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Journal of Family Nursing published online 4 November 2013

DOI: 10.1177/1074840713510205

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Journal of Family Nursing

XX(X) 1–22

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DOI: 10.1177/1074840713510205

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Abstract

Emotions are contagious in couples. The purpose of this study was to analyze the manner in which adults with chronic heart failure (HF) and their informal caregivers influence each other's self-care behavior and quality of life (QOL). A sample of 138 HF patients and spouses was enrolled from ambulatory centers across Italy. The Actor–Partner Interdependence Model (APIM) was used to analyze dyadic data obtained with the Self-Care of Heart Failure Index (SCHFI), the Caregivers Contribution to the SCHFI, and the Short Form 12. Both actor and partner effects were found. Higher self-care was related to lower physical QOL in patients and caregivers. Higher self-care maintenance

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in patients was associated with better mental QOL in caregivers. In caregivers, confidence in the ability to support patients in self-care was associated with improved caregivers' mental QOL, but worsened physical QOL in patients. Interventions that build the caregivers' confidence are needed.

Keywords

family caregivers, heart failure, dyads, couples, Actor–Partner Interdependence Model, self-care, quality of life

Introduction

A growing body of literature addresses the unique bond that forms between individuals in a committed personal relationship (Lewis et al., 2006). Observing the emotional expressions of another person causes an automatic tendency to share the person's experiences (Frith & Frith, 2006), and emotions are particularly contagious in couples (Chung, Moser, Lennie, & Rayens, 2009; Rohrbaugh, Shoham, Cleary, Berman, & Ewy, 2009). Yet, the study of emotional contagion within couples is in its infancy in couples in which one individual is the caregiver for a spouse with a chronic illness. Therefore, the purpose of this study was to analyze the manner in which adult patients with chronic heart failure (HF) and their informal spousal caregivers influence each other's self-care behavior and quality of life (QOL).

Background

HF affects more than 5 million individuals in the United States and many more million worldwide, especially in countries with large numbers of older adults (Go et al., 2013). In 2002, it was reported that HF had an overall population prevalence of approximately 1% to 3%, rising to approximately 10% in the very elderly (McMurray & Stewart, 2002). In the United States, currently about 2.8% of the adult population has HF (Go et al., 2013). In Italy, where these data were collected, 1.1% of the overall population has HF with a prevalence that increases to 12.1% in people aged 70 and over (Valle et al., 2006). Self-care is an integral element of the treatment of HF that is necessary at all stages of HF (Riegel, Lee, & Dickson, 2011).

The trajectory of HF is unpredictable, with a gradual decline in functional capacity that is accompanied by significant symptom burden, impaired mental acuity, and poor QOL (Dekker, 2012; Gott et al., 2006; Pressler et al., 2010). This decline in functioning, accompanied by an increase in caregiving responsibilities, significantly burdens informal caregivers (Calvert, Freemantle, &

Cleland, 2005; Friedman, 1997; Goldstein & Lynn, 2006; Lee, Yu, Woo, & Thompson, 2005; Lewis et al., 2001; Pressler et al., 2013). In couples, the burden of caregiving has been shown to impair the couple's relationship by causing difficulties in communication and social roles that accentuate the emotional distress experienced by both patients and caregivers (Luttik, Blaauwbroek, Dijker, & Jaarsma, 2007; Molloy, Johnston, & Witham, 2005).

