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Changes over 6-months in health-related quality of life in a matched sample of hispanics and non-hispanics with heart failure

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Abstract

Hispanics are a growing ethnic minority in the United States and one at significant risk for heart failure. Health-related quality of life (HRQL) is poor in individuals with heart failure, especially during and immediately following hospitalization. No prior research into the HRQL of Hispanics with heart failure was located. A sample of 80 individuals with heart failure, evenly divided by primary language and matched on functional status using the New York Heart Association classification system and age, was studied for 6 months following hospital discharge. Data on HRQL were collected using Spanish and English versions of the *Minnesota Living with Heart Failure Questionnaire*. Scores improved over time in both groups but significantly more so in the Hispanics when compared to the non-Hispanics. Group differences in HRQL could not be explained by demographics, clinical characteristics, treatment received, perceived support, or instrument response characteristics. Further exploration of this naturally occurring phenomenon may provide insight into how HRQL can be improved in the general heart failure population.

Key words: Congestive heart failure, Hispanic, Latino, Quality of life

Introduction

Hispanics represent the fastest growing ethnic minority in the United States (US) and comprise 11.7% of population [1]. Between 1990 and 1997, the segment of the population in whom cardiovascular disease is most prevalent – those over age 65 – grew five times faster in US Hispanics than non-Hispanics [2]. Cardiovascular disease is the leading cause of death for the general population and for US Hispanics [3–5]. This group of diseases, including heart failure, poses an enormous personal, social, and financial burden on society [6].

Data on the current incidence of heart failure in Hispanics are sparse, but one study documented that 26% of US Hispanics developed HF within a 43-month period [7], a rate comparable to that of the general elderly population in the US (27%) [8]. Risk factors known to cause cardiovascular disease account for much of the prevalence in cardiovascular disease in Hispanics. Aronow et al. [7] found that the risk of developing heart failure was 2.5 times greater in Hispanics with hypertension and 1.5 times greater in those with diabetes compared to Hispanics without these comorbidities. Nationwide, hypertension rates are comparable in Hispanics (24.2% men, 22.4% women) and non-Hispanic whites (25.2% men, 20.5% women) but diabetes rates are significantly higher in Hispanics (8.1% men, 11.4% women) than in non-Hispanic whites (5.4% men, 4.7% women), suggesting that heart failure may become an epidemic in the Hispanic population [6].

There is some evidence to indicate that outcomes from heart failure may be worse for Hispanics than for non-Hispanics. In one study, the percentage of patients rehospitalized for heart failure or other causes, total hospital days, and total hospital charges were all significantly higher in Hispanics than non-Hispanic whites [9]. In addition, Hispanics were more likely to be readmitted multiple times following the index heart failure hospitalization. No investigations of health-related quality of life (HRQL) in the Hispanic heart failure population were located in the literature, but HRQL is typically poor in persons with heart failure [10–12]. Studies regarding the impact of other chronic diseases imply that Hispanic patients may experience relatively more disruption in response to illness than non-Hispanic patients [13, 14].

In multiethnic samples with cancer, Hispanics reported stronger concerns, more disruption, worse pain, and poorer quality of life than other ethnic groups [13, 14]. Conversely, a study of non-insulin-dependent diabetics compared to individuals without diabetes found lower quality of life in persons with diabetes but no relationship between ethnicity and quality of life [15]. Other investigators have attempted to identify the factors linking ethnicity and HRQL by examining physical, social, demographic, and attitudinal factors for which ethnicity could be a surrogate. Variables shown to be related to poor HRQL in samples of Hispanics with other chronic illnesses (e.g., cancer, asthma) include poor functional ability, low socioeconomic status, few household resources and excessive demands, few spiritual beliefs, unmarried status, high severity of illness, and more recent diagnosis [16–19].

