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Correlation of Health Related Quality of Life and Health Literacy Levels in Patients with Heart Failure

Deana J. Batross
Otterbein University, deana59@gmail.com

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QUALITY OF LIFE, HEART FAILURE AND LITERACY

Correlation of Health Related Quality of Life and Health Literacy Levels in Patients with Heart

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Deana Batross, MSN, CNP

The Graduate School

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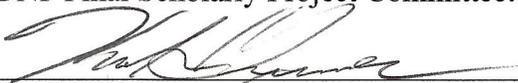
_____   4/4/2016
Dr. Kirk Hummer, DNP, MBA, RN, CNP (Adviser)   Date

_____   4/4/2016
Dr. Brian Garrett, CRNA, DNP   Date

_____   4/4/2016
Nihad AlAssaad, MD   Date

QUALITY OF LIFE, HEART FAILURE AND LITERACY

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Executive Summary

Heart Failure (HF) is a leading cause of morbidity and mortality in the United States with over 5.1 million documented cases (Go, et al., 2013). Patients diagnosed with HF are required to learn a multitude of self-care behaviors to prevent exacerbations, worsening symptoms, and progression of their disease. Further investigation of the relationship between low health literacy levels and health related quality of life (HRQoL) in the patient with HF may help to develop a better understanding of the health education needs of this growing population.

An evaluation of the effects of health literacy scores on the measured HRQoL of the heart failure patient was evaluated. The health literacy level was measured utilizing the Rapid Estimation of Adult Literacy in Medicine – Revised (REALM-R). The health related quality of life was measured utilizing the Minnesota Living with Heart Failure questionnaire, (MLwHF).

The results of the study revealed that out of 46 participants, 45.7% were found to be at risk for low health literacy levels. A regression analysis of the MLwHF score and REALM-R revealed no relationship with a p-value of 0.868 and a r-Sq=0.1%. An evaluation of the measured comorbidities revealed a possible negative correlation with quality of life in this small pilot study that may warrant further investigation.

The article concludes with factors to consider when caring for heart failure patients with low health literacy level and the impact on the HRQoL they experience. This information may be applicable to many individuals with low health literacy levels and other disease processes encountered in the health care environment.

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Introduction

Self-care is defined by Dorothea Orem as "a human regulatory function", an "action deliberately performed by persons to regulate their own functioning and development" (1995, p. 106). Orem states that self-care "includes seeking and participating in medical care prescribed by physicians in the event of deviations or departures from health, and periodic scientific evaluations of health status" (p. 107). To perform self-care behaviors, an individual must be able to recognize symptoms of deviations from their normal health pattern and then know how to act upon them to maintain his or her health. For patients with a diagnosis of heart failure, monitoring signs and symptoms and understanding how to act upon them may mean the difference in not only life or death, but may also have an effect on the quality of life they experience. In this study of participants in an outpatient heart failure program, patients are provided with an appointment within three days following discharge from the inpatient setting with a diagnosis of heart failure (HF). They are then evaluated clinically and supplied with educational material regarding their disease process in a written and oral format.

Background

HF is defined by the Heart Failure Society of America's (HFSA) 2010 guidelines as "a syndrome caused by cardiac dysfunction generally resulting from myocardial muscle dysfunction or loss and characterized by either left ventricular dilation or hypertrophy or both" (p. 480). The HFSA 2010 guidelines recommends that patients and their families be educated on self-care behaviors. The HFSA recommends that the goals of education should be to "help patients, their families, and caregivers to acquire the knowledge, skills, strategies, problem solving abilities, and motivation necessary for adherence to the treatment plan and effective self-care" (2010, p. e98).

The Institute of Medicine defines health literacy as "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions" (Ratzan & Parker, 2000). In 2003, The National Assessment of Adult Literacy (NAAL) measured health literacy by surveying 19,000 people and found that only 12 percent were considered proficient (Kutner, et al, 2006). According to the Institute of Medicine "health literacy is more than reading, but includes writing, numeracy, listening, speaking, and conceptual knowledge" (2004, p xi). Without adequate health literacy levels, the patient diagnosed with heart failure may have significant difficulty following instructions or performing self-care behaviors and can result in progression of their disease or increased mortality.

Quality of life is defined by the World Health Organization as an "individuals' perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns" (1997, p. 1). Health-related quality of life (HRQoL) was defined by Torrance in 1987 as "only those factors that are part of an individuals' health" (p. 594). Torrance reported that only "physical functioning" and "emotional functioning" make up HRQoL and describes it as a "subset" of the more general term of quality of life.

