

Caregiver Self-Efficacy as a Mediator of Caregiver Contribution to Self-Care in Coronary Heart Disease: A Cross-Sectional Structural Equation Modeling Study

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Background: Self-care is a determinant of long-term outcomes in coronary heart disease, yet it remains suboptimal in many patients. Informal caregivers support patient self-care, but the mechanisms underlying variability in caregiver contribution (CC) are not fully understood. This study examined whether caregiver self-efficacy mediates the association between caregiver characteristics and CC to self-care across the domains of self-care maintenance, self-care monitoring, and self-care management.

Methods: This cross-sectional study analyzed baseline data from 155 informal caregivers enrolled in the Italian HEARTS-IN-DYADS study. Caregiver contribution to self-care was measured using the CC to Self-Care of Coronary Heart Disease Inventory, and self-efficacy using the Caregiver Self-Efficacy in Contributing to Self-Care scale. Structural equation models were estimated separately for each CC to self-care domain, with self-efficacy specified as a mediator.

Results: The CC scores were below the adequacy threshold across all domains, whereas self-efficacy scores were adequate. All models demonstrated excellent fit. Caregiver self-efficacy was a consistent predictor of CC across all domains ($\beta = 0.34\text{--}0.51$, $P < .001$). Indirect effects via self-efficacy were observed for occupation, education, and caregiving hours. Direct effects emerged primarily in the monitoring domain, where age, education, financial adequacy, and caregiving hours were associated with CC. The models explained 17%–33% of the variance in CC and 10% in self-efficacy.

Conclusions: Caregiver self-efficacy is a key factor associated with CC to self-care in coronary heart disease and may represent a potential target for interventions aimed at improving caregiver involvement in patient self-care.

KEY WORDS: caregiver contribution to self-care, caregivers, coronary heart disease, self-care, self-efficacy, structural equation modeling

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The authors have no funding or conflicts of interest to disclose.

The data underlying this article are not publicly available due to privacy and ethical restrictions. De-identified data may be made available from the corresponding author upon reasonable request and subject to appropriate approvals.

Supplemental digital content is available for this article. Direct URL citations appear in the printed text and are provided in the HTML and PDF versions of this article on the journal's Website (www.jcnjournal.com).

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Coronary heart disease (CHD) remains one of the leading causes of morbidity and mortality worldwide, accounting for more than 7 million deaths annually.¹ Although acute management, most notably percutaneous coronary intervention, has substantially improved survival, long-term outcomes are largely determined by patients' ability to engage in effective self-care behaviors, including adherence to treatment, lifestyle modification, and timely response to symptoms.² Within the middle-range theory of self-care in chronic illness,³ self-care is conceptualized as a dynamic and naturalistic decision-making process that encompasses 3 interrelated domains: self-care maintenance (eg, engaging in physical activity), self-care monitoring (eg, blood pressure measurement), and management (eg, recognizing a symptom and consulting a doctor). These domains reflect increasing levels of behavioral and cognitive complexity, ranging from routine health behaviors to symptom recognition and response.³

Evidence consistently shows that higher levels of self-care are associated with reduced hospitalizations, improved quality

What's New and Important

- Caregiver self-efficacy was consistently associated with caregiver contribution to self-care across maintenance, monitoring, and management domains in coronary heart disease.
- Caregiver self-efficacy mediated the associations between caregiver characteristics (occupation, education, and caregiving hours) and caregiver contribution to self-care.
- Direct associations between caregiver characteristics and caregiver contribution emerged primarily in the monitoring domain, suggesting domain-specific mechanisms underlying caregiving behaviors.

of life, and lower mortality across chronic conditions, including cardiovascular diseases.^{4,5} However, in CHD populations, it is often suboptimal, particularly among patients with multimorbidity or functional limitations, suggesting that additional mechanisms of patient support may be required.⁶ In this context, informal caregivers (eg, family members) play a critical role in supporting patient self-care. According to the Situation-Specific Theory of Caregiver Contribution to Self-Care, caregiver contribution (CC) refers to the supportive or substitutive behaviors performed by informal caregivers to help patients engage in self-care. Depending on patients' needs and level of autonomy, caregivers may assist with maintaining healthy behaviors, monitoring changes in health status, and managing symptoms and treatment-related decisions.⁷ While caregiver involvement has been associated with improved adherence,^{8,9} enhanced symptom monitoring, and better clinical outcomes,¹⁰ substantial variability exists in the extent and effectiveness of CC, which may be influenced by factors such as caregiver burden, stress, emotional strain, and level of preparedness.¹¹

