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Journal

J Card Fail, 9(1)

Authors

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Publication Date

2003

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Peer reviewed

Gender Differences in Quality of Life Are Minimal in Patients With Heart Failure

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ABSTRACT

Background: Prior investigators have suggested that quality of life differs in men and women with heart failure, especially in the physical functioning domain. The purpose of this study was to compare quality of life in men and women with heart failure to determine if differences exist after controlling for functional status, age, and ejection fraction.

Methods: Data from a sample of 640 men and women (50% each) matched on New York Heart Association functional classification and age were used for this secondary analysis. Scores on the Minnesota Living with Heart Failure Questionnaire were compared at baseline and 3 months after enrollment using multivariate techniques with ejection fraction controlled. Treatment group (intervention versus control) was controlled statistically at 3 months because the original data were drawn from experimental and quasi-experimental studies in which an improvement in quality of life had been a goal of the intervention. The sexes differed on marital status, so this variable was controlled in analyses as well.

Results: In all analyses, quality of life was minimally worse in women compared with men (1–3 points at most). None of the differences reached statistical significance except for emotional quality of life at baseline ($P = .03$). By 3 months, both men and women reported significantly improved and comparable quality of life and there were no significant differences between them.

Conclusion: Quality of life is similar in men and women with heart failure when functional status, age, ejection fraction, and marital status differences are controlled.

Key Words: Women, physical functioning, emotions, adjustment, systolic heart failure, diastolic heart failure.

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Manuscript received June 4, 2002; revised manuscript received November 11, 2002; revised manuscript accepted December 12, 2002.
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Funded by a grant from the College of Health and Human Services, San Diego State University, San Diego, CA.
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1071-9164/03/0901-0007\$30.00/0
doi:10.1054/jcaf.2003.1

The incidence of heart failure (HF) is almost equal in men and women, although clinical characteristics, treatment patterns, and outcomes differ in the sexes. Clinical trial data would suggest that HF is more common in men than women because only 0% to 32% of large published samples are female.¹ However, when Medicare data were analyzed, 58% of hospital discharges were women.² In the National Health and Nutrition Examination Survey (NHANES II) data, approximately half (53%) of the sample with HF was female.³ Clearly, HF is not a man's illness, but women with HF remain understudied.⁴

Women typically are diagnosed with HF at an older age than men.⁵ In spite of this, women live longer with HF than men do.⁶ In the Framingham study, 38% of women *vs.* 25% of men survived for 5 years after diagnosis.⁷ Longer life is not necessarily a better life, however, because women with HF have worse quality of life than that of normative populations and people with other chronic illnesses such as Parkinson's disease and cancer.⁸ Functional status is poorer in women with HF than men and women are more likely to report peripheral edema, fatigue, and dyspnea at rest.⁵ Others have suggested that quality of life differs in men and women with HF,^{9,10} but this is a relatively unexplored area of study. Therefore, the purpose of this study was to compare quality of life in a sample of men and women with HF to determine if differences exist after controlling for functional status, age, and ejection fraction.

Background

Few investigators have compared subjective responses to the diagnosis of HF by gender. Riedinger and colleagues⁹ found, in a sample of 1,382 hospitalized HF patients evenly split by gender, that women reported worse quality of life than men, even after controlling for age, ejection fraction, and New York Heart Association (NYHA) functional classification. Quality of life was defined as a global construct containing aspects of general life satisfaction, current life situation, and dimensions of physical function, emotional distress, and social and perceived health. A battery of 5 instruments was used to measure the construct. The women in the study reported significantly worse quality of life in several dimensions, although many differences disappeared after controlling for functional status. Specifically, when NYHA functional classification was used as a covariate in the analysis, the only quality of life differences in the women were worse satisfaction with physical functioning in intermediate activities of daily living (walking several blocks, running errands, climbing a flight of stairs, driving a car), and with social activity (visiting, participating in community activities).

The observation that women experience lower quality of life in the area of physical functioning is consistent with other studies of gender differences in quality of life in HF. Chin and colleagues found less improvement at 1 year in the physical component of quality of life in women than in men with HF, even after adjusting for clinical characteristics, socioeconomic variables, and baseline quality of life scores.¹¹ Others have found that men with physical limitations resulting from HF were more likely to be depressed than women with physical limitations.¹²

Subjective and objective evidence point to gender differences in physical functioning in persons with HF, but whether this difference can be interpreted as a clinically meaningful difference in quality of life is in question because so few investigators have studied this issue. Others have argued that women with HF experience better health perceptions and psychosocial adjustment to HF than men, perhaps because they attribute philosophic meaning to illness.¹⁰ Evangelista and colleagues¹⁰ found that men were more likely than women to view HF as an enemy and to feel emotionally burdened by the diagnosis. To add to this small literature base, we performed a secondary analysis of existing data, comparing a carefully matched sample of men and women with HF, to assess their quality of life at enrollment and again three months later.