Others have suggested a 'Latino advantage' based on the knowledge that although rates of chronic illness and disability are higher and physiological aging precedes chronological aging in Hispanics [20], death rates for heart disease and cancer are lower for Hispanics than non-Hispanic whites [21]. This advantage has been attributed to aspects of the culture that mediate the influence of known risk factors on health [22]. Family support and a generally healthy lifestyle are the major factors thought to protect Hispanics and extend life, in spite of their heavy illness burden. Research is needed to determine if the Latino advantage extends into adjustment to chronic illness. The purpose of this study was to describe how HRQL changes in Hispanics in the first 6 months following a heart failure hospitalization and compare it to that of a matched sample of non-Hispanics. It was hypothesized that the two groups would differ in HRQL measured over time.

Methods

Data for this study were obtained during a randomized, controlled clinical trial testing the effectiveness of a telephonic case management intervention in a multiethnic population of heart failure patients from southern California [23]. In that study, physicians admitting heart failure patients were randomized to intervention or control. Patients of randomized physicians were enrolled during hospitalization and baseline demographic, clinical, and HRQL data were obtained at that time. Patients then were assigned to receive a telephonic case management intervention or to the control group based on their physician's group assignment. Patients from both groups were used in the current analysis. All patients were followed for 6 months, with collection of HRQL data as well as acute care and outpatient resource use at 3-month intervals.

A bilingual/bicultural registered nurse telephoned patients assigned to the intervention group within 5 days after hospital discharge. Counseling regarding diet, medication adherence, signs and symptoms indicating worsening illness and the frequency of follow-up phone calls were guided by a decision-support software program – *At Home with Heart Failure*™ – developed by Pfizer, Inc. The program supports best practices derived from published guidelines, prior research, and input from experts. Patients in the intervention group received an average of 17 (median 14; interquartile range 11–22) phone calls at decreasing levels of intensity, length, and frequency over the 6-month follow-up period. Educational material printed in the desired language was mailed to patients monthly. Physicians were mailed reports of patient progress and were telephoned by the case managers as needed. Guidelines for the treatment of systolic heart failure [24] were distributed to all physicians in the intervention group. Care for patients in the usual care control group was not standardized, but patients presumably received some education regarding their diagnosis prior to hospital discharge. The intervention effectively decreased acute care resource use and cost. Cost shifting to the outpatient setting was not seen. Those results have been reported elsewhere [23]. This is the first report of the HRQL data.

Sample

After institutional review board approval was obtained, bilingual nurse research associates screened patients hospitalized for heart failure to determine eligibility. Those enrolled in the trial had a confirmed clinical diagnosis of heart failure, spoke either English or Spanish, and gave informed consent. Patients with cognitive impairment or psychiatric illness, severe renal failure requiring dialysis, terminal disease (e.g., cancer, AIDS), discharge to a long-term care facility, or previous enrollment in a heart failure disease management program were excluded.

Participants were coded as Hispanic or non-Hispanic based on their self-report of primary language. Ethnic group is often missing information on the hospital admission form perhaps because, as the 2000 census demonstrated, individuals in the US are commonly multi-ethnic. Thus, primary language was used as a surrogate measure of ethnic group. A total of 49 Hispanics predominately of Mexican origin were enrolled in the study but longitudinal data on HRQL were available on only 40. Functional status was unavailable on one of the 49 patients, so he could not be matched, and eight others were lost to follow-up.

For this analysis, 40 Hispanic patients were matched with 40 non-Hispanic patients from the same sample on functional status and decade of age using nearest available metric method [25]. These matching variables were chosen based on data demonstrating that poor functional ability and age are predictors of poor HRQL [17, 26]. Gender was considered as a matching variable because prior authors have suggested that women with heart failure have lower HRQL, particularly in the physical functioning domain [27]. However, others have demonstrated that gender differences in HRQL are minimal when functional status and age are controlled and that any early differences resolve rapidly over time (B. Riegel et al., submitted) so gender was not used. In nearest available metric matching, the closest possible comparison subject for each Hispanic participant was identified from the reservoir of yet unmatched non-Hispanic patients. The sample size available had a power of 0.80 to detect a moderate difference in HRQL at 6 months, assuming a two-tailed comparison and an α 0.05 [28]. Repeated measures increased the power of the comparison.