Caregiver self-efficacy represents a plausible psychological mechanism linking individual characteristics to caregiving performance. Grounded in Social Cognitive Theory,¹² caregiver self-efficacy refers to caregivers' confidence in their ability to successfully perform behaviors that support patients' self-care. Higher self-efficacy reflects greater confidence in helping patients maintain health behaviors, recognize symptoms, and appropriately respond to changes in their clinical condition. In caregiving contexts, higher self-efficacy has been linked to improved caregiving performance¹³ and better patient outcomes.^{14,15} However, although previous studies have demonstrated the importance of caregiver involvement and caregiver self-efficacy, little is known about the mechanisms through which caregiver characteristics influence CC to self-care in CHD. In particular, no previous study has examined whether caregiver self-efficacy mediates the associations between caregiver characteristics and CC across the 3 domains of self-care (maintenance, monitoring, and management). Addressing this gap is clinically relevant because caregiver self-efficacy is a modifiable construct that may represent an actionable target for interventions designed to strengthen caregiver involvement in patient self-care.

Aim of the Study

Therefore, the aim of this study was to examine the associations between caregiver sociodemographic (eg, age) and contextual characteristics (eg, perceived financial adequacy, cohabitation with the patient, and weekly caregiving hours), caregiver self-efficacy, and CC to self-care in patients with CHD. Specifically, we tested whether caregiver self-efficacy statistically mediates the relationship between caregiver sociodemographic and contextual characteristics and CC to self-care across the domains of CC to self-care maintenance, self-care monitoring, and self-care management.

Methods

Study Design

This is a cross-sectional analysis of baseline data from the Italian observational study "Self-Care in Coronary Heart Disease Patient and Caregiver Dyads (HEARTS-IN-DYADS)" aimed at describing self-care behaviors in patients with CHD and their informal caregivers (Supplemental Digital Content, <https://links.lww.com/JCN/A436>).¹³

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The Journal of Cardiovascular Nursing (XXX) XXX:00–00

Received: 19 May 2026; Accepted 28 July 2026

Published online 7 October 2026

DOI: 10.1097/JCN.0000000000001390

Sample and Data Collection

Informal caregivers of patients diagnosed with CHD were recruited from multiple hospitals in Northern and Central Italy. Caregivers were eligible if they were aged ≥ 18 years, provided unpaid care to a patient with CHD, were able to understand Italian, and provided informed consent. Caregivers with severe cognitive impairment were excluded. Data were collected during patients' hospitalization in participating centers. Informal caregivers completed self-completed paper-based questionnaires assessing caregiver characteristics, self-efficacy, and contribution to self-care. All questionnaires were administered at baseline as part of the HEARTS-IN-DYADS study protocol.¹³ Completed questionnaires were reviewed for completeness and subsequently entered into a secure electronic database (REDCap, version 12.2.6). Data quality was ensured through double-checking procedures and standardized data entry protocols.

Sample Size

This study represents a secondary analysis of baseline data from a previously conducted observational study. Therefore, no a priori sample size calculation was performed for the present analyses. All available caregivers who met the eligibility criteria and completed baseline assessments were included ($N = 155$). A root mean square error of approximation (RMSEA)-based post hoc power analysis was conducted for the structural equation modeling (SEM) models ($df = 44$), comparing close fit ($RMSEA = 0.05$) with poor fit ($RMSEA = 0.08$). The available sample size provided modest power (approximately 0.59) to detect poor model fit.

Instruments

Caregiver Contribution to Self-Care

Caregiver contribution to self-care was assessed using the Caregiver Contribution to Self-Care of Coronary Heart Disease Inventory,¹⁴ a disease-specific instrument specifically developed for caregivers of patients with CHD. The Caregiver Contribution to Self-Care of Coronary Heart Disease Inventory measures CC across 3 domains: CC to self-care maintenance, CC to self-care monitoring, and CC to self-care management. The CC to self-care maintenance refers to behaviors that support treatment adherence and healthy lifestyle habits; CC to self-care monitoring involves observing and recognizing changes in the patient's clinical condition. The CC to self-care management reflects caregiver responses to symptoms, including decision-making and seeking appropriate care. Items are rated on Likert-type scales and standardized 0–100 scores are calculated for each domain, with higher scores indicating greater CC. The psychometric properties of the instrument, including structural validity and internal consistency, were previously established in this dataset and are reported elsewhere,¹⁴ with reliability coefficients ranging from 0.73 to 0.90 across the 3 scales.