The cardinal symptoms of heart failure are dyspnea and fatigue. Other symptoms of HF include edema, orthopnea, paroxysmal nocturnal dyspnea, cough, confusion and loss of appetite, (AAHFN, 2006). The symptoms of HF may have a deleterious effect on the HRQoL experienced by the patient, impacting his or her physical and emotional well-being.

Significance to Nursing

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Nurses are experts at assessing and educating patients on self-care behaviors, but they must first recognize the importance of teaching patients according to their individual learning needs and abilities. In a study on health literacy among nursing professionals, O'Connell et al, (2011) found that nurses' knowledge of and understanding of health literacy was limited. An understanding of how low health literacy levels impact the HRQoL may help to guide nurses in their assessment and education of the HF patient.

A systematic review of the literature performed by Wu, et.al (2008), looked at medication adherence in patients who have heart failure. They found that patients were non-adherent to treatment recommendations for a wide variety of reasons, including modifiable and non-modifiable factors. Studies performed by Kollipara, et.al (2008), O'Connell, et.al (2011), and DeWalt, et.al (2012), looked at literacy levels and heart failure. Kollipara, et.al (2008) performed a comparison study looking at readmission rates in participants with low sodium levels and found that low health literacy led to adverse outcomes in heart failure patients. DeWalt, et.al (2012) used single session versus multiple session education using literacy level appropriate material and telephone counseling, measuring hospitalization and death primarily, and heart failure related admissions and quality of life secondarily. They found no change in clinical outcomes but patients with low literacy levels benefited more in quality of life measures from multisession interventions.

In a study of functional health literacy in adults on heart failure knowledge and self-care behaviors, O'Connell, et al., (2011) looked at 605 participants from four separate institutions reviewing the relationship between literacy and the heart failure related quality of life. They found that low literacy was associated with lower heart failure quality of life scores but found that differences in knowledge did not explain the lower quality of life scores.

Dennison, et al., (2011) evaluated the effect of low literacy levels on self-care of heart failure and readmissions. They utilized a convenience sample of 59 participants and found that 42% had inadequate health literacy but that self-care and 30 day readmissions did not differ by literacy levels. Chen, et al., (2013) looked at the relationship of health literacy and HF knowledge, self-efficacy and self-care adherence and found that adequate health literacy was associated with greater HF knowledge but not self-adherence or efficacy over time.

The Nursing Committee of the Heart Failure Society of America working group developed a consensus statement after reviewing the literature on heart failure and health literacy. Their conclusion was a "call to action" to "recognize patients with low literacy and provide them additional support to enhance self-care and optimize therapy" (Evangalista, et. al., 2009). Further research is required to elucidate the most effective format to deliver self-care education that is individualized and literacy appropriate which may result in an improvement in the quality of life of those suffering from heart failure.

Problem Statement

Successful self-care management may be difficult for the patient with HF and inadequate literacy skills. Further evaluation of the effects of low health literacy levels and HRQoL in the heart failure population is needed. An understanding of the link between heart failure and inadequate literacy levels and their effect on HRQoL may help to guide nurses in the promotion and education of self-care behaviors in the future.

Project Purpose

The overall goal of the project is to examine the relationship between the perceived HRQoL and measured health literacy level of the patient with heart failure in the outpatient setting. A secondary objective will be to compare the quality of life scores experienced by

patients with a diagnosis of heart failure and inadequate health literacy with those patients with

heart failure and adequate healthcare literacy. This may help to further define the role that

healthcare literacy plays on the HRQoL experienced by the heart failure population. An

examination of significant comorbidities including chronic obstructive pulmonary disease,

diabetes mellitus, ischemic heart disease, and peripheral vascular disease and their impact on

HRQoL was also evaluated. The impact on HRQoL of arrhythmias was also evaluated including

an atrial or ventricular focus and the presence of an internal cardiac device, including permanent

pacemakers or automatic internal cardiac defibrillators.