Procedure

At enrollment, participants were asked their primary language and their language of choice. All subsequent oral and written communication was done in the chosen language. Registered nurse research associates collected demographic (e.g., age, gender, marital status) and clinical data (e.g., heart failure type) at enrollment into the primary study. Before data were collected, an experienced cardiovascular clinical nurse specialist carefully trained the nurse research associates to assure consistency of data collection.

Functional status was measured using the New York Heart Association (NYHA) classification system. Few patients had physician documentation of NYHA class so a single master's-prepared nurse practitioner retrospectively rated NYHA class on every patient based on information available in the hospital admission record. The NYHA functional classification system is derived primarily by inference from the history [29], so although interview is the usual method of gathering these data, chart review was deemed preferable over missing data.

Comorbidity was measured using the interview format of the Charlson Index [30]. Severity of illness at the time of hospital admission was measured using the refined diagnostic related grouping (DRG) technique from 3M (St. Paul, MN). Baseline drug therapy at the time of hospital discharge was obtained from the hospital medical record. Information on ejection fraction was obtained from the medical record and used to classify patients into systolic dysfunction ($\leqslant$40% ejection fraction), diastolic dysfunction ($\geqslant$50%), or a mid-range category (41–49%). Ejection fraction, usually derived from an echocardiogram, was not available on all patients because costly procedures are less frequently ordered in this heavily managed care environment. Newness of the diagnosis was determined by self-report. Patients reporting that they learned they had heart failure within the past 2 months were classified as newly diagnosed.

Data on HRQL were collected by telephone 3 and 6 months after hospital discharge by a bilingual research assistant. About 1 week before the telephone call, the 6-point response scale of the HRQL measure was mailed to patients along with a letter explaining that the research assistant would be calling soon and to please have the response scale readily accessible to facilitate data collection. Once the letter was received, the research assistant collected data on HRQL over the telephone and entered the data directly into the computer.

Outcome measurement

HRQL was measured using the *Minnesota Living with Heart Failure Questionnaire* (LHFQ), a disease-specific measure that assesses patients' perceptions of the influence of heart failure on physical, socioeconomic, and psychologic aspects of life [31]. The instrument was translated into Spanish by a certified company providing translation services and back-translated by bilingual staff fluent in the local Mexican idioms. Participants respond to 21 items using a 6-point response scale (0–5). The total summary score can range from 0 to 105; a lower score reflects better HRQL. Two subscale scores reflect physical (eight items) and emotional (five items) impairment. Other items address financial, medication side-effect, and lifestyle concerns. Internal consistency reliability of the instrument is adequate, with Cronbach's α typically ranging from 0.73 to 0.93 [32]. Test–retest reliability was high after a 1-week interval ($r = 0.93$ total, $r = 0.89$ physical dimension, $r = 0.88$ emotional dimension) [33]. Validity of the instrument has been shown by demonstrating differences in LHFQ scores in various clinical groups [34, 35]. In this sample, internal consistency was 0.89 for the total score and did not vary significantly between Hispanics (0.88) and non-Hispanics (0.90).

Statistical analysis

The Hispanic and non-Hispanic samples were compared at baseline on demographics, clinical characteristics, and scores on the LHFQ. Most demographic and clinical comparisons were done using Pearson χ^2 because the data were categorical. Baseline LHFQ scores and other interval level data (e.g., age) were compared using independent sample *t*-tests.

