8-2009

Heart Failure Self-Care in Developed and Developing Countries

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Recommended Citation

Riegel, B., Driscoll, A., Suwanno, J., Moser, D. K., Lennie, T. A., Chung, M. L., Wu, J., Dickson, V., Carlson, B., & Cameron, J. (2009). Heart Failure Self-Care in Developed and Developing Countries. *Journal of Cardiac Failure, 15* (6), 508-516. http://dx.doi.org/10.1016/j.cardfail.2009.01.009

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Abstract

Background

Heart failure (HF) self-care is poor in developed countries like the United States, but little is known about self-care in developing countries.

Methods and Results

A total of 2082 adults from 2 developed (United States and Australia) and 2 developing countries (Thailand and Mexico) were studied in a descriptive, comparative study. Self-care was measured using the Self-Care of HF Index, which provided scores on self-care maintenance, management, and confidence. Data were analyzed using regression analysis after demographic (age, gender, education), clinical (functional status, experience with the diagnosis, comorbid conditions), and setting of enrollment (hospital or clinic) differences were controlled. When adequate self-care was defined as a standardized score ≥70%, self-care was inadequate in most scales in most groups. Self-care maintenance was highest in the Australian sample and lowest in the Thai sample ($P < .001$). Self-care management was highest in the US sample and lowest in the Thai sample ($P < .001$). Self-care confidence was highest in the Mexican sample and lowest in the Thai sample ($P < .001$). Determinants differed for the three types of self-care (eg, experience with HF was associated only with self-care maintenance).

Conclusion

Interventions aimed at improving self-care are greatly needed in both the developed and the developing countries studied.

Keywords

self-management, treatment adherence, hispanic, minority groups

Disciplines

Cardiovascular Diseases | Public Health and Community Nursing

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Published in final edited form as:
J Card Fail. 2009 August ; 15(6): 508–516. doi:10.1016/j.cardfail.2009.01.009.

Heart Failure Self-care in Developed and Developing Countries

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Abstract

Background—Heart failure (HF) self-care is poor in developed countries like the United States, but little is known about self-care in developing countries.

Methods—2,082 adults from two developed (United States and Australia) and two developing countries (Thailand and Mexico) were studied in a descriptive, comparative study. Self-care was measured using the Self-Care of HF Index (SCHFI), which provided scores on self-care maintenance, management, and confidence. Data were analyzed using regression analysis after demographic (age, gender, education), clinical (functional status, experience with the diagnosis, comorbid conditions), and setting of enrollment (hospital or clinic) differences were controlled.

Results—When adequate self-care was defined as a standardized score ≥70%, self-care was inadequate in most scales in most groups. Self-care maintenance was highest in the Australian sample

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and lowest in the Thai sample (p<.001). Self-care management was highest in the U.S. sample and lowest in the Thai sample (p<.001). Self-care confidence was highest in the Mexican sample and lowest in the Thai sample (p<.001). Determinants differed for the three types of self-care (e.g., experience with HF was associated only with self-care maintenance).

Conclusion—Interventions aimed at improving self-care are greatly needed in both the developed and the developing countries studied.

Keywords

Self-management; treatment adherence; Hispanic; minority groups

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Heart failure (HF) is the most common and expensive chronic illness among older people in developed countries. In the United States alone, the prevalence of HF is 5,700,000, with one in eight deaths attributable to HF (1). Australia also is caring for a large number of cases, with HF accounting for 2.0% of all deaths in 2002 (2). In developing countries, the epidemiology of HF is becoming increasingly similar to that of industrialized nations. Once communicable diseases and malnutrition are controlled, population aging, hypertension and ischemic heart disease contribute to a rising prevalence of HF (2-5). For example, in Thailand, heart disease is the primary cause of death and 70% of all cardiac deaths in Thailand in 2003 were attributed to HF (6). The prevalence of HF in Latin American countries is currently undocumented although the increase in publications on HF from these countries suggests a rising prevalence of HF (7).

