Correlating perceived arrhythmia symptoms and QoL in the elderly with Heart Failure in an urban clinic: A prospective, single center study

Kathleen T. Hickey, EdD, ANP-BC, FNP-BC [Assistant Professor of Nursing],
School of Nursing, Columbia University 630 West 168th Street, New York, NY

James Reiffel, MD [Professor of Clinical Medicine],
College of Physicians & Surgeons, Columbia University, New York, NY

Robert R. Sciacca, EngScD,
Statistician School of Nursing, Columbia University, New York, NY

William Whang, MD, MS [Assistant Professor of Clinical Medicine],
College of Physicians & Surgeons, Columbia University, New York, NY

Angelo Biviano, MD, MPH [Esther Aboodi Asstitant Professor of Clinical Medicine],
College of Physicians & Surgeons, Columbia University, New York, NY

Maurita Baumeister, ACNP-BC [Acute Care Nurse Practitioner],
College of Physicians & Surgeons, Columbia University, New York, NY

Carmen Castillo [Research Coordinator],
College of Physicians & Surgeons, Columbia University, New York, NY

Jyothi Talathothi, B.A.M.S. [Research Assistant], and
College of Physicians & Surgeons, Columbia University, New York, NY

Hasan Garan, MD, MS [Professor of Medicine]
College of Physicians & Surgeons, Columbia University, New York, NY

Abstract

Aim—To determine the relationship between quality of life (QoL) and perceived self reported symptoms in an elderly, ambulatory, urban population living with heart failure (HF).

Background—While arrhythmias in the elderly with HF are well documented, the association between perceived arrhythmia symptoms and QoL is not well defined.

Design—Prospective, cross sectional single center study.

Methods—A single-center, prospective study was conducted with HF patients recruited from an urban outpatient cardiology clinic in the United States. Fifty-seven patients completed a baseline QoL survey with 42 of these completing the 6-month follow-up survey. QoL was evaluated with the SF-36v2™ and frequency of symptoms with the Atrial Fibrillation Severity Scale. Subjects wore an auto triggered cardiac loop monitor (LifeStar AF Express®) for 2-weeks to document arrhythmias. Data analysis utilized Spearman's rank correlation and logistic regression.

kth6@columbia.edu; Phone: 212-305-4944; Fax: 212-305-6937.

Results—Baseline and 6-month QoL measures did not correlate with recorded arrhythmias. However, perceptions of diminished general health correlated significantly with symptoms of exercise intolerance, lightheadedness/dizziness, palpitations, and chest pain/pressure. By multivariable logistic regression, more severe perceived arrhythmic, symptoms of exercise intolerance, and lightheadedness/dizziness were independently associated with diminished QoL.

Conclusion—QoL was significantly worse in patients with perceptions of severe arrhythmic episodes and in those whose symptoms of dizziness and exercise intolerance.

Relevance to clinical practice—The findings of this study indicate that symptomatic HF patients suffer from poor QoL and that interventions are needed to improve QoL and decrease symptom severity. Nurses who care for HF patients play an essential role in symptom evaluation and management and could significantly improve overall QoL in these patients by carefully evaluating symptomatology and testing interventions and educational programs aimed at improving QoL.

Keywords

Quality of Life; Elderly; Arrhythmia; Heart Failure0

Introduction

Individuals 65 years of age or older are living longer but with a variety of chronic diseases including heart failure (HF) (Fuster et al., 2006; Hunt et al., 2005). Those with HF commonly reported symptoms of fatigue, dyspnea (Carlson et al., 2001; De Peuter et al., 2004; Ramasamy et al., 2006) and exercise intolerance (Hunt et al., 2005). However, these symptoms can also exist in people experiencing an atrial or ventricular arrhythmia (Dorian et al., 2000; Francis et al., 2010; Hickey et al., 2010). Regardless of the underlying cause, HF and isolated arrhythmias (atrial and ventricular ectopy) can result in significant symptoms, which can impact quality of life (QoL). To date, the relationship of perceived symptoms to QoL in the elderly remains poorly investigated, especially in urban Latinos living with HF and other cardiovascular disease.

