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Patient-Reported Outcomes

Patient Self-Care and Caregiver Contribution to Patient Self-Care of Chronic Conditions: What Is Dyadic and What It Is Not



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ABSTRACT

Objectives: Self-care of chronic conditions involves both patients and their informal caregivers and therefore might be considered as a dyadic phenomenon. Nevertheless, empirical evidence supporting a dyadic construct is unavailable. This study aimed to explore the existence of a dyadic construct in self-care maintenance, monitoring, and management in patients affected by chronic conditions and their informal caregivers.

Methods: This study used a cross-sectional design. We used the Self-Care of Chronic Illness Inventory and the Caregiver Contribution to Self-Care of Chronic Illness Inventory, which measure patient self-care and informal caregivers' contribution to self-care maintenance, monitoring and management. Exploratory Structural Equation Modeling was performed to verify the existence of dyadic latent constructs in each scale in patients and informal caregivers.

Results: A convenience sample of 493 patients and informal caregivers, with a mean age of 76.47 and 52.76 years, respectively, was studied. In the self-care maintenance scales, 2 correlated factors ($r = 0.34$, $P < .001$) were identified, indicating the presence of a dyadic second-order construct. In addition, 2 factors that were not correlated ($r = 0.11$, $P = .064$) were identified in the self-care monitoring scales, indicating the absence of a dyadic construct. Finally, we found a 3-factor model in the self-care management scales composed of both patient and caregiver items, indicating a dyadic first-order construct.

Conclusions: Knowing which care behaviors are dyadic in chronic conditions is important for tailoring interventions to improve self-care. Self-care maintenance and management would benefit from dyadic interventions, while self-care monitoring would not. The results of this study may illuminate future theoretical and scientific developments in dyadic care of chronic illness.

Keywords: caregiver contribution, chronic conditions, dyad, self-care.

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Introduction

The prevalence of chronic conditions is increasing worldwide. In the United States and Europe, 49% of older adults have at least 2 chronic conditions.^{1,2} Among the chronic illnesses, diabetes mellitus (DM), chronic obstructive pulmonary disease (COPD), and heart failure (HF) are the most prevalent and frequently associated chronic conditions in the population aged 65 years and older.^{3,4} In Europe, DM, COPD, and HF have a prevalence of 20.1%,⁵ 13.3%,⁶ and 11.8%,⁷ respectively; in the United States, the prevalence of DM, COPD, and HF is estimated from 22.7% to 27.0%,⁸ 10.2%,⁹ and 4.8% to 13.5%,¹⁰ respectively, in older population. People with chronic conditions have worsen quality of life (QOL), increased mortality rates, and higher number of hospitalizations.¹¹ To counteract the burden of chronic conditions, patients perform daily self-care behaviors aimed at maintaining stability of their conditions, for example, adhering to prescribed treatments and modifying

lifestyles (self-care maintenance), monitoring signs and symptoms (self-care monitoring), and managing signs and symptoms to avoid worsening of the conditions (self-care management).^{12,13} These self-care behaviors are influenced by self-care self-efficacy, defined as the individuals' beliefs about their ability to perform self-care, despite difficulties.¹⁴ When patients with a chronic condition perform adequate self-care, mortality rates are lower, hospitalizations are fewer, and QOL is higher.^{15–18} Nevertheless, performing self-care is problematic for chronically ill patients because they are often older, have cognitive impairment, and have poor self-care self-efficacy.¹⁹ In these cases, an informal caregiver (hereafter referred to as “caregiver”), usually a family member or a close friend, is crucial to support patient self-care.^{20,21}

The help provided by caregivers to patients has been defined as caregiver contribution (CC) to patient self-care and entails the recommendations that caregivers provide to patients, or the activities performed by caregivers on behalf of the patients, to help

maintain patient disease stability (CC to self-care maintenance), facilitate monitoring and symptom perception (CC to symptom monitoring and perception), and respond to signs and symptoms if an exacerbation occurs (CC to self-care management).²² Greater CC to self-care in chronic conditions improves patients' adherence to therapy,²³ health-related QOL, depression,²⁴ and mortality.²⁵