Although the interdependence between individuals in a committed relationship has been discussed in the health care literature for decades (Geden & Taylor, 1999; Vellone, Piras, Venturini, Alvaro, & Cohen, 2012), relatively few investigators have studied HF patient and caregiver dyads. Seven such studies were located (Agren, Evangelista, Davidson, & Stromberg, 2011; Agren, Evangelista, Hjelm, & Stromberg, 2012; Chung et al., 2009; Kurylo, Elliott, DeVivo, & Dreer, 2004; Luttik, Jaarsma, et al., 2007; Retrum, Nowels, & Bekelman, 2012; Sebern & Riegel, 2009), but only one of these used an analytic approach that allowed assessment of the effect of one individual on the other person in the dyad (Chung et al., 2009). Three of the studies compared outcomes in separate patient and partner groups (Agren et al., 2011; Agren et al., 2012; Luttik, Jaarsma, et al., 2007), an approach referred to as family-related rather than family research (Feetham, 1991). Four of the studies examined the influence of one person's emotions on behavior of the partner, but none of these studies fully accounted for the dynamics of the dyad. For example, in one study of 27 patients with HF and their family caregivers, a negative orientation toward solving problems in caregivers was a significant predictor of higher depression and decreased QOL in patients (Kurylo et al., 2004). In another study exploring the contribution of supportive relationships to HF self-care in 75 dyads, strong, positive relationships were found between patient and spousal caregiver shared care decision making and HF patients' self-care maintenance and self-care confidence (Sebern & Riegel, 2009). Another study examined congruence or consistency in perspective in 17 patient and caregiver dyads using a qualitative approach (Retrum et al., 2012). These authors found that much of the tension and distress among couples was due to conflicting views about how emotions should be expressed.

Only one prior study of HF and caregiver dyads used the Actor-Partner Interdependence Model (APIM), an analytic approach that fully accounts for dyadic dynamics (Chung et al., 2009). Chung and colleagues enrolled 58 HF patient and spousal caregiver dyads from a single site in the Southeastern United States. Depressive symptoms and anxiety were assessed using the Brief Symptom Inventory. QOL was assessed using the Minnesota Living With Heart Failure Questionnaire. Using a cross-sectional design, the investigators found both actor and partner effects.

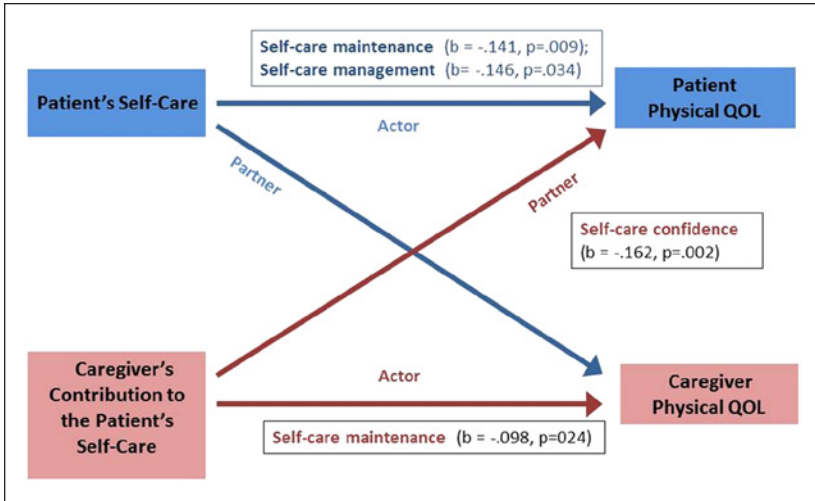


Figure 1. The actor and partner effects of self-care maintenance, management, confidence on physical QOL in patient-caregiver dyads ($N = 138$).
 Note. QOL = quality of life.

Depression and anxiety had significant actor effects on both patients and spouses; those with more depression and higher anxiety had poorer QOL. Partner effects were evident on patients' QOL; patients whose spouses had more depressive symptoms and higher anxiety were more likely to have poorer QOL (Chung et al., 2009).

No other studies of dyadic dynamics were located in the existing HF literature. Because so little is known about the manner in which HF patients and their informal caregivers influence each other and because self-care and QOL are such fundamental issues in HF, we explored the manner in which self-care contributes to QOL in patients and spousal caregivers.

Method

The research question that stimulated this study was: How does chronic illness affect the manner in which individuals in a couple influence each other? The specific aim of this study was to describe the manner in which QOL and self-care vary within a couple as a function of chronic HF. We hypothesized that, in dyads of HF patients and spousal caregivers, the QOL and self-care of one member of the dyad would influence the QOL and self-care of the other member of the dyad. All analyses were guided by the model shown in Figure 1.