Theoretical Framework

Riegel and Dickson (2008) developed the Self-Care of Heart Failure (SCHF) model and

describe two key concepts, self-care maintenance and self-care management, consisting of five

stages. Stage one includes symptom monitoring and treatment adherence. Stage two includes

symptom recognition, stage three requires an evaluation of the symptoms experienced, and stage

four involves implementing a treatment. Stage five requires the patient to evaluate the treatment

that was implemented. Underlying the conceptual model of SCHF is self-confidence. They

proposed that self-care is "influenced by knowledge, experience, skill, and compatibility with

values", and that "symptom recognition is the key to successful self-care management", and that

"confidence mediates and/or moderates the influence of self-care outcomes" (Riegel and

Dickson, 2008, p. 193).

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Project Implementation and Measures

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Method

A quantitative, non-experimental descriptive correlational design was implemented. A

retrospective chart review was performed of approximately 46 patients utilizing a convenience

sample of attendees of an outpatient heart failure program. The project utilized the results of a

HRQoL questionnaire and literacy evaluation previously completed upon the patient's first visit

to the heart failure program. A comparison was made of the HRQoL and health literacy level in

each participant.

Instruments

The MLwHF (appendix b), was utilized to assess the quality of life experienced by the

HF patient, and the REALM-R was utilized to assess literacy levels. The MLwHF questionnaire

is a 21 item, 6 point Likert scale, which assesses physical, emotional, and overall health ranging

from 0-5, reporting 0 as "no impairment" and 5 as "very much impairment". According to

Rector, 2005, the MLwHF questionnaire addresses the quality of life of the HF patient in regards

to symptoms, functionality, and psychological assessments. Rector, Kubo, and Cohn performed

several validity tests on the MLwHF questionnaire in relationship to various heart failure

medications and found it to be a "valid indicator of the therapeutic benefit of medications for

heart failure" (1993, p. 1107). Munyombwe, et al., performed an evaluation of the MLwHF

questionnaire and confirmed the ordinal scales to be valid "supporting the use of sum scores to

assess quality of life in people diagnosed with HF", (2013, p. 1753). Garin, et al., examined the

reliability and validity of the MLwHF questionnaire and report that the "reliability coefficient

reached 0.9 for almost all physical scores" and "all mean scores showed the ability to

differentiate among functional capacity groups" (2013, p. 2675).

The REALM-R, (appendix a), is a brief word recognition test that can be given to

patients in any clinical setting. Dumenci, et al., describes the REALM as consisting "of 125

medical terms taken from medical education material and participants were asked to read the

words in order of increasing difficulty" (p. 135). The REALM was divided into five reading

levels and it was assumed that patients with less than 9th grade educational levels would have difficulty reading medical information. A Revision of the REALM, the REALM-R was developed by Bass, Wilson, and Griffith (2003) and involved eight items to be executed in less than two minutes, making it ideal for a busy practice. The authors describe the REALM-R as "a rapid-screening instrument to assess how well primary care patients read words that they commonly experience and are expected to understand" (p. 1036). Original reliability studies by Bass, Wilson, and Griffith (2003) revealed a Cronbach's alpha of 0.91. The correlation between the REALM-R and the REALM was 0.72. In a systematic review of literacy and numeracy instruments by Al Sayah, Williams, and Johnson, (2012) they reveal the REALM-R Cronbach's alpha to be .91 and the validity to be 72 with the REALM.

Data Collection

Data was collected retrospectively and extracted from charts of patients who participated in an outpatient heart failure clinic over the previous three years. This population underwent an evaluation with the REALM-R and MLwHF questionnaire during their initial evaluation. Data was collected by performing a chart review for all New York Heart Association functional classification of heart failure (NYHA) class II and III. These scores were collected and maintained in a database utilizing an excel spread sheet. Descriptive data collected included age, and gender. The etiology of their HF was documented and included systolic or diastolic dysfunction, and ischemic or dilated heart failure. Data on comorbidities was collected and included chronic obstructive pulmonary disease, ischemic heart disease, peripheral vascular disease, and diabetes mellitus. The presence of arrhythmias including atrial or ventricular in origin was documented. The presence of any cardiac device such as permanent pacemakers or

internal cardiac defibrillators was also noted since their presence may have an effect on the quality of life experienced by this population.

Tools for Data Analysis

Nominal data such as age and sex was analyzed using frequencies, percentages and medians calculations. The comorbidity data was evaluated calculated evaluated utilizing a Two Sample T Test and regression analysis to evaluate their impact on HRQoL scores. The REALM-R and MLwHF questionnaire data was gathered using parametric statistics and a regression analysis was utilized to evaluate the existence of a relationship between the level of literacy and the quality of life scores obtained.

