). CPs provided more telephone support to patients with depression ($M=3.02$ hours) compared to those without depression ($M=2.09$ hours per week, $IRR=1.42$, $p<.001$). Patient depression had no effect on caregiver burden ($IRR=1.00$, $p=.843$).

Conclusion: Patients with clinically significant depressive symptoms receive more in-person assistance and telephonic support from CarePartners. Despite that additional contact, caregiver burden was not greater among the supporters of depressed patients.

Keywords

Depression; Heart Failure; Social Support; Helping; Caregiver Burden

Introduction

Approximately 1 in 5 of patients with heart failure (HF) experience significant depressive symptoms (Husaini, Taira, Norris, Moonis, & Levine, 2017; Rutledge, Reis, Linke, Greenberg, & Mills, 2006). Among patients with HF, comorbid depression is associated with worse self-care (e.g., lower rates of heart medication adherence) (Morgan et al., 2006; Riegel, Dickson, Goldberg, & Deatrick, 2007), lower quality of life (Faller et al., 2010), and more frequent emergency department visits and rehospitalizations (Freedland, Carney, et al., 2016; Luttik, Jaarsma, Moser, Sanderman, & van Veldhuisen, 2005; Macchia et al., 2008), which in turn account for significantly greater health care costs compared to HF patients without depression (Fulop, Strain, & Stettin, 2003; Husaini et al., 2017). Further, HF patients with depression have a substantially greater risk of mortality (Deveney, Belnap, Mazumdar, & Rollman, 2016; Freedland, Hessler, et al., 2016; Jiang et al., 2007; Moraska et al., 2013; Rutledge et al., 2006; Sherwood et al., 2007). Depression is nonetheless under-recognized among patients with HF (Cully, Jimenez, Ledoux, & Deswal, 2009; O'Connor & Joynt, 2004; Yohannes, Willgoss, Baldwin, & Connolly, 2010) and only a small proportion of patients with HF and depression receive any treatment for their depressive symptoms (Macchia et al., 2008; Rutledge et al., 2006).

Informal sources of support, from unpaid family members and friends, can help improve disease-related outcomes among adults with HF. Multiple empirical studies demonstrate a link between social support and better self-care among patients with HF (Gallagher, Luttik, & Jaarsma, 2011; Graven & Grant, 2014; Rosland, Heisler, Choi, Silveira, & Piette, 2010; Sayers, Riegel, Pawlowski, Coyne, & Samaha, 2008), while lack of social support is associated with higher rates of re-hospitalization and mortality (Barth, Schneider, & Von Känel, 2010; Luttik et al., 2005; Murberg & Bru, 2001). Fortunately, prior research suggests that many people with HF and similar conditions have a family member or friend who provides support with managing medical conditions. For example, a large, national survey found that 44% of U.S. adults provide disease related support to a functionally independent adult with a chronic health condition (Rosland et al., 2013). Another study found that 74% of surveyed patients with HF had at least one key supporter who helped with disease self-care (Rosland et al., 2010).

Informal supporters living outside the patient's home have the potential to provide meaningful disease related support to older adults with HF. Approximately 28% of all older adults and 38% of older adults with chronic illness live alone (Administration for Community Living & Administration on Aging, 2018; Piette, Rosland, Silveira, Kabeto, & Langa, 2010) suggesting a large need for informal supporters living outside patients' homes. A recent study of current informal supporters in the United States found that 69% provided support to a functionally independent adult living outside of their home (Lee et al., 2017). This support most often included listening to patients' concerns, assisting with chronic

disease self-management, and communicating with patients' health care providers. Together, these findings suggest a need to better understand factors that influence out-of-home supporters' level of support for patients' self-management of chronic health conditions such as HF.