Design and Sample

A cross-sectional design was used to conduct the study. A convenience sample of 1,192 HF patients was enrolled from ambulatory cardiovascular centers in 19 Italian provinces located in the north, center, and south of Italy. Inclusion criteria specified enrollment of only adults (older than 18 years) with a confirmed diagnosis of HF regardless of etiology or type. HF was confirmed by echocardiography and clinical evidence of HF. Patient participants had to be stable, without an acute coronary event in the prior 3 months. Otherwise eligible patients were excluded if they had obvious evidence of dementia. No other inclusion and exclusion criteria were specified, so that we could include as many patients as possible. This analysis was conducted using data from enrolled patient participants who were accompanied by a spousal caregiver at the time of enrollment. The rationale for focusing on spouses was that generally spousal caregivers are considered the primary caregivers and their relationship with patients is more interdependent than other family members or caregivers (Lewis et al., 2006). Any spouse accompanying an enrolling HF patient was invited to enroll; no further inclusion or exclusion criteria were specified for the spousal caregivers.

Procedures

The Institutional Review Board of each center where patients and caregivers were recruited approved the study. Data collection was done by nurses who were trained in the standardized collection of research data. Data collectors screened patients during routine ambulatory visits. When patients met the inclusion criteria, the study was explained and patients were invited to participate. If an informal primary caregiver was attending the patient's visit, the research assistant invited him or her to participate as well. Both patients and caregivers gave written informed consent before data collection was done. All data were obtained in a private, quiet room. Anecdotally, most caregivers completed the instruments on their own, while most patients asked research assistants to read the instrument items to them.

Instruments. Both patients and caregivers completed a sociodemographic survey, a measure of self-care, and a measure of QOL, as detailed below. An investigator-designed survey was used to collect information regarding the dyad's sociodemographic characteristics (e.g., age, gender, education, relationship between patient and caregiver). Information on the patient's clinical status (e.g., illness duration, New York Heart Association [NYHA] functional class, ejection fraction) was abstracted by nurses from the medical record.

Self-Care of Heart Failure Index (SCHFI) version 6.2. The SCHFI version 6.2 (v.6.2; Riegel et al., 2004; Riegel, Lee, Dickson, & Carlson, 2009) was used to measure self-care in HF patients. The SCHFI is a widely used instrument measuring self-care behaviors in people with HF that consists of three scales: the self-care maintenance, the self-care management, and the self-care confidence scales. The self-care maintenance scale has 10 items measuring self-monitoring (e.g., checking weight daily) and treatment adherence (e.g., following a low salt diet, taking medications). The self-care management scale has six items that measure how quickly patients recognize and evaluate symptoms of a HF exacerbation (shortness of breath or ankle swelling), treatment implemented after symptoms are identified (e.g., reducing salt and fluid intake) and treatment evaluation. The self-care confidence scale, with six items, evaluates how much confidence patients perceive in each phase of the self-care process (e.g., confidence in symptom management). All SCHFI v.6.2 items use a 4-point self-report scale. Each SCHFI v.6.2 scale yields a standardized score from 0 to 100 where higher scores mean better self-care. The SCHFI v.6.2 has adequate psychometric characteristics in the U.S. population (Riegel et al., 2009) and has been found to have adequate validity and reliability in the Italian population as well (Vellone, Riegel, Cocchieri, Barbaranelli, D'Agostino, Antonetti, et al., 2013).

Caregiver Contribution to SCHFI. The Caregiver Contribution to Self-Care of Heart Failure Index (CC-SCHFI; Vellone, Riegel, Cocchieri, Barbaranelli, D'Agostino, Glaser, et al., 2013) was used to measure self-care contributions by caregivers. The CC-SCHFI is a modified version of the SCHFI v.6.2 for use with caregivers of HF patients that measures the extent to which a caregiver contributes to a patient's self-care maintenance and self-care management as well as the caregiver's confidence in his or her ability to contribute to the patient's self-care. Items in the CC-SCHFI correspond perfectly to those of the SCHFI v.6.2. The caregiver contribution to the self-care maintenance scale, with 10 items, measures how often a caregiver recommends to the patient that she or he monitor HF symptoms (e.g., checking ankles for swelling) and adhere to HF treatment (e.g. reminding the patient not to forget his or her medicine). The scale also assesses how often the caregiver substitutes for the patient because she or he is not able to do specific behaviors (e.g., checking the patient's ankles or administering the medicines). The caregiver contribution to the self-care management scale has six items that measure the caregiver's ability to recognize HF symptoms in the patient (e.g., trouble breathing or ankle swelling), implement treatments for symptoms (e.g., reducing salt in the patient's diet), and evaluating the treatment implemented. The caregiver's confidence in his or her contribution to self-care has six items that assess the extent to which the caregiver feels confident contributing to