Background

One of the consequences of aging is the increasing prevalence of chronic diseases (Bayliss et al., 2004). Among these, heart failure (HF) has become one of the most prevalent diseases in the elderly, and this will continue to increase in the coming decades as the aging population lives longer (Jaagosild et al., 1998; Jaarsma et al., 1999) and the baby boomer population continues to age. Nearly 90% of patients with HF experience symptoms such as dyspnea and fatigue (Edmonds et al., 2005; Evangelista et al., 2008; Falk et al., 2007)and emotional symptoms like depression, anxiety and uncertainty (Evangelista et al., 2008; Heo et al., 2008; Moser et al., 2010). Thus, diagnosing symptoms related to HF vs. an underlying arrhythmia can be very difficult because of changes in sensory and symptom perception, and hearing, memory and comprehension losses, coupled with emotional symptoms and poor functional status which also become more common with advancing aging (Bayliss et al., 2004; Carlson et al., 2001; Heo et al., 2007). This further underscores the challenges for clinicians on how to best delineate whether reported symptoms are from a chronic cardiovascular condition such as HF or a potentially life-threatening arrhythmia. Since individual symptoms vary greatly in intensity, duration, and frequency from day to day, documentation and evaluation is especially difficult. In fact, some elderly patients may not be aware of subtle changes in their physical and mental well-being and may not report symptoms to their practitioners unless specifically asked. Others may simply forget to report symptoms experienced between routine follow up exams, or may attribute symptoms to

aging. Thus, further evaluation e.g., cardiac monitoring, or other diagnostic testing is not conducted. In this population, we previously reported that external cardiac monitoring was able to detect significant cardiac events that would have otherwise gone undetected and lead to appropriate cardiac treatment with either a pacemaker or implantable cardioverter defibrillator (ICD) (Hickey et al., 2010). Thirty percent of subjects with HF reported symptoms while wearing an external cardiac monitor that were most frequently correlated with isolated atrial and ventricular premature ectopic beats, non-sustained ventricular tachycardia, and AV block (Hickey et al., 2010). Although recognition of arrhythmias that require treatment is of paramount importance, symptom differentiation in the elderly takes on a vital role. Evaluating health-related quality of life and the impact of perceived symptoms becomes more critical in the elderly living with chronic cardiovascular diseases to determine the origin of such symptoms and to better understand the impact on QoL among elderly individuals suffering from multiple chronic diseases.

Health related QoL is a general concept that is often used to describe ones overall well being, as subjective and multidimensional, including physical, psychological and social dimensions. The options for the measurement tool should be based on the aims of the study and on the availability of the instrument (developed or culturally adapted) for the target population. Analysis of the psychometric properties of an instrument is critical for evaluating its reliability and the QoL dimensions for specific groups, like the elderly (Johansson et al., 2004; McHorney et al., 1994; Ware et al., 2007). Among the instruments for HF that are currently used, the Short-Form Health Survey (SF-36) is one of the most frequently applied generic instruments for adult populations (Bayliss et al., 2004; Johansson et al., 2004; Ware et al., 2007).

In addition, the components of the instrument should be clear, the population and the disease for which the measurement was developed should be defined, and the instrument has to be simple and straightforward, such that the time taken to administer it is appropriate (Jenkinson et al., 1997; McHorney et al., 1994; Ware et al., 2007).

This study utilized the SF-36 because of its established reliability and validity, straightforward and simple questions, and previous use in elderly populations (Peek et al., 2004; Jang et al., 2009). The goal of this study was to determine the relationship between QoL and perceived self reported symptoms commonly experienced in an elderly, ambulatory, urban population living with HF, and other cardiovascular risk factors (e.g., hypertension, diabetes, hyperlipidemia, and smoking). For this purpose, assessments of QoL and associated self-reported symptoms at baseline (prior to cardiac monitoring) were captured with the SF 36 initially and again at 6 months for comparisons.