Several studies have demonstrated that poor self-care is associated with admission to the hospital with worsening HF (8-12). Self-care refers to the naturalistic decision-making process that patients use in the choice of behaviors that maintain physiologic stability—symptom monitoring and treatment adherence—and the response to symptoms when they occur (13). Self-care is poor in U.S. and European samples (14-16), but little is known about the adequacy of self-care in developing countries. Exploring HF self-care in developed and developing countries can improve the planning of public health initiatives in countries with increasingly diverse populations. Therefore, the purpose of this study was to describe and compare self-care in two developed - U.S. and Australia - and two developing countries - Thailand and Mexico.

Methods

This study was a descriptive, comparative study of 2,082 adults with chronic HF. The samples had been recruited for other studies between 2002 and 2007. Self-care was measured in each group using the Self-Care of HF Index (SCHFI), a 15 item measure of self-care maintenance, management, and confidence described below (17). All participants had a diagnosis of chronic HF confirmed using objective criteria and all resided in a private residence where self-care was a reasonable expectation. Subtle differences in inclusion and exclusion criteria are shown in Table 1. All studies had been approved by the local institutional review board overseeing research. Each study conformed to the principles outlined in the Declaration of Helsinki and all participants provided informed consent.

Sampling

A team of collaborating HF investigators gathered six samples of HF patients from the United States (2 samples), Australia (2 samples), Thailand, and Mexico. All available subjects were used in the analysis except for three Hispanic patients enrolled in the U.S. sample who were deleted from the database to avoid confounding the comparison with the Mexican sample.

United States—Two samples of adults with HF were enrolled from four states in the eastern United States. In the first sample, 131 patients were enrolled from either an out-patient HF clinic (71%) or during an acute hospitalization in Pennsylvania. These patients were pre-screened by staff, so the number screened is not available, but of those eligible and referred, 85% were enrolled. In the second sample, 322 patients were enrolled from out-patient settings in Kentucky, Indiana, and Georgia; 65.5% of those eligible to participate agreed to do so.

Australia—Two samples of HF patients were enrolled from Australia. The first sample of 1045 patients was recruited from HF disease management programs across the continent of Australia. Forty-nine of the 65 programs existing in 2006 and 2007 participated in the study (74% program participation rate). Each of these out-patient programs enrolled a consecutive sample of at least 20 patients; 66.1% of eligible patients agreed to participate. This was the only sample that had received an intervention (i.e., disease management) before self-care was measured. The second sample of 50 consecutive patients was drawn from HF patients hospitalized in Melbourne, Australia between June and December 2005. In this sample, 52% of eligible patients agreed to participate.

Thailand—A consecutive sample of 400 Thai HF patients was enrolled from four tertiary care hospitals and two smaller community hospitals randomly selected from 12 hospitals in southern Thailand; 91% were enrolled while hospitalized. In this sample, 98.5% of eligible patients agreed to participate. In Thailand, most persons invited to participate in research conducted by students seeking a higher academic degree agree to participate.

Mexico—A consecutive sample of 134 self-identified Hispanics of Mexican decent was enrolled during a hospitalization at two participating community hospitals in Southern California close to the United States-Mexico border (18). Although these patients were technically living in the U.S., few had acculturated, defined as the extent to which they had adapted to the U.S. culture (19). Acculturation was measured using the 5-item Short Acculturation Scale for Hispanics (20), with possible scores ranging from 5 to 25; lower scores indicate less acculturation. Over half (52%) of the patients in the sample were completely unacculturated (score = 5). The average score was low ($X = 8.2 \pm 5.4$) and only eight (6%) had a score of 25 indicating full acculturation into U.S. society. Most (55%) completed all data collection in Spanish. There were no significant differences in age, gender, or self-care scores between those acculturated and those not acculturated, so the full sample of 134 was retained for analysis. Although these patients used the U.S. health care system, no disease management programs were available in the area at the time this study was conducted. Most were treated in free neighborhood clinics or by Hispanic providers; many routinely returned to Mexico for care that was not urgent.