Caregiver Self-Efficacy

Caregiver self-efficacy was measured using the Caregiver Self-Efficacy in Contributing to Self-Care scale.¹⁵ It consists of 10 items, each of which is rated from 1 ("not confident") to 5 ("extremely confident") on a 5-point Likert scale. The score on this scale is standardized from 0 to 100, with higher scores indicating greater self-efficacy. The scale has demonstrated good psychometric properties in caregivers of patients with multiple chronic conditions, including satisfactory structural validity and excellent internal consistency, with reliability coefficients ranging from 0.90 to 0.97.¹⁵

Sociodemographic and Contextual Variables

A structured questionnaire developed by the research team was used to collect predictor variables included in the conceptual

model (Figure 1). These comprised sociodemographic characteristics (age, gender, education, marital status, and occupation) and contextual variables, including cohabitation with the patient, perceived financial adequacy, relationship to the patient, and weekly caregiving hours.

Ethical Considerations

Ethical approval was obtained from the Ethics Committees of all participating centers (approval number 1244–06/08/2020). Written informed consent was obtained from all participants before data collection. Participants were assured of the confidentiality and anonymity of their data. All data were securely stored and handled in compliance with data protection regulations.

Statistical Analysis

Descriptive statistics were first computed to summarize the sociodemographic and clinical characteristics of the caregivers. Means and standard deviations (*SDs*) were reported for continuous variables, while categorical variables were expressed as absolute and relative frequencies. Before structural modeling, item parcels were created to represent latent constructs. Item parceling refers to the practice of combining multiple items into aggregate indicators that serve as manifest variables for latent constructs. Parceling was adopted to improve indicator reliability, reduce model complexity, and enhance the stability of parameter estimates, particularly in the context of structural equation models involving multiple latent variables and a relatively modest sample size. This approach is especially appropriate when the underlying constructs are theoretically well-defined and supported by prior psychometric evidence, as in the case of the instruments used in this study.¹⁶ For dimensions characterized by a second-order factor structure, parcels were constructed by aggregating items within their theoretically defined first-order factors. For the remaining constructs, parcels were generated using random assignment procedures, ensuring an approximately equal number of items per parcel and 3 parcels per latent variable.¹⁷

SEM was employed to investigate the direct and indirect associations between caregiver sociodemographic and contextual characteristics, caregiver self-efficacy, and CC to self-care. SEM is a multivariate statistical technique that combines measurement and structural components, allowing relationships among latent constructs to be estimated while accounting for measurement error. This approach was selected because it permits the simultaneous evaluation of complex pathways, including mediation effects through caregiver self-efficacy, within a unified analytical framework. Caregiver age and weekly caregiving hours were modeled as continuous variables. Educational attainment was dichotomized as ≤ 8 versus ≥ 9 years of formal education, corresponding to lower versus upper secondary or higher education, to preserve adequate group sizes for the SEM analyses. Perceived financial adequacy was treated as a binary variable (adequate vs. inadequate). Caregiver occupational status was dichotomized as actively employed versus not actively employed (unemployed or retired). Separate models were estimated for each self-care domain (maintenance, monitoring, and management), with caregiver self-efficacy specified as a mediator. Direct, indirect, and total effects were estimated for each model. Direct effects represent associations between caregiver characteristics and CC that are independent of caregiver self-efficacy, whereas indirect effects represent associations operating through caregiver self-efficacy. Significant indirect effects were interpreted as evidence that caregiver self-efficacy may function as a mediating mechanism linking caregiver characteristics to CC to self-care. Standardized path coefficients (β) are reported together with 95% confidence intervals. The significance of indirect effects was assessed using nonparametric bootstrapping with 5000 replications. Model fit was

assessed using the Comparative Fit Index (CFI), Tucker–Lewis Index (TLI), RMSEA, and Standardized Root Mean Square Residual (SRMR). Consistent with recommendations by Hu and Bentler,¹⁸ CFI and TLI values ≥ 0.95 , RMSEA values ≤ 0.06 , and SRMR values ≤ 0.08 were interpreted as indicating good fit. Values of CFI and TLI ≥ 0.90 and RMSEA ≤ 0.08 were considered indicative of acceptable fit. Model evaluation was based on the combined interpretation of all fit indices. All analyses were performed with Mplus version 8.9 (Muthén & Muthén, Los Angeles, California).

Results

Sample Characteristics

Caregivers (*N* = 155) had a mean age of 54 years (*SD* = 14.0) and were predominantly female (79.4%). Most caregivers were spouses or partners of the patients (70.3%) and cohabited with them (75.5%). The majority were married or partnered (70.3%), 58.7% were employed, and 24.5% were retired. Regarding educational attainment, 45.8% had completed high school, 32.3% middle school, 13.5% elementary school, and 8.4% held a university degree. Approximately two-thirds of caregivers (67.1%) reported providing ≤ 3 hours of care per week and perceived their financial resources as adequate (67.1%). Mean scores for CC were 58.64 (*SD* = 26.32) for self-care maintenance, 53.23 (*SD* = 28.03) for monitoring, and 59.85 (*SD* = 24.70) for management. The mean score for caregiver self-efficacy was 70.68 (*SD* = 23.67). Using the predefined adequacy threshold (≥ 70),¹⁹ mean scores for all CC domains were below the cutoff, whereas the mean self-efficacy score was above this threshold. Detailed sociodemographic and contextual characteristics are presented in Table 1.