Methods

Design

A prospective, cross sectional study was conducted to determine the association between self-reported symptoms and QoL assessments. Subjects were asked to wear the LifeStar AF Express® (LifeWatch, Inc.), an auto-triggered external memory-loop EKG recorder, for 14 days and transmit EKG strips daily via their home phone line in order to document the frequency and duration of arrhythmias, both silent and symptomatic. In addition, subjects were requested to press an event recorder button on the monitor when symptomatic and to record any associated symptoms in a free-form text diary similar to what is used in clinical practice. Overall QoL and symptoms were assessed prior to wearing the cardiac event monitor for a period of two weeks. Two previously validated instruments were used: the SF-36v2™ and the University of Toronto Atrial Fibrillation Severity Scale (AFSS). QoL was measured by the SF-36v2™ and symptoms were assessed using the AFSS. Although the

AFSS has been developed and used in the detection of associated symptoms in those with atrial fibrillation, we employed it in this study because symptoms of arrhythmias and heart failure have been reported to be similar (e.g., fatigue and dyspnea) (Dorian et al., 2002; Francis et al., 2010; Fuster et al., 2001).

Subjects

A convenience sample of subjects was recruited from the outpatient cardiac clinic at New York-Presbyterian Hospital. Inclusion criteria for study participation were: (1) age 65 years or older, and (2) a history of HF documented in their medical chart by their primary cardiologist. Exclusion criteria were: (1) a recent cardiac event (myocardial infarction, stroke) in the month prior to enrollment; (2) a prior pacemaker or ICD implant; or (3) a history of documented atrial fibrillation or ventricular or bradycardiac arrhythmias.

Power calculations indicated that a sample size of 46 was required to have 80% power at a 0.05 significance level to detect an association with a correlation coefficient of magnitude 0.40 or greater.

Ethical Considerations

Approval for the study was obtained from the Columbia University Institutional Review Board and informed consent was obtained from all subjects prior to participation. The purpose of the study and procedures to be used were explained to the subjects and they were informed that their participation was voluntary. They were told that that the study data would be kept confidential with the results being reported only in aggregate and that there would be no consequences for refusing to participate.

Measures

The SF-36v2™ is a multi-item scale that measures QoL and 8 health concepts (4 physical and 4 mental health domains) rated on a 3- to 6-point Likert scale (Ware et al., 2007) with documented validity and reliability when used in elderly white and minority populations (Peek et al., 2004; Jang et al., 2009). This instrument queries an individual about activities, perceptions, and limitations in a typical day within the last 4 weeks and compared to one year ago. This validated QoL tool has been used in a variety of AF clinical trials (Lonnerholm et al., 2000; Newman et al., 2003; Savelieva et al., 2001). Responses to the SF-36v2™ QoL questionnaire were transformed into norm-based scores. The 4 physical domains (physical functioning, role-physical, bodily pain, general health) and 4 mental health domains (vitality, social functioning, role-emotional, and mental health) were determined along with the physical component summary (PCS) and mental component summary (MCS) scores. These measures are scaled to have a mean of 50 and a standard deviation of 10 in the general population (Ware et al., 2007). Patients with heart disease typically have lower than average PCS scores (Ware et al., 2007). The response to question 1, characterizing general health as excellent, very good, good, fair, or poor, was used as the primary outcome measure of QoL. Responses to this question have been used as the "gold standard" for assessing criterion validity for other dimensions of the SF-36 (Jenkinson et al., 1994).

The AFSS is a 14-item disease-specific scale developed to capture subjective and objective ratings of AF disease burden, including frequency, duration, and severity of subjectively perceived episodes (Dorian et al., 2002; Maglio, 1998). The most recent version of the AFSS also includes an abbreviated version of the AF Symptoms Checklist (Bubien et al., 1996). This scale has been used successfully in large clinical trials, including the Canadian Trial of Atrial Fibrillation in which patients with paroxysmal or persistent AF who were treated with antiarrhythmic drug therapy reported higher (better) scores of global well-being

at 3 months as compared to baseline (Dorian et al., 2002). The AFSS documents the severity of symptoms during the past 4 weeks on a scale of 0 to 5 including: palpitations, shortness of breath at rest, shortness of breath during physical activity, exercise intolerance defined as fatigue during mild physical activity, fatigue at rest, lightheadedness or dizziness, and chest pain or pressure. A score of 0 denotes a complete lack of symptoms while a score of 5 indicates that the symptom is present a great deal of the time. Severity of the most recent episode of irregular heart rhythm on a scale of 1 to 10 was also recorded. Patients who did not experience any episodes of irregular heart rhythm were assigned a score of 1. In addition, the AFSS also collected information on visits to doctors and hospital emergency rooms during the preceding 4 weeks.