Depression may play an important role in the disease related support that family members and friends provide to patients with HF. The Interpersonal Theory of Depression posits that individuals with depression interact with others in a ways that increase their likelihood of social rejection which, in turn, reinforces their depressive symptoms (Hames, Hagan, & Joiner, 2013; Joiner, 2000). For example, individuals with depression often exhibit greater dependency on others, frequent reassurance seeking, passivity, and social withdrawal. Accordingly, informal supporters would be expected to experience greater burden, burnout over time, and provide less support to chronically ill members of their social network who are depressed. However, at least some evidence suggests that adults with chronic illness and comorbid depression receive more, rather than less, support from family members and friends. For example, Janevic, Rosland, Wiitala, Connell, and Piette (2012) surveyed a representative sample of U.S. adults about their willingness to provide disease-related support to contacts with chronic disease (i.e., heart disease, pulmonary disease, diabetes, and arthritis). Respondents reported greater willingness to help chronically ill contacts who they believed to have comorbid depression as compared to those without comorbid depression (Janevic et al., 2012). This finding suggests that predictions based on the Interpersonal Theory of Depression may not extend to family and friends' willingness to provide support for health management.

Family members and friends often experience burden and role-related strain when providing disease-related support to adults with heart failure (Molloy, Johnston, & Witham, 2005). Greater provision of support is associated with greater burden related to individuals' support roles (Riffin, Van Ness, Wolff, & Fried, 2018) which in turn contributes to poorer caregiver mental and physical health (Pinquart & Sörensen, 2007). However, no studies of which we are aware have directly examined the link between HF patients' depression and support burden among informal supporters living outside patient's home. If out-of-home supporters are providing comparable or greater support to chronically ill adults who are also depressed, it would be important to determine what effect this might have on supporters' own level of support burden.

The purpose of this study was to quantify and compare out-of-home supporters' hours of weekly support and perceived role-related burden among supporters of HF patients with and without depression. We refer to these informal supporters as "CarePartners" rather than caregivers to reflect their role in helping chronically ill adults to manage their own health conditions. First, building upon prior research among informal supporters of patients with chronic diseases (Janevic et al., 2012), we hypothesized that out-of-home CarePartners would provide more hours of support to patients with depression compared to those without depression. Second, we hypothesized that CarePartners of HF patients with depression would experience greater support-related burden than CarePartners of HF patients without depression.

Methods

Participants

The present study used baseline data from patient-supporter dyads participating in a trial of a technology-based support intervention for adults with congestive HF (Piette, Striplin, Marinec, Chen, & Aikens, 2015). HF patients were recruited from outpatient clinics within a VA healthcare system. Eligible patients had to have: 1) a diagnosis of congestive heart failure with an ejection fraction of <40%, 2) a New York Heart Association symptom classification of II or III, 3) at least one VA primary care visit in the past 12-months, and 4) speak English. Patients who had a diagnosis of dementia or serious mental illness; used oxygen; lived in a skilled nursing facility; received palliative care; or had a life-threatening condition were excluded from the study.

Medical records were used to identify potential study participants, who were then screened by telephone and asked to complete a written informed consent form. Patients were asked to identify up to 4 potential out-of-home CarePartners. Patients completed the Norbeck Social Support Questionnaire (NSSQ; Norbeck, Lindsey, & Carrieri, 1983) to quantify the total functional support they received from each potential CarePartner. Individuals with the highest total functional support scores on the NSSQ were designated as the patients' CarePartner except in cases where patients specifically requested to designate another nominated person as their CarePartner. CarePartners were then contacted by telephone. Interested CarePartners were then screened for eligibility and completed informed consents. Eligible CarePartners had to live outside of the patient's home, have a telephone and email, speak English, and have contact with the patient at least once per month. Using these criteria, 372 CarePartner-patient dyads were enrolled in the study.

The purpose of the present study was to examine hours of support provided by these CarePartners. Therefore, based on AARP's definition of "high hour caregiving" (Caregiving in the United States: 2015 Report, June 2015), we excluded CarePartners who reported providing intensive levels of support (i.e., >20 hours of in-person support *or* telephone-based support per week) characteristic of full-time caregivers. Among enrolled supporters, 14 (3.7%) reported providing >20 hours of in-person support and 10 (2.7%) reported providing >20 hours of telephone support per week. The final sample consisted of 348 HF patients with reduced ejection fraction and their out-of-home CarePartners. All study methods and procedures were approved by the VA Ann Arbor IRB.