TABLE 1
Sociodemographic and Contextual Characteristics of Caregivers (N = 155)

Characteristic	n (%) or M (SD)
Age, years	54.17 (13.98)
Gender	
Female	123 (79.4)
Male	32 (20.6)
Relationship to patient (spouse/partner)	109 (70.3)
Cohabitation with patient (yes)	117 (75.5)
Marital status	
Married/partnered	109 (70.3)
Single/divorced/widowed	46 (29.7)
Education	
Elementary school	21 (13.5)
Middle school	50 (32.3)
High school	71 (45.8)
University degree	13 (8.4)
Employment status	
Employed	91 (58.7)
Unemployed	26 (16.8)
Retired	38 (24.5)
Caregiving hours/week (≤ 3)	104 (67.1)
Perceived financial adequacy	
Adequate	104 (67.1)
Inadequate	51 (32.9)
Caregiver contribution	
Maintenance	58.64 (26.32)
Monitoring	53.23 (28.03)
Management	59.85 (24.70)
Self-efficacy	70.68 (23.67)

Caregiver contribution to self-care and caregiver self-efficacy scores range from 0 to 100, with higher scores indicating greater levels of contribution and self-efficacy, respectively. A score ≥ 70 was considered indicative of adequate levels of contribution.
SD, standard deviation; n, absolute frequency.

TABLE 2
Standardized Direct, Indirect, and Total Effects of Caregiver Characteristics on Caregiver Contribution to Self-Care Domains (N = 155)

Domain	Predictor	Direct β (95% CI)	P Value	Indirect β (95% CI)	Total β
Maintenance	Occupation	0.09 [−0.12, 0.30]	.433	0.07 [0.01, 0.16]	0.16
	Education	0.02 [−0.18, 0.23]	.828	0.07 [0.01, 0.17]	0.09
	Caregiving hours	−0.04 [−0.26, 0.14]	.887	0.05 [0.01, 0.13]	0.01
Monitoring	Occupation	−0.01 [−0.20, 0.18]	.783	0.07 [0.01, 0.16]	0.06
	Education	0.18 [0.01, 0.36]	.041	0.08 [0.01, 0.17]	0.26
	Caregiving hours	−0.26 [−0.43, −0.10]	.002	0.06 [0.003, 0.13]	−0.21
	Age	0.28 [0.06, 0.49]	.010	−0.04 [−0.13, 0.04]	0.25
	Financial adequacy	0.16 [0.00, 0.31]	.043	−0.05 [−0.13, 0.02]	0.12
Management	Occupation	−0.07 [−0.31, 0.14]	.433	0.10 [0.01, 0.21]	0.02
	Education	0.18 [−0.01, 0.37]	.068	0.10 [0.01, 0.23]	0.28
	Caregiving hours	0.01 [−0.18, 0.17]	.887	0.08 [0.002, 0.17]	0.09

Values are standardized coefficients (β) from STDYX solutions. Indirect effects were estimated using nonparametric bootstrapping (5000 resamples) and are reported with bootstrap 95% confidence intervals; *P* values are not reported for indirect effects as confidence intervals provide the primary basis for inference. Direct effects are reported with 95% confidence intervals. Total effects were computed as the sum of direct and indirect effects. Confidence intervals not including zero were interpreted as evidence of statistical significance.

Structural Equation Modeling Results

As shown in Table 2, all 3 structural equation models demonstrated acceptable to excellent fit. The Maintenance and Monitoring models exhibited excellent fit across all indices, whereas the Management model showed comparatively less favorable, although still acceptable, fit (RMSEA = 0.055, CFI = 0.971, TLI = 0.955, SRMR = 0.045). Standardized factor loadings were high across all constructs, supporting the adequacy of the measurement models (Figures 2–4). Across domains, caregiver self-efficacy consistently predicted CC (Maintenance β = 0.34, *P* < .001; Monitoring β = 0.37, *P* < .001; Management β = 0.51, *P* < .001). Indirect effects via caregiver self-efficacy were observed for occupation, education, and caregiving hours, with partial support based on bootstrap confidence intervals. Direct effects on CC emerged only in the monitoring domain. Specifically, older age (β = 0.28, *P* = .010), higher education (β = 0.18, *P* = .041), better perceived financial adequacy (β = 0.16, *P* = .043), and fewer caregiving hours (β = −0.26, *P* = .002) were independently associated with higher levels of CC. The models explained 17% of the variance in self-care maintenance, 26% in monitoring, and 33% in management, while approximately 10% of the variance in caregiver self-efficacy was accounted for by the included predictors.