the patient's self-care (e.g., confidence in evaluating the importance of the patient's symptoms). Each CC-SCHF item uses a 4-point self-report scale. A standardized score from 0 to 100 is computed for each scale; higher scores indicate more caregiver contribution to patient's self-care. Construct and discriminant validity, internal consistency, and test-retest reliability of the CC-SCHF have been shown in the Italian population (Vellone, Riegel, Cocchieri, Barbaranelli, D'Agostino, Glaser, et al., 2013).

Short Form 12 (SF-12). The SF-12 (Ware, Kosinski, & Keller, 1996), a generic measure of QOL appropriate for adult populations, was used in both patients and caregivers. The SF-12 is composed of 12 items that are aggregated into two dimensions: the Physical Component Summary (PCS) and the Mental Component Summary (MCS). The PCS items address physical QOL as influenced by physical health, physical functioning, role limitations caused by physical health and bodily pain. The MCS items address mental QOL as influenced by mental health, vitality, role limitations caused by mental health and social functioning. A standardized score ranging from 0 to 100 is obtained from each SF-12 dimension, with higher scores indicating better QOL. The SF-12 has been demonstrated to be a valid and reliable instrument in the Italian population (Gandek et al., 1998) and has been used in several studies to measure QOL in HF patients (Ad, Henry, & Hunt, 2011; Hopman et al., 2009; Prior, Jordan, & Kadam, 2012) and in caregivers of older adults with chronic conditions (Akosile, Okoye, Nwankwo, & Mbada, 2011; Roth, Perkins, Wadley, Temple, & Haley, 2009; Vellone et al., 2011). In this study, the SF-12 was administered to both members of the dyad.

Statistical Analysis

The APIM was used to analyze the dyadic data, as this approach allows investigators to evaluate the influence of partners on each other (Rayens & Svavarsdottir, 2003). In APIM, the actor effect is the influence of a person's emotions on himself or herself (e.g., effect of depression on QOL). The partner effect is the impact of one person's emotions on his or her partner (e.g., effect of depression in one person on the partner's QOL). This analytic approach has been applied to adaptation in families of young children with asthma (Rayens & Svavarsdottir, 2003), fear in cancer survivors and their family caregivers (Mellon, Kershaw, Northouse, & Freeman-Gibb, 2007), distress in couples in therapy (Anderson & Johnson, 2010; Cook & Snyder, 2005), physical and mental health of survivors of advanced prostate cancer and their spousal caregivers (Zhou et al., 2011), QOL of children with cystic fibrosis and their caregivers (Driscoll, Schatschneider, McGinnity, & Modi,

2012), mental and physical health of patients awaiting coronary artery bypass grafting surgery and their partners or family caregivers (Thomson, Molloy, & Chung, 2012), distress in stroke patients and caregivers (Twiddy, House, & Jones, 2012), and psychological well-being in Korean family caregiving dyads (Kim, Reed, Hayward, Kang, & Koenig, 2011).

All analyses were conducted using SPSS for windows, version 20. An α level of .05 was used throughout. Paired sample *t*-tests were used to provide characteristics of distinguishable dyad members, patients, and spousal caregivers. To determine how an individual's QOL was influenced by his/her own self-care and the partner's self-care, we used a multilevel modeling dyadic analysis, APIM with distinguishable dyads (Kenny, Kashy, & Cook, 2006). In this APIM, the residual structure was treated as heterogeneous compound symmetry, including an inter-spousal correlation and separate variances for spouses' QOL. Prior to analysis, data were restructured to a pairwise dyadic data set, and the actor and partner scores on predictors were grand-mean centered and standardized using *z*-score to obtain both unstandardized and standardized regression coefficients for the actor and partner effects. We also used Pearson's product-moment correlation coefficients to identify bivariate association among predictors.