Measures

Sociodemographic Variables.—Patients' and CarePartners' sociodemographic characteristics including age, gender, race, ethnicity, level of education, marital status, and current employment status were self-reported. Additionally, CarePartners were asked to indicate the nature of their relationship with the patient (adult child, other family member, or friend).

CarePartner Support.—CarePartners were asked to think about the amount of help they provide in six different areas including: 1) shopping and errands; 2) household chores and

preparing meals; 3) taking prescription medications, such as reminders for taking doses and measuring correct doses of medication; 4) transportation, either by driving or with the use of public or private transportation; 5) managing finances, paying bills or filling our insurance claims; and 6) arranging for needed medical services. CarePartners were then asked to indicate the amount of time they spent helping their support recipients using the following item adapted from the Health & Retirement Survey (Davis et al., 1997): “Thinking now about all the kinds of help you provide, about how many hours do you spend helping your [relative/friend] in an average week?” CarePartners’ responses were used to quantify the amount of time they spent providing support to their support recipients with HF. Next, CarePartners were asked, “In a typical week, how many hours do you spend talking on the phone to your [relative/friend] to provide support and reassurance?” CarePartners’ responses were used to determine the amount of time they spent providing support to patients via telephone.

CarePartner Burden.—CarePartners’ burden of support was assessed using a version of the Modified Caregiver Strain Index (MCSI; Thornton & Travis, 2003) which we adapted for use with CarePartners of functionally independent adults with heart failure (Piette et al., 2015). For example, “Caregiving is inconvenient” was changed to “Helping my [relative/friend] is inconvenient” and “Caregiving is confining” was modified to “Helping my [relative/friend] is confining”. CarePartners rated the frequency that they experienced each difficulty on a three-point scale: 2 (“Yes, on a regular basis”) 1 (“Yes, sometimes”) or 0 (“No”). Possible total scores ranged from 0 to 26. The MCSI had adequate internal reliability in this study ($\alpha = .78$).

HF Patients’ Depressive Symptoms.—The Center for Epidemiological Studies Depression Scale – 10 (CESD-10) was used to measure HF patients’ depressive symptoms (Kohout, Berkman, Evans, & Cornoni-Huntley, 1993). Items correspond to ten symptoms of depression. Respondents indicate the frequency with which they have experienced each symptom during the past four-weeks using a four-point scale from 0 “Rarely/none of the time” to 3 “Most or all of the time”. Item responses were summed to generate a total score. Patients with scores ≥ 10 were categorized as having probable depression (hereafter, depression). A cutoff score of 10 or greater has demonstrated a high level of both sensitivity (77%) and specificity (79%) for identifying major depression, as determined by structured clinical interview, among patients with heart disease (McManus, Pipkin, & Whooley, 2005). The CESD-10 showed good internal reliability ($\alpha = .83$) in the current sample of patients with HF.

Control Variables.—Patients were asked whether they had been told by a healthcare provider that they had any of four types of comorbid conditions including cardiovascular conditions (i.e., heart attack, stroke, or coronary artery disease), chronic respiratory disease (i.e., chronic bronchitis, emphysema, COPD, or asthma), chronic pain conditions (i.e., arthritis, chronic back pain, sciatica, or migraine) or gastrointestinal conditions (i.e., heartburn, acid reflux, irritable bowel syndrome, or stomach or duodenal ulcers). Responses were coded 0 = “No” and 1 = “Yes”. CarePartners reported their geographic proximity to the patient in miles (<10 miles = 0, 10 to 20 miles = 1, >20 to 100

miles = 3, and >100 miles = 4). CarePartners' emotional closeness to the patient was measured using a single item ("How close are you to [patient name]") with a Likert type response scale of from 0 (not very close) to 10 (very close). Finally, patients reported their current living situation (0 = live alone in home vs. 1 = live in home with one or more persons).