DISCUSSION

The aim of this study was to examine the associations between caregiver sociodemographic, contextual, and caregiving characteristics, caregiver self-efficacy, and CC to self-care in patients with CHD, with a specific focus on the mediating role of self-efficacy across the domains of maintenance, monitoring, and management. The findings indicate that caregiver

self-efficacy was consistently associated with CC across all self-care domains and mediated the relationships between selected caregiver characteristics, namely occupation, education, and caregiving hours, and caregiving behaviors. In contrast, direct effects of caregiver characteristics were limited and emerged only for the monitoring domain. These results extend existing literature by providing a domain-specific examination of CC in CHD and by identifying caregiver self-efficacy as a central mechanism linking caregiver characteristics to caregiving behaviors, highlighting its potential as a target for tailored interventions.

In this study, caregivers’ contribution to self-care was below the adequacy threshold across all domains, whereas caregiver self-efficacy was, on average, adequate. This apparent discrepancy may be interpreted in light of the timing of data collection, which occurred during patients’ hospitalization. At this stage, many caregiving behaviors, particularly those related to ongoing support of daily self-care routines, may not yet have been fully enacted in real-life settings. In contrast, self-efficacy reflects perceived confidence rather than actual performance and may therefore be less constrained by contextual opportunities to act. In the context of CHD, caregivers may feel confident in their ability to support behaviors such as medication adherence, dietary modifications, or physical activity, which are generally perceived as familiar and manageable. These findings should be considered in light of the evidence available on caregiving in CHD populations. Compared with other cardiovascular conditions, the role of caregivers in supporting self-care has been less explored in CHD populations. In contrast, a large body of evidence has examined caregiving processes in heart failure, a condition often characterized by greater clinical complexity and more demanding self-care requirements.²⁰ In these settings, caregiver involvement is typically more structured, given the need for continuous symptom

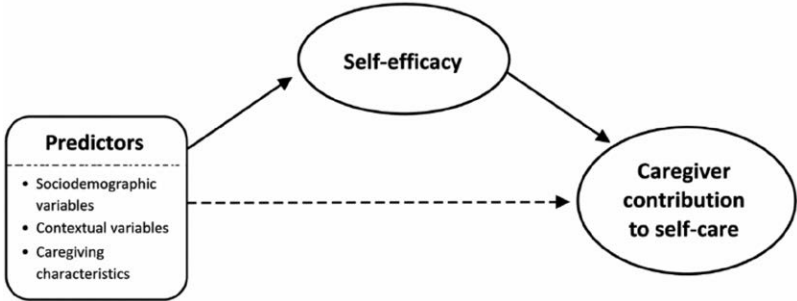


FIGURE 1. ThGraph of the Conceptual Model Adopted in the Study.

