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Barbara Riegel

University of Pennsylvania, briegel@nursing.upenn.edu

Debra K. Moser


Mary Kay Rayens

Beverly Carlson

Susan J. Pressler

See next page for additional authors

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Ethnic Differences in Quality of Life in Persons with Heart Failure

Abstract

Background

Chronic illness burdens some groups more than others. In studies of ethnic/racial groups with chronic illness, some investigators have found differences in health-related quality of life (HRQL), whereas others have not. Few such comparisons have been performed in persons with heart failure. The purpose of this study was to compare HRQL in non-Hispanic white, black, and Hispanic adults with heart failure.

Methods

Data for this longitudinal comparative study were obtained from eight sites in the Southwest, Southeast, Northwest, Northeast, and Midwest United States. Enrollment and 3- and 6-month data on 1212 patients were used in this analysis. Propensity scores were used to adjust for sociodemographic and clinical differences among the ethnic/racial groups. Health-related quality of life was measured using the Minnesota Living with Heart Failure Questionnaire.

Results

Significant ethnic/racial effects were demonstrated, with more favorable Minnesota Living with Heart Failure Questionnaire total scores post-baseline for Hispanic patients compared with both black and white patients, even after adjusting for baseline scores, age, gender, education, severity of illness, and care setting (acute vs. chronic), and estimating the treatment effect (intervention vs. usual care). The models based on the physical and emotional subscale scores were similar, with post hoc comparisons indicating more positive outcomes for Hispanic patients than non-Hispanic white patients.

Conclusion

Cultural differences in the interpretation of and response to chronic illness may explain why HRQL improves more over time in Hispanic patients with heart failure compared with white and black patients.

Keywords

culture, ethnicity, heart failure, Hispanic, propensity analysis, race, quality of life

Disciplines

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

Author(s)

Barbara Riegel, Debra K. Moser, Mary Kay Rayens, Beverly Carlson, Susan J. Pressler, Martha Shively, Nancy M. Albert, Rochelle R. Armola, Lorraine Evangelista, Cheryl Westlake, and Kristen Sethares

Ethnic Differences in Quality of Life in Persons with Heart Failure

Barbara Riegel, DNSc, RN, FAAN, Associate Professor
University of Pennsylvania, School of Nursing, Philadelphia, PA

Debra K. Moser, DNSc, RN, FAAN, Professor and Gill Endowed Chair of Nursing, University
of Kentucky, College of Nursing, Lexington, KY

Mary Kay Rayens, PhD, Associate Professor
University of Kentucky, Colleges of Nursing and Public Health, Lexington, KY

Beverly Carlson, MS, RN, CNS
Cardiac Research Project Director, Clinical Research Department, Sharp HealthCare
Lecturer, San Diego State University, San Diego, CA

Susan J. Pressler, DNS, RN, FAAN
Professor, School of Nursing, University of Michigan, Ann Arbor, MI

Martha Shively, PhD, RN
Associate Chief, Nursing Service for Research, VA San Diego Healthcare System,
San Diego, CA

Nancy M. Albert, PhD, RN, CCNS, CCRN, CNA, Director Nursing Research and Clinical Nurse
Specialist, Cleveland Clinic, Cleveland, Ohio

Rochelle R. Armola, MSN, RN
Clinical Nurse Specialist, Coronary Intensive Care Unit, The Toledo Hospital, Toledo, OH

Lorraine Evangelista, PhD, RN
Assistant Professor, School of Nursing, University of California, Los Angeles, CA

Cheryl Westlake, RN, PhD, APRN-BC, PN
Associate Professor, Department of Nursing, CSUF, Fullerton and Professor, School of Nursing,
Azusa Pacific University, Azusa, CA

Kristen Sethares, PhD, RN, Assistant Professor
College of Nursing, University of Massachusetts Dartmouth, Dartmouth, MA

Address for Correspondence

Dr. Barbara Riegel
University of Pennsylvania; School of Nursing
420 Guardian Drive
Philadelphia, PA 19104-6096
215-898-9927 (W)
240-282-7707 (FAX)
briegel@nursing.upenn.edu

Abstract

Background: Chronic illness burdens some groups more than others. In studies of ethnic/racial groups with chronic illness, some investigators have found differences in health-related quality of life (HRQL) while others have not. Few such comparisons have been performed in persons with heart failure. The purpose of this study was to compare HRQL in non-Hispanic White, Black, and Hispanic adults with heart failure.