Methods

The methods used in this study are described in detail elsewhere and summarized briefly here.¹³ Data from a convenience sample of 9 experimental or quasi-experimental studies were used for this study. The 9 studies had been conducted at 8 sites representing the Southwest, Southeast, Northwest, Northeast, and Midwest sections of the United States. Each of the studies tested an intervention (eg, disease management, education, exercise) designed to improve outcomes in people with HF and measured quality of life with the Minnesota Living with Heart Failure Questionnaire (LHFQ).

Data collected at baseline and 3 or 4 months after enrollment were submitted in an Excel file, cleaned, and integrated into a single database for analysis. The data collected at 3 or 4 months were combined (and labeled 3 months) based on the rationale that investigators typically allow 2 weeks on either side of the due date for data collection. In addition to quality of life data, information on patient age, gender, marital status, income, education, ejection fraction, NYHA functional class, and the setting where the data were collected (eg, home, hospital) were contributed to the database. Local Institutional Review Boards had approved the individual studies and the review committee at the primary author's institution approved this secondary analysis.

Sample

A total of 1,136 people with HF formed the accessible population in the full database from which a matched sample of 640 was drawn. Characteristics of the accessible population are described elsewhere.¹³ The demographic and clinical variables were similar in this sample of 640 when compared with the full accessible population. The sexes differed significantly on 3 variables in the full sample (income, education, and NYHA functional class) but not in this subsample of 640. Inclusion criteria were similar at all sites. Eligible HF patients had to have a documented diagnosis of HF and speak either English or Spanish. Patients with acute myocardial infarction, unstable angina, cognitive impairment, or severe psychiatric problems were excluded. Those discharged to an extended care or skilled nursing facility and those who were homeless were also excluded.

The sample of 640 men and women used in this analysis was matched on NYHA functional class and age using nearest available matching.¹⁴ This matching technique involves finding the closest possible comparison subject for each participant in the smaller of the 2 groups from the reservoir of yet unmatched participants; 49.2% of the original population of 1,136 was female. Participants were unable to be matched on ejection fraction because most (74.2%) of the full sample of men had systolic HF but only 61.1% of the full sample of women had systolic HF. To match on HF type would have pulled 57 subjects from this analysis. Therefore, ejection fraction was used as a covariate in the analysis. The matching variables of functional class and age were chosen based on the study from Riedinger and colleagues⁹ in which the sample was matched on age and ejection fraction but many differences in quality of life disappeared when NYHA functional class was controlled in the analysis. The sample size of 640 was sufficient to detect a small (.25) difference in scores between the groups with a power of .85.¹⁵

Measurement

Rector and colleagues defined quality of life as physical, socioeconomic, and psychological well-being, and developed the LHFQ, which was used in this study.¹⁶ The LHFQ is a 21-item, disease-specific measure of quality of life. All items on this self-report instrument are measured on a 6-point response scale (0 to 5). The total summary score can range from 0 to 105; a lower score reflects better quality of life. Two subscale scores reflect physical (8 items) and emotional (5 items) components of quality of life. The LHFQ has demonstrated internal consistency, stability, and discriminant validity.¹⁶ In this study, the alpha coefficient was .92 for the total score at baseline.

Analysis

Sample sociodemographic and clinical characteristics were compared using chi-square and independent *t*-tests, depending on the level of measurement. Each baseline LHFQ score was first compared by gender, controlling for ejection fraction, to facilitate comparison with Riedinger and colleagues'⁹ findings. Marital status differed significantly between the groups and could theoretically influence quality of life; therefore, this variable was also used as a covariate in the analyses. Then multivariate analysis of covariance was used to compare the baseline physical and emotional subscale scores between genders at 3 months, controlling for ejection fraction, marital status, and baseline scores. The total score was analyzed separately using repeated measures analysis of covariance because the total is composed primarily of the 2 subscale scores. By 3 months, the matched sample was no longer complete because of attrition; therefore, 3 different analytic approaches were used to lend confidence to the results. These approaches are described in the following section. An alpha of .05 was used in all analyses.