The presence of a chronic condition affects not only the life of the chronically ill person but also the life of the caregivers. In turn, caregivers influence patients' self-care and their health outcomes. Several theories based on family system theory have been used to explain how the patient-caregiver unit, usually called a dyad, manage the chronic illness together and how they influence each other.^{26,27} The theory of communal coping describes how the patient and the partner adjust to the patient's chronic illness in terms of shared illness appraisal and collaboration in disease management.²⁷ According to this theory, the patient and the partner may perceive the illness as "our problem" (shared illness appraisal) or as "my" or "their" problem (individualist appraisal). They may work together to manage the disease ("our responsibility") or act individually ("my responsibility" or "their responsibility") with the goal of improving the patient's health. Collaboration between patients and their partners is more likely to occur when they present a shared illness appraisal (our problem and our responsibility) leading to communal coping. When the patient and partner do not see the issue as a common problem, it is likely that they will not work jointly to treat it. For example, without communal coping, the partner may not provide support to the patient (their problem) and the patient may not request support (my problem). Even though this theory was developed for couples, the theory developers believe that it can be expanded to other family members.²⁷ Furthermore, the type of chronic illness might influence communal coping. For example, better adjustment may be more likely if the condition is amenable to caregiver involvement and collaboration.²⁷

During the last decades, several instruments have been developed to measure patient self-care^{13,28-31} and the CC to self-care in chronic conditions.^{21,32,33} Most instruments measuring CC to self-care of chronic conditions have been developed mirroring those measuring self-care of patients. For example, the CC to Patient Self-Care of Chronic Illness Inventory (CC-SCCII),²¹ based on the middle range theory of self-care in chronic illness,¹³ evaluates the same behaviors as the patient's Self-Care of Chronic Illness Inventory (SCCII),^{34,35} with the only difference being item wording changed to measure the extent to which a caregiver recommends (or substitutes for) the patient to perform the same self-care behaviors (eg, recommending exercise to the patient). Psychometric studies of these instruments demonstrated significant correlations between instruments.²¹ Moreover, researchers using these instruments have found, after controlling for the interdependence between patients and caregivers, that several caregiver variables influence patient self-care and several patient variables influence CC to self-care.^{36,37} In addition, patient self-care influences caregiver outcomes and CC to self-care influences patient outcomes.^{25,38-40}

Therefore, these studies and the theory on communal coping²⁷ suggest that the constructs of the patient self-care and CC to patient self-care might be dyadic; that is, the self-care behaviors are conducted together by patients and caregivers for the good of the patient. Such dyadic behaviors in self-care of chronic illness occur because patients and caregivers interact with an exchange of feelings, thoughts, and behaviors regarding illness management.^{41,42} To date, the existence of a dyadic construct in patient and CC to self-care measured by the SCCII and the CC-SCCII has never been studied.

The identification of a dyadic construct within patient self-care and CC to self-care in chronic illnesses would provide important scientific and clinical perspectives. From a scientific perspective, the identification of a dyadic construct could advance dyadic science in self-care because this might illuminate which behaviors performed by patients and caregivers are dyadic. From a clinical perspective, understanding whether self-care behaviors are dyadic could guide clinicians to tailor specific educational interventions directed to patients and caregivers. If self-care behaviors are performed together, educational interventions should include both patients and caregivers to improve these behaviors. On the contrary, if self-care behaviors are not dyadic, interventions should be implemented at the patient or caregiver level, because the inclusion of the other member of the dyad is unnecessary. Therefore, we conducted a study with the aim to explore the existence of dyadic latent constructs in the self-care maintenance, monitoring, and management of the SCCII and the CC-SCCII.

Methods

Design

Baseline data of a longitudinal study, Self-care of patient and caregiver DyAds in multiple chronic conditions: A Longitudinal study (SODALITY),⁴³ aimed at describing patient self-care and CC to patient self-care in multiple chronic conditions (MCCs), were used for this study.

Participants

A convenience sample of people affected by chronic conditions and their caregivers was enrolled. The patient inclusion criteria were 65 years of age or older and a diagnosis of DM, COPD, or HF and at least one other chronic illness, for a minimum of 6 months. Patients with a diagnosis of dementia recorded on their clinical documentation were excluded because the data collected through self-reported instrument could not be reliable. The caregiver inclusion criteria were 18 years of age and older and identification by the patient as the principal unpaid caregiver, within or outside the family, providing most of the informal care. Both members of the dyad had to agree to participate to be included into the study.

Data Collection

Data were collected in outpatient and community settings from April 2017 to January 2020. Participants were enrolled by nurse trained research assistants. Participants identified as eligible according to inclusion and exclusion criteria were informed by research assistants about study aims, procedures, and required written consent. Participants compiled the questionnaires autonomously when they were able to do so or, in case of difficulties in vision or writing, via face-to-face interviews conducted by research assistants. Patients and caregivers were requested to independently complete the set of instruments. Data collection occurred at the outpatient clinics before or after the medical visit or at home, according to the participants' preference.