Methods: Data for this longitudinal comparative study were obtained from eight sites in the Southwest, Southeast, Northwest, Northeast, and Midwest United States. Enrollment, 3-, and 6-month data on 1,212 patients were used in this analysis. Propensity scores were used to adjust for sociodemographic and clinical differences among the ethnic/racial groups. Health-related quality of life was measured using the Minnesota Living with Heart Failure Questionnaire (MLHFQ).

Results: Significant ethnic/racial effects were demonstrated, with more favorable MLHFQ total scores post-baseline for Hispanic compared to both Black and White patients, even after adjusting for baseline scores, age, gender, education, severity of illness, care setting (acute vs. chronic), and estimating the treatment effect (intervention vs. usual care). The models based on the physical and emotional subscale scores were similar, with post-hoc comparisons indicating more positive outcomes for Hispanics than non-Hispanic White patients.

Conclusion: Cultural differences in the interpretation of and response to chronic illness may explain why HRQL improves more over time in Hispanic patients with heart failure compared to White and Black patients.

Key words: heart failure, Hispanic, race, ethnicity, culture, quality of life, propensity analysis

Heart failure is common in the United States, regardless of ethnic or racial background.

According to the National Health and Nutrition Examination Survey (NHANES) for the 1999 to 2002 period, heart failure was found in 2.5% (men) to 1.9% (women) of the non-Hispanic White population, 2.7% (men) to 1.6% (women) of the Hispanic population, and 3.1% (men) to 3.5% (women) of the non-Hispanic Black population.¹ These rates rise significantly with age.

Eliminating health disparities among different ethnic/racial groups is a major goal of Healthy People 2010. Ethnicity and race refer to families, tribes, peoples, or nations belonging to the same common stock, or a class or kind of people unified by shared interests, habits, or characteristics.² The unequal burden of chronic illness has caused some ethnic/racial groups to have more symptoms, worse functional disability, and lower health-related quality of life (HRQL) than others. In studies of HRQL by ethnic/racial groups, some investigators found differences but others did not.³⁻⁵ Since few comparisons of HRQL by ethnicity/race have been performed in persons with heart failure, the burden of heart failure experienced by various ethnic/racial group is unknown.

The purpose of this study was to compare HRQL in a sample of non-Hispanic White, non-Hispanic Black, and Hispanic adults with heart failure. We hypothesized that differences in HRQL would exist among these groups based on our earlier work.⁶ Health-related quality of life refers to the perception of how illness influences one's physical, emotional, and social well-being.⁷ Physical and emotional components of HRQL were compared to identify specific problematic areas or mechanisms for differences. Knowing how different ethnic/racial groups experience heart failure would help focus education and intervention content.

Methods

Data for this longitudinal comparative study were obtained from a registry of heart failure quality of life (The Heart Failure Quality of Life Trialists Collaborative) contributed to by investigators from eight sites representing the Southwest, Southeast, Northwest, Northeast, and Midwest sections of the United States. Some sites were in large urban areas and others were in mid-sized cities. The settings where recruitment occurred represented the range of possibilities: community hospitals, tertiary care centers, a federal health care system, and outpatient clinics that were both specialty and general in focus. No one setting was over-represented. Most participants had been enrolled during an acute hospitalization (56%), with the remaining respondents were enrolled in a chronic care setting. The different recruiting sites introduced heterogeneity into the sample that was controlled by including type of enrollment setting in the propensity score model.

Sample

Enrollment, 3-, and 6-month data on 1,212 patients were used in this analysis. The inclusion criteria were similar at all sites. Only patients with an established diagnosis of chronic heart failure documented in the medical record by a physician provider were included. Patients were excluded if they had an acute myocardial infarction, unstable angina, cognitive impairment, or severe psychiatric problems, or were discharged to an extended care or skilled nursing facility or were homeless. Three investigative teams formally tested cognitive function with the Mini-Mental State Examination or the Pfeiffer Short Portable Mental Status Questionnaire and others used clinical criteria to exclude patients who were unable to complete questionnaires and participate in data collection. Subjects of Hispanic descent were enrolled primarily at the Southern California sites, 99% of which were persons of Mexican ancestry. Ethnicity/race was self-reported in all studies. Self-identification of ethnicity and race is problematic, but the best

method available at this time.⁸

Some studies in the registry were observational assessments of usual care. Others were studies of behavioral, nonpharmacologic interventions such as education, counseling, and self-care monitoring. To adjust for the influence of having received an active intervention on HRQL, patients were categorized as receiving “treatment” or “usual care” and this variable was included as an adjusting factor in the longitudinal analysis.