Results

Sample Characteristics

The men and women in the sample of 640 were perfectly matched in NYHA functional class and very similar in age (Table 1). The genders differed significantly, however, on marital status, ejection fraction, and HF type. The women were more likely than the men to be unmarried (eg, widowed) and to have diastolic dysfunction. This sample of 640 differed from the accessible population of 1,136 on age, education, income, HF type, and NYHA class. In the accessible population, the men were younger and more likely to be better educated, to earn more than \$20,000 annually, and to have systolic dysfunction, but also to be in NYHA class I.

Primary Analysis

When baseline data from the matched sample were analyzed with ejection fraction and marital status controlled as covariates, scores on the emotional subscale differed significantly by gender ($F = 4.74$, degrees of freedom [df] = 1, 576, $P = .03$), but differences in the physical subscale ($F = 3.72$, $df = 1,576$, $P = .054$) and the total score ($F = 3.12$, $df = 1,577$, $P = .08$) did not reach statistical significance (Table 2). At baseline, mean total scores on the LHFQ were, on average, 3.3 points higher (poorer quality of life) in the women compared with the men. The addition of marital status as a covariate resulted in the loss of 59 subjects; therefore, the analysis was re-

Table 1. Sociodemographic and Clinical Characteristics of the Baseline Sample With Heart Failure and Those Who Also Provided Survey Data at 3 Months

	Full Matched Sample (n = 640)			Subsample with Both Baseline and 3-month Data (n = 339)		
	Males (n = 320)	Females (n = 320)	<i>P</i>	Males (n = 165)	Females (n = 174)	<i>P</i>
Age (y)	66.5 ± 13.1	67.6 ± 14.3	.33	66.99 ± 12.7	68.05 ± 14.7	.48
NYHA functional class			1.0			.95
Class I	5 (1.6%)	5 (1.6%)		5 (3%)	4 (2.3%)	
Class II	70 (21.9%)	70 (21.9%)		29 (17.6%)	28 (16.1%)	
Class III	151 (47.2%)	151 (47.2%)		76 (46.1%)	84 (48.3%)	
Class IV	94 (29.4%)	94 (29.4%)		55 (33.3%)	58 (33.3%)	
Ejection fraction	32.5% ± 15.9	38.5% ± 18.2	<.001	35.48% ± 16.1	40.24% ± 18.4	.01
Marital status						
Married	166 (56.7%)	113 (39.2%)	<.001	85 (52.1%)	69 (41.1%)	
Unmarried (widowed, divorced, single)	127 (43.3%)	175 (60.8%)		78 (47.9%)	99 (58.9%)	.03
Less than a high school education	50 (23%)	59 (26.8%)	.21	29 (17.8%)	36 (21.6%)	.23
Income less than \$20,000 annually	67 of 104 (64.4%)	70 of 91 (76.1%)	.052	53 of 84 (63.1%)	55 of 72 (76.4%)	.052
Type of heart failure						
Systolic dysfunction	238 (74.4%)	194 (60.6%)	<.001	115 (69.7%)	101 (58%)	
Diastolic dysfunction	56 (17.5%)	112 (35%)		34 (20.6%)	63 (36.2%)	.005
Mid-range	26 (8.1%)	14 (4.4%)		16 (9.7%)	10 (5.7%)	

NOTE: Ventricular dysfunction was defined as follows: systolic dysfunction ($\leq 40\%$), diastolic dysfunction ($\geq 50\%$), or intermediate, mixed (41–49%).¹⁸

NYHA, New York Heart Association.

run without that covariate and the physical subscale became significant ($F = 4.43$, $df = 1,636$, $P = .04$).

Only 339 of the sample of 640 were available for the analysis of scores over time. Demographic characteristics of this subsample looked very similar to that of the full sample of 640 (see Table 1). Another covariate—treatment group—was added to this analysis because the data were drawn from experimental and quasi-experimental studies in which an intervention had been administered to a portion of the participants with the goal of influencing quality of life. When the change in LHFQ scores over time was examined in this subsample with

ejection fraction, marital status, and treatment group in the original study controlled, multivariate tests were not significant for total ($F = .15$, $df = 1,326$, $P = .70$) or subscale ($F = .31$, $df = 2,323$, $P = .74$) analyses. The power of this analysis was lower than that anticipated but adequate because of the addition of repeated measures.