Measurement

Sociodemographic variables were measured using investigator-designed surveys. Clinical information was obtained primarily from medical record review. Comorbid illnesses were measured using the Charlson Comorbidity Index (21). Scores can range from 0 to 34 but every study participant had a score of at least 1 because all had HF. Responses are summed, weighted, and indexed into one of three categories (low, moderate, or high) according to the published method. Validity was demonstrated by the instrument authors when comorbidity category predicted mortality, complications, health care resource use, length of hospital stay, discharge disposition, cost.

In each study, HF self-care was quantified using the Self-Care of HF Index (SCHFI) (17). Except for the Australian sample obtained from disease management programs, only baseline data obtained before the receipt of any planned intervention were used in this analysis. The 15

item SCHFI uses a 4-point Likert scale to gather information used to form three scales: self-care maintenance, management, and confidence. Maintenance and management are the essential elements of self-care; confidence is thought to be a mediator or moderator of the relationship between self-care and outcomes (13). For this reason, the three scale scores are calculated separately.

Self-care maintenance items assess treatment adherence behaviors and self-monitoring performed to prevent an acute exacerbation of HF (e.g., daily weighing). Self-care management items assess ability to recognize symptoms when they occur, evaluate symptoms, make decisions about treatments (e.g., take an extra diuretic for weight gain), and evaluate the effectiveness of the treatments implemented. Items measuring self-care confidence address the patient's perceived ability to engage in each phase of self-care (e.g., recognize symptoms). Scores on each of the scales are standardized to 100; higher scores reflect better self-care. In this study, the internal consistency of the SCHFI scales were .61 (maintenance), .67 (management), and .88 (confidence). The SCHFI has been shown previously to be valid and sensitive to subtle behavioral changes in a variety of HF samples (22-24).

Translation—The SCHFI was translated into both Thai and Spanish for the studies used in this analysis. The Thai process of translation and back-translation was guided by the methods of Brislin (25). Decentering and back translation techniques were used to ensure culturally equivalent versions in the Thai language. Decentering refers to a process by which material in an original language (English), when translated, is changed so that there is a smooth, natural-sounding version in another language (Thai). A back translation technique was employed to ensure accuracy in the translation. The SCHFI was translated into Thai by a native Thai speaker and back translated into English by two bilingual translators fluent in both languages. Items with apparent discrepancies between the two language versions were modified until both the researcher and the translators mutually agreed that the final back translation conveyed the same meaning as the original. Two rounds of back translation were conducted. The modified Thai version of the SCHFI was judged by a panel of experts to be clinically and culturally valid.

A similar rigorous process was used in the translation of the SCHFI into Spanish. The SCHFI was translated into Spanish and back translated into English by two fluently bilingual translators. Items with discrepancies between the two language versions were modified and back translated again until the translators mutually agreed that the back translation conveyed the same meaning as the original SCHFI. Then the Spanish version of the SCHFI was judged by a panel of experts to be clinically and culturally valid.

Analysis

Raw data from each site were integrated into a single database. Scores were computed for each of the three SCHFI scales—self-care maintenance, management, confidence. Self-care management scores were computed only for persons who were symptomatic in the prior month, as specified in the instrument scoring instructions. Correlations between the mean self-care scores (maintenance, management, and confidence) were computed for each of the four countries.

Adequacy of self-care was defined as a standardized score of ≥ 70 on each scale, based on prior research (24,26). The proportion of the sample in each group scoring within the adequate range on each of the self-care scales was compared using Pearson Chi-square analysis. Then binary logistic regression analysis with an enter method was used to identify the determinants of self-care maintenance, management, and confidence.

Factors anticipated to influence self-care were entered in the first step and country was entered in a separate, second step. The factors anticipated to influence self-care were age (27), gender

(27), education (28), functional status measured using New York Heart Association (NYHA) class (28), comorbid illness severity (27), and experience with the HF diagnosis (29). Less than or equal to two months was used as the cut-point for experience, based on prior results showing that even without intervention, patients develop some competence in HF self-care within the first two months after diagnosis (29). In addition, the setting of enrollment (hospital vs. clinic) differed among the participants and the sites so this characteristic was adjusted as well. Some factors shown previously to be associated with poor self-care - worse cognition, more sleepiness, higher depression, and poorer family functioning (24) - were not measured consistently in all the studies so these factors could not be adjusted in analyses. Simple comparisons were performed using the last category as the reference group.

