



3-13-2018


Social Support Predicts Self-Care Confidence in Patients with Heart Failure

Hayley C. Fivecoat
University of Pennsylvania

Steven L. Sayers
University of Pennsylvania

Barbara Riegel
University of Pennsylvania, briegel@nursing.upenn.edu

Follow this and additional works at: <https://repository.upenn.edu/nrs>

 Part of the [Behavioral Medicine Commons](#), [Cardiology Commons](#), [Cardiovascular Diseases Commons](#), [Circulatory and Respiratory Physiology Commons](#), [Medical Humanities Commons](#), [Nursing Commons](#), and the [Preventive Medicine Commons](#)

Recommended Citation

Fivecoat, H. C., Sayers, S. L., & Riegel, B. (2018). Social Support Predicts Self-Care Confidence in Patients with Heart Failure. *European Journal of Cardiovascular Nursing*, 17 (7), 598-604. <http://dx.doi.org/10.1177/1474515118762800>

This paper is posted at ScholarlyCommons. <https://repository.upenn.edu/nrs/168>
For more information, please contact repository@pobox.upenn.edu.

Social Support Predicts Self-Care Confidence in Patients with Heart Failure

Abstract

Background:

Self-care for patients with heart failure includes engaging in behaviours that maintain medical stability and manage problematic symptoms, as well as the confidence in one's ability to carry out such behaviours. Given the social context of self-care behaviours in heart failure, there has been increasing interest in social support as a predictor of self-care.

Aim:

The goal of the present study was to examine the role of social support in self-care across time for persons with heart failure.

Methods:

Using data from an observational study of patients with chronic heart failure ($n = 280$), we examined the role of three types of support – instrumental support, emotional support and assistance with self-care – in the longitudinal course of self-care maintenance, management and confidence. Self-report questionnaire data were collected at baseline and at three and six months later.

Results:

We found that instrumental and emotional support predicted better self-care confidence on average and that self-care confidence improved at a faster rate for those with less instrumental support. Emotional support was positively associated with self-care management and self-care confidence, and assistance with self-care was positively associated with self-care maintenance.

Conclusion:

These findings highlight the contribution of social support to self-care in heart failure and provide guidance for future family-based interventions to improve self-care.

Keywords

heart failure, self-care, social support, self-efficacy

Disciplines

Behavioral Medicine | Cardiology | Cardiovascular Diseases | Circulatory and Respiratory Physiology | Medical Humanities | Medicine and Health Sciences | Nursing | Preventive Medicine

Social Support Predicts Self-Care Confidence in Patients with Heart Failure

Hayley C. Fivecoat^{1,2}

Steven L. Sayers^{1,2}

Barbara Riegel³

¹Mental Illness Research, Education and Clinical Center (Mailstop 116), Corporal Michael J. Crescenz VA Medical Center, 3900 Woodland Avenue, Philadelphia, PA 19104, USA. Email: hayley.fivecoat@gmail.com, steven.sayers@va.gov

²Department of Psychiatry, Perelman School of Medicine, University of Pennsylvania, 3535 Market Street, Philadelphia, PA 19104, USA.

³School of Nursing, University of Pennsylvania, Claire M. Fagin Hall, 418 Curie Boulevard, Philadelphia, PA 19104, USA. Email: briegel@nursing.upenn.edu

Correspondences concerning this article should be addressed to Hayley Fivecoat., Ph.D., Corporal Michael J. Crescenz VA Medical Center, Mailstop 116, 3900 Woodland Avenue, Philadelphia, PA 19104. Email: hayley.fivecoat@gmail.com. Phone: 215-823-4552.