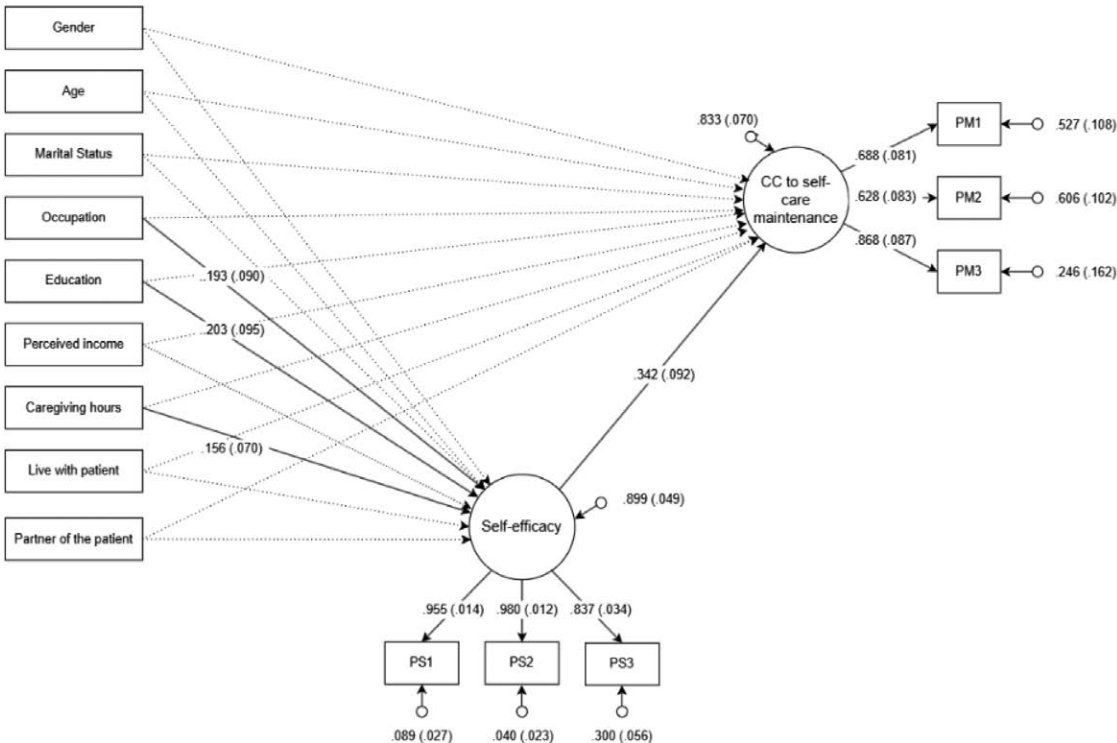


FIGURE 2. Structural Equation Model of Caregiver Contribution to Self-Care Maintenance (N = 155). Path diagram representing the structural relationships between caregiver characteristics, caregiver self-efficacy, and caregiver contribution to self-care maintenance. Standardized coefficients (STDYX) are displayed along the paths, with standard errors in parentheses. Solid lines indicate effects with confidence intervals not including zero, whereas dashed lines indicate nonsupported paths.

monitoring and timely management of exacerbations.⁷ By comparison, although self-care remains central to secondary

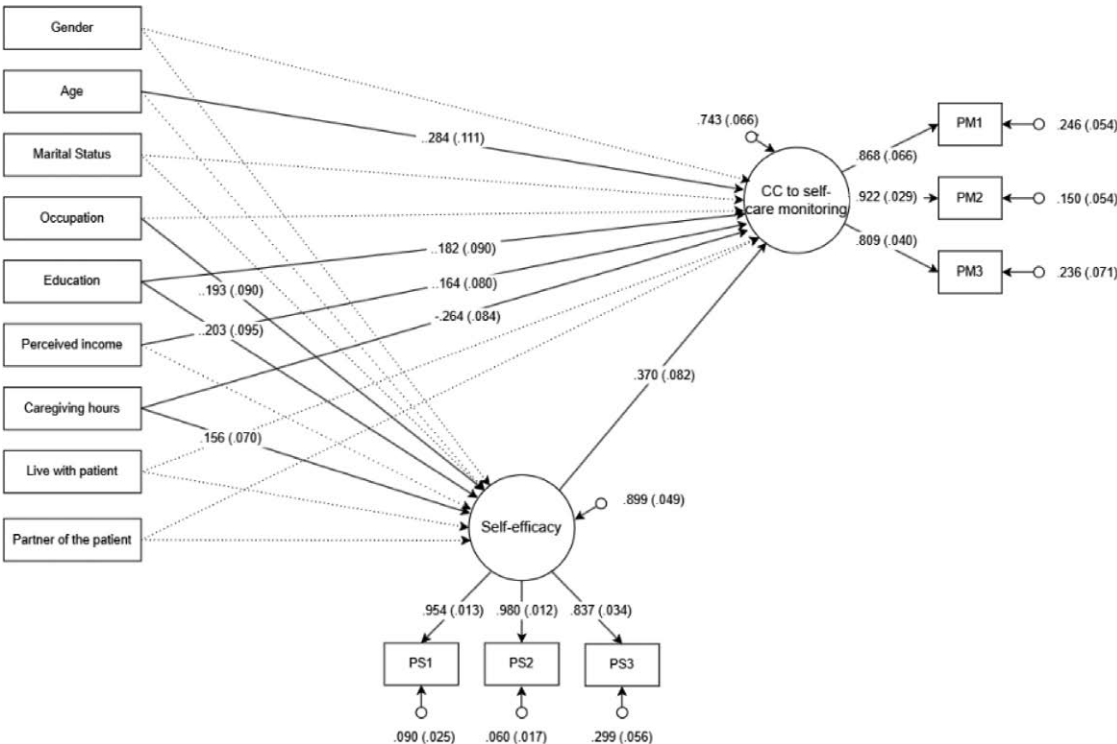


FIGURE 3. Structural Equation Model of Caregiver Contribution to Self-Care Monitoring (N = 155). Path diagram representing the structural relationships between caregiver characteristics, caregiver self-efficacy, and caregiver contribution to self-care monitoring. Standardized coefficients (STDYX) are displayed along the paths, with standard errors in parentheses. Solid lines indicate effects with confidence intervals not including zero, whereas dashed lines indicate nonsupported paths.