Adding Additional Controls

To lend confidence to the conclusion of no difference, we explored the data further. First, the repeated measures analysis of variance with total LHFQ scores was redone

Table 2. Primary Analysis Comparing Minnesota Living With Heart Failure Questionnaire Scores in Men and Women Over Time (n = 640)*

	Baseline			3 Months		
	Males (n = 293)	Females (n = 288)	<i>P</i>	Males (n = 163)	Females (n = 168)	<i>P</i>
	Baseline Mean ± SD	Baseline Mean ± SD		3 Months Mean ± SD	3 Months Mean ± SD	
Total scores	52.41 ± 23.8	55.75 ± 23.9	.08	35.26 ± 25.0	36.86 ± 24.6	.46
Physical subscale scores	24.32 ± 11.1	26.22 ± 10.9	.054	14.56 ± 11.4	15.63 ± 11.1	.44
Emotional subscale scores	11.44 ± 7.7	12.84 ± 7.9	.03	8.77 ± 7.6	9.42 ± 7.4	.53

*Total and subscale scores were compared by gender at baseline, controlling ejection fraction and marital status. The matched sample of 640 decreased to 581 when marital status was used as a covariate. Gender differences were consistent across time but only emotional quality of life was significant at baseline. At 3 months, significant attrition had occurred. The trend toward slightly poorer quality of life in women persisted over time but no significant gender differences were evident at 3 months when ejection fraction, marital status, and treatment group assignment in the original study were controlled in the analysis. Note that higher scores indicate poorer quality of life.

SD, standard deviation.

with additional covariates because the matching was no longer intact to control NYHA and age. These variables and ejection fraction were controlled in the analysis with data from those participants who provided data at both baseline and 3 months. Marital status and treatment group also were controlled as covariates.

When scores were reanalyzed in the sample of 339 using these five covariates (NYHA class, age, ejection fraction, marital status, and treatment group), gender differences persisted but were not statistically significant at 3 months (total: $F = .12$, $df = 1,324$, $P = .73$; subscales: $.55$, $df = 1,324$, $P = .46$). Overall quality of life improved 33% in the men and 32% in the women over time.

Comparing Change Over Time

Individual LHFQ scores at 3 months were evaluated in comparison to baseline scores to determine if quality of life had changed. Scores were classified as having worsened, stayed stable, or improved over time. The decision regarding exactly where to classify a score as “stable” is subjective, so three different cut points were examined: <5 points based on the minimally important difference in scores suggested by Rector and colleagues,¹⁷ <3 points, and a change of only 1 point (<2 points). Without a good rationale for any of the choices, all 3 options were explored. The proportion of participants in each of the categories (eg, stable) was compared using chi square analysis.

There were no gender differences in the proportion of individuals whose total LHFQ scores improved, worsened, or stayed stable (Table 3), regardless of the number

of points allocated to the “stable” category. If <5 points change in either direction in the 3-month period was used, 20.1% ($n = 68$) of the full sample would be classified as stable. Men and women did not differ ($P = .17$). If a less conservative score of <3 was used, 14.5% ($n = 49$) of the full sample would be classified as stable. Men and women did not differ ($P = .21$). And, if a score differing by only 1 point (<2 points) was used, 11.8% ($n = 40$) of the full sample would be considered stable. Men and women did not differ ($P = .12$).

Change Over Time in a Matched Subsample

Individuals whose match had dropped out of the study by 3 months were removed from the database and the original analysis (repeated measures analysis of covariance with total scores and multivariate analysis of variance with subscale scores) was duplicated using only those 89 matched pairs with LHFQ data at both baseline and 3 months and data on all the covariates. The only difference between this sample and the full matched sample of 640 was that ejection fraction was not significantly different in this sample of 178. It was still controlled in the analysis as a covariate, however.

When the matched pairs with LHFQ data at both baseline and 3 months were examined over time, none of the LHFQ scores differed significantly in men and women at 3 months ($P > .05$) (Table 4). These results did not differ from those found in the original matched sample ($n = 640$) or the subsample with follow-up LHFQ scores at 3 months ($n = 339$), lending confidence to these results.