Abstract

Background: Self-care for patients with heart failure includes engaging in behaviors that maintain medical stability and manage problematic symptoms, as well as the confidence in one's ability to carry out such behaviors. Given the social context of self-care behaviors in heart failure, there has been increasing interest in social support as a predictor of self-care. **Aim:** The goal of the present study was to examine the role of social support in self-care across time for persons with heart failure. **Methods:** Using data from an observational study of patients with chronic heart failure ($N = 280$), we examined the role of three types of support – instrumental support, emotional support, and assistance with self-care – in the longitudinal course of self-care maintenance, management and confidence. Self-report questionnaire data were collected at baseline, 3 and 6 months later. **Results:** We found that instrumental and emotional support predicted better self-care confidence on average, and that self-care confidence improved at a faster rate for those with less instrumental support. Emotional support was positively associated with self-care management and self-care confidence, and assistance with self-care was positively associated with self-care maintenance. **Conclusion:** These findings highlight the contribution of social support to self-care in heart failure and provide guidance for future family-based interventions to improve self-care.

Keywords: heart failure; self-care; social support; self-efficacy

Introduction

Heart failure is a debilitating chronic medical syndrome affecting approximately 6.5 million adults in the United States¹. This chronic illness creates an estimated economic burden of \$30.7 billion per year due to medical costs associated with the illness (including hospitalizations) and loss of work productivity². In addition to economic costs, heart failure is also associated with poorer quality of life relative to similarly aged healthy individuals³. In response to these concerns, researchers have identified adequate self-care as an important factor for reducing health care utilization (including hospitalizations) and improving health outcomes in heart failure patients⁴. In the present study, we examine the role of social support in self-care over time for persons with heart failure.

According to the situation-specific theory of self-care in heart failure^{5,6}, self-care processes for patients with heart failure include behaviors patients engage in to maintain medical stability (self-care maintenance), including monitoring for symptoms, and how patients recognize and respond to problematic symptoms of heart failure (self-care management). Additionally, confidence in one's ability to engage in self-care maintenance and management behaviors (self-care confidence), based on the concept of self-efficacy, is thought to impact the use of such behaviors to positively influence heart failure outcomes. Indeed, self-care confidence was shown to have direct associations with self-care maintenance and management, and to mediate associations between cognitive problems and self-care maintenance and management⁷. Further, self-care confidence was shown to moderate the association between self-care management and health outcomes in patients with heart failure⁸.

Self-care in heart failure patients has been positively associated with better health outcomes, including a reduction in biomarkers of systemic inflammation⁹ and fewer hospital admissions¹⁰. Thus, it is important to understand factors that contribute to self-care in order to develop interventions that can improve self-care in this population. Although there are myriad factors that contribute to self-care in heart failure, there has been increasing interest in understanding how social factors contribute to self-care. For example, there has been recent interest in the contribution of both patients and caregivers to self-care processes¹¹, as well as the different approaches that heart failure dyads tend to take in managing heart failure¹². Thus, social support and its associations with self-care and health outcomes have also been of interest to heart failure researchers. Indeed, heart failure researchers have examined constructs such as emotional support (providing emotional comfort, reassurance and encouragement), instrumental support (providing assistance with specific tasks or activities one needs to accomplish) and informational support (providing helpful information to an individual in need), in the context of self-care behaviors.

Social support is associated with better treatment adherence in heart failure patients¹³. A more specific examination of this association showed that perceived emotional-informational support was associated with better self-care maintenance and management in heart failure patients, which was mediated by self-care confidence¹⁴. Similarly, perceived emotional support was associated with better adherence to medication and dietary regimens¹⁵. In addition to research specific to self-care, the literature also suggests an association between social support and health outcomes in heart failure patients. For example, heart failure patients with higher levels of perceived social support had a decreased likelihood of having cardiac events over a period of 3.5 years¹⁶. Additionally, qualitative research has shown that a lack of support (e.g.,

lack of transportation or access to healthy meals) can contribute to heart failure patients' risk for hospital readmission¹⁷.

Although evidence for the association between social support and self-care indices has accumulated, there are several gaps in this line of research that we hoped to address in the present study. First, the majority of studies assessing the association between social support and self-care indices in heart failure patients are derived from studies using cross-sectional data; less is known about the effects across time of social support on indicators of self-care. Additionally, although research in this area has progressed from using broader measures of perceived social support to more refined types (e.g., emotional, instrumental, informational), it remains unclear what specific behaviors contribute to self-care, and what specific behaviors contribute to the perception of greater levels of social support in heart failure patients.