Target Population and Sample

Patients included in the project were at least 18 years of age, male and female, that had a diagnosis of heart failure from any cause. The sample size was limited to 300 participants. Exclusion criteria included any person with severe mental or physical impairment that would prohibit him or her from performing self-care activities. Participants residing in long-term care facilities were also excluded due to the restrictions that they may experience in performing self-care behaviors

Each patient was assigned a classification according to the New York Heart Association Functional Class which was documented at their initial visit. According to the American College of Cardiology and the American Heart Association Guidelines (2009), the NYHA functional classification for heart failure assigns a class based on the patient's symptoms with 1 being asymptomatic on exertion to stage IV with symptoms at rest. Stage 1 heart failure patients were excluded from the study due to the lack of symptomatology. Stage IV heart failure patients were

excluded due to the severity of their symptoms at rest which may not be impacted by literacy level or self-care behaviors.

Budget

Data was collected over a 12-week time period by the principal investigator. Data analysis was then completed with the assistance of a statistician. Budgetary requirements included the investigators time of approximately 8 hours weekly and the use of a lap top computer with Microsoft office and excel spreadsheet capabilities. The budget considerations for the statistician was minimal as the statistician donated his personal time to this project.

Timeline

The projected timeline was approximately 6 months. Approval was obtained from the Institutional Review Board at Otterbein University in August of 2015 and Genesis Healthcare System in September of 2015. Formal presentation and dissemination of the study findings occurred in March and April of 2016.

Limitations and Barriers

The current data is available utilizing the existing data the principal investigator had utilized over the past 3 years, however, over the past year the data transformed from paper charts to a computerized format. The ability to obtain the data from non-computerized charts resulted in a delay in data collection. Data collection consisted of a chart review in paper format or by searching for information that was scanned manually into the computer system by an offsite medical records department.

The MLwHF questionnaire is considered to be a self-administered exam but becomes difficult for the patient with low literacy levels. For the data extracted from the patient charts,

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this exam was administered by the nursing personnel and may be subject to bias due to administrator interpretation of the patient's results.

Protection of Human Subjects

An application to the Institutional Review Boards (IRB) at Otterbein University and Genesis Healthcare System was submitted and was granted an expedited review at each institution. Each subjects medical record number was converted to a separate patient identifier to eliminate the possibility of identification. The original records were kept in a locked office at all times and under the direct care of the principal investigator.

Outcomes Analysis Plan

Statistical Analysis

Descriptive statistics of the participant's sociodemographic characteristics, comorbidities, health literacy and HRQoL scores were calculated. Regression analysis was utilized to evaluate the MLwHF score versus REALM-R score and MLwHF score versus the NYHA functional class. A two sample T-Test was also utilized to evaluate the MLwHF and NYHA functional class and ACCF/AHA stage of heart failure. The two sample T-Test was utilized to evaluate the MLwHF score with the REALM-R score and each co-morbidity evaluated.

Results

A total of 46 eligible HF patients were evaluated. Sociodemographic evaluations reveal a mean age of 66.85 with 67% of participants being male (n-31) and 33% were female (n-15). In this sample, 52% of participants had heart failure that was ischemic in origin (n-24), while 33% had a diagnosis of dilated HF (n-13), and only 13% were considered to have diastolic dysfunction (n-6). Of the participants 28% (n-13), had a comorbidity of chronic obstructive pulmonary disease (COPD), while 50% (n-23) of participants had a diagnosis of continuing

ischemic disease and were treated with vasodilation including oral nitrates. This may signify ongoing limitation and disability in function due to the presence of angina. Only 0.7% (n-3) had a diagnosis of peripheral vascular disease and 35% (n-16) were being treated for diabetes mellitus. Of the participants 72% (n-33) had a diagnosis of atrial fibrillation and 28% (n-13) had documentation of ventricular arrhythmias. The prevalence of the participants who had previously undergone implantation of either a permanent pacemaker or automatic internal cardiac defibrillator (AICD) was 72% (n-33).

The MLwHF scores did correlate positively with the NYHA functional class revealing p-value of 0.019, both being indicators of worsening symptoms experienced by the patient. A positive correlation may be considered true for the ACCF/AHA stage of heart failure, revealing worsening ventricular dysfunction correlating with worsening HRQoL scores, stage C participants scored a mean on the MLwHF score of 33.9 (n-42). Stage D scored a mean of 49.0 (n-4) revealing a p-value of 0.294, although the relationship was not as strong as was seen for the NYHA functional class it may be significant in this pilot study.