Some patients in the sample provided 6-month data but failed to provide 3-month data ($n = 7$) and some provided only baseline and 3-month data ($n = 4$). There were no significant differences between those who provided data at all intervals or only one of the two follow-up periods so all subjects were kept in the sample ($n = 80$). To allow an analysis of change over time, these 11 data points were estimated using series means. Then, the primary analysis was conducted using repeated measures ANCOVA comparing LHFQ scores (total, physical and emotional subscales) at baseline, 3- and 6-months. Because these data were gathered during an intervention trial, the treatment group to which the patient had been randomized in the primary study (i.e., intervention or control) was controlled as a covariate. In addition, a second ANCOVA was performed with education level, a variable on which the groups differed significantly, controlled as a covariate in addition to treatment group. All analyses were performed using SPSS version 9.0 (Chicago, IL). A *p*-value < 0.05 was predetermined as indicating a statistically significant difference between the groups over time. In addition, the criterion of clinical significance recommended by the instrument author (5-point change in total scores) was used to evaluate the results [36].

Results

The sample of 80 individuals was elderly (70.1 ± 11.95 years), functionally compromised (65% NYHA class IV), and evenly split by ethnic group (Hispanic and non-Hispanic). Most were female (59%) and about half were unmarried (51%). Many were poor; 80.4% of the 51 who provided income data earned < \$20,000 US dollars annually. Ethnic differences in demographic and clinical variables are shown in Table 1. The only statistically significant difference in socio-demographic or clinical characteristics between the groups was in education; 77.5% of the Hispanic sample and 15% of the non-Hispanic sample had less than a high school education ($\chi^2 = 324$, $df = 2$, $p < 0.0001$). However, clinically impor-

Table 1. Demographic, clinical, treatment, and outcome descriptors separated by ethnic group (Hispanics and non-Hispanic)

Variable	Hispanics N = 40	Non-Hispanics N = 40
Demographic characteristics		
Age in years	69.9 ± 12.38[a]	70.2 ± 11.66[a]
Female	65% (n = 26)	52.5% (n = 21)
Education*		
<High school	77.5% (n = 31)	15% (n = 6)
High school	17.5% (n = 7)	47.5% (n = 19)
Some college	5.0% (n = 2)	37.5% (n = 15)
Poverty level income (i.e., <$20,000 US dollars annually)	85.7% (n = 18/51)	76.7% (n = 23/51)
Marital status		
Married	47.5% (n = 19)	50% (n = 20)
Divorced/separated	17.5% (n = 7)	17.5% (n = 7)
Widowed	30% (n = 12)	25% (n = 10)
Single	5% (n = 2)	7.5% (n = 3)
Live alone	20% (n = 8)	27.5% (n = 11)
Presence of a confidant	95% (n = 38)	97.5% (n = 39)
Support perceived as good or excellent	77.5% (n = 31)	80% (n = 32)
Clinical characteristics on enrollment into the study		
Severely ill at the time of index hospital admission (3M group 3 or 4)	12 (30%)	15 (37.5%)
Comorbidity		
Low	47.5% (n = 19)	47.5% (n = 19)
Moderate	37.5% (n = 15)	37.5% (n = 15)
Severe	15% (n = 6)	15% (n = 6)
New diagnosis (<2 months)	58.3% (n = 21/75)	48.7% (n = 19/75)
Ejection fraction	49.7 ± 14.77[a]	44.1 ± 19.19[a]
Heart failure type		
Systolic dysfunction	36.7% (n = 11/46)	48.4% (n = 15/46)
Mid-range	3.3% (n = 1/46)	6.4% (n = 2/46)
Diastolic dysfunction	60.0% (n = 18/46)	45.2% (n = 14/46)
Atrial fibrillation at hospital discharge	3 (7.5%)	9 (22.5%)
NYHA functional class		
Class II	2.5% (n = 1)	2.5% (n = 1)
Class III	32.5% (n = 13)	32.5% (n = 13)
Class IV	65% (n = 26)	65% (n = 26)
Treatment during the course of the study		
Discharged on either an ACE-Inhibitor or an angiotensin receptor blocking agent	61.1% (n = 22/73)	59.4% (n = 22/73)
Random assignment to the group receiving telephone case management	27 (67.5%)	20 (50%)
Outcomes during the 6 month trial period		
Readmitted to the hospital at least once	13 (32.5%)	17 (42.5)

tant differences in gender, newness of the diagnosis, and the incidence of systolic dysfunction were evident, with the Hispanics more likely than non-Hispanics to be newly diagnosed females with diastolic dysfunction.