Results

The samples representing the four countries differed in their demographic and clinical profiles (Table 2). The U.S. sample was the youngest. The samples from the developing countries were more likely to be female than those from the developed countries. Education was lower in the developing countries. The sample from the U.S. had a higher level of comorbid illness than the samples from the other countries.

Correlations between Mean Self-Care Scores by Country

In the full sample, self-care maintenance, management and confidence were significantly but only moderately correlated. When separate analyses were done using each individual country alone, in the U.S. sample the correlations were similar to that of the full sample, but in the Mexican and Australian samples, the correlations were lower. Correlations among the three scales were highest in the Thai sample (Table 3).

Adequacy of Self-Care

When the proportion of participants adequate in self-care was compared across the four countries, adequate self-care maintenance was significantly more common in those from Australia than any of the other countries (Figure 1) ($p<.001$). Self-care management was inadequate in most of the samples but it was adequate most commonly in the U.S. sample and least commonly in the Thai sample (52.5% vs. 5%); the difference among the countries was statistically significant ($p<.001$). Adequate self-care confidence was most common in the Mexican sample and least common in the Thai sample (65.6% vs. 17.5%, $p<.001$).

Determinants of Self-Care

When age, gender, education, functional status, comorbid illness severity, experience with HF, and setting of enrollment (hospital vs. clinic) were entered into the logistic regression equation first, they explained 25.8% of the variance in self-care maintenance. When country was entered in a separate step, it added an additional 5.2% variance in self-care maintenance. Significant determinants of self-care maintenance were higher education, experience with the diagnosis, lower or better NYHA class, and country. Setting where enrolled, age, gender, and comorbidity were not significant determinant of self-care maintenance (Table 5).

The model of seven covariates explained 10.3% of the variance in self-care management. When country was entered in the second step, country added 7.8% of the variance in self-care management. Significant determinants of self-care management were younger age, more comorbid illnesses, and country. Gender, education, experience with the illness, setting where enrolled, and functional status were not significant determinants of self-care management.

The model of seven covariates explained only 8.4% of the variance in self-care confidence. When country was entered in the next step, an additional 6.7% of the variance in self-care

confidence was explained. Significant determinants of self-care confidence were relatively younger age, less comorbid illness, higher education, and lower or better NYHA class, and country. Gender, experience with HF, and setting where enrolled were not significant determinants of self-care confidence.

Discussion

The results of this study demonstrate poor self-care in chronic HF patients in all four countries, with few notable distinctions. Self-care maintenance was adequate most commonly in the Australian sample. This finding may be explained by the fact that most of the Australian sample was obtained based on their participation in a HF disease management program (30). However, a determinant of self-care maintenance that differed in the Australian sample was functional status. Better functional status was a significant determinant of self-care maintenance and the Australian sample had the lowest proportion of NYHA class III and IV participants.

Adequate self-care management was significantly more common in the U.S. sample compared to the others. Two determinant of self-care management that differed in the U.S. sample were age and comorbid illness. The U.S. sample was the youngest, on average, yet they had the highest proportion of severe comorbid illness. These factors may explain the higher self-care management scores in the U.S. sample.

Adequate self-care confidence was more common in the Mexican sample than the other samples. The confidence scale is the only scale of the SCHFI that demonstrates some social desirability. That is, some of the items in this scale stimulate people to respond in the manner they think others want them to respond. So, we suspect that social desirability may have something to do with the high confidence scores in the Mexican sample. But, regardless of the reason for it, confidence is an important factor that influences the relationship between self-care and clinical outcomes (13). In a secondary analysis of the data from the Mexican sample included in this article, Lee and colleagues (31) demonstrated that when self-care confidence was assessed as a moderator of the relationship between self-care management and acute care costs, higher self-care management was associated with lower direct inpatient costs. This finding illustrates the importance of identifying ways to build self-care confidence in HF patients. Disease management is one way to build confidence in self-care ability (32). Another factor associated with self-care confidence is functional status, which is amenable to influence. For example, when HF patients adhere to a low sodium diet, they retain less fluid, which improves functional status (33). Helping patients see the relationship between their self-care and their functional abilities may build confidence in self-care.