Below are tabular descriptive statistics based on the sample data. This summarizes the results for the 46 participants. For the data below the columns are as follows:

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Table 1

Description of sample data

| Variable	N	N*	Mean	Minimum	Q1	Median	Q3	Maximum
NYHA Class	46	0	2.5000	2.0000	2.0000	2.50000	3.0000	3.0000
ACCF/AHA Stage	46	0	1.0870	1.0000	1.0000	1.00000	1.00001	2.0000
MLwHF Score	46	0	35.17	0.00	11.00	31.50	58.50	82.00
REALM-R Score	46	0	5.261	0.00	1.750	7.000	8.000	8.000
Age	46	0	66.85	42.00	59.00	67.50	77.00	86.00

Variable: name of the variable, N: number of patients with complete data for the given variable, N*: number of patients with missing data
Mean: sample mean, Minimum: smallest value, Q1: First quartile (or 25th percentile), Median: 50th percentiles, Q3: Third quartile (or 75th percentile), Maximum: largest value

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Of the participants, 45.7% (n = 21) were found to be "at risk" for low health literacy with scores on the REALM-R of 6 or below. The mean score on the REALM-R was 7 and the average score was 5.4, (see Figure 1).

Figure 1. Pie Chart of REALM-R Score

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Pie Chart of REALM-R score
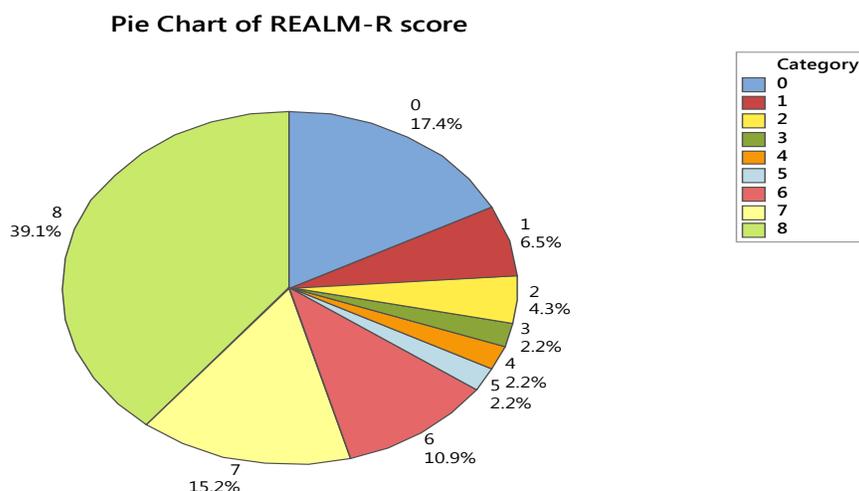
A regression analysis of the MLwHF score versus the REALM-R score revealed no relationship between the HRQoL score and the REALM-R with a r-Sq = 0.1% and p-value of 0.868. The regression analysis is testing the null hypothesis Ho: slope = 0 versus the alternative hypothesis Ha: slope ≠ 0. A slope of 0 implies no linear relationship between the two variables. If it is possible to reject Ho, then we have a statistically significant regression implying knowledge of one variable aids in the prediction of the other. If the p-value is less than 0.05, then we have a statistically significant regression relationship at the 95% confidence level. See Figure 2.