Instruments

The SCCII^{34,35} was used to measure patient self-care. It has 3 separate scales measuring the 3 dimensions of self-care described in the middle range theory of self-care of chronic illness⁴: the 8-item Self-Care Maintenance scale that measures patient behaviors directed at maintaining stability (eg, "How often do you do physical activity?"), the 5-item Self-Care Monitoring scale that measures patient behaviors directed to monitoring signs and

symptoms of a chronic condition (eg, “How often do you monitor whether you tire more than usual doing normal activities?”), and the 6-item Self-Care Management scale that measures behaviors aimed at managing the symptoms of a chronic condition when they occur (eg, “When you have symptoms, how likely are you to change activity level?”). Item 14 (“How quickly did you recognize it as a symptom of your illness?: I Have not had symptoms”) identifies symptomatic versus asymptomatic patients. Only patients with symptoms respond to the Self-Care Management scale. The SCCII has shown adequate validity and reliability (comparative fit index [CFI] ranged between 0.93 and 1.00 in the 3 scales and reliability coefficients ranged from 0.67 to 0.86).³⁴

The CC-SCCII²¹ was used to measure CC to patient self-care; it considers the same behaviors as the SCCII distributed in 3 separate scales. The 8-item CC Self-Care Maintenance scale measures the frequency of recommending to the patient to perform behaviors to maintain stability of health (eg, How often do you recommend that the person you care for does physical activity?); the 5-item CC Self-Care Monitoring scale evaluates the behaviors that the caregiver recommends (or replaces) for monitoring signs and symptoms of a chronic condition (eg, “How often do you monitor whether the person you care for tires more than usual doing normal activities?”). The 7-item CC Self-Care Management scale measures the behaviors that caregivers recommend managing the signs and symptoms of the condition (eg, “When the person you care for has symptoms, how likely are you to recommend or actually change his/her activity level [eg, slow down, rest]?”). The CC Self-Care Management scale is completed only by caregiver of symptomatic patients. The CC-SCCII showed good factorial validity (CFI ranged 0.97–0.99 in the 3 scales) and reliability (reliability coefficients ranged 0.70–0.96 in the 3 scales) in caregivers of chronically ill patients.²¹

In both instruments, a 5-point Likert scale is used for responses (from 1 “never” to 5 “always”). Standardized 0 to 100 scores are computed per each scale, with higher scores indicating better patient and CC self-care. Because the item #7 of the Self-Care Maintenance and CC Self-Care Maintenance scales had low loadings and low correlations with the other items and item #14 of the Self-care Management and CC Self-Care Management scales did not consistently load on self-management dimensions in structural analysis,^{21,34,35} these items were excluded from these analyses. A questionnaire was administered to all participants to collect sociodemographic, clinical, and caregiving characteristics.

Ethical Considerations

The SODALITY study adhered to the Declaration of Helsinki and was approved by the Ethics Committee of a regional healthcare system (ComEt ASReM #128-07/ 25/17). Patient and caregiver participation was voluntary, and a written informed consent was obtained from all participants before data collection. Data were collected, analyzed, and reported under the strictest confidentiality.

Data Analysis

Descriptive statistics were computed to describe sociodemographic and clinical characteristics of patients and caregivers. To define the number of plausible factors to extract, 3 parallel analyses^{44–46} were performed putting together the items of each of the 3 scales of the SCCII and the CC-SCCII. We considered as unit of analyses the dyad, and therefore, the data set was created putting on each line representing a dyad all the items of 3 corresponding self-care and CC self-care scales. To explore the existence of dyadic latent constructs, 3 separate Exploratory Structural Equation Modeling (ESEM) with Geomin oblique

rotation were performed, one for each self-care scale. Thus, for example, for self-care maintenance, all the items of the Self-Care Maintenance and CC Self-Care Maintenance scales were put together in the first ESEM extracting the number of factors suggested in the parallel analysis.

