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**eTable 1.** Medications changes after baseline

This supplementary material has been provided by the authors to give readers additional information about their work.
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eMethods1. CBT for HF Self-Care: Therapist Instructions

During the initial clinical evaluation (i.e., the patient’s first meeting with the therapist), review any HF self-care deficits that were identified on the baseline Self-Care of Heart Failure Index as well as on the patient’s initial list of problems and goals on the Pre-Treatment Problem List (PLIST) form, and ask the patient to identify any salient barriers to HF self-care.

Also work with the patient to complete the Self-Care Goals Worksheet to identify any self-care deficits or barriers that she or he agrees would be appropriate to target. If she or he does not have any significant self-care deficits or barriers, it is not necessary to include self-care goals in the CBT treatment plan. However, you should err on the side of including self-care in the plan if you are uncertain about the clinical significance of any deficits or barriers that are found.

During Session 2 or 3, work with the patient to develop a revised problem list on the Collaborative PLIST form. Since no more than 4 high-priority problems can be listed, and depression or depressive symptoms should be one of the targeted problems, self-care problems and goals have to compete for the 3 remaining slots. If any salient self-care problems are present but the patient does not nominate them for inclusion on the collaborative PLIST, negotiate with the patient to include this as one of the items. If the patient does not agree to include HF self-care at this juncture, advise him or her that this issue will be revisited later in the course of therapy, after progress has been made on the initial problems.

If any self-care problems or behaviors are listed, include them in the case conceptualization diagram and the treatment plan.

Use standard cognitive-behavioral techniques to target any self-care problems or barriers that are included in the treatment plan. Examples:

1. Use the Dysfunction Thoughts Record (DTR) or the Testing Your Thoughts (TYT) worksheet to help the patient identify and challenge automatic thoughts that interfere with self-care behaviors or erode self-care confidence (e.g., “It’s such a hassle to weigh myself every day. Why should I bother anyway? It doesn’t make me feel any better.”)

2. Help the patient implement environmental cues for self-care behaviors that are frequently forgotten or overlooked, e.g., place the pill bottles next to the bathroom sink so that the patient will see them when it’s time to take his/her medications.

3. Use behavioral activation and scheduling to increase the frequency of physical activity and exercise (within safe limits set by the patient’s physician).

Remember that your role as a therapist is to use cognitive-behavioral techniques to build on the HF education that the patient receives from the cardiac nurse-educator, not to replace it and not to work without taking the patient’s HF education into account. If you have any questions about the compatibility of a patient’s self-care deficits, barriers, or goals with his/her HF education, discuss this with the cardiac nurse-educator.

During each CBT session after the initial clinical evaluation, complete the Self-Care Performance Criterion Scale (SC-PCS) to assess the ongoing effectiveness of the self-care component of the intervention and the patient’s compliance with self-care treatment goals. Use the Daily Heart Failure Self-Care Log (completed by the patient weekly) to monitor progress.

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eMethods 2. Power Analysis

As noted in the manuscript, clinically significant effects were originally defined on the primary and co-primary outcomes as a difference of >3 points on the BDI-II, >20 points on the Self-Care of Heart Failure Index total score, and >11 points on the Kansas City Cardiomyopathy Questionnaire. The Bonferroni-corrected Type 1 error rate for these outcomes was set at α=0.05/3 = 0.016. Power was set at >0.80 for all three outcomes, and expected attrition was set at ≤25%. The estimated variability (s) and intra-class correlations for these measures were:

<table>
<thead>
<tr>
<th>Measure</th>
<th>S</th>
<th>ICC</th>
</tr>
</thead>
<tbody>
<tr>
<td>BDI-II</td>
<td>6.0</td>
<td>0.55</td>
</tr>
<tr>
<td>Self-Care total score</td>
<td>42.0</td>
<td>0.50</td>
</tr>
<tr>
<td>Kansas City Cardiomyopathy Questionnaire</td>
<td>22.0</td>
<td>0.50</td>
</tr>
</tbody>
</table>

Primary and co-primary outcome data were simulated under these assumptions in replicates of sizes ranging from 20 to 300 by 20. Each replicate was fitted to the main mixed-effects regression model with an auto-regressive (AR1) covariance structure in a 4-step procedure described by WW Stroup et al. The replicate with N=180 subjects provided 0.82 power to detect a >3 point difference on the BDI-II, 0.85 power for a >20 point difference on the Self-Care total score, and 0.85 for a >11 point difference on the Kansas City Cardiomyopathy Questionnaire. The final target sample size was then determined to be N=180*(4/3) = 240 patients to allow for up to 25% attrition.