Table 3. Proportion of Men and Women in Whom Scores on the Minnesota Living With Heart Failure Questionnaire Changed Over Time ($n = 339$)

	Women ($n = 174$)		Men ($n = 165$)	
Total LHFQ scores ($\chi^2 = 4.19$, $df = 2$, $P = .12$)*	Worsened	29 (16.7%)	Worsened	36 (21.8%)
	Stable	26 (14.9%)	Stable	14 (8.5%)
	Improved	119 (68.4%)	Improved	115 (69.7%)
Total LHFQ scores ($\chi^2 = 3.12$, $df = 2$, $P = .21$)†	Worsened	28 (16.1%)	Worsened	35 (21.2%)
	Stable	30 (17.2%)	Stable	19 (11.5%)
	Improved	116 (66.7%)	Improved	111 (67.3%)
Total LHFQ scores ($\chi^2 = 3.59$, $df = 2$, $P = .17$)‡	Worsened	23 (13.2%)	Worsened	30 (18.2%)
	Stable	41 (23.6%)	Stable	27 (16.4%)
	Improved	110 (63.2%)	Improved	108 (65.5%)

LHFQ, Minnesota Living with Heart Failure Questionnaire.

*Stable defined as 0 or 1 point change in scores

†Stable defined as <3 point change in scores

‡Stable defined as <5 point change in scores

Table 4. Primary Analysis Comparing Minnesota Living With Heart Failure Questionnaire Scores in Men and Women Over Time Replicated With Matched Pairs with Complete Data (n = 178)*

	Baseline			3 Months		
	Males (n = 88)	Females (n = 90)	<i>P</i>	Males (n = 88)	Females (n = 90)	<i>P</i>
	Baseline Mean ± SD	Baseline Mean ± SD		3 Months Mean ± SD	3 Months Mean ± SD	
Total scores	50.32 ± 25.5	51.27 ± 24.7	.82	31.21 ± 24.4	32.35 ± 23.4	.60
Physical subscale scores	23.43 ± 12.2	23.78 ± 11.3	.94	12.67 ± 11.0	13.38 ± 10.2	.49
Emotional subscale scores	11.48 ± 8.1	12.19 ± 8.2	.61	7.92 ± 6.9	8.40 ± 7.1	.61

*Total and subscale scores were compared by gender over time in the 78 matched pairs with complete data at both intervals. Ejection fraction, marital status, and treatment group assignment in the original study were controlled in the analysis. Gender differences were not significant. SD, standard deviation.

Discussion

In this study, emotional dimensions of quality of life were statistically significantly lower in women than in men at the time of study enrollment, but these differences were small and were no longer statistically significant at 3 months. These results are similar to those of other investigators^{9,11} who found small gender differences in quality of life at study enrollment and those who found comparable quality of life in men and women later in the recovery period.¹⁰ It appears, although women may experience slightly more early disruption than men, both men and women adapt quickly and their quality of life improves within 3 months.

The statistically significantly lower quality of life scores in the women at baseline could reflect sample differences. There were significant gender differences in marital status and HF type. Perhaps being married gave the men in this sample an early adjustment advantage over the women. The fact that the women started lower in quality of life and recovered quickly to levels comparable with the men may reflect gender differences in HF type. Early recovery from diastolic HF, the predominant type of HF in the women, could be more rapid than the recovery from systolic HF, which predominated in the men, but little is known about the recovery or stabilization trajectory in the 2 types of HF. Statistical control of marital status and ejection fraction in the analysis may not have been sufficient to equalize group differences in these important variables.

The improvement in quality of life over time in both men and women is interesting. This finding is consistent with our prior research in which we demonstrated that LHFQ scores improved significantly after hospital discharge, even in patients assigned to a usual care control group.¹³ This finding underscores the importance of a comparison group in all research assessing quality of life in HF. Time appears to be sufficient to improve quality of life as patients move further from the acute event that precipitated their enrollment into a study. Without a

control group for comparison, this improvement could erroneously be attributed to the intervention.

The results of this study extend those of prior investigators by demonstrating both early gender differences and comparable quality of life at 3 months in a single sample. When separate studies with unique samples are conceptually integrated, the possibility of error is always a concern. But, when change over time is evident in a single sample, more confidence is generated in the results. However, this study was a secondary analysis of existing data and quality of life was measured at only 2 periods early after study entry, which limits the generalizability of these results. The attrition of patients from the studies at follow-up is also an important limitation. Those remaining may have had more quality of life concerns than those who dropped out. Using ejection fraction in the analysis was problematic because, assuredly, the data were gathered using different methods and at different times at the various sites. Regardless of concerns about measurement differences, ejection fraction may influence quality of life, perhaps because it is an indicator of illness severity.