Results

Characteristics of Patient-Spouse Dyads

Within the sample of 1,192 HF patients, only 339 (28.4%) attended the medical visit with a caregiver. Of these 339 patients, 138 (40.7%) of the caregivers were spouses. These 138 dyads form the unit of analysis. The mean age of patients was 73.6 years ($SD = 9.6$) and most were males (64.4%). More than 85% of patients had less than high school education and were retired or unemployed. The median illness duration was almost 4 years. Patients were distributed throughout the four categories of NYHA functional class, although class IV (i.e., symptomatic at rest) was less represented than the other classes. The average ejection fraction was 43% (Table 1). Spousal caregivers were 70.4 years old ($SD = 9.4$) on average, and most were female (67.4%). Education was low for most caregivers as only 22% of them had a high school or university education. Few caregivers (15.9%) were working outside the home (Table 1). Comparing sociodemographic variables within the dyads, patients were 3 years older than caregivers (paired $t = 5.6, p < .001$). Patients were more likely to be male while caregivers were more likely to be female ($p < .001$ Fisher exact test). Patients and caregivers were not different in years of education ($p = .45$ Mann-Whitney U test) or in employment ($p = .74$ Fisher exact test).

Table 1. Patients' ($n = 138$) and Caregivers ($n = 138$) Characteristics on Enrollment.

| | Patients N (%) | Spousal caregivers N (%) |
|--|-------------------|-----------------------------|
| Age (<i>M, SD</i>) | 73.6 (9.6) | 70.4 (9.4) |
| Gender | | |
| Male | 93 (67.4) | 45 (32.6) |
| Female | 45 (32.6) | 93 (67.4) |
| Education | | |
| Elementary | 48 (35.0) | 47 (34.3) |
| Middle school | 45 (32.8) | 41 (29.9) |
| Professional school | 24 (17.5) | 18 (13.1) |
| High school | 16 (11.7) | 24 (17.1) |
| University degree | 4 (2.9) | 7 (5.1) |
| Profession | | |
| Employed | 19 (13.8) | 22 (15.9) |
| Unemployed | 119 (86.2) | 116 (84.1) |
| Illness duration (years, median, interquartile ranges) | 3.7 (2.1-6) | |
| NYHA | | |
| I | 30 (21.7) | |
| II | 46 (33.3) | |
| III | 49 (35.5) | |
| IV | 13 (9.4) | |
| Ejection fraction (<i>M, SD</i>) | 43 (10.8) | |

Note. NYHA = New York Heart Association; SD = standard deviation.

Comparing patients from the dyads studied in our sample to those in the entire sample, the only difference was in comorbidity; patients cared for spousal caregivers had higher comorbidity than the rest of the sample (2.8 vs. 3.4 illnesses, $p = .02$). The two groups were statistically equivalent in the patients' age ($p = .14$), education ($p = .59$), NYHA functional class ($p = .96$), ventricular ejection fraction ($p = .10$), and illness duration ($p = .11$).

Self-Care and QOL in Patient–Spousal Caregiver Dyads

As shown in Table 2, patients and spousal caregivers reported similar levels of self-care maintenance, management, and confidence, but, as expected, patients' QOL (i.e., physical QOL and mental QOL) was worse than that of their spousal caregivers. Patients' self-care maintenance, management, and confidence were significantly correlated with those of caregivers, with the

Table 2. Comparisons of Self-Care and Quality of Life Between Patients and Spousal Caregivers.

| Characteristics | Patients | Spousal caregivers | Paired <i>t</i> | <i>p</i> value |
|-----------------|------------------------|------------------------|-----------------|----------------|
| | <i>M</i> (<i>SD</i>) | <i>M</i> (<i>SD</i>) | | |
| Self-care | | | | |
| Maintenance | 53.7 (15.5) | 55.2 (16.6) | -0.894 | .373 |
| Management | 51.0 (18.5) | 52.4 (16.6) | -0.620 | .576 |
| Confidence | 49.8 (18.5) | 52.2 (17.8) | -1.548 | .124 |
| Quality of life | | | | |
| Physical | 36.1 (9.7) | 43.1 (8.3) | -6.9 | <.001 |
| Mental | 43.1 (9.8) | 46.6 (9.7) | -3.5 | .001 |

Note. *SD* = standard deviation.

strongest correlation found for self-care management (Table 3). Patients' self-care scores were negatively correlated with their own physical QOL; higher self-care maintenance was associated with worse physical QOL. Self-care management was not significantly correlated with physical QOL of patients or caregivers. However, spousal emotional QOL was significantly correlated with patients' self-care maintenance and confidence. There were no high correlations among predictors; all correlation coefficients were less than .6. Although patients' physical QOL was not significantly correlated with spouses' physical QOL ($r = .013, p > 0.5$), patients' mental QOL was significantly correlated with spouses' mental QOL ($r = .345, p < .001$).