Figure 2. Regression plot of MLwHF versus REALM-R Score

Fitted Line Plot
MLwHF score = 34.17 + 0.190 REALM-R score

S	24.5282
R-Sq	0.1%
R-Sq(adj)	0.0%
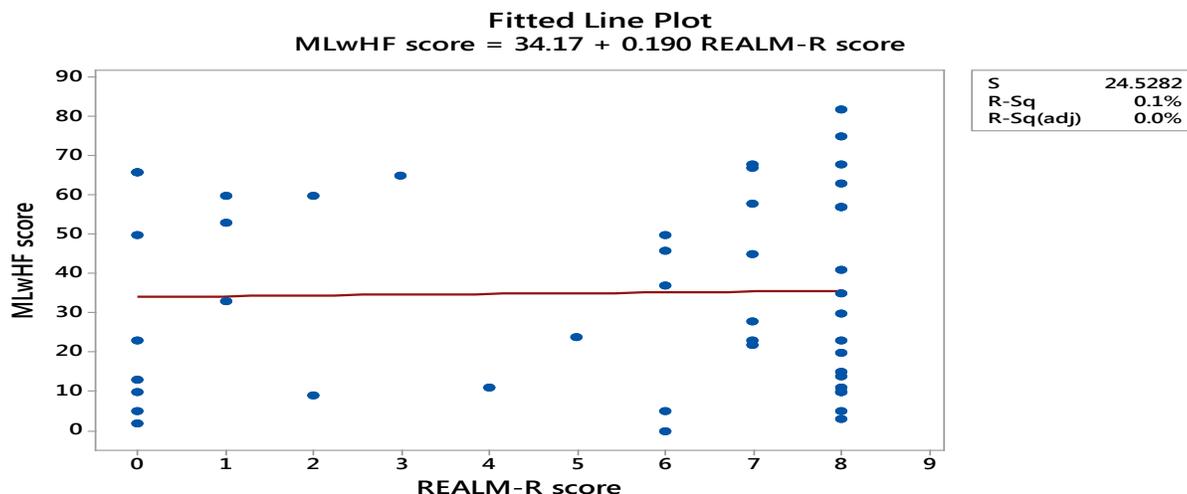
A regression analysis of the MLwHF score and age showed poor correlation with a *p*-value of 0.750. Therefore, there is not a statistically significant linear relationship between these two variables. See Figure 3.

Figure 3. Regression plot of MLwHF versus Age.

Fitted Line Plot
MLwHF score = 28.40 + 0.1014 Age

S	24.5072
R-Sq	0.2%
R-Sq(adj)	0.0%
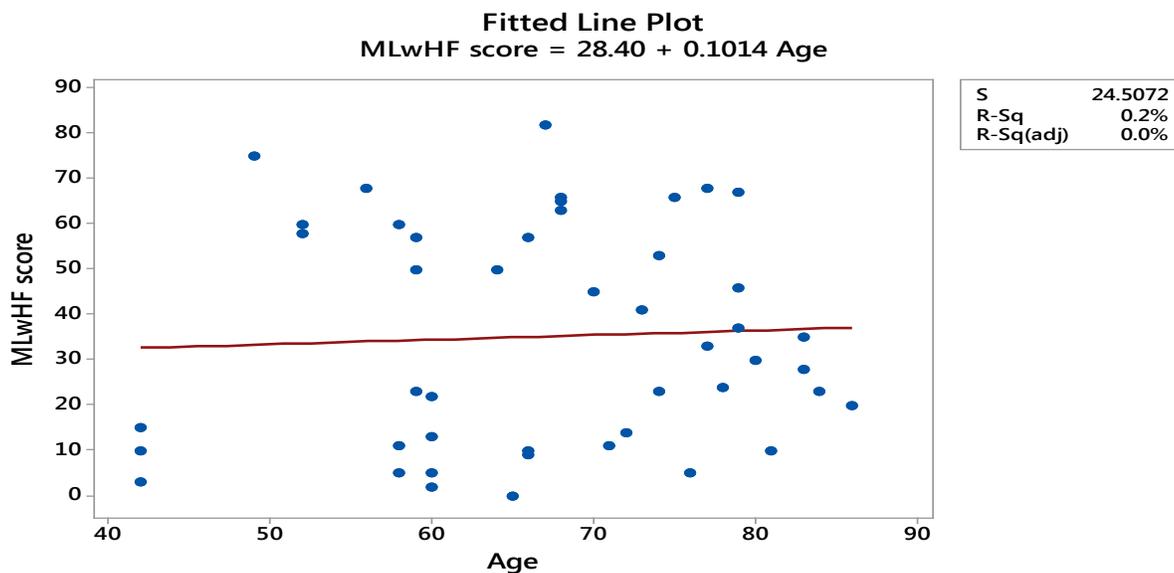
A Two Sample T Test compared the MLwHF score means for gender showing no significant difference with a p-value of 0.722. Utilizing a Two Sample T-Test to evaluate quality of life (MLwHF) and co-morbidities, poor quality of life was compared in patients with COPD

(n=13) with a p-value of 0.103, ischemic heart disease (n=23) with a *p*-value of 0.121 and

diabetes mellitus (n=16) with a p-value of 0.103. Peripheral vascular disease (n=3) revealed a *p*-value of 0.796 and the presence of a cardiac device (n-33) revealed a p-value of 0.658 revealing

less impact on quality of life scores. Treating this study as a pilot study with a relatively small

sample it is common to use a lower confidence level such as 80%. In such a case any p-value ≤

0.20 is statistically significant. Therefore, COPD, ischemic heart disease, and diabetes mellitus

are statistically significant with respect to MLwHF.