Data Analysis

All analyses were conducted using Stata 15.0. Descriptive statistics were used to characterize the sample. Univariate distributions and descriptive statistics (i.e., mean and variance) suggested over-dispersion of each count-based outcome variable (in-person and telephone-based support of hours per week, Caregiver Strain Index). Data were incomplete for six study variables with proportions of missing data ranging from 0.3% to 10.2%. The pattern of missingness for each variable was not significantly associated with any other study variables (all $ps > .05$) suggesting that the data were missing at random. We used Multiple Imputation with Chained Equations (MICE) to impute 10 data sets which were used for all subsequent analyses (Azur, Stuart, Frangakis, & Leaf, 2011).¹

We used three negative binomial regression models to analyze the relationship between patient depression status and each outcome (i.e., CarePartners' hours of in-person and telephone support per week and Modified Caregiver Strain Index score) while controlling for patients' medical comorbidities, living situation (live alone vs. live with one or more persons) as well as CarePartners' geographic proximity and emotional closeness to the patient. Incidence Rate Ratios (IRR) were reported for each variable. The dispersion parameter for each model was significantly greater than 0 (all $ps < .001$), thus supporting the use of negative binomial regression. Averaged adjusted means and 95% confidence intervals (95%CI) were calculated for both depressed and non-depressed patients for each outcome using all available cases. Finally, we tested the association between CarePartners' hours of in-person and telephone support per week with Modified Caregiver Strain Index scores using two separate negative binomial regression models. All statistical tests were two tailed with $\alpha = .05$.

Results

Patient and CarePartner Characteristics

Table 1 depicts the descriptive statistics for the sample of HF patients and their CarePartners. Patients were predominantly male (99.1%), White (78.9%), and non-Hispanic (99.1%) with an average age of approximately 68 years ($SD = 10.28$). Approximately half of all patients were married (59.2%) and had at least some college education (51.4%). Nearly one-third (32.5%) of patients lived alone. Only a small proportion of patients were employed (12.4%). Patients had high rates of comorbid cardiovascular diseases (76.3%), chronic pain conditions (50.1%), chronic lung diseases (41.8%), and gastrointestinal diseases (49.1%). Nearly half of HF patients screened positive for probable depression (CESD-10 = 10).

¹The pattern of findings did not change for any of the subsequent models when using all available cases.

Most CarePartners were female (64.4%), White (79.1%), and non-Hispanic (99.1%) with an average age of 47 years ($SD = 13.20$) (Table 1). The majority of CarePartners were married (69.9%), employed (63.1%) and had at least some college education (73.1%). CarePartners were most commonly the adult child of their support recipient (61.8%). Over half of all CarePartners (53.8%) lived within 10 miles of the patient to whom they provided support.

In-person and Telephone Support

Table 2 depicts the results of separate multivariable negative binomial regression models predicting CarePartners' in-person and telephone support hours per week. Results showed that patients with depression received 35% more hours of in-person support per week from their CarePartners compared to patients without depression when controlling for patients' comorbidities, living alone, and CarePartners' geographic proximity and emotional closeness ($IRR = 1.35$, 95%CI: 1.01, 1.79, $p = .040$). Adjusted marginal means showed that CarePartners provided an average of 3.43 hours (95%CI: 2.75, 4.11) of in-person support per week to depressed HF patients and an average of 2.55 hours (95%CI: 2.01, 3.09) to non-depressed HF patients.

Similarly, the second negative binomial regression model showed that patients with depression received 42% more hours of telephone-based support per week compared to patients without depression after adjusting for patients' comorbidities, living alone, and CarePartners' geographic proximity and emotional closeness ($IRR = 1.42$, 95%CI: 1.16, 1.73, $p < .001$). Adjusted marginal means showed that CarePartners provided an average of 2.88 hours (95%CI: 2.48, 3.28) of telephone-based support per week to depressed patients and an average of 2.01 hours (95%CI: 1.70, 2.31) telephone-based support per week to non-depressed patients.