When the ethnic groups were compared on HRQL at baseline, no significant differences in total scores, physical or emotional subscales were found. When group differences were assessed over time with treatment group controlled, the hypothesis of difference was supported. Scores improved significantly over time in both groups, although the improvement in total ($F = 4.15$, $df = 1,77$, $p = 0.045$) and physical ($F = 6.92$, $df = 1,77$, $p = 0.01$) LHFQ subscale scores were significantly better in the Hispanic than the non-Hispanic group, in spite of the blunting of variability introduced with the imputed scores (Table 2). The computed effect size (η^2) was small (0.051 overall and 0.082 for the physical subscale). Scores on the emotional subscale were not significantly different between the two groups over time

Table 2. Mean scores on the *Minnesota Living with Heart Failure Questionnaire* at 6 months from the matched sample of Hispanics and non-Hispanics with heart failure (n = 80)

Variable	Sample	Baseline		3 Months		6 Months	
		Mean (SE)	Confidence Interval	Mean (SE)	Confidence Interval	Mean (SE)	Confidence Interval
Total scores adjusted for treatment group*	Non-Hispanics (n = 40)	51.50 (3.54)	44.4–58.5	38.88 (3.52)	31.8–45.8	35.59 (3.86)	27.9–43.3
	Hispanics (n = 40)	50.02 (3.54)	42.9–57.1	24.59 (3.52)	17.59–31.59	23.95 (3.86)	16.26–31.64
Total scores adjusted for treatment group and education	Non-Hispanics (n = 40)	51.15 (4.02)	43.1–59.1	37.27 (3.98)	29.3–45.2	33.04 (4.35)	24.4–41.7
	Hispanics (n = 40)	50.38 (4.02)	42.3–58.4	26.20 (3.98)	18.3–34.1	26.51 (4.35)	17.8–35.2
Physical subscale scores adjusted for treatment group*	Non-Hispanics (n = 40)	24.48 (1.69)	21.1–27.8	16.71 (1.50)	13.7–19.7	15.43 (1.77)	11.9–18.9
	Hispanics (n = 40)	22.09 (1.69)	18.7–25.5	9.45 (1.50)	6.5–12.4	10.05 (1.77)	6.5–13.6
Physical subscale scores adjusted for treatment group and education	Non-Hispanics (n = 40)	24.41 (1.92)	20.6–28.2	15.38 (1.67)	12.0–18.7	13.78 (1.97)	9.8–17.7
	Hispanics (n = 40)	22.16 (1.92)	18.3–25.9	10.78 (1.67)	7.4–14.1	11.69 (1.97)	7.8–15.6
Emotional subscale scores adjusted for treatment group	Non-Hispanics (n = 40)	11.80 (1.19)	9.4–14.2	9.50 (1.10)	7.3–11.7	9.06 (1.11)	6.8–11.2
	Hispanics (n = 40)	11.77 (1.19)	9.4–14.2	7.37 (1.10)	5.2–9.6	6.96 (1.11)	4.7–9.2
Emotional subscale scores adjusted for treatment group and education	Non-Hispanics (n = 40)	12.18 (1.35)	9.5–14.9	9.57 (1.25)	7.1–12.1	8.98 (1.27)	6.4–11.5
	Hispanics (n = 40)	11.39 (1.35)	8.7–14.1	7.31 (1.25)	4.8–9.8	7.04 (1.27)	4.5–9.6

*$p < 0.05$.
Note: Score adjustment reflects the use of covariates in analysis.

($F = 1.05$, df = 1,77, $p = 0.31$). When education was controlled in the analysis, the differences in total ($F = 1.20$, df = 1,76, $p = 0.28$) and physical subscale ($F = 1.60$, df = 1,76, $p = 0.21$) scores were no longer statistically significant, although they still met and exceeded the 5-point change criteria for clinical significance (Table 2). Scores improved most significantly in the first three months and minimally thereafter (Figure 1).