Influence of Self-Care on Physical QOL

The results of the APIM analysis are presented in Figures 1 and 2. Details are shown in Table 4. There is evidence for an actor effect of self-care maintenance on physical QOL for both patients and caregivers; individuals higher in self-care maintenance were lower in physical QOL. Specifically, a one unit increase in patient self-care maintenance was associated with a 0.141 unit decrease in physical QOL. For caregivers, a one unit increase in self-care maintenance was associated with a 0.098 unit decrease in their physical QOL. For self-care management, the only actor effect was on physical QOL of patients ($b = -.146, p = .034$); higher self-care management was associated with lower physical QOL. The only partner effect of self-care confidence was on physical QOL of caregivers to patients; every one unit increase in the caregiver's confidence was associated with a 0.162 unit decrease in the patient's physical QOL.

Table 3. Correlation Among Predictors and Outcome Variable.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|-------------------------------|---------|--------|--------|--------|--------|---------|-------|------|--------|
| 1. Patient self-maintenance | .228** | | | | | | | | |
| 2. Caregiver self-maintenance | .488** | .336** | | | | | | | |
| 3. Patient self-management | .444** | .418** | .478** | | | | | | |
| 4. Caregiver self-management | .423** | .257* | .545** | .412** | | | | | |
| 5. Patient self-confidence | .230 | .357** | .338** | .492** | .508** | | | | |
| 6. Caregiver self-confidence | -.225** | -.039 | -.178 | .118 | -.050 | -.248** | | | |
| 7. Patient physical QOL | -.070 | -.203* | -.149 | -.077 | -.154 | -.143 | .103 | | |
| 8. Caregiver physical QOL | .120 | -.075 | -.023 | .173 | .169* | .050 | -.082 | .107 | |
| 9. Patient mental QOL | .220** | .193* | -.025 | -.010 | .185* | .262** | -.182 | .092 | .304** |
| 10. Caregiver mental QOL | | | | | | | | | |

Note. QOL = quality of life.

* $p < .05$. ** $p < .01$.

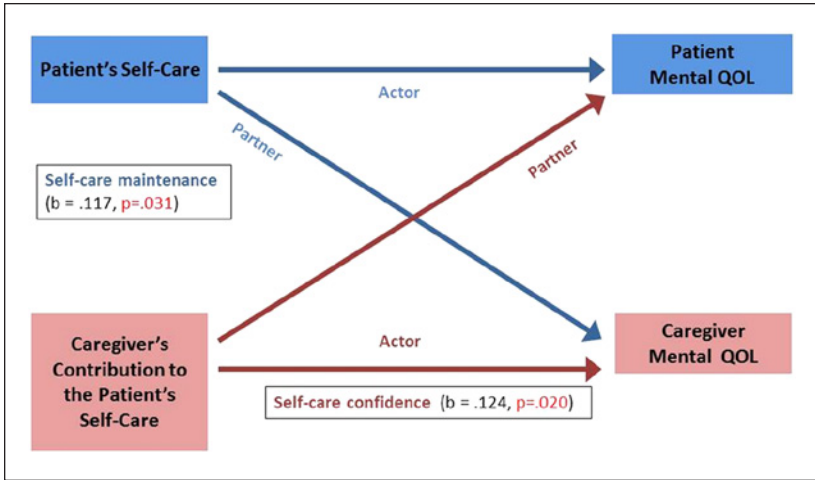


Figure 2. The actor and partner effects of self-care maintenance, confidence, management on mental QOL in patient-caregiver dyads ($N = 138$).

Note. QOL = quality of life.