Thus, in the present study, we tested whether social support predicted self-care management, maintenance and confidence on average and how these self-care indices change across time. We tested two types of perceived support (emotional and instrumental), as well as specific acts of assistance with self-care tasks, as predictors of self-care indices. We hypothesized that emotional support, instrumental support and specific assistance with self-care would be associated with indicators of improved self-care on average in heart failure patients. Because the literature does not yet address how support is related to change in self-care across time, we utilized a non-directional hypothesis to test whether these indicators of support predicted trajectories of self-care across a period of 6 months in patients with heart failure.

Methods

Participants

The present study involved secondary analysis of data from a prospective cohort study on patients with heart failure in the northeastern U.S.. The primary goal of the study was to examine cognitive impairment and sleep dysfunction in heart failure patients; methods for this study have been described elsewhere¹⁸ and are summarized briefly here. After obtaining institutional review board approval, participants ($N = 280$) were recruited from three sites. In order to participate, patients had to be diagnosed with chronic heart failure as confirmed by echocardiogram and clinical evidence, previously or currently symptomatic, and have adequate sensory abilities and literacy to participate. Exclusion criteria included dementia; living in a long-term care facility; working nights or rotating shifts; being on renal dialysis; being imminently terminally ill; having plans to move out of the area within 6 months; meeting criteria for, or having a diagnosis of, major depression; and a history of significant alcohol or substance abuse in the past year. The flow of recruitment and study completion has been described previously¹⁸. Participant characteristics are displayed in Table 1. Participants were predominantly men, white, married, at least high school educated, unemployed and financially comfortable.

Procedure

Participation involved completing assessments at baseline, 3 months and 6 months later for data collection. Study participation involved questionnaire completion, administration of neuropsychological tests, providing consent for research staff to review the medical record, and various at-home tasks. These data were collected in participants' homes by research assistants between 2007 and 2010. Only questionnaire data was used for the purpose of this study.

This investigation conforms to the principles outlined in the Declaration of Helsinki. All participants signed a written informed consent document. Study procedures were approved by the Institutional Review Boards at the Corporal Michael J. Crescenz VA Medical Center (ID#: 01004), University of Pennsylvania (Protocol#: 805671) and Cristiana Care Health System (Protocol#: 27044).

Measures

Social support was measured using the Multidimensional Scale of Perceived Social Support¹⁹. The measure includes 12 items rated on a scale from 1 (very strongly disagree) to 7 (very strongly agree), and assesses aspects of support from friends, family and a special person. As previously used¹⁵, the measure was split into subscales for instrumental support ($\alpha = .75$) and emotional support ($\alpha = .84$) for the present analyses.

We measured Assistance with Self-Care using items created for the purpose of this study. Respondents responded with “yes” (coded 1) or “no” (coded 0) to five items indicating that family and friends have assisted with self-care activities in the following ways: (1) “they remind me of things I need to do;” (2) “they drive me places like the doctor's office;” (3) “they shop for and/or prepare the foods that I should be eating;” (4) “they help me interpret my symptoms;” and (5) “they help me decide what to do about new symptoms or changes.” The five items were summed, such that those with the most assistance from friends and family could achieve a maximum score of 5. Inter-item consistency was .68. We entered all five items into a principal components factor analysis in order to determine whether items appeared to load onto a single construct, yielding a one-factor solution (Eigenvalue = 2.21, accounting for 44.2% of the variance). Factor loadings for items 1-5 were .63, .58, .66, .72 and .72, respectively.

We used the Self-Care of Heart Failure Index v6.2²⁰ (SCHFI) to measure self-care outcomes in the present study. The SCHFI is a 22-item self-report measure designed for use in patients with heart failure, with subscales for self-care maintenance (indicating behaviors that maintain optimal health in heart failure patients), self-care management (indicating use of behaviors to manage symptoms of heart failure when they occur) and self-care confidence (indicating confidence in one's ability to engage in self-care behaviors). Each separate scale is standardized (score 0–100) with higher scores indicating better self-care. The SCHFI's psychometric properties have been well documented; in a study computing reliability coefficients using these data, reliability coefficients ranged from .75-.83 for self-care maintenance, .66-.77 for self-care management, and .84-.90 for self-care confidence²¹. Based on a cut-off score of 70 or more, adequate self-care at baseline was found in 47.5% of the sample for self-care maintenance, 49.6% for self-care management, and 68.9% for self-care confidence.