As noted in the manuscript, Riegel et al. (2009) recommended that the Self-Care total score be abandoned and that Self-Care subscale scores be used instead. This change was published after our grant proposal was written but before the start-up of our study. The ramifications of this change were considered prior to the start-up of enrollment by the trial’s Data and Safety Monitoring Board, acting in its capacity as the study’s protocol review committee.

Because the move to Self-Care scores would have unduly increased the number of “primary” outcomes, the DSMB recommended making the BDI-II the “primary” outcome, the Self-Care Maintenance and Confidence subscales “co-primary” outcomes, and the Kansas City Cardiomyopathy Questionnaire a “secondary” outcome. This change was agreed to prior to the start-up of enrollment. The original target sample size of N=240 provided sufficient power for the revised set of primary and co-primary measures, and this remained the target for the trial.

eMethods3. Multiple Imputation Procedure

We followed the recommendations and guidelines for multiple imputation that were presented in Graham (2009). We selected variables for each imputer’s model (one for each outcome) by 1) correlating all available variables with the outcome, 2) selecting variables that correlated $r>0.25$, 3) creating a dichotomous missingness indicator, and 4) correlating it with key variables, including both the ones required for the analysis models and any auxiliary variables that were related ($r>0.20$) with each missingness indicator. The variables selected via this process for each outcome are listed in a separate online supplement. Once the variables were selected, a Markov Chain Monte Carlo (MCMC) method from the MI procedure in SAS was used to create 20 multiply-imputed analysis datasets from the input list of variables for each related outcome.

eTable1. Number of patients who started or discontinued medications after baseline.

<table>
<thead>
<tr>
<th>Medication</th>
<th>EUC (n=79)</th>
<th>CBT (n=79)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antidepressants</td>
<td>10 (12.7%)</td>
<td>11 (13.9%)</td>
</tr>
<tr>
<td>Beta blockers</td>
<td>7 (8.9%)</td>
<td>5 (6.3%)</td>
</tr>
<tr>
<td>ACE inhibitors or ARBs</td>
<td>7 (8.9%)</td>
<td>8 (10.1%)</td>
</tr>
<tr>
<td>Aldosterone antagonists</td>
<td>14 (17.7%)</td>
<td>10 (12.7%)</td>
</tr>
</tbody>
</table>

Notes: None of the between-group differences are statistically significant. Data on dosage changes are not included in the table.
**Supplementary Online Content:**

**Imputers Models**


<table>
<thead>
<tr>
<th>Imputer Models</th>
<th>Description</th>
</tr>
</thead>
</table>
| BDI-2          | 1. Treatment group  
                 2. Antidepressant stratum  
                 3. Education  
                 4. Employed  
                 5. History of angina  
                 6. History of cerebrovascular accident  
                 7. Income  
                 8. LVEF at baseline  
                 9. Number of major medical comorbidities  
                10. Number of readmissions  
                11. NYHA class at baseline  
                12. Age  
                13. Patient read heart failure education packet at weeks 2 and 4  
                14. SF-12 physical component scores at baseline, 3 and 9 months  
                15. SF-12 mental component scores at 3, 6, 9 and 12 months  
                16. PROMIS physical functioning scores at baseline and 6 months  
                17. PROMIS SSR scores at baseline and 6 months  
                18. PROMIS fatigue scores at baseline and 6 months  
                19. KCCQ overall scores at baseline, 3, 6, 9, 12 months  
                20. KCCQ clinical scores at baseline, 3, 6, 9, 12 months  
                21. Hamilton Rating Scale for Depression (HAM-D-17) scores at baseline and 6 months  
                22. Beck Anxiety Inventory (BAI) scores at baseline, 3, 6, 9, 12 months  
                23. Self-Care Heart Failure Index (SCHFI) maintenance scores at baseline, 6 and 12 months  
                24. Self-Care Heart Failure Index (SCHFI) confidence scores at 3, 6 and 12 months  
                25. 6-min walk test (feet traveled) at baseline  
                26. Beck Depression-II Inventory (BDI-2) scores at baseline, 3, 6, 9 and 12 months  