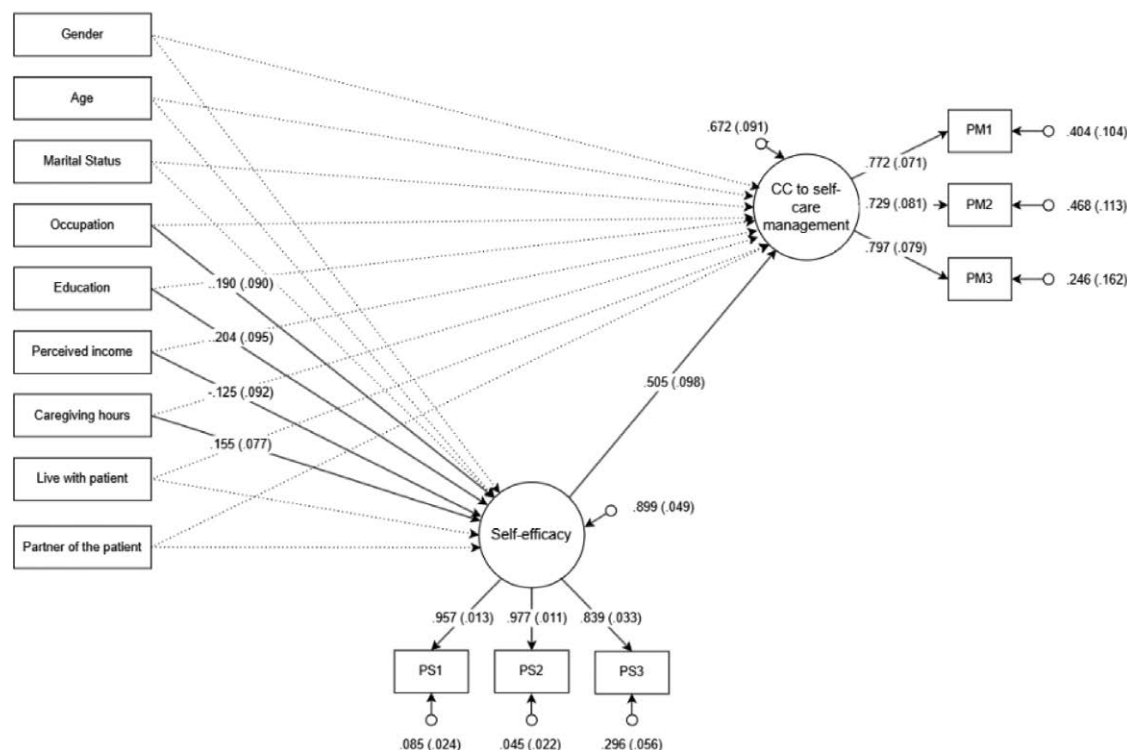


FIGURE 4. Structural Equation Model of Caregiver Contribution to Self-Care Management (N = 155). Path diagram representing the structural relationships between caregiver characteristics, caregiver self-efficacy, and caregiver contribution to self-care management. Standardized coefficients (STDYX) are displayed along the paths, with standard errors in parentheses. Solid lines indicate effects with confidence intervals not including zero, whereas dashed lines indicate nonsupported paths.

prevention in CHD, the processes through which caregivers contribute to patient self-care, and the factors influencing such contribution, have received comparatively limited attention. This imbalance in the literature may contribute to the still limited understanding of how caregiver behaviors are developed and enacted in CHD populations.

One relevant finding of this study was that caregivers who were unemployed or retired were more likely to contribute to patient self-care compared with those who were actively employed. In other words, caregivers who were not working reported higher self-efficacy, which in turn was associated with greater involvement in patient self-care. These findings are consistent with previous research suggesting that caregivers who are not actively employed or retired may have more time available to support patient self-care, while employment itself can represent an additional source of burden, as caregivers often reduce working hours or leave employment to accommodate caregiving responsibilities.²¹

Education showed a similar indirect association with caregivers' contribution to self-care through self-efficacy. Caregivers with higher educational attainment (≥ 9 years of education) reported higher levels of self-efficacy, which in turn were associated with greater contribution to patient self-care. Furthermore, a direct effect was observed for self-care monitoring, suggesting that education may independently facilitate engagement in more cognitively demanding tasks such as symptom recognition and clinical observation. These findings are in line with previous research in heart failure, indicating that educational attainment is associated with more consistent contribution to self-care behaviors,²² potentially through mechanisms such as health literacy and cognitive resources. The domain-specific effect observed for monitoring may reflect the higher cognitive demands of symptom recognition and interpretation in cardiovascular conditions, which are more strongly influenced by educational level. However, there are also instances of inconsistent

evidence; for example, in ostomy care, contribution to monitoring was associated with a lower formal education.²³ This discrepancy may be explained by differences in the nature of monitoring tasks: while in cardiovascular conditions monitoring often involves the identification and interpretation of internal symptoms and subtle clinical changes,⁷ in ostomy care it is more frequently based on the observation of visible and concrete signs (eg, peristomal skin changes or signs of infection), which may be less cognitively demanding and less dependent on formal education.²⁴