We also used the New York Heart Association (NYHA) functional class assessment in the present study. NYHA functional class was determined using a standardized interview used previously²². The interviews were administered by research assistants, and the results of these interviews were reviewed by a single board certified cardiologist who determined NYHA functional class for each participant.

Results

Data Analysis

Multilevel modeling, using the SAS PROC MIXED procedure, was used to examine the role of social support in self-care maintenance, management and confidence on average and across time. Participants' baseline NYHA functional class was entered as a covariate in each

analysis in order to control for heart failure severity. We entered NYHA, time (0, 3 or 6 months), support, and time X support to predict each index of self-care. Parameter estimates for time and support were used to determine main effects on self-care outcomes, while the time X support interaction term was used to determine whether the support variable predicted linear trajectories of self-care indices across the 6 month observation period. This analysis was run separately for each type of support (instrumental support, emotional support, and assistance with self-care) and for each self-care outcome (maintenance, management and confidence), yielding a total of 9 separate analyses. When the time X support predictor was nonsignificant, we ran reduced models without the interaction term to obtain more accurate estimates of main effects.

Maximum likelihood estimation was used to handle missing data. There were varying degrees of missing data across timepoints: $n = 10$ missing at baseline (for all variables of interest except NYHA class, which had no missing data), $n = 44$ at 3 months (for all variables of interest), and $n = 38$ at 6 months (for all variables of interest except Assistance with Self-Care, which had 36 missing data points).

Main Effects

As displayed in Tables 2 and 3, each of the three self-care indices tended to improve across the course of the 6-month observation period of this study. Additionally, we found several associations between support indices and self-care outcomes. Instrumental support and emotional support were independently associated with higher levels of self-care confidence on average. Additionally, emotional support was associated with higher self-care management scores. Finally, assistance with self-care was **positively** associated with self-care maintenance, such that those who reported receiving greater assistance for specific self-care activities reported **more** use

of recommended behaviors to maintain health for individuals with chronic heart failure. No other associations between support and self-care indices were found.

Support Predicting Trajectories of Self-Care

Instrumental support and time interacted to predict changes in trajectories of self-care confidence across time (see Table 3 and Figure 1). Although those who perceived higher levels of instrumental support had higher self-care confidence on average (a main effect), those who perceived lower levels of instrumental support showed greater improvement in self-care confidence across time compared to those with higher levels of perceived instrumental support. In other words, those with less initial instrumental support improved more in self-care confidence across time than those with higher initial instrumental support. Instrumental support did not predict changes in trajectories of self-care maintenance or management across time. Neither emotional support nor assistance with self-care predicted changes in trajectories of self-care maintenance, management or confidence over time.

Discussion

Self-care is critical to the maintenance of medical stability and prolonging life in individuals with heart failure. The present study demonstrated that perceived social support is one important factor associated with better self-care in heart failure patients. In particular, the present study found, for the first time, that those with less instrumental support showed greater increases in self-care confidence across a period of 6-months. Our study also showed that those with more instrumental and emotional support had more self-care confidence on average, that those with more emotional support had better self-care management, and that those with more assistance with self-care tended to have **better** self-care maintenance.

There are several potential explanations for the novel and counterintuitive finding that lower levels of instrumental support predicted more growth in self-care confidence across time for patients with heart failure. It is possible that, because those with less instrumental support tended to have lower self-care confidence on average, there was simply greater room for improvement for these patients. Alternatively, there is some research from the broader population showing that social support has potential negative effects by means of lowering the support receiver's sense of self-efficacy²³, potentially conveying that the individual under stress is managing stressful circumstances poorly. Thus, in the case of heart failure patients, although there appears to be an overall benefit of social support, it may also limit the potential for growth in self-efficacy. With this in mind, however, note that the negative effects social support can potentially be mitigated through skillful delivery of support²⁴.