ESEM, like exploratory factor analysis, does not require specifying in advance the cross-loadings of factorial patterns, given that all indicators depend on all factors.⁴⁷ Similar to confirmatory factor analysis, ESEM allows access to all the usual SEM parameters, such as residual variances and covariances, and testing of the statistical significance of factor loadings. ESEM also allows one to identify items showing inadequate primary factor loadings lower than the recommended range of [0.30] to [0.40]^{48,49} or with a difference between the primary loading and the second highest cross-loading less than [0.30].⁵⁰ Finally, modification indices were examined to specify residual covariances between items of each scale of the SCCII and CC-SCCII using maximum likelihood robust estimators, which is indicated for continuous indicators with non-normal item distribution. The existence of dyadic constructs for each scale was verified through (1) the presence of a dyadic factor identified by a first-order factorial solution or (2) the occurrence of significant correlations between the patient self-care and CC self-care factors (second-order structure) identified in the ESEM. Goodness of fit statistics, including Comparative Fit Index (CFI), Tucker and Lewis Index (TLI), root mean square error of approximation (RMSEA), standardized root mean square residual (SRMR), and chi-square test, were used to interpret model fit and to add any residual covariances. The software SPSS version 26.0 (IBM SPSS Statistics, Armonk, New York) was used to analyze the sociodemographic and clinical characteristics, and Mplus program version 8.2 for the ESEM analyses.

Results

Characteristics of the Sample

Of the 561 eligible patient-caregiver dyads, 496 dyads (88.4%) agreed to participate whereas 65 (11.6%) declined because of a lack of time or interest; the participant selection process is described in [Appendix Figure 1](https://doi.org/10.1016/j.jval.2022.01.007) in Supplemental Materials found at <https://doi.org/10.1016/j.jval.2022.01.007>. The only differences that emerged between people who agreed and refused participation were employment status and age of patients and/or, caregivers: people unemployed, retired, or older were more likely to consent to participate in the study. Sociodemographic and clinical characteristics of the dyads who consented to participate are described in [Table 1](#). Patients were mostly female, with a mean age of 76.47 (SD 7.25), retired (95.54%), living with their caregiver (51.70.0%), and having an average of 3.33 (SD 1.38) chronic diseases. The most prevalent chronic conditions were DM (90.12%) and HF (41.91%). Caregivers were mainly females (69.80%), with a mean age of 52.76 (SD 15.33) years, still employed (61.04%), and children or spouses (55.20% and 27.00%, respectively) and had cared for the patients for a mean of 9.49 years.

Dyadic Behaviors in Self-Care Maintenance Scales

Parallel analysis suggested the extraction of 2 factors from the data set. Accordingly, a 2-factor ESEM was conducted. The model yielded good fit indices ([Table 2](#)). The 2 factors were labeled as Patient Self-Care Maintenance and CC to Patient Self-Care Maintenance. Factor loadings of all items were >0.30 indicating that they were good indicators of the corresponding dimension⁵¹ except for items #1 (“make sure to get enough sleep”) and #3 (“do physical activity”) of the SCCII ([Table 3](#)). The 2 factors were

Table 1. Sociodemographic characteristics of patient-caregiver dyads (N = 493 dyads).

Characteristics	Patient M (\pm SD)	Caregiver M (\pm SD)
Age in years	76.47 (7.25)	52.76 (15.33)
No. chronic diseases	3.33 (1.38)	-
Gender	n (%)	n (%)
Female	282 (57.20)	344 (69.80)
Male	211 (42.80)	149 (30.20)
Education level in years		
0-8	306 (82.40)	190 (38.60)
9-13	72 (14.60)	208 (42.20)
> 13	15 (3.00)	95 (19.30)
Employment status		
Employed	22 (4.46)	301 (61.04)
Unemployed/retired	471 (95.54)	192 (38.96)
Perceived income		
High income	78 (15.80)	94 (19.10)
Enough for living	392 (79.50)	377 (76.40)
Low income	23 (4.70)	22 (4.50)
Type of chronic conditions		
DM	356 (90.12)	
HF	65 (41.91)	
COPD	70 (17.80)	
Year of caregiving	-	9.49 (8.09)
Caregiving hours per week	-	22.57 (29.70)
Living together		
Yes	255 (51.70)	
No	238 (48.30)	
Patient-caregiver relationship		
Spouse	133 (27.00)	
Child	272 (55.20)	
Other	88 (17.80)	

COPD indicates chronic obstructive pulmonary disease; DM, diabetes mellitus; HF, heart failure; M, mean.

significantly correlated ($r = 0.337$, $P < .001$) indicating the presence of a possible dyadic second-order latent construct of dyadic self-care maintenance behaviors of chronic illness. In addition, we found significant covariances among the residual of items #1 (“to

get enough sleep”), #2 (“try to avoid getting sick”), #3 (“do physical activity”), and #4 (“eat a special diet”) of the SCCII and of the CC-SCCII (Appendix Table 1 in Supplemental Materials found at <https://doi.org/10.1016/j.jval.2022.01.007>).