To evaluate our logic of combining the interventions into a single “treatment” group, we assessed treatment group means and the variability in scores. As expected, the intervention subjects had greater improvement in HRQL compared with controls over the 6-month study period; the average change in HRQL between baseline and 6-months was 22.9 for the treatment group, and 12.5 for controls. Although the treatment group was comprised of subjects exposed to different behavioral interventions, the degree of variability in this group was not greater than within the cohort of controls. The test for equality of variances for baseline HRQL was not significant (the treatment *SD* 24.8 compared with 24.5 for the control group). Tests of equality of variances at 3- and 6-months were also nonsignificant: the standard deviations at 3-months for the intervention and control groups were 25.3 and 25.6, respectively; at 6-months the standard deviations were 24.0 for intervention and 25.7 for control. These findings indicate that while treatment group respondents may have responded differently to the various interventions they received, as a group their response to study participation exhibited the same range of variability as found in the more homogenous group of control subjects.

Measurement

Health-related quality of life was measured using the Minnesota Living with Heart Failure Questionnaire (MLHFQ), a 21-item disease-specific measure of HRQL. The MLHFQ

measures overall well-being and two HRQL domains: physical limitations and emotional responses. English and Spanish versions of the MLHFQ were used in this study. Participants were given the choice to complete the instrument by themselves or to have it read to them by fluently bilingual research staff. The Spanish version had been translated professionally and back translated to English by fluent Spanish speakers residing in the region where the data were collected to assure that the local idioms (i.e., phrases and terms used in Southern California) were appropriate. The MLHFQ has been shown repeatedly to be internally consistent (with alpha coefficients usually $>.90$ in clinical samples) and stable over a short period of time.⁹⁻¹¹ For the total scale score and for both the physical limitations and emotional responses subscales, lower scores on the MLHFQ indicate better health-related quality of life.

Severity of illness was measured using New York Heart Association (NYHA) class. Technically, NYHA class is a measure of functional status,¹² but others have shown that higher NYHA class is associated with increased mortality and hospitalization rates in persons with heart failure.¹³

Procedure and Analysis

The primary investigator obtained Institutional Review Board approval for this comparison in addition to the approval obtained at each individual site. De-identified data on HRQL, group assignment (treatment or usual care), setting where enrolled (acute or chronic), ethnic/racial group, age, education, and NYHA functional class were submitted to a central site where it was integrated, reviewed for accuracy, and analyzed. From the full data set of 1,490 patients, subjects with baseline and at least one follow-up MLHFQ score were retained for this analysis.

Descriptive statistics were used to summarize the data. Group differences in the

demographic and clinical characteristics, as well as baseline HRQL, were determined using one-way analysis of variance (ANOVA), two-sample t-tests or chi-square tests, as appropriate.

Comparisons among ethnic/racial groups, between treatment groups, and between those retained or not retained for this analysis, were made using these techniques.

Comparing demographic and clinical characteristics of the 1,212 subjects in the analysis and the 278 subjects in the registry who were not included in the analysis, subjects in this analysis were significantly younger ($M = 66.1$ vs. $M = 68.4$; $t = 2.4$, $p = .02$), more likely to have at least some post-secondary education ($\chi^2 = 10.7$, $p = .005$), and more likely to have received an active intervention rather than usual care ($\chi^2 = 99.6$, $p < .0001$). A larger proportion of those enrolled from a chronic care settings were included (93%), while only 74% of those enrolled from an acute care setting were included ($\chi^2 = 84.9$, $p < .0001$). There were no differences in gender, ethnic/racial group, or NYHA class between those included or not included in the study.