Cardiac monitoring

All subjects were given a LifeStar AF Express® monitor to wear for 14 days along with instructions in English or Spanish on how to transmit data from their device over the phone to a central receiving service for analysis. A 2-week monitoring period was chosen as a modest and tolerable period for continuous ambulatory outpatient ECG monitoring in an older population that may not be technologically savvy. This time frame is longer than standard Holter monitoring (24 hours) yet shorter than most cardiac event monitors (3-4 weeks) and was felt to be achievable in a "real world" environment.

Subjects were instructed to transmit at least once daily, as well as any time they experienced any symptoms. Daily compliance rate for transmission was 79% for the 2-week period and all symptoms were captured at the time of transmission by a cardiac technician who assisted patients with transmission over the phone. Seventy-eight percent of subjects recorded the presence or absence of symptoms in their daily diary. However, all subjects reported to the staff at LifeWatch, Inc. (via telephone) whether or not they had experienced symptoms just prior to their daily transmission. This data was used to correlate symptoms related to arrhythmia with findings on the external cardiac devices.

Cardiac monitoring documented one episode of atrial fibrillation in a female patient who was symptomatic while wearing the monitor for whom therapy was later begun (anticoagulation). In addition, 2 subjects had 4 to 6 beat runs of self-terminating ventricular tachycardia that contributed to a decision to implant an ICD for primary prevention of sudden cardiac death. Four subjects underwent permanent pacemaker placement for severe bradycardia: one for a prolonged pause, and the other 3 individuals for advanced AV block captured during the monitoring period. Therefore, in 7/57 subjects (12%), a significant, otherwise unanticipated dysrhythmia of clinical importance was detected during the two week monitoring period

Statistical analysis

Clinical data are reported as means and standard deviations for continuous variables and as frequencies for categorical variables. Correlations between QoL measures and severity of symptoms were determined using Spearman's rank correlation. Multivariable logistic regression was used to determine the relationship between the primary QoL assessment of general health, dichotomized as fair/poor and good/very good/excellent, and clinical variables and symptom severity. For this analysis, symptom severity was dichotomized as 0-1 (none or very little) vs. 2- 5 corresponding to greater severity of symptoms. The overall severity of the last irregular heart rhythm was dichotomized as 4 or > 4, corresponding to the 75th percentile of the distribution for this variable. All variables that were significantly correlated with general health were considered as candidates with variable selection being performed using a stepwise procedure with a p-value of 0.05 as inclusion criterion. The

significance of changes over time in QoL measures was assessed by paired t-test. A p-value of 0.05 was used for significance in all analyses.

Results

Sixty-three ambulatory patients with chronic stable systolic HF (class II to III) from a primarily minority, Medicare population seen in an urban cardiac clinic of New York City were enrolled and followed in the study from 2005-2009 (Figure 1). Fifty-seven of these (90%) completed the baseline QoL determination and are the subject of this report. Incomplete questionnaires that lacked responses to general health questions were received from 5 of the enrolled patients who were excluded from the study. Forty-eight of the 57 patients who completed the baseline questionnaire (84%) had recorded symptoms documented by the LifeStar AF Express® and were transmitted to LifeWatch, Inc. Overall QoL and symptoms were assessed prior to wearing the cardiac event monitor for a period of two weeks. Forty-two out of the 57 patients (74%) completed their 6-month follow-up where QoL was again measured. The 15 patients who did not complete their 6-month follow up were unable to be reached via telephone, or were noted as being out of the country (Dominican Republic) and had not returned to the clinic for their previously scheduled 6-month follow up visit. The demographic and clinical characteristics and baseline QoL scores between those who completed and did not complete their 6-month outpatient cardiac care visit with their primary provider were not significantly different, nor were their cardiac event rates on long term follow up. The characteristics of the patient population are presented in Table 1. Cardiac monitoring data revealed 75% experienced ectopic activity, and 31% were symptomatic including 10% with palpitations and 8% with dizziness. There was no significant difference between the self-reported symptoms at baseline and the 6-month follow-up visit.