Table 2. Fit indices for the model tested derived from ESEM.

Scale	χ^2	df	CFI	TLI	SRMR	RMSEA 90% confidence interval P (RMSEA < .05)
Dyadic care maintenance	151.428*	59	0.923	0.881	0.038	0.056 0.045-0.067 ($P = .169$)
Dyadic care monitoring	67.372*	24	0.977	0.957	0.021	0.060 0.044-0.078 ($P = .146$)
Dyadic care management	134.432*	30	0.900	0.779	0.036	0.091 0.076-0.107 ($P \leq .001$)

Note. To examine model fit, we used the following goodness-of-fit indices: CFI with values of 0.90 to 0.95 indicating acceptable fit and values of ≥ 0.95 indicating a good fit⁵⁷; RMSEA with values ≤ 0.05 indicating a well-fitting model, values between 0.05 and 0.08 a moderate fit, and values ≥ 0.10 a poor fit.⁵⁸ SRMR with values ≤ 0.08 indicating good fit.

χ^2 indicates chi-square test; CFI, comparative fit index; RMSEA, root mean square error of approximation; SRMR, standardized root mean square residual; TLI, Tucker and Lewis Index.

* $P < .001$.

Table 3. Exploratory Structural Equation Modeling and item factor loadings of the self-care maintenance, self-care monitoring, and Self-Care Management scales of the Self-Care of Chronic Illness Inventory and the Caregiver Contribution to Self-Care of Chronic Illness Inventory.

Self-care scales	Patient factor		Caregiver factor
	Loading		Loading
P-Self-Care Maintenance scale (N = 496)			
<i>How often or routinely do you do the following?</i>			
1P. Make sure to get enough sleep	0.235		-0.087
2P. Try to avoid getting sick (eg, flu shot, wash your hands)	0.543		0.025
3P. Do physical activity (eg, take a brisk walk, use the stairs)	0.212		-0.131
4P. Eat a special diet	0.446		0.009
5P. See your healthcare provider for routine healthcare	0.579		0.022
6P. Take prescribed medicines without missing a dose	0.591		-0.081
8P. Manage stress	0.364		-0.025
CC-Self-Care Maintenance scale (N = 496)			
<i>How often do you recommend that the person you care for do the following things?</i>			
1C. Make sure to get enough sleep	-0.108		0.697
2C. Try to avoid getting sick (eg, flu shot, wash their hands)	0.171		0.654
3C. Do physical activity (eg, take a brisk walk, use the stairs)	0.070		0.430
4C. Eat a special diet	-0.001		0.591
5C. See their healthcare provider for routine healthcare	0.084		0.641
6C. Take prescribed medicines without missing a dose	-0.092		0.761
8C. Manage stress	0.029		0.552
Correlation between patient and caregiver factors	0.337*		
P-Self-Care Monitoring scale (N = 496)			
<i>How often do you do the following?</i>			
9P. Monitor your condition	0.744		-0.078
10P. Monitor for medication side-effects	0.715		-0.023
11P. Pay attention to changes in how you feel	0.666		0.001
12P. Monitor whether you tire more than usual doing normal activities	0.720		0.034
13P. Monitor for symptoms	0.762		0.013
CC-Self-Care Monitoring scale (N = 496)			
<i>How often do you do the following things?</i>			
9C. Monitor the condition of the person you care for	-0.004		0.799
10C. Pay attention to changes in how the person you care for feels	0.125		0.858
11C. Monitor for medication side-effects of the person you care for	-0.010		0.853
12C. Monitor whether the person you care for tires more than usual doing normal activities	0.062		0.833
13C. Monitor for symptoms of the person you care for	-0.015		0.839
Correlation between patient and caregiver factors	0.081		
	F1 Consulting dyadic behaviors	F2 Autonomous dyadic behaviors	F3 Compensatory dyadic behaviors
P-Self-Care Management scale (N = 422)			
<i>When you have symptoms, how likely are you to use one of these?</i>			
15P. Change what you eat or drink to make the symptom decrease or go away	0.052	0.432	-0.270
16P. Change your activity level (eg, slow down, rest)	0.065	0.388	-0.295
17P. Take a medicine to make the symptom decrease or go away	-0.013	0.449	-0.481
18P. Tell your healthcare provider about the symptom at the next office visit	0.739	0.042	-0.028
19P. Call your healthcare provider for guidance	0.809	-0.027	0.008
20P. Think of a treatment you used the last time you had symptoms. Did the treatment you used make you feel better?	0.009	0.474	-0.423
CC-Self-Care Management scale (N = 422)			
<i>When the person you care for has symptoms, how likely are you to recommended or actually use one of these?</i>			
15C. Change what he/she eats or drinks to make the symptom decrease or go away	-0.066	0.581	0.122
16C. Change the activity level (eg, slow down, rest)	0.023	0.533	0.174
17C. Take medicines to make the symptoms decrease or go away	-0.073	0.660	0.040