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**Hamilton Rating Scale for Depression**

<table>
<thead>
<tr>
<th>Imputer Models</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1. Treatment group</td>
</tr>
</tbody>
</table>

---
2. Antidepressant stratum
3. Education
4. Employed
5. History of angina
6. Patient read heart failure education packet at weeks 2 and 4
7. SF-12 physical component scores at baseline, 6 and 12 months
8. SF-12 mental component scores at 3 and 6 months
9. PROMIS physical functioning scores at baseline and 6 months
10. PROMIS SSR scores at baseline and 6 months
11. PROMIS SSD scores at baseline and 6 months
12. PROMIS fatigue scores at baseline and 6 months
13. KCCQ overall scores at baseline, 3 and 6 months
14. KCCQ clinical scores at baseline, 3 and 6 months
15. Beck Anxiety Inventory (BAI) scores at baseline, 3 and 6 months
16. Beck Depression-II Inventory (BDI-2) scores at baseline, 3 and 6 months
17. Hamilton Rating Scale for Depression (HAM-D-17) scores at baseline and 6 months

Self-Care of Heart Failure – Maintenance Subscale
1. Treatment group
2. Antidepressant stratum
3. Employed
4. History of heart failure hospitalizations
5. History of AICD implantation
6. Patient participated in cardiac rehabilitation
7. Patient participated in cardiac support group
8. LVEF at baseline
9. Number of major medical comorbidities
10. Number of baseline prescribed medications
11. Age
12. Patient read heart failure education packet at weeks 2 and 4
13. SF-12 mental component score at 12 months
14. PROMIS fatigue score at baseline
15. PROMIS SSR score at 6 months
16. KCCQ overall score at 6 months
17. Beck Depression-II Inventory (BDI-2) scores at 3 and 6 months
18. Self-Care Heart Failure Index (SCHFI) confidence scores at baseline, 3, 6 and 12 months
19. Self-Care Heart Failure Index (SCHFI) maintenance scores at baseline, 3, 6, 9 and 12 months
   Self-Care Heart Failure Index – Confidence Subscale
1. Treatment group
2. Antidepressant stratum
3. Employed
4. History of heart failure hospitalizations
5. History of AICD implantation
6. History of cerebrovascular accident
7. Current medical insurance coverage (secondary)
8. LVEF at baseline
9. Number of major medical comorbidities
10. Number of depressive symptoms at baseline
11. Age
12. Patient read heart failure education packet at weeks 2 and 4
13. PROMIS fatigue score at baseline
14. PROMIS SSR score at 6 months
15. PROMIS SSD score at 6 months
16. KCCQ overall score at 6 months
17. Beck Depression-II Inventory (BDI-2) scores at 3, 6, 9 and 12 months
18. Beck Anxiety Inventory (BAI) scores at 6 and 12 months
19. Self-Care Heart Failure Index (SCHFI) maintenance scores at baseline, 3, 6, 9 and 12 months
20. Self-Care Heart Failure Index (SCHFI) confidence scores at baseline, 3, 6, 9 and 12 months
Beck Anxiety Inventory