Self-Reported Symptoms on the AFSS

From the AFSS questionnaire, 23% of patients reported having visited an emergency room and 52% reported seeing their MDs in the 4 weeks prior to the baseline symptom assessments. In addition, during that 4 week period 78% reported fatigue with mild exercise, 74% shortness of breath with exercise, 59% resting fatigue, 52% palpitations, 54% resting shortness of breath, and 45% chest pain/pressure.

4.2. Self-Reported Symptoms on the SF-36v2™—On the baseline SF-36v2™ QoL questionnaire, 1 patient (2%) reported their general health as excellent, 4 (7%) as very good, 23 (40%) as good, 27 (47%) as fair, and 2 (4%) as poor. Baseline assessments of general health were significantly correlated with the severity of fatigue at rest (r=0.37, p= 0.008), exercise intolerance (r=0.48, p = 0.0005), lightheadedness/dizziness (r=0.57, p < 0.0001), palpitations (r=0.37, p = 0.008), and chest pain/pressure (r=0.44, p = 0.001), as represented in Figure 2, but was not related to sustained arrhythmic events recorded during the subsequent cardiac monitoring. The norm-based scores for the SF-36v2™ QoL questionnaire are shown in Table 2. PCS averaged 40.82 while MCS averaged 43.40, values typical for patients with heart disease (Ware et al., 2007). All domains were below the value of 50 expected for the general population as well as for randomly selected individuals of similar age (Peek et al., 2004; Jang et al., 2009). Fatigue at rest and exercise intolerance were significantly correlated with PCS and MCS scores, as represented in Figures 3 and 4, but did not correlate significantly with recorded arrhythmias on cardiac monitoring.

Univariate and multivariable logistic regression analysis was performed to determine which clinical variables and symptoms were independently related to perceptions of general health (Table 3). Variables significantly related to general health in the multivariable analysis

included exercise intolerance (odds ratio = 7.7, 95% CI 1.1-51.9, p = 0.02), lightheadedness/ dizziness (odds ratio = 23.6, 95% CI 2.2-251, p = 0.0002), and severity of the last irregular heart rhythm (odds ratio = 16.4, 95% CI 1.7-156, p = 0.01).

Responses to the SF-36v2™ questionnaire were collected on 42 individuals at the time of their 6 month clinic follow up. No significant changes were observed in any of the individual domains or summary scores, and there were no significant differences between patients who did and did not demonstrate ectopic activity during cardiac monitoring. PCS decreased slightly from 40.7 ±10.0 to 39.3 ± 9.3 while MCS increased slightly from 42.3 ± 14.4 to 43.4 ± 14.2.

Discussion

HF is a chronic and progressive disease, in which lower QoL is associated with worse clinical outcomes, including high rates of hospital readmission and mortality. Our results found the overall QoL of this primarily Latino, elderly urban population living with HF was decreased, as compared with the general population, in all domains except vitality; high scores for pep offset diminished scores for amount of energy, feelings of being worn out, and tiredness in the vitality domain. Perceived general health status was significantly correlated with the severity of fatigue at rest, exercise intolerance, lightheadedness/ dizziness, palpitations, and chest pain/pressure, and did not change in either the physical or mental domain over a 6-month interval, emphasizing the chronic status of these symptoms over time. Patients who perceived their arrhythmic episodes prior to cardiac monitoring to be more severe as well as those with reported symptoms of dizziness and exercise intolerance were more likely to perceive their QoL fair or poor. Limited research exists in the literature in regards to older adults living in the community living with HF (Hayes et al., 1995). However, our findings are similar to M. Gott, et al. who found a decreased QoL in the elderly with HF living in a community setting (Gott et al., 2006). In addition, this research identified those over 60 years with two or more co-morbidities as having the poorest QoL (Gott et al., 2006). Our findings are similar; all subjects in our investigation were over 65 years, with systolic HF and multiple other underlying co-morbidities such as hypertension, diabetes and hyperlipidemia. In addition, these researchers reported that women living with HF in the community had a worse, QoL as compared to men (Friedman and King, 1995; Gott et al., 2006). This is generally consistent with our findings, where 60% of our participants were women living in an urban community, who had both poor physical and mental QoL. While no significant differences between men and women were observed in baseline PCS and MCS scores, male gender was related to better perceptions of general health in the univariate logistic regression analysis. This is consistent with previous research that showed men with a better emotional functioning had a better QoL (Corvera-Tindel et al., 2009).