continued on next page

Table 3. Continued

	F1 Consulting dyadic behaviors	F2 Autonomous dyadic behaviors	F3 Compensatory dyadic behaviors
18C. Tell the healthcare provider about the symptoms at the next office visit	0.460	0.029	0.696
19C. Call the healthcare provider for guidance	0.600	−0.013	0.657
20C. Think of a remedy you tried the last time the patient you care for had symptoms. Did the remedy make the person you care for feel better?	−0.063	0.673	−0.015
Correlation between factors			
Factor 1—consulting dyadic behaviors		0.275*	−0.167
Factor 2—autonomous dyadic behaviors			0.321*

Note. Item numbering reflects the sequence in the Self-Care of Chronic Illness Inventory and the CC to Self-Care of Chronic Illness Inventory. Loadings come from Mplus completely standardized solutions. Primary factor loadings are in boldface.

P indicates patient; C, caregiver; CC, caregiver contribution.

*Significant correlations.

Behaviors in Self-Care Monitoring Scales

Parallel analysis suggested the extraction of 2 factors and a 2-factor ESEM was performed. This model yielded good fit indices (Table 2). Factor loadings of all items were > 0.30 . The 2 factors, labeled Patient Self-Care Monitoring and CC to Patient Self-Care Monitoring, were not significantly correlated ($r = 0.109$, $P = .064$), indicating that the behaviors of self-care monitoring do not represent a dyadic construct.

Dyadic Behaviors in Self-Care Management Scales

Parallel analysis suggested the extraction of 3 factors and consequently a 3-factor ESEM was performed. This model yielded acceptable fit indices (Table 2). Factor loadings of all items were generally medium to high, attesting to a substantial proportion of common variance among items, except for items #15 (“change what you eat or drink to make the symptom decrease or go away”) and #16 (“Change your activity level”) of the SCCII; all factor loadings were positive except for items #15, #16, #17, and #20 of the SCCII (Table 3). Factor correlations were low indicating a moderate association among the different facets of dyadic behaviors of self-care management (Table 3). The 3 factors were composed of both patient and caregiver self-care management items so we could interpret them as dyadic factors at first-order level. This proves that self-care management behaviors have a strong dyadic nature. The factors were labeled as consulting dyadic behaviors (F1), autonomous dyadic behaviors (F2), and compensatory dyadic behaviors (F3). Residual covariances of items #15 (“change what you eat or drink”), #16 (“change your activity level”), and #17 (“take a medicine to make the symptom decrease or go away”) of the SCCII and the CC-SCCII were significantly correlated (Appendix Table 1 in Supplemental Materials found at <https://doi.org/10.1016/j.jval.2022.01.007>).

Discussion

This study aimed to determine the existence of dyadic care behaviors in the Self-Care Maintenance, Monitoring, and Management scales of the SCCII and CC-SCCII. Our results showed that care maintenance and management behaviors measured by these 2 instruments are dyadic, whereas care monitoring behaviors are not. Regarding self-care maintenance, our results suggest that the Self-Care Maintenance and CC Self-Care Maintenance scales reflect

both individual and dyadic care behaviors. Thus, behaviors directed at maintaining physical (eg, smoking cessation, preparing healthy food) and emotional stability (eg, managing stress) and the behaviors related to illness (eg, taking medication as prescribed) can be acted upon individually and jointly by the patient-caregiver dyad. The theory of communal coping and adjustment to chronic illness²⁷ helps explain our results. As described earlier, dyad members engage in individual or collaborative activities to manage the patient’s illnesses according to their perception of the illness as an individual or a common problem. We hypothesize that self-care maintenance may be perceived by patients as an individual problem because it requires their direct engagement (ie, it is the patient who performs physical activity or eats a healthy diet); nevertheless, caregivers can also consider it a common problem and provide support with reminders and efforts to prepare healthy food. Given that the scales did not appraise how dyad members perceived these behaviors, the hypothesis of incongruent appraisal needs to be confirmed by further studies. Qualitative investigations could also be useful to understand the different perceptions of these behaviors between members of the dyad.