1. Treatment group
2. Antidepressant stratum
3. Education
4. Employed
5. LVEF at baseline
6. Number of major medical comorbidities
7. NYHA class at baseline
8. Age
9. SF-12 physical component scores at baseline, 3, 6, 9 and 12 months
10. PROMIS physical functioning scores at baseline and 6 months
11. PROMIS SSR scores at baseline and 6 months
12. PROMIS SSD score at 6 months
13. PROMIS fatigue scores at baseline and 6 months
14. PROMIS anxiety scores at baseline and 6 months
15. KCCQ overall scores at baseline, 3, 6, 9, 12 months
16. KCCQ clinical scores at baseline, 3, 6, 9, 12 months
17. Self-Care Heart Failure Index (SCHFI) maintenance scores at baseline, 3 and 6 months
18. Self-Care Heart Failure Index (SCHFI) confidence scores at baseline, 3 and 6 months
19. 6-min walk test (feet traveled) at baseline
20. Beck Depression-II Inventory (BDI-2) scores at baseline, 3, 6, 9 and 12 months
21. Beck Anxiety Inventory (BAI) scores at baseline, 3, 6, 9, 12 months
6-Minute Walk Test Distance
1. Treatment group
2. Antidepressant stratum
3. Gender
4. Race
5. Employed
6. Married or partnered at baseline
7. Current medical insurance coverage (primary)
8. Patient participated in cardiac rehabilitation
9. History of peripheral vascular disease
10. Body mass index at baseline
11. Income
12. Number of major medical comorbidities
13. NYHA class at baseline
14. Patient read heart failure education packet at week 2
15. SF-12 physical component scores at baseline, 3 and 6 months
16. PROMIS physical functioning scores at baseline and 6 months
17. PROMIS SSR score at baseline
18. PROMIS SSD scores at baseline and 6 months
19. PROMIS fatigue scores at baseline and 6 months
20. KCCQ overall scores at baseline, 3 and 6 months
21. KCCQ clinical scores at baseline, 3 and 6 months
22. Beck Anxiety Inventory (BAI) scores at baseline and 3 months
23. Self-Care Heart Failure Index (SCHFI) maintenance score at 6 months
24. Self-Care Heart Failure Index (SCHFI) confidence score at 12 months
25. Average energy activity counts at baseline and 6 months
26. Average energy expenditure at baseline
27. 6-min walk test (feet traveled) at baseline and 6 months
Kansas City Cardiomyopathy Questionnaire