Self-care in the Thai sample was poor in every category of HF self-care. The reason for low self-care in the Thai population is probably that community awareness and understanding of HF is low in Thailand. A decade ago, HF was not widely recognized as a major cause of death in Thailand (6) so knowledge about how to care for oneself or a family member with HF is not widely known. Self-care is a cultural norm in Thailand (34), though, so once knowledge about how to care for this chronic illness is disseminated we expect self-care to increase.

The determinants of self-care maintenance, management, and confidence differed among the countries in an interesting fashion. Younger aged patients were more likely to have adequate self-care management and confidence in this study. It may be that those patients who are relatively younger are used to making decisions about their health care while older patients expect decisions to be made by the provider. Another interpretation is that older patients struggle relatively more with symptom recognition because of age-related changes in interoception (35).

Higher education was associated with better self-care maintenance and confidence scores. This finding substantiates that of Rockwell et al. (28) who, using an early version of the same measure of self-care maintenance, also found that higher education was associated with better HF self-care. It may be that formal education makes it easier for patients to understand the rationale behind self-care. The finding that experience with the diagnoses was associated with better self-care maintenance is consistent with that of Francque-Frontiero et al. (36) who, using an early version of the same measure of self-care maintenance, also noted that those diagnosed more than two months prior had better self-care even without provider intervention. So, some learning occurs with early experience with the diagnosis.

We found that more comorbid illnesses was associated with better self-care management but not with self-care maintenance, as Chriss et al. (27) had found using an early version of the same measure of self-care maintenance. It may be that as HF patients become more ill, attending to self-care becomes more salient to them. It was interesting, though, that low comorbidity, not high, was a determinant of self-care confidence. It may be that when other illnesses do not confuse the picture, patients are more confident that they can use self-care to manage their HF.

Functional status measured using the NYHA classes was associated with both self-care maintenance and confidence; better functional status was associated with better self-care. Those with better functional status may have energy to devote to self-care. They may also believe that because they are less symptomatic they must be managing their HF well. These results differ from those of Rockwell et al. (28) who found that patients with worse NYHA scores were more likely to engage in self-care than those who were asymptomatic.

Limitations of this study include the secondary analytic approach. The data sets used in this study were all collected for other primary studies and integrated for the current analysis. The data were not uniformly sampled, although most were consecutive samples and one was both consecutive and random. These differences may have influenced the results. Because of differences in the data collected, possible confounding variables were unavailable for use as covariates in the analysis. Type of HF was unavailable in a large proportion of the Thai sample because echocardiography is not routinely performed in Thailand. However, the etiology of most cases of HF was ischemic, so the HF type can be assumed to be primarily systolic. Another limitation was the demographic, clinical, and treatment differences among the groups. Differences among the groups required statistical adjustment that may not have adequately controlled existing differences. Another limitation was that no Aborigines were enrolled in the Australian samples. They were not excluded on purpose, but most of the participants were obtained from the coastal areas. At the time these studies were conducted, there were no HF programs in Central Australia, top of Western Australia, or in Central Queensland (36), the areas of Australia most densely populated with Aborigines. As there were no programs in these areas it naturally restricted the number of the indigenous population recruited into the Australian cohort.

In summary, we found significant differences in self-care in the four countries we sampled, but self-care was not adequate in the majority of any of the samples studied. The attention given to translating the measure of self-care into the languages used by the two groups that were not native English speakers—Thai and Spanish—suggests that these differences reflect true differences in self-care rather than a lack of cultural sensitivity of the measure. These results illustrate an important opportunity for improvement in the care provided to HF patients worldwide. Future research is needed to identify ways to improve self-care maintenance, management, and confidence in both developed and developing countries.