Regarding self-care monitoring, our results showed that the behaviors directed to detecting and observing changes in signs and symptoms (eg, body listening)¹³ operationalized by the items of the SCCII and the CC-SCCII should be considered individual behaviors. In other words, patients and caregivers act individually and do not influence each other in monitoring the clinical manifestations of chronic conditions. A possible explanation is that, because of the subjective nature of symptoms, both patients and caregivers appraise self-care monitoring as an individual problem. They use different clues to detect the occurrence of symptoms: the patients monitor for subjective symptoms (eg, fatigue, breathlessness) and the caregiver monitors objective signs (eg, changes in blood sugar or oxygen saturation) or the effects of symptoms on the patient (eg, limitation in physical activity because of breathlessness). Consequently, self-care monitoring behaviors are performed by patients and caregivers in different ways. Further studies should confirm the individual appraisal of illness monitoring by members of the dyads. Another possible explanation is that, because general disease monitoring behaviors are evaluated in these scales (eg, “Monitor for symptoms”), patients and caregivers could think of different symptoms when answering. Future research should verify whether in disease-specific monitoring scales—for example, in self-care of HF inventory (SCHFI)²⁹ and CC

to SCHFI³³—assessing more specific disease clinical manifestations (eg, “check ankles for swelling”) could identify dyadic care monitoring behaviors.

Our results showed that the disease management behaviors reported in the Self-Care Management scales of SCCII and CC-SCCII are dyadic. We found 3 different factors that highlight the complexity of the disease management process. The consulting dyadic behaviors factor includes those dyadic behaviors that involve consultation with healthcare providers to treat the clinical manifestations of the diseases (“call the healthcare provider for guidance” and “tell healthcare providers about symptoms at the next visit”). When a dyad scores high in consulting dyadic behavior factor, it means that both patient and caregiver take initiative to refer to a healthcare provider when symptoms occur; for example, the caregiver suggests calling a physician and the patient does; therefore, a dyadic style of taking actions together is applied by both patient and caregiver. On the contrary, when a dyad scores low in this factor, their style of care management behaviors is that of not taking initiatives in consulting healthcare personnel for health problems. The autonomous dyadic behaviors factor comprises changes in lifestyle that are implemented by the dyad at the occurrence of symptoms (“changing what patient eat or drink,” “changing activity level,” and “taking medicines”). When a dyad scores high in this factor, it means that, in the presence of symptoms, both patient and caregiver take actions to solve autonomously the problem: for example, caregiver recommends patient taking medicines and patient does take them. Conversely, in dyads with low scores on autonomous dyadic behaviors factor, we have a dyadic style in managing the symptoms that does not entail taking autonomous initiatives; for example, neither patients decide to take medicines, nor the caregiver recommend doing this. The compensatory dyadic behaviors factor includes autonomous behaviors (including “changing what eat or drink,” “changing activity level,” “taking medicines,” “tell healthcare providers about symptoms,” and “call providers for guidance”) that present a different dyadic mechanism of action: the caregiver compensates for the patient not performing a specific self-care behavior. A high score in this factor means, for example, that if the patient does not change what he/she eats or drinks or his/her activity level to decrease the symptoms, the caregiver calls the healthcare provider for help. A low score in this factor indicates a dyadic style in managing the symptoms that do not entails compensatory dyadic behaviors: neither patients nor caregivers act to respond at the symptoms. Studies are needed to identify what factors determine the different dyadic style in care managing behaviors.

Our findings support previous research indicating that collaborative relationships between patient and caregiver help dyads manage chronic illness.^{52,53} The presence of different care arrangements in patient with chronic conditions and caregiver dyads have been also previously identified. Four dyadic care types have been described in HF⁵⁴ and MCCs⁵⁵: patient oriented, caregiver oriented, collaborative oriented, and incongruent. In the first 2 dyadic care types, the patient or the caregiver takes the sole responsibility for chronic disease care with the acquiescence of the other dyad member, showing the presence of individualistic care behaviors. In the collaborative-oriented type, both members of the dyad are engaged in patient self-care, sharing the decisions and actions, or complementing each other, identifying the presence of dyadic care behaviors. Finally, in the incongruent type, patients and caregivers disagree on who is responsible for patient self-care.⁵⁶ This evidence supports that dyadic care in chronic conditions can be considered as a transactional process derived by the interaction between patient and caregiver in which disease

stages, needs, cognitions, and motivation of both member of the dyad interact within the MCC context.⁵⁵