The Black, White, and Hispanic groups differed in several characteristics. The three ethnic/racial groups differed in mean age ($F = 46.5$, $p < .0001$); Black patients were significantly younger ($M = 58.4$) than either the White ($M = 68.0$) or Hispanic patients ($M = 67.6$). Significant ethnic/racial group differences were also found in gender, education, care setting (acute vs. chronic), and NYHA class (see Table 1), but the percentage of treatment participants did not differ across the three ethnicities.

Propensity scores minimize bias that may occur when making comparisons among groups that are dissimilar on demographic or clinical characteristics.¹⁴ Using the variables that demonstrated significant ethnic/racial differences, propensity scores were determined with logistic regression and these scores were used as a covariate in subsequent analyses. The methodology requires that ethnicity/race has only two levels, since probabilities can only be

determined in logistic regression for binary outcomes. In this study, the propensity score is the probability, with a potential range of zero to one, of being a member of a particular ethnic/racial group given the profile of demographic and clinical characteristics.

The Hosmer-Lemeshow goodness-of-fit test was used to determine how well each model fit the data; for this test, large p -values are desired since these correspond to a nonsignificant lack of model fit. The area under the receiver operating characteristic (ROC) curve was assessed as a measure of how well each logistic model discriminated between the ethnic/racial groups. The ROC curve is a plot of the sensitivity versus 1-specificity. The area under the curve can range from 0 to 1, with values closer to 1 indicating a higher degree of accuracy of the model in the ability to discern between the two ethnic/racial groups being compared, based on the values of the predictor variables.

Repeated measures analysis of covariance (ANCOVA) was used to compare HRQL among the ethnic/racial groups over time, adjusting for baseline MLHFQ score and the propensity scores. Although not the focus of this analysis, treatment group (intervention vs. usual care) was included as a factor in these longitudinal models because the interventions were designed to influence HRQL. Since propensity scores are determined for two ethnic/racial groups at a time, three ANCOVA models were developed, one for each pair of the three groups. Each model included time (3- and 6-months), ethnicity/race (two groups), treatment group (control and intervention), and the two-way and three-way interactions of these factors. Post-hoc analysis was based on Fisher's least significant difference procedure for pairwise comparisons.

Patients were retained in the study if they had the baseline MLHFQ score and at least one of the two follow-up scores. Some of these subjects were omitted from the longitudinal analysis because they were missing one or more of the demographic and clinical characteristics used to

calculate the propensity scores (5% of the sample, $n = 56$). Since the propensity scores (PS) were used as a covariate in the repeated measures models, any subject missing the PS was omitted from the longitudinal analysis. There was no difference in baseline MLHFQ between those who were included in the longitudinal study and those who were not (because their PS could not be determined). All of the remaining 1,156 subjects were included in two of the three repeated measures models (corresponding to their ethnic group), even though 42% were missing from one of the two follow-up assessments based on the original study design. The SAS procedure used for the repeated measures analysis, PROC MIXED, is particularly appropriate for longitudinal studies where dropouts are not uncommon,¹⁵ assuming the incomplete data are missing at random. Since there was no difference in baseline MLHFQ scores between those who had complete data and those who were missing one of the two follow-up scores, this assumption is reasonable.

All analyses were done using SAS for Windows, version 9.1 (SAS Institute, Inc., Cary, NC). An alpha level of .01 was used throughout to control for the overall Type I error rate associated with multiple comparisons.

Results

Most of the 1,212 participants were male (54%) and non-Hispanic White (63%); the non-White patients were split nearly equally between Black (19%) and Hispanic (18%) patients. The mean age overall was 66.1 ($SD = 14.0$), with a range from 20 to 96 years. Slightly more than one-third (36%) of the sample had less than a high school education, while the remaining subjects were split between high school graduates (32%) and those with some post-secondary education (32%). The most common level of physical functioning was NYHA class III (44%), with 32% in class II and 24% in class IV. The sample was split between the treatment (48%) and

usual care (52%) conditions. There was no difference by ethnicity/race in the percentage of patients assigned to the treatment or usual care groups. Importantly, there was no difference among the three ethnic/racial groups in baseline MLHFQ scores.

Each of the three propensity score models fit the data well, as evidenced by nonsignificant p-values in each case (Table 2). The area under the curve was high for each of the models, suggesting that the propensity scores captured the differences between each ethnic/racial pair accurately and that the scores are based on models that fit the data adequately.