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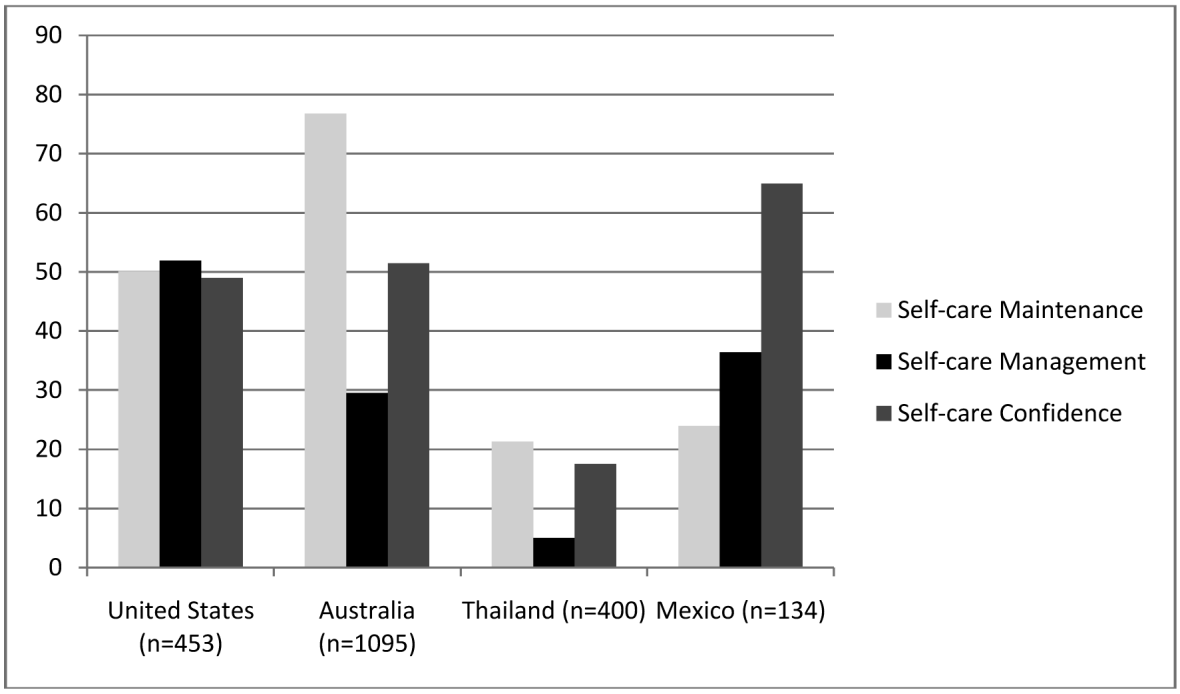

Figure 1.

Comparison of Self-Care Adequacy across Developed and Developing Countries

Adequacy was defined as a standardized scale score of ≥70 on a 100 point scale. The proportion of each sample scoring within the adequate range on each scale is compared here. These scores are unadjusted for group differences in demographic, clinical, and/or treatment differences. Using Thailand as the comparison group, self-care maintenance was higher in the U.S. and Australian samples ($p<.001$), management was higher in all three other samples ($p<.001$), and confidence was higher in the Mexican sample than any others ($p<.001$).