In addition, we found significant covariances between the residuals of the corresponding items of Self-Care Maintenance and Management scales of the SCCII and of the CC-SCCII, which express a dyadic consonance, meaning that dyad members act dependably with respect to that specific behavior measured by the items of both instruments. Further studies should be conducted to verify the possible reasons for these consonances, such as the existence of an additional underlying dyadic dimension, issues of measurement error or item wording.

Strengths and Limitations

This is the first study to explore what is dyadic in caring behaviors of chronic illness using 2 instruments developed to measure patient self-care and CC to patient self-care of chronic conditions.^{12,13} Evaluating the simultaneous influence of patient and CC self-care on patient behavior permits the identification of a construct of dyadic behavior that can be used in future research. There are a number of limitations to be acknowledged. First is the use of an exploratory approach; further studies using a confirmatory approach are needed to support our results. Second, participants had homogeneous social characteristics and were from the same geographical areas in Italy, although enrolled in different settings; therefore, the generalizability of our findings could be limited. Finally, we enrolled dyads who voluntarily agreed to participate; thus, our findings might be confined to more psychologically and physically healthy participants.

Implications for Research and Practice

Further studies should be conducted to confirm our hypothesis on the dyadic nature of care behaviors. For researchers, the construct of dyadic care behaviors of chronic illness can be particularly useful in studying patient-caregiver dyads. In particular, dyadic measures can be advantageous to use in variable-oriented approaches, for example, in dyadic structural equations model, or in person-oriented approaches to identify specific subgroups of patient-caregiver dyads. Finally, the results of our study represent an important contribution to the science of dyadic self-care,²⁶ the adjustment to chronic illness theory,²⁷ and the middle range theory of self-care of chronic illness,¹³ from which the SCCII and CC-SCCII were derived. Further research is needed to examine whether lower scores on these dyadic constructs can help identify vulnerable groups of dyads; moreover, it could usefully investigate whether caregivers affected by chronic conditions can influence the dyadic construct and whether higher dyadic care behaviors are associated with better patient's outcomes. Finally, further studies comparing subgroups of dyads with different characteristics (ie, high vs low hours of caregiving, cohabitant vs noncohabitant caregivers) should be conducted to identify differences in dyadic maintenance and management care behaviors.

From a clinical perspective, healthcare professionals should consider the patient-caregiver dyad as the subject of care given that both members collaborate and influence each other in patient care. By administering the Self-Care Maintenance and Management scales of the SCCII and the CC-SCCII, clinicians can identify dyads at risk of performing inadequate dyadic care behaviors. Those at risk may not be working as a “system” with patient and caregiver sharing objectives, behaviors, knowledge, and skills. In addition, knowing what care behaviors are dyadic in chronic illnesses is important because clinicians can plan tailored interventions directed to both the patient and caregiver to improve patient self-care maintenance and/or CC self-care maintenance

(eg, in case of a lack of patient's adherence to prescribed treatments) and patient self-care management and/or CC self-care management (eg, responding promptly to symptoms) measured by SCCII and CC-SCCII. Thus, the caregiver represents for clinicians a further resource to engage in the work of self-care. In contrast, educational interventions directed to improving disease monitoring could be implemented individually without having to engage the other member of the dyad. Finally, the construct of dyadic care behaviors of chronic illness can help to measure the effectiveness of the implemented interventions on the dyad so that modifications can be made as necessary.

Conclusions

The SCCII and CC-SCCII have been demonstrated to measure dyadic behaviors in self-care maintenance and management in MCCs patients-caregiver dyads and could be used by clinicians and researchers to measure dyadic and individual self-care behaviors. Clinicians could use the theory-based language to measure, document, and communicate the care behaviors in which the patient-caregiver dyads are having a specific problem and tailor specific interventions aimed to improve inadequate dyadic care behaviors. For researchers, the evidence of dyadic care behaviors of chronic illness is open to further developments in dyadic care science. Further research is needed to develop specific tailored healthcare interventions directed to dyads and to identify determinants and outcomes of dyadic care behaviors.

Supplemental Materials

Supplementary data associated with this article can be found in the online version at <https://doi.org/10.1016/j.jval.2022.01.007>.

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