In spite of these limitations, the results of this study are significant because little is known about this important topic of gender differences in response to HF. Future investigators are strongly encouraged to continue studying quality of life in men and women with HF, although the importance of controlling for influential variables either methodologically (eg, matching) or statistically (eg, analysis of covariance) is stressed. Clearly, NYHA class, age, ejection fraction, and marital status should be controlled in future analyses to avoid attributing clinical and demographic differences to gender differences in quality of life. Other factors potentially contributing to quality of life should be explored or controlled in future analyses as well—symptom severity, newness of the diagnosis, and adequacy of treatment.

In summary, this study replicated the findings of prior investigators who demonstrated gender differences in quality of life at study enrollment. However, these

differences dissipated within the first 3 months. Both men and women with HF recover quickly and report adequate quality of life after 3 months.

References

- Petrie MC, Dawson NF, Murdoch DR, Davie AP, McMurray JJ. Failure of women's hearts. *Circulation* 1999; 99(17):2334–2341.
- Croft JB, Giles WH, Pollard RA, Keenan NL, Casper ML, Anda RF. Heart failure survival among older adults in the United States: a poor prognosis for an emerging epidemic in the Medicare population. *Arch Intern Med* 1999; 159(5):505–510.
- Ho KK, Anderson KM, Kannel WB, Grossman W, Levy D. Survival after the onset of congestive heart failure in Framingham Heart Study subjects. *Circulation* 1993; 88(1):107–115.
- Wenger NK. Women, heart failure, and heart failure therapies. *Circulation* 2002;105(13):1526–1532.
- Simon T, Mary-Krause M, Funck-Brentano C, Jaillon P. Sex differences in the prognosis of congestive heart failure: results from the Cardiac Insufficiency Bisoprolol Study (CIBIS II). *Circulation* 2001;103(3):375–380.
- Vaccarino V, Chen YT, Wang Y, Radford MJ, Krumholz HM. Sex differences in the clinical care and outcomes of congestive heart failure in the elderly. *Am Heart J* 1999;138(5 Pt 1):835–842.
- Ho KKL, Pinsky JL, Kannel WB. The epidemiology of heart failure: The Framingham study. *J Am Coll Cardiol* 1993;22(4 Suppl A):6A–13A.
- Riedinger MS, Dracup K, Brecht ML. Quality of life in women with heart failure, normative groups, and patients with other chronic conditions. *Am J Crit Care* 2002;11(3): 211–219.
- Riedinger MS, Dracup KA, Brecht ML, Padilla G, Sarna L, Ganz PA. Quality of life in patients with heart failure: do gender differences exist? *Heart Lung* 2001;30(2):105–116.
- Evangelista LS, Kagawa-Singer M, Dracup K. Gender differences in health perceptions and meaning in persons living with heart failure. *Heart Lung* 2001;30(3):167–176.
- Chin MH, Goldman L. Gender differences in 1-year survival and quality of life among patients admitted with congestive heart failure. *Med Care* 1998;36(7):1033–1046.
- Murberg T, Aarsland T, Svebak S. Functional status and depression among men and women with congestive heart failure. *Int J Psychiatry Med* 1998;28(3):273–291.
- Riegel B, Moser D, Glaser D, Carlson B, Deaton C, Armola R, et al. The Minnesota Living with Heart Failure Questionnaire: sensitivity and responsiveness to intervention intensity in a clinical population. *Nurs Res* 2002; 51:209–218.
- Anderson S, Auguier A, Hauck WW, Oakes D, Vandaele W, Weisberg H. Statistical methods for comparative studies: techniques for bias reduction. New York, John Wiley & Sons, 1980.
- Lipsey MW. Design sensitivity: statistical power for experimental research. Newbury Park, CA, Sage Publishers, 1990.
- Rector T, Kubo S, Cohn J. Patient's self-assessment of their congestive heart failure. Part 2: content, reliability and validity of a new measure, The Minnesota Living with Heart Failure Questionnaire. *Heart Fail* 1987; October/November:198–209.
- Rector T, Tschumperlin L, Kubo S, Bank A, Francis G, McDonald K, et al. Use of the Living With Heart Failure questionnaire to ascertain patients' perspectives on improvement in quality of life versus risk of drug-induced death. *J Cardiac Fail* 1995;1(3):201–206.
- Kitzman DW. Therapy for diastolic heart failure: on the road from myths to multicenter trials. *J Cardiac Fail* 2001;7(3):229–231.