Table 1

Details of the Parent Studies from which Data were obtained for this Analysis

	United States (131)	**United States (322)**	**Australia (n=50)**	**Australia (1045)**	**Thailand (400)**	**Mexican (N=134)**
Study Purpose	To identify determinants of HF self-care (23,24,26).	To explore biobehavioral and physiologic mechanisms for the known association between depression, and increased morbidity and mortality in HF (37,38,41) To examine the impact of biofeedback-relaxation training on HF patient outcomes (on-going) To examine the effects of dietary nutrients, inflammatory markers, body weight, and body fat distribution on event-free survival and quality of life in patients with HF (ongoing) (39,40)	To test a conceptual model of determinants of HF self-care (42).	To develop a quality score of heart failure programs based on outcomes of patients participating in HF programs (43).	To test a causal model of relationships among sociodemographic characteristics, illness characteristics, and self-care management ability in relation to health status (44).	To test the effectiveness of telephone case management in decreasing hospitalizations and improving health-related quality of life and depression in Hispanics of Mexican origin with HF (18).
Inclusion Criteria	• Chronic HF confirmed by echocardiogram • Fluent in English	• Chronic HF confirmed by echocardiogram • Fluent in English	• Chronic HF with moderate systolic dysfunction confirmed by echocardiogram or diagnosed by a Cardiologist • Fluent in English • Adults at least 45 years of age	• Adults over age 18 • Chronic HF confirmed on echocardiogram • ≥1 prior hospital admission for decompensated HF • Fluent in English	• Chronic HF confirmed using the European Society of Cardiology (ESC) criteria (45) and/or objective evidence such as echocardiogram • HF symptoms in the past month • 18 years of age or older	• Chronic HF confirmed by echocardiogram or physician judgment based on typical HF symptoms • Planning to return to the community after hospital discharge • Fluent in either English or Spanish
Exclusion Criteria	• Cognitive deficit • Terminal illness • Chronic renal failure requiring dialysis • History of stroke or acute myocardial infarction within the prior three months	• Cognitive deficit • Terminal illness • Chronic renal failure requiring dialysis • History of stroke or acute myocardial infarction within the prior three months	• History of dementia, cerebral vascular accident, transient ischemic attack, or short-term memory loss	• History of dementia, cerebral vascular accident or transient ischemic attack	• Cognitive impairment • Unable to comprehend the Thai language	• Cognitive deficit • Terminal illness • Chronic renal failure requiring dialysis • History of stroke or acute myocardial infarction within the prior three months

Table 2

Demographic and Clinical Characteristics of the Combined Samples from the Four Countries

	United States (N=453)	**Australia (N=1095)**	**Thailand (N=400)**	**Mexican (N=134)**
	Mean ± Standard deviation (range) (number available for analysis)	Mean ± Standard deviation (range) (number available for analysis)	Mean ± Standard deviation (range) (number available for analysis)	Mean ± Standard deviation
Age	59.87 ± 12.21 (20-98)	69.52 ± 12.62 (19-100)	64.73 ± 13,83 (26-96)	72.13 ± 10.9 (20-94)
Ejection fraction	33.2% ±15.4 (5 - 85%) (n=414)	31.5% ± 13.3 (1 - 79) (n=589)	Unavailable	43.2% ± 18.1 (9 - 79) (n=105)
	Frequency (number available for analysis)	Frequency (number available for analysis)	Frequency (number available for analysis)	Frequency (number)
Female gender	33.6% (152)	32.9% (360)	48.0% (192)	53.7% (72)
Race or ethnicity	74.8% White; 24.1% Black; 1% other	95% White; .5% Black; .9% Asian; 3.5% other	100% Thai	100% Hispanic
Married	57.8%	64.5%	71.3%	59.7%
Educated at a high school level or above	83.3%	82.3%	9.8%	21.6%
Ischemic etiology	44.0% (n=410)	45.8% (n=1038)	55.0% (n=146)	43.3% (n=125)
Systolic (or mixed type) heart failure	75.9% (n=410)	88.7% (n=1038)	26.7% (n=146)	56.8% (n=125)
New York Heart Association Class III/IV	54.8%	29.2%	62.1%	81.4%
Highest level of comorbid illnesses on Charlson Index	33.9%	16.6%	14.1%	17.9%
Newly diagnosed with heart failure (≤2 months prior)	3.8% (n=373)	22.8% (n=1094)	28.0% (n=400)	29.9% (n=125)
Setting of enrollment	91.6% out-patients	95.4% out-patients	91% hospitalized	100% hospitalized
Percentage of subjects in a disease management program before self-care was measured	0	95.4%	0	0

Significant differences are indicated with cell highlighting. Variables with large amounts of missing data were not compared.