Discussion

All of the patients in this sample, regardless of ethnic group, experienced an improvement in HRQL over time, but the improvement was clearly greater in the Hispanic sample when compared to a carefully matched non-Hispanic sample. This finding is important because it is the first to suggest that HRQL may improve more in Hispanics than in non-Hispanic patients following hospitalization for heart failure. If this finding is confirmed in other studies, it could have important implications for clinicians working with the heart failure patient population. HRQL is known to be difficult to influence in individuals with heart failure [37, 38]. Identifying a population in which heart failure has relatively less of a devastating long-term impact on HRQL, in spite of similar physiologic characteristics, may provide insight into factors that could be strengthened in the non-Hispanic population. For example, perhaps spirituality [39, 40], a culturally slower pace of living [22], or living in a large family group [41], factors known to be strengths of the Hispanic culture, can ease recovery from a heart failure hospitalization.

The results of this study are surprising in light of other studies demonstrating worse HRQL in His-

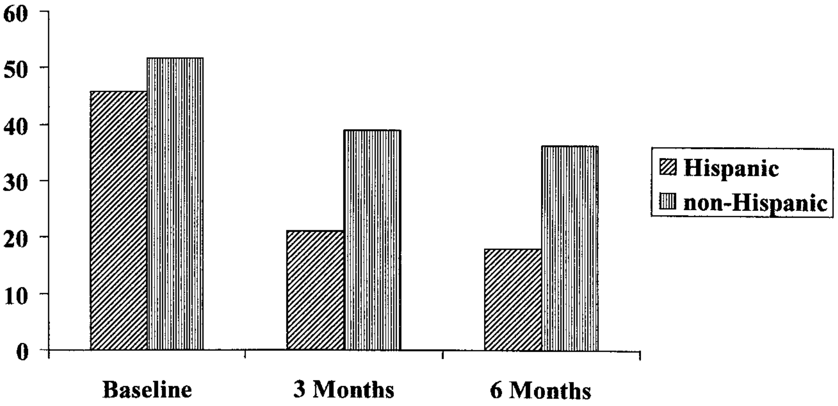

Figure 1. Changes in total scores on the Minnesota Living with Heart Failure Questionnaire at 3- and 6- months from baseline, according to ethnic group. HRQL, as measured by the *Minnesota Living with Heart Failure Questionnaire*, improved in all subjects over time. However, differential improvement in scores was evident by ethnic group. Even after controlling the effect of treatment group assignment in the primary study and for education, the major factor on which the ethnic groups differed, total scores improved from baseline 24.2 points (48%) at 3 months and 23.9 points (47%) at 6 months in Hispanics. In contrast, scores improved 13.9 points (27%) at 3 months and 18.1 points (35%) at 6 months in non-Hispanics. Note that lower scores indicate better HRQL.

panics compared to other ethnic groups with cancer [13, 14]. One reason why HRQL was not lower in the Hispanics in this sample may have been that functional status was controlled in the process of matching the groups. Wan et al. [17] identified functional status as a significant predictor of HRQL in a large sample of Hispanic and African-American cancer patients, although race/ethnicity was not. This finding suggests that significant differences in functional ability could be misinterpreted as racial/ethnic differences in HRQL. In our study, when group differences in functional ability were controlled through matching, the striking improvement over time in HRQL in Hispanics became more apparent.

One possible explanation for the differences between this study and the findings of others that Hispanics experience more distress with illness is that this sample was comprised of Mexican-Americans. In the US, individuals from Cuba, Puerto Rico, Mexico, Caribbean, Central and South America are all called Hispanic. However, there may be significant differences in the cultural beliefs of people from these diverse backgrounds [42]. Future research should focus on specific subgroups so that these issues can be clarified.