An evaluation of MLwHF score with respect to arrhythmias was performed using a two-sample t-test with a resulting p-value of 0.226. The associated sample means below tend to

indicate that Atrial arrhythmias experience a worse quality of life than do Ventricular

arrhythmias. While not quite significant at the 80% confidence this result is statistically

significant at the lower 75% confidence level.

No difference was noted of gender and health literacy level with a Two Sample T-Test

revealing p-value of 0.779. A regression analysis of the REALM-R score versus age resulted in a

p-value of 0.594 revealing that based on this small sample size, the analysis was unable to

demonstrate that older age signified an increased risk of poor literacy levels.

Conclusion

Based on the study results, no significant correlation exists between the HRQoL and

health literacy scores utilizing the MLwHF questionnaire and the REALM-R. While health-care

illiteracy levels were significantly elevated, with 47% of participants found to be "at risk" or

below adequacy for health-literacy, no relationship was found in the quality of life scores

measured. While the MLwHF questionnaire is considered to be a self-administered exam for

heart failure patients and this may be problematic for the participants who scored "below

adequate" on the REALM-R. All participants in the study were given the MLwHF exam

verbally by the clinic personnel, which consisted of the possibility of three separate

administrators. Study bias may have been introduced with scores relying on the different

techniques of each administrator. Future studies should take administration techniques into

consideration.

Co-morbidities including COPD, ischemic heart disease, and diabetes mellitus did appear

to have an impact on the HRQoL scores obtained, underlining the importance of consideration of

these disorders on the quality of life of the heart failure patient. The presence of cardiac devices

which included permanent pacemakers and automatic internal cardiac defibrillators did not

appear to impact quality of life scores. A consideration of the type of cardiac devices may elicit

more insight into the impact on quality of life, including the presence of newer cardiac

resynchronization therapy devices which help to improve systolic heart failure by restoring the

timing of the cardiac cycle.

An evaluation of the patient with electrophysiological disturbances revealed patients with

atrial arrhythmias scored higher on the MLwHF questionnaire with a mean score of 37.9, (SD

25.1) than patients with ventricular arrhythmias who scored a mean of 28.9, (SD 21.9). This may

indicate the possibility of a higher degree of impact that atrial arrhythmias may have on the

quality of life and physical functioning of the heart failure patient.

Recommendations

Further studies are needed to evaluate the effect of health literacy levels on the quality of

life of the patient with a diagnosis of heart failure. While there was not found to be a significant

correlation between the HRQoL and the health literacy level in the heart failure patient in this

small sample, quality of life remains a subjective and personal evaluation of each patient and may benefit from further evaluation with a larger sample size.

In a systematic literature review from 2000 to 2010 by Baranson, et.al (2011), looking at interventions promoting self-care behaviors in heart failure patients. The review examined studies that used non-pharmacological interventions to improve self-care, using control and treatment groups for self-care education and measurements of self-care. They concluded that patients receiving cognitive behavioral interventions including counseling and peer support resulted in improved self-care behaviors. They also noted that intervention groups "had significantly improved health related quality of life". Individual counseling may be superior to the provision of written material in educating the heart failure patient regarding self-care behaviors.

Further study into the possible adaptation techniques patients with low health literacy levels utilize may be helpful. The presence of adequate social support may have an impact on the self-confidence required to perform self-care strategies, even though he or she may score low on health literacy examinations. Exploration of whether the patient has assistance in the home setting with reading and following written instructions should be undertaken. Consideration the impact of family, marital status, or significant others who may assist with health care instructions may elucidate the impact they may have on the HRQoL and the health literacy level for the heart failure patient.

Other factors to consider in the evaluation of HRQoL in the heart failure patient includes the educational level, race, and socioeconomic status of the patient. An evaluation of the level of education of the heart failure patient may help to provide further insight into health-literacy and HRQoL measures, although Riegel, et al., (2009) warns that the level of education may not

correlate with literacy and that "one can be literate without possessing health literacy", (p. 1150). While this study took place in a small rural community with predominately Caucasian, English speaking participants, it may be useful to document ethnicity and socioeconomic status for further evaluation of their impact on health-literacy levels and quality of life.