Caregiving Strain

Table 2 depicts the results of a multivariable negative binomial regression model predicting Modified Caregiver Strain Index (MCSI) score. Despite the additional caregiving contact, patient depression was not significantly associated with caregiving strain ($IRR = 1.00$, 95%CI: 0.81, 1.23, $p = .984$). CarePartners adjusted marginal mean MCSI score was 3.17 (95%CI: 2.71, 3.63) for patients with depression and 3.14 (95%CI: 2.67, 3.61) for those without depression.

CarePartners who provided greater in-person support hours per week had significantly greater MCSI scores ($IRR = 1.03$, 95%CI: 1.01, 1.06, $p = .008$). However, CarePartners' weekly telephone support hours were not significantly associated with their MCSI scores ($IRR = 1.02$, 95%CI: 0.98, 1.06, $p = .341$).

Discussion

Findings from this study indicate that health supporters ("CarePartners") of patients with HF living outside the patients' home provide approximately one additional hour of in-person and one additional hour of telephone-based support per week to individuals with comorbid depression compared to those without comorbid depression – after adjusting from patients' medical comorbidities, patients' living situation (i.e., living alone vs. living with one or

more persons) and CarePartners' geographic proximity and emotional closeness to the patient. Contrary to our hypothesis and contrary to what would be predicted by the Interpersonal Theory of Depression, supporter burden did not differ between HF patients with and without depression despite the additional contact.

Our results are consistent with findings from at least one prior study which showed that family members and friends were twice as likely to be willing to provide support to adults who had both a chronic health condition (i.e., arthritis, diabetes, heart disease, lung disease) and depression compared to those without comorbid depression (Janevic et al., 2012). The present study builds on these findings in several ways. First, Janevic et al. (2012) relied on informal supporters' report of both patients' depressive symptoms as well as their own willingness to provide support. The use of only one dyad member increases the risk of single-source bias (Campbell & Fiske, 1959). Single-source bias is a form of common-method variance which results in spuriously high correlations attributable to a common source of the measurement (i.e., a single survey respondent) (Meier & O'Toole, 2012). In contrast, the present study surveys both patients and their informal supporters. As a result, we were able to examine the association between patients' self-reported depressive symptoms and CarePartners' report of their hours of weekly support. Second, this study examined differences in support from out-of-home supporters – who represent a large and untapped resource for chronic disease related support (Rosland et al., 2013). Third, whereas Janevic et al. (2012) assessed individuals' willingness to provide support, our data allowed us to quantify the weekly hours of in-person support and telephone-based support provided by informal supporters.

Findings from this study run counter to predictions based on Interpersonal Theory of Depression, which suggests that having depression is associated with receiving less rather than more overall social support (Hames et al., 2013; Joiner, 2000). We did not assess supporters' reasons for providing greater support to HF patients with or without depression. However, we offer several possible explanations for this finding. First, supporters may be more accepting of depression among patients with heart failure because they attribute depressive symptoms to circumstances outside of patients' control or view depressive symptoms as appropriate given the patients' medical issues. Second, individuals who provide disease-related support may have particularly strong relationships with patients and be more motivated to provide support. Consequently, the amount of time these individuals spend providing support may be less affected by patients' depressive symptoms. However, patients' depressive symptoms may erode interpersonal relationships and reduce available support within patients' broader social networks.

Our results indicate that out-of-home supporters provide substantially more weekly support hours to HF patients with depression as compared to those without depression. However, it is not clear what factors cause these out-of-home supporters to provide more support to HF patients with depression. For example, supporters may recognize patients' depressive symptoms and respond by providing more assistance. Indeed, prior work shows that caregivers are relatively accurate in estimating HF patients self-reported depressive symptoms (Quinn, Dunbar, & Higgins, 2010). Alternatively, supporters may not explicitly recognize patients' depressive symptoms but nevertheless perceive these patients as having

greater support deficits. Existing research shows that HF patients with depression have poorer disease self-management (Maeda, Shen, Schwarz, Farrell, & Mallon, 2013; Yohannes et al., 2010) and greater functional limitations (Shimizu, Yamada, Miyake, & Izumi, 2011). Consequently, HF patients with depression may have more apparent support needs compared to those without depression.