The two samples differed significantly only in education, although clinically important differences in gender, newness of the diagnosis, and heart failure type were noted. The Hispanic sample could be characterized as poorly educated, newly diagnosed women with diastolic dysfunction. Does that describe a group we expect to have better HRQL? Gender has been studied extensively as a contributor to quality of life; however, the results are not conclusive. Some investigators have found quality of life to be better in women than men [43]. Others have found female gender to predict poor quality of life [44]. Few medical investigators have studied the influence of education on HRQL, but Glasgow et al. [45] demonstrated that less education was associated with lower quality of life in a sample of 2056 adults with diabetes. Left ventricular dysfunction might be assumed to decrease HRQL more than preserved ventricular function, but Jaarsma et al. [46] found no difference in HRQL based on heart failure type. Newness of the diagnosis has rarely been studied in relation to HRQL, but Stull et al. [47] describe a process of identify formation in which crisis, diagnosis, and response to diagnosis predominate in the early stages. Acceptance and adjustment, assumed to be associated with better HRQL, are later phases. Moadel et al. [16] found more ethnic group spiritual/existential needs in those diagnosed relatively recently, also suggesting that HRQL should be lower in the newly diagnosed patients. In this sample, there were no group differences in marital status, perceived support, presence of a confidant, or living alone that could explain these results. The higher incidence of poverty in the Hispanic sample certainly does not explain their superior HRQL. Further research is needed to explore factors potentially responsible for ethnic group differences.

It is possible that simply being included in the research may have been enough to improve HRQL in the Hispanic sample. Hispanics are underrepresented in clinical research, perhaps because of the challenges of translating documents and revising interventions to make them culturally sensitive. In this study, the Hispanic patients were grateful to be included, even when allocated to the control group. This feeling of being included may have been sufficient to raise HRQL in both the intervention and control groups.

Another possibility is that the ethnic group differences found in this study are actually a measurement artifact. This is the first reported use of the LHFQ in a Hispanic sample. To address this issue, a detailed analysis was conducted in which the groups were compared on each individual item of LHFQ. Group scores were significantly different on two LHFQ items, but neither appeared to be culturally relevant or emotionally charged ('Did your HF prevent you from living as you wanted during the last month by causing swelling in your ankles, legs, etc.?' and 'Did your HF prevent you from living as you wanted during the last month by making your work around the house or yard difficult?') Hayes and Baker [48] note a tendency for Spanish-speaking patients to respond 'good' to items more frequently than English-speaking patients. However, they also found differences in the reliability of the English and Spanish version of the Interpersonal Aspects of Care Examiner Scale. We found no such differences in reliability in the *Minnesota Living with Heart Failure Questionnaire*. The instrument alpha coefficient was virtually identical in the two groups (Hispanic $\alpha = 0.88$; non-Hispanic α 0.90). The research assistant reported that Hispanic patients had no difficulty responding to the items. Further, no such social desirability of responses was seen in baseline measures; scores did not differ at baseline by ethnic group. Thus, measurement artifact is not an adequate explanation for these results.

Matching on important confounding variables – functional status and age – strengthened the study by controlling for variables known to influence HRQL. A limitation of the study was the use of primary language as the method of assigning patients to Hispanic vs. non-Hispanic groups. Many persons in the US are multiracial and multicultural, which makes identification of a single race or cultural group difficult. Therefore, in this study, participants indicating that Spanish was their primary language were classified as Hispanic while those choosing English as their primary language were classified as non-Hispanic. A problem with this approach is that some individuals could be misclassified. For example, English-speaking Hispanics who grow up in the US may claim English as their primary language but identify with the Hispanic culture; these Hispanics would have been misclassified as non-Hispanic with this method. However, well-acculturated Hispanics can also be expected to hold many of the beliefs of the mainstream US population. Therefore, classifying patients based on primary language may have facilitated our ability to examine the true population of interest.

Further research is needed to confirm these results and to explore those factors responsible for differences in HRQL in Hispanics and non-Hispanics with heart failure. Investigators are encouraged to measure the strengths of the Hispanic culture and variables shown in other studies to promote coping (e.g., cognitive style) [49–51] to explain these results.

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