Additionally, the most prominent effects of social support observed in this study were in the domain of self-care confidence. In particular, perceived emotional and instrumental support each predicted greater confidence in one's ability to engage in self-care behaviors for heart failure. This social contribution to self-care confidence in heart failure patients could be highly beneficial. Indeed, self-care confidence is associated with a wide range of positive outcomes in heart failure patients, including better self-care management behaviors²⁵ and better general health outcomes⁸. Conversely, less perceived self-efficacy in heart failure patients has been associated with poorer treatment adherence¹³, and was demonstrated to mediate the association between social support and self-care behaviors²⁶. Further evidence was suggested by a systematic review which concluded that that self-efficacy was an important mechanism for the effectiveness of disease management programs for heart failure patients²⁷. Indeed, others have shown that self-

care confidence fully mediated the association between cognition and self-care maintenance and management¹¹.

We also found that emotional support was associated with better self-reported management of symptoms (e.g., reducing fluid intake, calling a medical provider) in patients with heart failure. This suggests that others' attentiveness and emotional response to the heart failure patient's symptom flare ups may contribute to the patient being more proactive in managing such symptom exacerbation. This finding is consistent with previous literature indicating the role of emotional support in self-care management in heart failure¹⁴. Additionally, we found that assistance with self-care was positively associated with self-care maintenance scores. This highlights the valuable, practical role that supportive figures in the lives of heart patients can play in maintaining better health behaviors, such as helping patients adhere to recommended diets and monitor symptoms. Indeed, previous studies have suggested that a lack of support was perceived as a risk factor for hospital readmission in heart failure patients¹⁷. The present study extends this literature by indicating that tangible assistance from family and friends can support in maintaining health for heart failure patients, which prevent risk for further complications of the illness¹⁰.

More broadly, this study highlights the importance of social factors in heart failure patients' self-care, and suggests that social support is a factor that should be assessed and utilized by providers managing patients with heart failure. Future research on heart failure patients and their support systems should aim to establish what specific behaviors and interaction styles should be adopted by supportive individuals to positively contribute to self-care processes in their loved ones. In other words, the gap between actual and perceived support in heart failure dyads should be elucidated. Alternatively, it may be fruitful to examine more individualized

strategies for what type, and perhaps how much, social support is likely to improve self-care. As evidence of this, using qualitative analysis, researchers identified four typologies for ways that heart failure patients and their spouses manage the condition together, and recommend working with couples in accordance with their natural strategy of managing the condition, rather than encouraging them to adopt a different dyadic approach¹². Additionally, this study supports the involvement of family members in interventions for people with heart failure, as have been previously tested²⁸.

This study has several important strengths. The longitudinal nature of this study allowed for the assessment of social support and self-care across time, rather than cross-sectionally. Additionally, the use of multiple indicators of social support allows for a more refined understanding of what type of support can facilitate self-care in individuals with heart failure (as evidenced by different findings across indices of support). Similarly, use of the SCHFI allowed us to assess outcomes on multiple components of heart failure self-care, all of which have important implications for longer-term heart failure outcomes. Further, our study had strong external validity, given the observational nature of our study and the characteristics of study participants who were diverse in their race, gender, marital status and financial status. Several limitations must also be acknowledged. As this study did not involve any particular intervention or experimental manipulation, the design is inherently correlational and causality cannot be inferred. Additionally, this study involved secondary analysis of data from a larger study examining cognitive impairment and sleep dysfunction in heart failure patients; as a result, the measures administered were not specifically designed for the purpose of testing associations between social support and self-care. Moreover, although we are examining a social process in this study, we did not have access to data from caregivers or other supportive figures to include

in our statistical models. Finally, only self-report measures were used to assess key variables in this study, which are subject to biases in memory and social desirability.