1. Treatment group
2. Antidepressant stratum
3. Employed
4. Education
5. History of cerebrovascular accident
6. Income
7. LVEF at baseline
8. Number of major medical comorbidities
9. Time to readmission
10. NYHA class at baseline
11. Systolic blood pressure at baseline (1st reading)
12. Age
13. Patient read heart failure education packet at weeks 2 and 4
14. Short Blessed Test (SBT) total score at baseline
15. SF-12 physical component scores at baseline, 3 and 6 months
16. SF-12 mental component score at 3 and 6 months
17. PROMIS SSR scores at baseline and 6 months
18. PROMIS SSD scores at baseline and 6 months
19. PROMIS fatigue scores at baseline and 6 months
20. PROMIS physical functioning scores at baseline and 6 months
21. PROMIS anxiety score at 6 months
22. Beck Anxiety Inventory (BAI) score at baseline
23. Self-Care Heart Failure Index (SCHFI) maintenance scores at baseline and 6 months
24. Self-Care Heart Failure Index (SCHFI) confidence score at 3 months
25. 6-min walk test (feet traveled) at baseline and 6 months
26. Beck Depression-II Inventory (BDI-2) scores at baseline, 3 and 6 months
27. KCCQ clinical scores at baseline, 3 and 6 months
28. KCCQ overall scores at baseline, 3, 6, 9 and 12 months
SF-12 Physical Component
1. Treatment group
2. Antidepressant stratum
3. Education
4. Employed
5. Current medical insurance coverage (secondary)
6. Number of major medical comorbidities
7. NYHA class at baseline
8. Systolic blood pressure at baseline (1st reading)
9. Age
10. Patient read heart failure education packet at weeks 2 and 4
11. PROMIS physical functioning scores at baseline and 6 months
12. PROMIS SSR scores at baseline and 6 months
13. PROMIS SSD scores at baseline and 6 months
14. PROMIS fatigue scores at baseline and 6 months
15. KCCQ overall scores at baseline, 3 and 6 months
16. KCCQ clinical scores at baseline, 3 and 6 months
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18. Self-Care Heart Failure Index (SCHFI) maintenance scores at baseline, 3 and 6 months
19. Self-Care Heart Failure Index (SCHFI) confidence score at 3 months
20. Average energy activity counts at baseline and 6 months
21. 6-min walk test (feet traveled) at baseline and 6 months
22. Beck Depression-II Inventory (BDI-2) score at 6 months
23. SF-12 physical component scores at baseline, 3, 6, 9 and 12 months
SF-12 Mental Component
1. Treatment group
2. Antidepressant stratum
3. Education
4. Number of major medical comorbidities
5. NYHA class at baseline
6. Age
7. Patient read heart failure education packet at weeks 2 and 4
8. PROMIS physical functioning scores at baseline and 6 months
9. PROMIS SSR scores at baseline and 6 months
10. PROMIS SSD score at 6 months
11. PROMIS fatigue scores at baseline and 6 months
12. KCCQ overall scores at baseline, 3 and 6 months
13. KCCQ clinical scores at 3 and 6 months
14. Beck Anxiety Inventory (BAI) scores at baseline and 6 months
15. Self-Care Heart Failure Index (SCHFI) maintenance scores at baseline, 3, 6 and 9 months
16. Self-Care Heart Failure Index (SCHFI) confidence score at 3, 6 and 12 months
17. 6-min walk test (feet traveled) at baseline
18. Beck Depression-II Inventory (BDI-2) score at baseline, 3 and 6 months
19. SF-12 mental component scores at baseline, 3, 6, 9 and 12 months
PROMIS Satisfaction with Social Roles
1. Treatment group
2. Antidepressant stratum
3. NYHA class at baseline
4. Systolic blood pressure at baseline (1st reading)
5. History of cerebrovascular accident
6. PROMIS physical functioning scores at baseline and 6 months
7. PROMIS SSD scores at baseline and 6 months
8. PROMIS fatigue scores at baseline and 6 months
9. PROMIS anxiety score at baseline
10. PROMIS depression score at baseline
11. KCCQ overall scores at baseline, 3 and 6 months
12. KCCQ clinical scores at baseline, 3 and 6 months
13. Beck Anxiety Inventory (BAI) scores at baseline and 3 months
14. Self-Care Heart Failure Index (SCHFI) maintenance score at 6 months
15. Self-Care Heart Failure Index (SCHFI) confidence score at 12 months
16. 6-min walk test (feet traveled) at baseline and 6 months
17. Beck Depression-II Inventory (BDI-2) scores at baseline and 3 months
18. SF-12 mental component scores at baseline, 3 and 6 months
19. SF-12 physical component scores at baseline, 3 and 6 months
20. PROMIS SSR scores at baseline and 6 months

PROMIS Anxiety
1. Treatment group
2. Antidepressant stratum
3. PROMIS physical functioning score at baseline
4. PROMIS SSD score at 6 months
5. PROMIS SSR score at 6 months
6. PROMIS fatigue score at baseline
7. PROMIS depression scores at baseline and 6 months
8. KCCQ overall score at 6 months
9. KCCQ clinical score at 6 months
10. Beck Anxiety Inventory (BAI) scores at baseline, 3 and 6 months
11. Self-Care Heart Failure Index (SCHFI) confidence scores at 6 and 12 months
12. Beck Depression-II Inventory (BDI-2) score at 6 months
13. SF-12 mental component scores at 3 and 6 months
14. PROMIS anxiety scores at baseline and 6 months
PROMIS Satisfaction with Discretionary Social Activities