This study is among the first to examine caregiving strain among supporters living outside of their support recipients' home. Caregiver strain, measured using the Modified Caregiver Strain Index (Thornton & Travis, 2003), was relatively low among the study sample of out-home supporters. For example, previous studies using the same measure of caregiver strain have reported moderately higher scores among caregivers of medically complex older adults with chronic health conditions (Giovannetti, Wolff, Frick, & Boulton, 2009; Wolff et al., 2009) and substantially higher scores among caregivers of adults with serious functional limitations such as dementia and Parkinson's disease (Jennings et al., 2015; Peters, Fitzpatrick, Doll, Playford, & Jenkinson, 2011). Nevertheless, we found that greater weekly hours of in-person support was associated with greater strain among supporters living outside of HF patients' homes. This result is consistent with previous findings showing that a greater number of caregiver hours is associated with greater strain among caregivers of patients with heart failure and other chronic diseases (Dionne-Odom et al., 2017; Saunders, 2008; Wakefield, Hayes, Boren, Pak, & Davis, 2012). In contrast, our results indicate that telephone-based support is not associated with greater supporter strain. Support activities that require direct contact with patients may be more energy or resource intensive compared to types of support provided via telephone.

We did not find a significant association between HF patients' depressive symptoms and caregiving strain. This finding suggests that out-of-home supporters do not experience greater burden in providing support to HF patients with comorbid depressive symptoms. In contrast, results from prior studies of predominantly in-home supporters have found that HF patients' depressive symptom severity was significantly associated with greater support related burden (Ågren, Evangelista, & Strömberg, 2010; Saunders, 2008). Discrepancies between these findings and those reported in the current study may be due to differences in supporter location. The sample of supporters in the present study were all living outside of the patient's home; however, previous studies have used samples which include both in and out-of-home caregivers. Supporters living outside of their support recipient's home may experience fewer support demands and lower caregiver strain compared to those living with their support recipient. Similarly, patients' depressive symptoms may have a more limited impact on caregiver strain among supporters living outside the patients' home compared to those living with patients. Future studies are needed to compare support burden among supporters living inside vs. outside patients' homes. However, non-cohabitating supporters may be less susceptible to strain and burden associated with providing support to HF patients with depression. Consequently, out-of-home supporters may represent an important target of interventions to improve HF support while minimizing supporter burden.

These findings should be interpreted in the context of five important limitations. First, given the observational nature of the study, we were unable to determine the directional relationship between patient depression and each outcome (i.e., hours of direct and

telephone support per week and supporter strain). While it may be possible that greater hours of support contribute to greater patient depression, this would be inconsistent with the large body of research showing that greater availability of social support contributes to less depressive symptoms (Hames et al., 2013). Second, we quantified support by assessing out-of-home supporters' hours of in-person help and telephonic support per week. However, we did not assess specific types of functional support (e.g., emotional or instrumental) provided by informal supporters. Third, patients with probable depression were identified using the CESD-10. Prior studies have demonstrated that the CESD-10 is an accurate screening instrument for identifying major depression among both older adults and patients with chronic heart disease (Kohout et al., 1993; McManus et al., 2005). However, we were not able to verify patients' diagnoses of major depression. Fourth, the sample of Veterans used in the study was predominantly non-Hispanic White and almost entirely male, and the relationships of interest may differ in racial-ethnic minority communities or when the patient is female. Fifth, the present study included only HF patients with reduced ejection fraction (<40%) and may not generalize to HF patients with preserved ejection fraction who are frequently older, female, and have a more comorbidities (Borlaug & Redfield, 2011).

Conclusions

Out-of-home supporters provide significantly more hours of in-person and telephone-based support per week to HF patients with comorbid depression than to those without depression. These findings suggest that informal supporters living outside HF patients' homes recognize greater support need among HF patients' depressive symptoms and respond by providing additional assistance and support. However, future studies could examine the mechanisms linking HF patient depression with greater assistance from out-of-home supporters. Findings from such studies could be used to inform the development of programs to further improve informal supporters' ability to recognize and respond effectively to HF patients with depressive symptoms. Finally, additional research could examine the effectiveness of dyadic programs to leverage additional support hours provided by out-of-home supporters to patients with comorbid depression who are at particularly high risk of poor HF disease related outcomes.