Collectively, our findings suggest that social support plays an important role in self-care for heart failure patients, particularly in the domain of self-care confidence. It is our hope that this line of research contributes to future family-based interventions for individuals with heart failure that effectively enhance self-care and health outcomes for patients, as well as a more refined understanding of how support networks can contribute to self-care in this population. More proximally, this research should be encouraging for current healthcare providers, as there is potential for family involvement in care to improve heart failure patients' adherence to self-care recommendations.

Implications for Practice

- Providers should regularly assess for the availability of others to support heart failure patients' self-care practices.
- Providers are encouraged to enlist the support of family and/or friends of heart failure patients to assist with self-care, as **such support can predict better self-care maintenance and confidence on average.**
- Providers **may** be mindful of the finding that **instrumental social support has the potential to limit** growth in self-care confidence in heart failure patients, and encourage others to provide support in a manner that supports patients' **autonomy and self-efficacy.**

Acknowledgements

We acknowledge and thank Thomas A. Gillespie, MD, FACC for scoring the New York Heart Association (NYHA) interviews.

Funding

This study was funded by a grant from the National Heart, Lung & Blood Institute (RO1 HL084394-01A1) and by the Philadelphia Veterans Affairs Medical Center, VISN 4 Mental Illness Research, Education, and Clinical Center. The writing of this manuscript was supported by the Office of Academic Affiliations, Advanced Fellowship Program in Mental Illness Research and Treatment, Department of Veterans Affairs.

Declaration of Conflicts of Interest

We declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

References

1. Benjamin EJ, Blaha MJ, Chiuve SE, Cushman M, Das SR, Deo R, et al. Heart Disease and Stroke Statistics—2017 Update: A Report From the American Heart Association. *Circulation*. 2017;135(10).
2. Heidenreich PA, Trogdon JG, Khavjou OA, Butler J, Dracup K, Ezekowitz MD, et al. Forecasting the Future of Cardiovascular Disease in the United States: A Policy Statement From the American Heart Association. *Circulation*. 2011;123(8):933–44.
3. Buck HG, Lee CS, Moser DK, Albert NM, Lennie T, Bentley B, et al. Relationship Between Self-care and Health-Related Quality of Life in Older Adults With Moderate to Advanced Heart Failure. *The Journal of Cardiovascular Nursing*. 2012;27(1):8–15.
4. Riegel B, Moser DK, Buck HG, Dickson VV, Dunbar SB, Lee CS, et al. Self-Care for the Prevention and Management of Cardiovascular Disease and Stroke. *Journal of the American Heart Association*. 2017;6(9).
5. Riegel B, Dickson VV. A Situation-Specific Theory of Heart Failure Self-care. *The Journal of Cardiovascular Nursing*. 2008;23(3):190–6.
6. Riegel B, Dickson VV, Faulkner KM. The Situation-Specific Theory of Heart Failure Self-Care. *The Journal of Cardiovascular Nursing*. 2016;31(3):226–35.
7. Vellone E, Pancani L, Greco A, Steca P, Riegel B. Self-care confidence may be more important than cognition to influence self-care behaviors in adults with heart failure: Testing a mediation model. *International Journal of Nursing Studies*. 2016;60:191–9.
8. Lee CS, Suwanno J, Riegel B. The Relationship Between Self-Care and Health Status Domains in Thai Patients with Heart Failure. *European Journal of Cardiovascular Nursing*. 2009;8(4):259–66.
9. Lee CS, Moser DK, Lennie TA, Tkacs NC, Margulies KB, Riegel B. Biomarkers of Myocardial Stress and Systemic Inflammation in Patients Who Engage in Heart Failure Self-care Management. *The Journal of Cardiovascular Nursing*. 2011;26(4):321–8.
10. Jonkman NH, Westland H, Groenwald RHH, Agren S, Atienza F, Blue L, et al. Do self-management interventions work in patients with heart failure? An individual patient data meta-analysis. *Circulation*. 2016;133(12):1189–98.
11. Vellone E, Fida R, D’Agostino F, Mottola A, Juarez-Vela R, Alvaro R, et al. Self-care confidence may be the key: A cross-sectional study on the association between cognition and self-care behaviors in adults with heart failure. *International Journal of Nursing Studies*. 2015;52(11):1705–13.
12. Buck HG, Kitko L, Hupcey JE. Dyadic heart failure care types: qualitative evidence for a novel typology. *Journal of Cardiovascular Nursing*. 2013;28(6):E37–E47.
13. Maeda U, Shen B-J, Schwarz ER, Farrell KA, Mallon S. Self-Efficacy Mediates the Associations of Social Support and Depression with Treatment Adherence in Heart Failure Patients. *International Journal of Behavioral Medicine*. 2012Mar;20(1):88–96.