Repeated measures analysis of covariance

Mean MLHFQ scores improved over time in all the ethnic/racial groups, but most dramatically among Hispanics (Figure 1). Both models of the total MLHFQ score that included Hispanic participants demonstrated a significant ethnic/racial effect (Table 3). The post-hoc analysis demonstrated more favorable MLHFQ total scores post-baseline for Hispanic compared to White patients, even after adjusting for MLHFQ total score at baseline, treatment group, and differences in demographic and clinical characteristics between the ethnic/racial groups. The least squares mean, which is adjusted for covariates, differed significantly between Hispanic and White patients post-baseline ($t = 7.6, p < .0001$). When Black and Hispanic patients were compared, adjusted total scores differed significantly as well ($t = 2.9, p = .004$).

The physical and emotional subscale score models demonstrated a significant ethnic/racial effect (Table 3). When comparing Hispanics and Whites, the Hispanics had more positive outcomes. On post-hoc analysis, the least squares mean indicated significant differences in physical ($t = 6.4, p < .0001$) and emotional ($t = 6.4, p < .0001$) subscale scores post-baseline between Hispanic and White participants.

When Hispanic and Black patients were compared, only total MLHFQ scores differed

between them post-baseline (Table 3), with Black patients reporting poorer total HRQL compared with Hispanic patients ($t = 2.9, p = .006$). No Black vs. White patient difference was significant for any of the three MLHFQ outcomes.

Discussion

The major finding of this study was that HRQL improved more over time in Hispanics with heart failure than White or Black samples after controlling for demographic, clinical, and treatment group differences among the three major ethnic/racial groups. The differential improvement in HRQL seen in the Hispanic sample is consistent with our prior comparison of Hispanic and non-Hispanic White patients with heart failure.⁶ In that study, we matched Hispanic and White patients on functional status and age and compared scores obtained using the same measure of HRQL over a six month period following hospital discharge. We found that Hispanic patients, some of the same patients used in this analysis, improved more over time than White patients. However, without a good explanation for the phenomenon, possible spuriousness of the results due to inadequate matching was considered.

In this comparison, propensity scores were used to statistically adjust for differences in multiple demographic and clinical characteristics that may have unduly influenced our prior findings. In addition, the treatment effect was accounted for in the analysis. Also, a third group of heart failure patients—non-Hispanic Blacks—was added to the comparison. Using these methods, we feel confident that the significant differences demonstrated in this analysis can be attributed to true group differences in MLHFQ scores rather than an artifact of group differences.

Few prior investigators have compared HRQL in ethnic/racial groups. Results from a population survey conducted between 1993 and 2002, the HRQL surveillance project from the National Center for Chronic Disease Prevention and Health Promotion, revealed few differences

among Hispanic, non-Hispanic Black and non-Hispanic White persons in perceived health, mental or physical functioning.¹⁶ In medically ill samples, Jackson-Triche and colleagues⁴ found that physical functioning scores on the SF-36 were highest (best) in Hispanics, lowest in Blacks, and in the middle in non-Hispanic Whites, similar to our results.

One explanation for our finding that HRQL improved more over time in Hispanics than non-Hispanic Whites and Blacks with heart failure is an inaccurate perception about the chronicity of the illness in the Hispanics. When Becker and colleagues¹⁷ compared views about chronic illness in Hispanic, Black, and Filipino persons, they found that many Hispanics believed that symptom remission was a cure and each exacerbation of symptoms was a separate illness unrelated to prior episodes. Black persons in their study held mainstream cultural views about chronic illness. It may be that the Black and White patients in the current study realized that heart failure was a chronic illness that can only be controlled, while the Hispanic patients believed that symptom remission indicated that they were cured. If true, disease-specific HRQL would be expected to improve over time in individuals who believed that the problem had resolved. Much has been written about the Hispanic paradox, which refers to the epidemiologic finding that Hispanics in the U.S. tend to paradoxically have significantly better health than the average population, in spite of what their aggregate socioeconomic indicators would predict.¹⁸ The specific cause of this phenomenon is poorly understood, but a mistaken perception about the meaning of illness may be protective in some fashion. It should be noted, though, that misperceptions about chronic illness are not limited to the Hispanic population; the same phenomenon has been noted in other populations.^{19, 20}

Another explanation for why HRQL is better in Hispanics could be inner strength. In one study, older Hispanic women described drawing strength from their past, focusing on

possibilities, being supported by others, knowing their purpose, and nurturing the spirit as characteristics that contributed to their inner strength and ability to cope with illness.²¹ This optimism was reflected in another study of Mexican-American families with chronically ill children.²² Family members took spiritual and secular actions to assure the best possible care for the ill child and sought to influence God's good will on behalf of the child and the family. Perhaps, over time, the Hispanic patients in this sample refocused themselves in this fashion and thereby improved their HRQL.