Table 4. The Actor and Partner Effects of Self-Care on QOL.

| Self-care subscales | Actor and partner effects | Physical QOL | | | Mental QOL | | |
|-----------------------|---------------------------|--------------|---------|----------------|-------------|---------|----------------|
| | | <i>b</i> | β | <i>p</i> value | <i>b</i> | β | <i>p</i> value |
| Self-care maintenance | Actor: patient | -.141 | -.236 | .009 | .092 | .149 | .099 |
| | Actor: caregiver | -.098 | -.163 | .024 | .088 | .143 | .079 |
| | Partner: patient | .007 | .012 | .884 | -.064 | -.104 | .216 |
| | Partner: caregiver | -.013 | -.022 | .773 | .117 | .190 | .031 |
| Self-care management | Actor: patient | -.146 | -.253 | .034 | -.055 | -.102 | .431 |
| | Actor: caregiver | -.025 | -.043 | .735 | -.005 | -.010 | .947 |
| | Partner: patient | .147 | .253 | .055 | .140 | .259 | .076 |
| | Partner: caregiver | -.040 | -.069 | .547 | .002 | .003 | .980 |
| Self-care confidence | Actor: patient | .053 | .099 | .295 | .103 | .187 | .051 |
| | Actor: caregiver | -.041 | -.076 | .377 | .124 | .227 | .020 |
| | Partner: patient | -.162 | -.306 | .002 | -.026 | -.048 | .627 |
| | Partner: caregiver | -.048 | -.092 | .266 | .037 | -.067 | .469 |

Note. QOL = quality of life. Bolding indicated significant values.

Influence of Self-Care on Mental QOL

As shown in Figure 2, only one partner effect and one actor effect were found in mental QOL. Self-care maintenance of patients had a significant partner effect on the mental QOL of caregivers; a one unit increase in the patient's self-care maintenance was associated with a .117 unit increase in the caregiver's mental QOL. Actor effects of self-care confidence on mental QOL were significant for caregivers ($b = .124, p = .020$), but the actor effect of self-care confidence on emotional well-being did not reach statistical significance for patients ($b = .103, p = .051$).

Discussion

In this study, we used the APIM to analyze the manner in which adults with HF and their spousal caregivers interact as a unit to influence self-care and QOL. We found both actor and partner effects in this sample of older couples. Surprisingly, higher self-care was related to lower physical QOL in both patients and caregivers. But, the relationship between self-care on mental QOL differed, with higher self-care maintenance in patients associated with better mental QOL in caregivers.

Only two partner effects were seen in this sample. First, we found that better self-care maintenance in patients was associated with better mental QOL in caregivers. This finding that mental QOL of caregivers improved when patients were adherent to therapy captures statistically the energy and emotions that caregivers put into their efforts to support self-care in their loved ones. For example, Rosland and colleagues described how most of the chronically ill patients in their study reported criticism or nagging about treatment adherence from their caregivers (Rosland, Heisler, Choi, Silveira, & Piette, 2010). This result is also consistent with our earlier results from a study of the relationship between shared care in couples and HF self-care (Sebern & Riegel, 2009). In that study, we found that caregiver decision making contributed in a positive fashion to patients' self-care maintenance. Finding that patients who follow the treatment regimen and engage in healthy behaviors improve the mental QOL of their spouses is not a surprise to anyone engaged in a long-term relationship.

The second partner effect is not so easily explained; higher caregiver self-care confidence was associated with poorer physical QOL in patients. Some insight into this finding can be gained from a prior study (Lee, Suwanno, & Riegel, 2009) demonstrating that confidence is an important moderator of the relationship between self-care and health status. That is, self-care confidence can change the strength and direction of the relationship between these

variables. Clinically, this interesting relationship between caregiver confidence and patient QOL may indicate that caregivers are assuming more responsibility as the patients they are caring for experience a physical decline. If this is true, the gain in confidence bodes well for the ability of caregivers to continue in the caregiving role (Gallagher et al., 2011; Gonyea, O'Connor, Carruth, & Boyle, 2005; Merluzzi, Philip, Vachon, & Heitzmann, 2011).