Table 3

Mean Scale Scores Separated by Country, with Scale Correlations

	United States (N=439)	**Australia (N=1083)**	**Thailand (N=400)**	**Hispanic (N=134)**
	Mean ± Standard deviation	**Mean ± Standard deviation**	**Mean ± Standard deviation**	**Mean ± Standard deviation**
Self-Care Maintenance	67.5 ± 16.9	73.35 ± 1.14	62.76 ± 1.42	57.8 ± 13.5
Self-Care Management	68.2 ± 17.7	53.79± 1.40	44.43 ± 1.81	59.5 ± 19.7
Self-Care Confidence	69.9 ± 15.7	65.91± 1.44	54.93 ± 1.78	77.0 ± 19.1

Correlations in full sample:

- maintenance and management: r = .36 ***
- maintenance and confidence: r = .39 ***
- management and confidence: r = .45 ***

Correlations in U.S. sample:

- maintenance and management: r = .41 ***
- maintenance and confidence: r = .34 ***
- management and confidence: r = .33 ***

Correlations in Australian sample:

- maintenance and management: r = .21***
- maintenance and confidence: r = .24 ***
- management and confidence: r = .36 ***

Correlations in Mexican sample:

- maintenance and management: r = .29 **
- maintenance and confidence: r = .21 *
- management and confidence: r = .31 ***

Correlations in Thai sample:

- maintenance and management: r = .54 ***
- maintenance and confidence: r = .48 ***
- management and confidence: r = .42 ***

* p<.05; **p<.01; ***p<.001

Table 4

Correlation Matrix Displaying the Relationship between Self-Care Scores in the Four Groups

	Self-Care Management Score	**Self-Care Confidence Score**
Self-Care Maintenance Score	Full sample: .365 United States sample: .410 Mexican sample: .293 Australian sample: .211 Thailand sample: .541	Full sample: .389 United States sample: .345 Mexican sample: .206 Australian sample: .242 Thailand sample: .484
Self-Care Management Score		Full sample: .455 United States sample: .327 Mexican sample: .315 Australian sample: .362 Thailand sample: .424

All relationships significant at $p<.001$

Table 5

Logistic Regression Analysis Indentifying Determinants of Self-Care Maintenance, Management, and Confidence Adequacy after Accounting for the Influence of Covariates

Variable	Comparisons	Odds Ratio (95% Confidence Interval)
Self-care maintenance • Country Significant covariates: • Education • Experience with HF • Functional class	U.S. > Thailand Australia > Thailand less than high school vs. higher education experience with HF vs. newly diagnosed NYHA class I vs. class IV NYHA class II vs. class IV NYHA class III vs. class IV	1.85 (1.12-3.04)* 6.05 (3.73-9.80)*** .67 (.51-.88)** 1.63 (1.24-2.12)*** 1.99 (1.33-2.98)** 1.75 (1.24-2.46)** 1.62 (1.15-2.29)**
Self-care management • Country Significant covariates: • Age • Comorbid illnesses	Mexico > Thailand U.S. > Thailand Australia > Thailand Relatively younger vs. older age Few comorbid illnesses vs. severe comorbidity	12.75 (7.02-23.15)*** 11.10 (5.66-21.78)*** 5.54 (2.83-10.85)*** .98 (.97-.99)** .68 (.50-.93)*
Self-care confidence • Country Significant covariates: • Age • Education • Comorbid illnesses • Functional class	Mexico > Thailand U.S. > Thailand Australia > Thailand Relatively younger vs. older age Less than high school vs. higher education Few comorbid illnesses vs. severe comorbidity Moderate comorbidity vs. severe comorbidity NYHA class I vs. class IV NYHA class II vs. class IV	10.24 (6.24-16.34)*** 2.63 (1.59-4.35)*** 2.85 (1.75-4.66)*** .99 (.98-1.00)* .58 (.45-.76)*** 1.34 (1.03-1.74)* 1.40 (1.06-1.84)* 1.96 (1.34-2.82)*** 1.42 (1.03-1.98)*

NYHA=New York Heart Association; HF=heart failure

* p<.05

** p<.01

*** p<.001