Another interpretation is related to language. Even though the Hispanic sample completed the instrument in their native language, it is plausible that the meaning given to the responses was interpreted differently. Others have noted that the lexicon of illness terms used by Hispanics in the US is affected by the practice of speaking both Spanish and English and by their experiences with different health systems.²³

It is also possible that social desirability of responses among Hispanics influenced the results. That is, it could be that the Hispanics in the sample felt inclined to present themselves in a manner that would be viewed favorably by others. However, if such an explanation is true, we have no explanation about why they responded in a fashion comparable to the other groups at baseline.

It was surprising that the physical component of HRQL was not significantly different for Black patients compared with either of the other ethnic/racial groups, considering prior studies. Others have found that physical decline may be more pronounced in ill Blacks than in ill Whites. For example, Clarke and colleagues²⁴ found that the risk of experiencing significant functional decline was approximately doubled in non-White patients with systolic dysfunction at one year. In work by Ferraro and colleagues, more rapid functional decline was observed in Black patients

over a 15-year period than in Whites and others, even when illness was taken into account.^{25, 26}

Others have suggested that socioeconomic status may explain differences in physical functioning among Blacks compared to other ethnic/racial groups.²⁷ Since the propensity score method controlled for sociodemographic differences, use of this strategy in the present study may explain why the differences in physical HRQL between Blacks and others were not significant.

The primary limitation of this study is that it was a secondary analysis of existing data. These results are not generalizable to all patients with chronic heart failure since the patients in this analysis were younger and more likely to have some post-secondary education than those not included in the analysis. The Hispanic sample was primarily of Mexican origin, so these results may not apply to Hispanics from other countries. The instrument used here to measure HRQL has been shown to be less sensitive than other measures of HRQL, so the extent of differences may be underestimated.²⁸ Another limitation was that the samples received different treatments at the various sites. However, the treatments were all behavioral in nature and treatment was controlled both as a predictor in the propensity scores and as a factor in the longitudinal analyses. An additional limitation was that variables that could further explain these differences, such as illness perceptions, social support, and spirituality were not measured. It is also possible that a cultural bias exists in the data obtained from the MLHFQ, but this seems unlikely since there were no differences in baseline scores and it was evident only on repeated assessment.

Strengths of the study include the methodological control introduced with the use of propensity scoring. Some authors have refuted the Hispanic Paradox concept, arguing that the apparent advantage reflects selection bias and poor methodological control of confounding variables.¹⁸ Based on the methodological controls used, we conclude that a true difference in HRQL exists among the ethnic/racial groups studied. Whether or not the difference seen is

related to heart failure cannot be stated with certainty, but use of longitudinal data strengthens our confidence in the conclusion that the response to heart failure appears to differ over time among the ethnic/racial groups studied.

The question of whether Hispanics improve more in HRQL over time because of inaccurate perceptions about illness chronicity, some inherent cultural strength, or differences in language remains the charge of future investigators. If there is something unique about the Hispanic culture that promotes positive HRQL, a greater understanding of how Hispanic culture promotes positive HRQL could bolster intervention strategies for all patients with heart failure.

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Figure 1. Average Scores on the Minnesota Living with Heart Failure Questionnaire by Time and Ethnic/Racial Group (N=1,212)

Figure Legend: Total and subscale scores are compared based on ethnic/racial group, regardless of assignment to treatment or usual care group; lower scores on the MLHFQ instrument indicate better HRQL.

Table 1. Summary of demographic and clinical characteristics by ethnicity and comparisons among ethnic groups (N = 1,212).