Several actor effects were observed in both patients and caregivers. A negative relationship was found between patients' self-care and their physical QOL, which differs from prior results demonstrating that self-care has a positive effect on health status (Jaarsma et al., 1999; Suwanno, Petpichetchian, Riegel, & Issaramalai, 2009). Perhaps, this result can be explained by the cross-sectional nature of these data, not causality of the relationship. It may be that patients with poor physical QOL are motivated to engage in better self-care rather than self-care causing a decline in physical QOL. We and others have shown previously that HF patients defer self-care until their functional status deteriorates (Heo, Moser, Lennie, Riegel, & Chung, 2008; Riegel et al., 2011).

In caregivers, higher contributions to self-care maintenance were associated with poorer physical QOL. This finding can be explained by the physical and emotional efforts required of caregivers to oversee and to provide direct care in order to support and maintain self-care of patients. Numerous prior studies have demonstrated that caregivers are burdened with their contributions to keeping HF patients stable (Heo et al., 2008; Calvert et al., 2005; Gott et al., 2006) and high caregiving stress has been associated with poor physical health in caregivers. It is not surprising that caregivers contributing to self-care of patients experience exhaustion that impairs their physical QOL.

In spousal caregivers, higher confidence in their contributions to patients' self-care was associated with better mental QOL. A positive relationship between self-care confidence and QOL has been found in HF patients (Britz & Dunn, 2010), but we are not aware of studies demonstrating this relationship in caregivers. This finding is important because the studies conducted to date describe poor physical and emotional QOL in HF caregivers (Luttik, Jaarsma, et al., 2007; Luttik, Jaarsma, Veeger, & van Veldhuisen, 2005; Pressler et al., 2013). Identifying a factor associated with better emotional QOL provides a direction for intervention.

We were surprised to not see more of a dyadic effect on self-care. In a prior mixed-methods study, we found that one of the primary factors distinguishing those patients who developed expertise in self-care was family engagement; expert patients had more support from engaged loved ones who fostered skill development in self-care (Riegel, Dickson, Goldberg, & Deatrck, 2007). It may be that self-care is fairly new in Italy, so the caregivers did not know how

to help their loved ones improve their self-care skills. Indeed, their scores on the CC-SCHFI were low. This result also might be explained by cultural differences in the interpersonal relationship between couples. Italian spouses may have a different perception about their role as caregivers of an ill family member than U.S. caregivers. Further investigation is needed to explore this hypothesis.

One major clinical implication of these results is a renewed appreciation of the importance of confidence in the performance of self-care. In caregivers, confidence in the ability to support patients in the performance of self-care improved caregivers' mental QOL, suggesting the need for interventions that build caregivers' confidence. But the improvement in caregiver confidence was associated with lower physical QOL in patients. Again, this appears to be a result that can be explained by the cross-sectional nature of the data. It may be that as patients deteriorate physically, their caregivers become more engaged in encouraging self-care, and in doing so they become more confident. These results add to the growing body of literature describing the effort required of HF patient caregivers. Innovative approaches to support these caregivers are needed.

The major strength of this study is the analytic method, which can yield significant insights into the dynamics that occur in a couple. The major limitation of this study is the cross-sectional nature of the data. Thus, although the analysis was conducted specifying the direction of the relationships, we acknowledge that the dynamics of the relationship are difficult to discern without longitudinal data. Investigators in this area are encouraged to study these relationships over time. Another limitation is that no power analysis was conducted prior to data collection. The sample of spousal caregivers was small, which may have biased our abilities to detect significant relationships. Further, spousal caregivers were available in only a small proportion of the full sample of HF patients. Although this subset of patients appears to be similar to those from the larger sample, there could be a systematic reason explaining the lack of availability of a spousal caregiver. Further, the regression coefficients in the analysis were quite small, so readers should not over-interpret these results. For these reasons, the results of this study should be used with caution.

Conclusion

Dyadic effects are clearly evident in couples living with chronic illness. Self-care is known to influence morbidity and mortality in patients, but here we demonstrate that self-care affects QOL in both patients and caregivers. The nuances of this influence require further research to fully appreciate its complexity.

Acknowledgments

The authors gratefully acknowledge Patricia D'Antonio, PhD, RN, FAAN, and George J. Knafl, PhD, for their review of a prior version of this manuscript.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) disclosed receipt of the following financial support for the research, authorship, and/or publication of this article: Riegel has been funded by NIH to study issues related to the content in this paper. This study was funded by the Center of Excellence for Nursing Scholarship, Rome, Italy.

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