Depression can have a significant impact on quality of life of the heart failure patient. The presence of depression should be taken into consideration when evaluating the impact of low health literacy on HRQoL. In a study by Savoy and Penckofer, (2015) they evaluated depressive symptoms impact on health promoting life style behaviors on quality of life in health women. They report that "depressive symptoms contribute significantly to health-promoting life style behaviors and recommend early detection and treatment to improve quality of life (p. 360).

Conclusion

Studies have shown that "heart failure is characterized by worse HRQoL and functional status and also by poor prognosis, including frequent hospitalizations and high mortality" (Wu, et al., 2015, p. 6). McNaughten, et. al. (2015) performed a cohort study of patients hospitalized with heart failure and health literacy and found that lower health literacy was associated with an increased risk of death after hospitalization for acute heart failure. While the HRQoL is subjective, it is important for patients to perform difficult self-care behaviors to prevent worsening symptoms and mortality.

The role of health literacy on HRQoL was insignificant in this small sample size but the effect of low health literacy level on mortality has been proven. Peterson, et al., (2011) measured the effects of low literacy among heart failure patients which they described as "a condition that requires self-management and frequent interactions with the healthcare system". They concluded that low literacy was significantly associated with all-cause mortality.

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       Health care providers need to be aware of the varying level of health literacy of all patients to improve the performance of self-care behaviors. It is recommended by the U. S. Department of Health and Human Services to use a "universal precautions approach" and to "assume that most patients will have difficulty understanding health information", (2010, p. 11). Alternative techniques for education HF patients should be utilized. The Agency for Healthcare Research and Quality recommend the use of "universal precautions" when interacting with all patients. This includes "taking specific actions that minimize risk for everyone when it is unclear which patients may be affected", (Dewalt, et al, 2010). They recommend improving spoken and written communication and improving self-management and empowerment with improved support systems and have developed an "Universal Tool Kit" for providers to implement in their practice. The Universal Tool Kit makes available to everyone a multitude of tools that can be used in a variety of healthcare settings to teach self-care behaviors to all patients.

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QUALITY OF LIFE, HEART FAILURE AND LITERACY

Appendix A

REALM-R Examiner Record

Reading Level _____

Patient Name/
Subject # _____ Date of Birth _____

Grade Completed _____

Date _____ Clinic _____ Examiner _____

fat		fatigue	_____
flu		directed	_____
pill		colitis	_____
allergic	_____	constipation	_____
jaundice	_____	osteoporosis	_____
		anemia	_____

Fat, Flu, and Pill are not scored. We have previously used a score of 6 or less to identify patients at risk for poor literacy.

Appendix B

MINNESOTA LIVING WITH HEART FAILURE® QUESTIONNAIRE

The following questions ask how much your heart failure (heart condition) affected your life during the past month (4 weeks). After each question, circle the 0, 1, 2, 3, 4 or 5 to show how much your life was affected. If a question does not apply to you, circle the 0 after that question.

Did your heart failure prevent you from living as you wanted during the past month (4 weeks) by -	No	Very Little				Very Much
1. causing swelling in your ankles or legs?	0	1	2	3	4	5
2. making you sit or lie down to rest during the day?	0	1	2	3	4	5
3. making your walking about or climbing stairs difficult?	0	1	2	3	4	5
4. making your working around the house or yard difficult?	0	1	2	3	4	5
5. making your going places away from home difficult?	0	1	2	3	4	5
6. making your sleeping well at night difficult?	0	1	2	3	4	5
7. making your relating to or doing things with your friends or family difficult?	0	1	2	3	4	5
8. making your working to earn a living difficult?	0	1	2	3	4	5
9. making your recreational pastimes, sports or hobbies difficult?	0	1	2	3	4	5
10. making your sexual activities difficult?	0	1	2	3	4	5
11. making you eat less of the foods you like?	0	1	2	3	4	5
12. making you short of breath?	0	1	2	3	4	5
13. making you tired, fatigued, or low on energy?	0	1	2	3	4	5
14. making you stay in a hospital?	0	1	2	3	4	5
15. costing you money for medical care?	0	1	2	3	4	5
16. giving you side effects from treatments?	0	1	2	3	4	5
17. making you feel you are a burden to your family or friends?	0	1	2	3	4	5
18. making you feel a loss of self-control in your life?	0	1	2	3	4	5
19. making you worry?	0	1	2	3	4	5
20. making it difficult for you to concentrate or remember things?	0	1	2	3	4	5

21. making you feel depressed?   0   1   2   3   4   5