1. Treatment group
2. Antidepressant stratum
3. Date of randomization
4. Employed
5. PROMIS physical functioning scores at baseline and 6 months
6. PROMIS SSR scores at baseline and 6 months
7. PROMIS fatigue scores at baseline and 6 months
8. Hamilton Rating Scale for Depression (HAM-D-17) scores at baseline and 6 months
9. KCCQ overall scores at baseline, 3 and 6 months
10. KCCQ clinical scores at baseline, 3 and 6 months
11. Beck Anxiety Inventory (BAI) scores at baseline, 3 and 6 months
12. Self-Care Heart Failure Index (SCHFI) confidence score at 12 months
13. 6-min walk test (feet traveled) at baseline
14. SF-12 mental component scores at baseline, 3 and 6 months
15. SF-12 physical component scores at baseline, 3, 6 and 12 months
16. PROMIS SSD scores at baseline and 6 months

PROMIS Depression

1. Treatment group
2. Antidepressant stratum
3. PROMIS physical functioning score at 6 months
4. PROMIS SSR score at 6 months
5. PROMIS SSD score at 6 months
6. PROMIS fatigue score at 6 months
7. PROMIS anxiety scores at baseline and 6 months
8. KCCQ overall score at 6 months
9. Beck Anxiety Inventory (BAI) scores at 3, 6 and 9 months
10. Self-Care Heart Failure Index (SCHFI) confidence scores at 6 and 12 months
11. Self-Care Heart Failure Index (SCHFI) maintenance score at 9 months
12. Beck Depression-II Inventory (BDI-2) scores at baseline, 3 and 6 months
13. SF-12 mental component scores at 3 and 6 months
14. PROMIS depression scores at baseline and 6 months
PROMIS Physical Functioning
1. Treatment group
2. Antidepressant stratum
3. Employed
4. NYHA class at baseline
5. PROMIS physical functioning scores at baseline and 6 months
6. PROMIS SSR scores at baseline and 6 months
7. PROMIS SSD score at 6 months
8. PROMIS fatigue scores at baseline and 6 months
9. KCCQ overall scores at baseline, 3 and 6 months
10. KCCQ clinical scores at baseline, 3 and 6 months
11. Beck Anxiety Inventory (BAI) scores at 3, 6 and 9 months
12. Beck Depression-II Inventory (BDI-2) scores at 3 and 6 months
13. SF-12 mental component score at 6 months
14. SF-12 physical component scores at baseline, 3 and 6 months
15. 6-min walk test (feet traveled) at baseline and 6 months
16. Average energy activity counts at baseline and 6 months
17. PROMIS physical functioning scores at baseline and 6 months

PROMIS Fatigue
1. Treatment group
2. Antidepressant stratum
3. History of cerebrovascular accident
4. NYHA class at baseline
5. PROMIS physical functioning scores at baseline and 6 months
6. PROMIS SSR scores at baseline and 6 months
7. PROMIS SSD scores at baseline and 6 months
8. KCCQ overall scores at baseline, 3 and 6 months
9. KCCQ clinical scores at baseline, 3 and 6 months
10. Beck Anxiety Inventory (BAI) scores at baseline, 3 and 6 months
11. Beck Depression-II Inventory (BDI-2) scores at 3 and 6 months
12. SF-12 mental component scores at baseline, 3 and 6 months
13. SF-12 physical component scores at baseline, 3 and 6 months
14. 6-min walk test (feet traveled) at baseline and 6 months
15. Average energy activity counts at baseline and 6 months
16. Average energy expenditure at baseline and 6 months
17. PROMIS fatigue scores at baseline and 6 months
Actigraphy (average activity counts)

1. Treatment group
2. Antidepressant stratum
3. Race
4. Employed
5. History of atrial fibrillation
6. LVEF at baseline
7. NYHA class at baseline
8. Number of readmissions
9. History of depression
10. Time to readmission
11. Age
12. Patient read heart failure education packet at weeks 2 and 4
13. PROMIS physical functioning scores at baseline and 6 months
14. PROMIS fatigue score at baseline
15. KCCQ overall score at baseline
16. KCCQ clinical score at baseline
17. SF-12 physical component scores at baseline, 3, 6, 9 and 12 months
18. 6-min walk test (feet traveled) at baseline and 6 months
19. Self-Care Heart Failure Index (SCHFI) confidence score at 12 months
20. Average energy expenditure at baseline and 6 months
21. Average energy activity counts at baseline and 6 months