14. Cené CW, Haymore LB, Dolan-Soto D, Lin F-C, Pignone M, Dewalt DA, et al. Self-Care Confidence Mediates the Relationship Between Perceived Social Support and Self-Care Maintenance in Adults With Heart Failure. *Journal of Cardiac Failure*. 2013;19(3):202–10.
15. Sayers SL, Riegel B, Pawlowski S, Coyne JC, Samaha FF. Social Support and Self-Care of Patients with Heart Failure. *Annals of Behavioral Medicine*. 2008;35(1):70–9.
16. Wu J-R, Frazier SK, Rayens MK, Lennie TA, Chung ML, Moser DK. Medication adherence, social support, and event-free survival in patients with heart failure. *Health Psychology*. 2013;32(6):637–46.
17. Retrum JH, Boggs J, Hersh A, Wright L, Main DS, Magid DJ, et al. Patient-identified factors related to heart failure readmissions. *Circulation: Cardiovascular Quality and Outcomes*. 2013;6(2):171–7.
18. Riegel B, Moelter ST, Ratcliffe SJ, Pressler SJ, De Geest S, Potashnik S, Fleck D, Sha D, Sayers SL, Weintraub WS, Weaver TE. Excessive daytime sleepiness is associated with poor medication adherence in adults with heart failure. *Journal of cardiac failure*. 2011 Apr 30;17(4):340-8.
19. Zimet GD, Dahlem NW, Zimet SG, Farley GK. The multidimensional scale of perceived social support. *Journal of personality assessment*. 1988 Mar 1;52(1):30-41.
20. Riegel B, Lee CS, Dickson VV, Carlson B. An Update on the Self-care of Heart Failure Index. *The Journal of Cardiovascular Nursing*. 2009;24(6):485–97.
21. Barbaranelli C, Lee CS, Vellone E, Riegel B. Dimensionality and Reliability of the Self-Care of Heart Failure Index Scales: Further Evidence From Confirmatory Factor Analysis. *Research in Nursing & Health*. 2014;37(6):524–37.
22. Kubo SH, Schulman S, Starling RC, Jessup M, Wentworth D, Burkhoff D. Development and validation of a patient questionnaire to determine New York heart association classification. *Journal of Cardiac Failure*. 2004;10(3):228–35.
23. Howland M, Simpson JA. Getting in under the radar: A dyadic view of invisible support. *Psychological Science*. 2010 Dec;21(12):1878-85.
24. Rafaeli E, Gleason MEJ. Skilled Support Within Intimate Relationships. *Journal of Family Theory & Review*. 2009;1(1):20–37.
25. Salyer J, Schubert CM, Chiaranai C. Supportive Relationships, Self-care Confidence, and Heart Failure Self-care. *The Journal of Cardiovascular Nursing*. 2012;27(5):384–93.
26. Mansouriyeh N, Poursharifi H, Sadeghi MRTS, Seirafi MR. Self-efficacy as a mediator in the relationship between social support and self-care in patients with heart failure. *International Journal of Medical Research & Health Sciences*. 2017;6(6):157–62.
27. Clark AM, Wiens KS, Banner D, Kryworuchko J, Thirsk L, McLean L, et al. A systematic review of the main mechanisms of heart failures disease management interventions. *Heart*. 2016;102:707–11.

28. Srisuk N, Cameron J, Ski CF, Thompson DR. Randomized controlled trial of family-based education for patients with heart failure and their carers. *Journal of Advanced Nursing*. 2016;73(4):857–70.