With regard to frequently reported symptoms such as fatigue and shortness of breath, these have been reported by other investigators as having a significant impact on overall QoL (Evangelista et al., 2008; Heo et al., 2007; Moser et al., 2010). In contrast to these studies, this work focused on the elderly with HF in a non-hospital setting, which is very different from previously completed clinical trials that have excluded this patient population. In clinical practice it has been observed that non-pharmacological interventions improve patients' physical symptoms and their functional capacity, yet in an ambulatory outpatient population living with several chronic disease data is lacking on interventions in urban elderly dwellers. Therefore, the present study suggests that strategies for improving HF patients' physical and mental condition need to be initiated and evaluated in regards to their impact on QoL. Recently completed work by Lewis and Riegel also identified older hypertensive adults living with chronic illnesses as having worse perceived health and

outcomes, which is similar to our findings, as 95% of our subjects also had underlying HTN (Lewis and Riegel, 2010).

The majority of patients served by our outpatient cardiac clinic are immigrants with a high school education or less. Lower educational attainment has been correlated with worse physical and functional conditions (Barbareschi et al., 2011). Since our elderly clinic population is known to be of a low socioeconomic status and this may further account not only the poorer health habits but higher levels of cardiac risk factors seen, in this HF population. Our findings are similar to others showing that fewer resources, lower literacy, lower socioeconomic status, and perceived control were associated with lower HF knowledge, and self care behaviors and a worse QoL (Doering et al., 2010; Macabasco-O'Connell et al., 2008; Macabasco-O'Connell et al., 2011).

This research examined an elderly outpatient urban population living with HF and identified symptoms and their associated impact on QoL. This research adds to the literature by examining HF and the association to perceived self-reported symptoms.

Replication of this study using a larger sample and involving other diverse ambulatory settings where elderly reside will serve to better understand QoL. In addition, more knowledge may be regenerated by using a qualitative approach in identifying factors impacting QoL of elderly HF patients with multiple chronic diseases (diabetes, hypertension, CAD) experiencing symptoms that likely include many origins that can impact on QoL. Examining Latinos and other minorities using measures adapted to their native language will further illuminate specific issues and ensure that information captured is done so in the correct cultural context.

Conclusions

The need for appropriate educational interventions aimed at helping to identify symptoms related to HF vs. an underlying arrhythmia is necessary. Detailed demographic and economic data should be collected and examined in future studies along with depression and anxiety measures since these may also have great influences on an individual's perception of both symptoms and overall QoL. Analyzing QoL in the future is important for identifying the impact of specific symptoms in the elderly living with chronic diseases and developing targeted strategies aimed at minimizing these symptoms. Research focused on the relationship of HTN, HF, medications, diet and physical activity are just some of the areas that require further investigation. Future research exploring the impact of family and community support systems and their role in the early identification and reporting of symptoms and the development of strategies aimed at self management is also critical. Engaging individuals and their families in the process of self monitoring and management of symptoms in conjunction with practitioners may also prove successful in averting hospitalizations by providing earlier interventions. In addition, the role of access to cardiac care, depression, anxiety, and other socio-demographic variables needs to be investigated. Furthermore, studies examining the effect of nursing interventions aimed at improving QoL, reducing symptoms and enhancing physical and mental health of patients living with HF over time are recommended.

Study limitations

This research was conducted in a single outpatient cardiac center, which serves a primarily underserved Latino population. A limitation of this the study is that most of our elderly population resided in NYC for only part of the year and spent the winter months in the Dominican Republic, thus resulting in 26% of our study population being unavailable for their 6 month follow up QoL. In addition, many other factors not examined in this

investigation may have impacted on the poor QoL results, such as limited access to clinical care, depression, anxiety and lower socio-economic status. These factors may limit the generalizability to other HF and cardiovascular populations.