Interestingly, caregiving hours showed a complex pattern of associations with caregivers' contribution to self-care. On the one hand, a positive indirect effect emerged through self-efficacy, indicating that those who reported spending more time in caregiving also reported higher levels of self-efficacy, which in turn were associated with greater contribution across domains. In contrast, a negative direct association was observed for the monitoring domain, whereby a higher number of caregiving hours was associated with lower levels of contribution to monitoring. This pattern may be explained by the nature of caregiving activities in this sample and the context in which data were collected. Caregivers were already involved in providing assistance before the CHD event; thus, higher caregiving intensity may primarily reflect engagement in general care tasks rather than disease-specific monitoring. In addition, data were collected during patients' hospitalization, a context in which monitoring activities are largely performed by healthcare professionals. As a result, caregivers, particularly those already highly involved in caregiving, may have reported lower engagement in monitoring behaviors, as these tasks were temporarily delegated to formal care providers. Moreover, self-care monitoring in CHD requires the recognition and interpretation of subtle and condition-specific symptoms, which may not be fully captured by general caregiving experience. Higher caregiving demands may also be associated with cognitive and emotional

burden,²⁵ potentially limiting the ability to engage in more complex and attention-demanding monitoring behaviors. However, there is also evidence that higher caregiving demands are associated with higher contribution to monitoring,²⁶ which warrants future investigations in the field of CHD populations.

Strengths and Limitations

This study has several strengths. First, it is among the first to examine CC to self-care in CHD using a theory-driven approach and to test a domain-specific mediation model, thereby providing a more nuanced understanding of caregiving processes. The use of validated instruments and SEM allowed for the simultaneous estimation of direct and indirect effects, strengthening the internal coherence of the findings. However, some limitations should be acknowledged. First, the cross-sectional design precludes causal inferences, particularly regarding the mediating role of self-efficacy. Second, data were collected during hospitalization, which may limit the generalizability of findings to the postdischarge context where caregiving behaviors are more fully enacted. Third, all measures were self-reported and may be subject to response bias. Fourth, the relatively small sample size and the inclusion of caregivers from a limited geographical area may affect the generalizability of the results. Finally, although the structural models demonstrated excellent fit and explained a moderate proportion of variance in caregivers' contribution to self-care across domains, the variance explained in caregiver self-efficacy was more limited. This pattern suggests that, while the included predictors adequately capture relevant determinants of caregiving behaviors, caregiver self-efficacy may be influenced by a broader set of factors not accounted for in the present models.

Implications for Practice, Policy, and Research

The present findings also have several implications for clinical practice, caregiver support programs, and future research. First, the consistent association between caregiver self-efficacy and CC across all self-care domains suggests that self-efficacy should be routinely assessed during caregiver education and discharge planning, as it represents a potentially modifiable target for interventions. Interventions based on skills training, guided practice, feedback, and coaching may strengthen caregivers' confidence and consequently improve their contribution to patient self-care. Second, the domain-specific findings observed for self-care monitoring indicate that caregivers with lower educational attainment, limited financial resources, or competing caregiving demands may require additional support to develop monitoring competencies, particularly because symptom recognition and interpretation represent cognitively demanding tasks. Tailoring educational interventions according to caregivers' characteristics may therefore improve the effectiveness of caregiver training programs. From a policy perspective, these findings support greater integration of informal caregivers into chronic disease management pathways, with structured educational initiatives extending beyond the patient alone. Finally, although caregiver self-efficacy emerged as a key mediator, the relatively modest proportion of its variance explained by the present models suggests that other potentially modifiable determinants, such as caregiver burden, psychological distress, health literacy, preparedness for caregiving, social support, or dyadic relationship quality, should be investigated in future longitudinal studies. Such studies are also needed to establish the temporal and potentially causal relationships between caregiver characteristics, self-efficacy, and CC to self-care.

CONCLUSIONS

In conclusion, caregiver self-efficacy emerged as a key factor associated with caregivers' contribution to self-care in CHD,

because it acted as a central mechanism linking caregiver characteristics to caregiving behaviors. While sociodemographic and caregiving factors showed indirect associations through self-efficacy, domain-specific direct effects were limited, highlighting the complexity of caregiving processes. These findings suggest that interventions aimed at enhancing caregiver self-efficacy may improve caregiver involvement in patient self-care and support better long-term management of CHD.

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