Characteristic	White (<u>n</u> = 767)	Black (<u>n</u> = 231)	Hispanic (<u>n</u> = 214)	Group comparison χ^2
	<u>n</u> (%)	<u>n</u> (%)	<u>n</u> (%)	
<u>Gender</u>				
Female	448 (58)	100 (43)	107 (50)	18.1**
Male	319 (42)	131 (57)	107 (50)	
<u>Education</u>				
< High school	207 (28)	86 (38)	133 (62)	107.9**
High school graduate	249 (33)	93 (41)	44 (21)	
Some college	293 (39)	46 (21)	36 (17)	
<u>Setting</u>				
Acute	450 (59)	46 (20)	180 (84)	192.7**
Chronic	317 (41)	185 (80)	34 (16)	
<u>NYHA Class</u>				
II	241 (32)	102 (45)	34 (16)	64.0**
III	331 (45)	98 (43)	94 (44)	
IV	169 (23)	28 (12)	84 (40)	
<u>Group</u>				
Control group	387 (50)	134 (58)	106 (50)	4.6
Intervention group	380 (50)	97 (42)	108 (50)	

* $p \leq .01$; ** $p \leq .0001$.

Table 2. *Summary of logistic models developed to obtain propensity scores for each pair of ethnic/racial groups**

Pair of ethnic groups being compared	Hosmer-Lemeshow goodness-of-fit test χ^2 (p value)	Area under the ROC curve
White and Black (<u>n</u> = 945)	5.4 (.7)	0.80
White and Hispanic (<u>n</u> = 934)	8.0 (.4)	0.76
Black and Hispanic (<u>n</u> = 433)	3.1 (.9)	0.88

*The number of observations used for each model is given in parentheses after the label indicating which pair of ethnic/racial groups is being compared; respondents who were missing one or more of the predictor variables were not included in the analysis, so the number is smaller than the total of the two ethnic/racial groups.

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Table 3. Repeated measures analysis of covariance models, with separate models for each pair of ethnic/racial groups*

Covariate or Factor	Black and White (combined $n = 945$)		White and Hispanic (combined $n = 934$)		Black and Hispanic (combined $n = 433$)	
	<i>F</i>	<i>p value</i>	<i>F</i>	<i>p value</i>	<i>F</i>	<i>p value</i>
<u>Outcome: Total score</u>						
MLHFQ at baseline	557.4	<.0001	394.3	<.0001	269.9	<.0001
Propensity score	24.9	<.0001	16.1	<.0001	33.9	<.0001
Time (T)	1.4	.2	10.2	.002	3.3	.07
Ethnic group (E)	0.5	.5	57.5	<.0001	8.2	.004
T*E	<.1	>.9	3.2	.08	1.7	.2
Treatment group (TG)	10.7	.001	6.5	.01	2.4	.1
T*TG	<.1	.8	0.6	.4	0.3	.6
E*TG	1.1	.3	1.0	.3	0.8	.4
T*E*TG	<.1	.9	0.9	.3	0.2	.7
<u>Outcome: Physical health subscale</u>						
MLHFQ–PH at baseline	354.3	<.0001	232.6	<.0001	186.9	<.0001
Propensity score	30.4	<.0001	14.4	.0002	34.0	<.0001
Time (T)	0.7	.4	3.5	.06	1.6	.2
Ethnic group (E)	2.7	.1	41.1	<.0001	3.7	.06
T*E	0.2	.7	1.8	.2	0.4	.5
Treatment group (TG)	13.3	.0003	4.8	.03	4.5	.04
T*TG	<.1	.9	1.3	.3	0.2	.6
E*TG	3.4	.07	1.0	.3	3.1	.08
T*E*TG	0.3	.6	0.1	.7	0.2	.7
<u>Outcome: Emotional health subscale</u>						
MLHFQ–EH at baseline	586.8	<.0001	477.1	<.0001	232.5	<.0001
Propensity score	8.9	.003	8.0	.005	20.7	<.0001
Time (T)	0.3	.6	10.7	.001	1.9	.2
Ethnic group (E)	<.1	.9	41.3	<.0001	4.7	.03
T*E	0.3	.6	4.1	.04	4.0	.05
Treatment group (TG)	7.0	.009	5.8	.02	1.1	.3
T*TG	0.4	.6	0.1	.7	0.3	.6
E*TG	0.3	.6	0.4	.6	<.1	.9
T*E*TG	0.4	.6	1.6	.2	<.1	.9

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*Ethnic group analyses are bolded for emphasis