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Table 1.Characteristics of CarePartners and HF patients ($N = 348$)^a

	CarePartners	HF patients
Age, years (mean $\pm$ SD)	47.04 $\pm$ 13.20	68.01 $\pm$ 10.28
Male	123 (35.6%)	344 (99.1%)
Race		
White	271 (79.1%)	271 (78.9%)
Black	71 (20.1%)	76 (18.5%)
Non-Hispanic	338 (99.1%)	344 (99.1%)
Some college or higher	250 (73.1%)	175 (50.4%)
Employed	215 (63.1%)	43 (12.4%)
Married	239 (69.9%)	206 (59.2%)
Patient lives alone ^b		113 (32.5%)
Relationship to patient		
Adult child	177 (51.2%)	--
Other family member	114 (33.0%)	--
Friend or acquaintance	53 (15.3%)	--
Distance from patient		
0 to <10 miles	187 (53.7%)	--
10 to <20 miles	39 (11.2%)	--
20 to 100 miles	64 (18.4%)	--
> 100 miles	58 (16.7%)	--
Depressed, CESD 10	--	167 (48.0%)
Other cardiovascular disease	--	266 (76.3%)
Chronic lung disease	--	146 (41.8%)
Chronic pain	--	179 (50.1%)
Gastrointestinal condition	--	174 (50.0%)
In-person support hours/week, (mean $\pm$ SD)	2.97 $\pm$ 4.01	
Telephone support hours/week, (mean $\pm$ SD)	2.44 $\pm$ 2.67	
Caregiver Strain Index, (mean $\pm$ SD)	3.14 $\pm$ 2.88	

HF = Heart Failure, SD = Standard Deviation

^aDescriptive statistics based on analysis of all available cases.^bPatient lives alone vs. with 1 other persons

Table 2.

Negative binomial regression models examining predictors of CarePartners' weekly hours of in-person and telephone-based support and Modified Caregiver Strain Index scores ($N = 348$)

Predictors	Hours of in-person assistance			Hours of telephone support			Modified Caregiver Strain Index					
	IRR	95%CI	p	IRR	95%CI	p	IRR	95%CI	p			
Depression ^a	1.35	1.01	1.79	.040	1.42	1.16	1.73	.001	1.23	.984		
Other comorbidities ^a												
Other CVD	1.27	0.90	1.80	.177	1.00	0.78	1.28	.987	1.18	0.92	1.51	.191
Chronic lung disease	1.08	0.79	1.47	.629	0.85	0.69	1.04	.114	1.05	0.84	1.30	.684
Chronic pain	1.45	0.47	4.46	.514	1.26	0.45	3.18	.628	0.92	0.38	2.25	.857
GI disease	0.73	0.24	2.24	.576	0.82	0.33	2.09	.680	1.23	0.51	3.03	.641
Geographic proximity												
0 to <10 miles (ref)	-	-	-	-	-	-	-	-	-	-	-	-
10 to 20 miles	0.65	0.40	1.03	.066	0.73	0.52	1.04	.081	0.90	0.64	1.27	.560
20 to 100 miles	0.70	0.48	1.29	.600	0.89	0.67	1.18	.424	0.93	0.71	1.23	.633
>100 miles	0.28	0.18	0.44	<.001	0.97	0.73	1.29	.831	0.96	0.72	1.28	.770
Emotional closeness	1.12	0.77	1.21	.002	1.19	1.13	1.25	<.001	0.95	0.91	0.99	.025
Lives alone ^b	0.93	0.77	1.44	.734	0.92	0.74	1.15	.464	1.12	0.89	1.41	.323

IRR = Incident Rate Ratio, 95%CI = 95% Confidence Interval, LL = Lower Limit, UL = Upper Limit, CVD = Cardiovascular Disease, GI = Gastrointestinal

^aNot present = 0, present = 1

^bPatient lives in home alone = 0, patient lives with one or more other persons = 1