Acknowledgments

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Relevance to clinical practice

This study highlights the need for symptom evaluation in older individuals living with HF and other cardiovascular co-morbidities in the community. Findings of this study indicate that QoL of symptomatic HF patients remains poor over a 6 month period, and interventions are needed to improve QoL and decrease symptom severity. Nurses who care for HF patients play an essential role in symptom evaluation and management and could significantly improve overall QoL in these patients by carefully evaluating symptomatology and testing interventions and educational programs aimed at improving QoL.
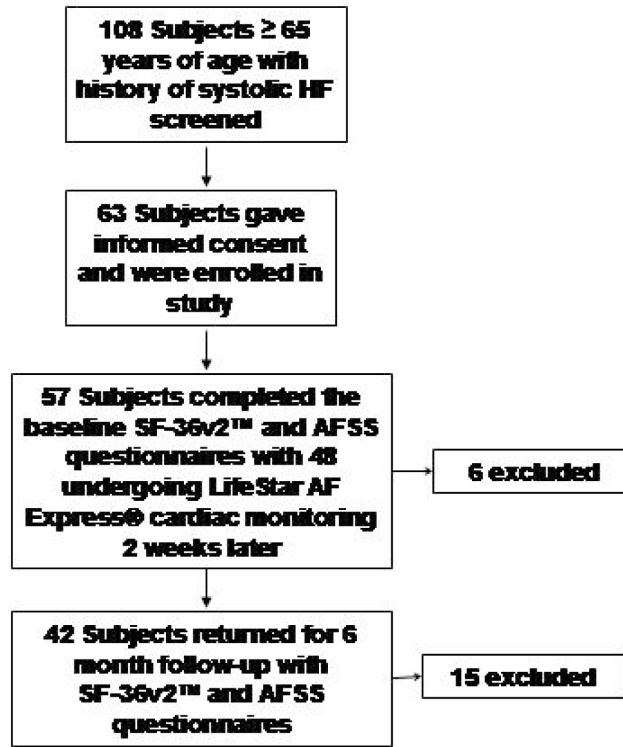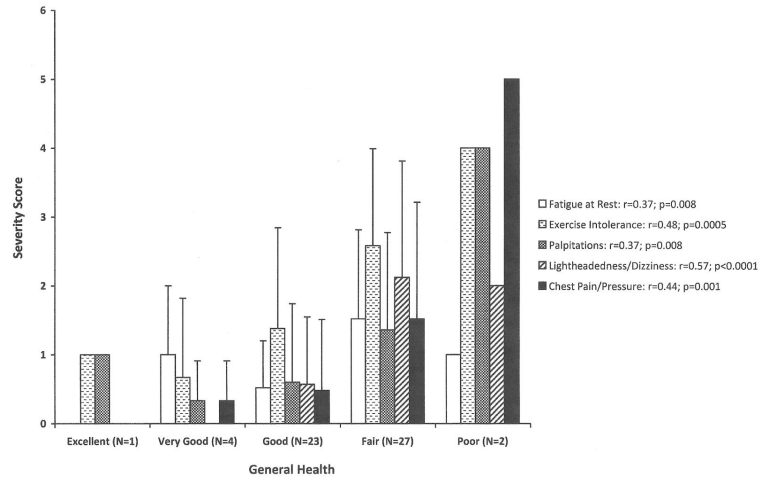
Figure 1.
patient Flow Chart
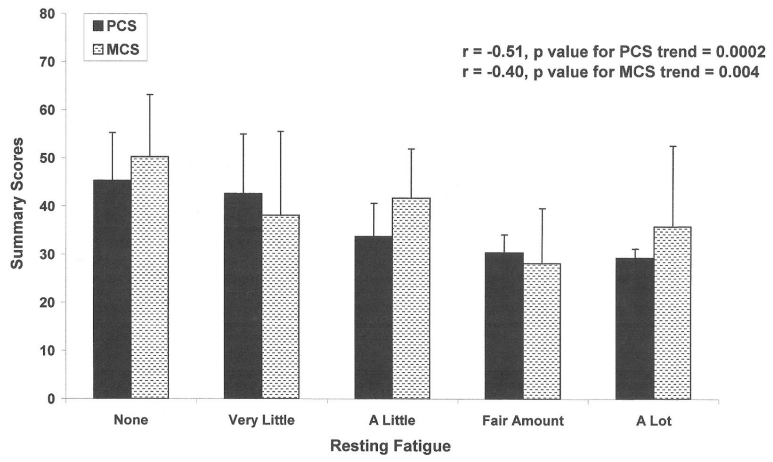
Figure 2.
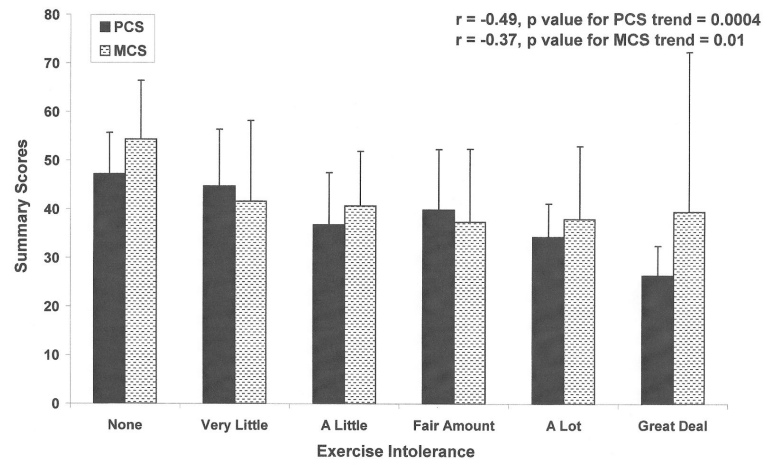Summery of Self-Reported Symptoms

Figure 3.
QoL Summary Measures

Figure 4.
QoL Summary Measures

Table 1

Demographic and Clinical Characteristics of the Study Population

Demographics	
Number of Subjects	57
Age (years ± SD)	73 ± 6
Females	34 (60%)
Race/Ethnicity Hispanic	42 (74%)
African-American	13 (23%)
Caucasian/Other	2 (4%)
Clinical Characteristics	
HF	57 (100%)
HTN	54 (95%)
Hyperlipidemia	35 (65%)
Diabetes	25 (44%)
Former Smokers	18 (32%)
Current Smokers	3 (5%)
BMI (Kg/m^2 ± SD)	34.1 ± 8.6
Mean Systolic Blood Pressure (mmHg ± SD)	138 ± 18
Mean Diastolic Blood Pressure (mmHg ± SD)	77 ± 12

Table 2

Norm-Based Quality of Life Profiles

	N	**Mean**	**Standard Deviation**	**Range**
Component Summary Measures				
Physical Component Summary	55	40.82	10.56	18.95 - 60.25
Mental Component Summary	55	43.40	15.00	16.20 - 69.50
Health Domain Scales				
Physical Function	57	36.82	11.42	14.94 - 57.03
Role Physical	55	39.09	18.07	17.67 - 56.85
Body Pain	56	45.20	12.09	19.86 - 62.12
General Health	57	40.67	9.87	18.61 - 60.08
Vitality	57	49.63	11.58	23.37 - 68.33
Social Function	56	41.66	12.03	13.22 - 56.85
Role Emotional	56	37.83	21.71	9.23 - 55.88
Mental Health	57	42.71	12.17	16.22 - 64.09

Table 3

Univariate and Multivariable Logistic Regression Results

Variable	Univariate Analyses			Multivariable Analysis		
	Odds Ratio	95% Confidence Limits	P Value	Odds Ratio	95% Confidence Limits	P Value
Age, per year	1.01	0.93, 1.10	0.83			
Male Gender	0.33	0.33, 0.99	0.048			
Diabetes	1.93	0.67, 5.58	0.23			
Hypercholesterolemia	4.60	1.36, 15.55	0.014			
History of Smoking	0.32	0.10, 0.98	0.047			
Severity of Last Irregular Heart Rhythm	6.87	1.32, 35.80	0.022	16.38	1.72,155.96	0.011
Palpitations	4.38	1.03, 18.56	0.046			
SOB at rest	3.69	1.05, 12.96	0.041			
SOB with physical activity	2.67	0.85, 8.37	0.09			
Exercise Intolerance	5.63	1.65, 19.23	0.006	7.71	1.15, 51.87	0.023
Fatigue at Rest	6.29	1.50, 26.31	0.012			
Lightheadedness/Dizziness	13.42	2.61, 69.01	0.002	23.62	2.22, 250.98	0.0002
Chest Pain	4.58	1.08, 19.38	0.039			

SOB=Shortness of Breath