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The Effects of Congestive Heart Failure on Quality of Life: As Evaluated by the Minnesota Living with Heart Failure Questionnaire

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Abstract

Congestive heart failure (CHF) is a chronic disease that impairs the quality of life (QoL) of patients and is associated with both high hospital readmission rates and healthcare resource utilization such as emergency services. This study proposed use a student led transitional care program in providing home care to NYHA functional class II and III CHF patients. It evaluated the impact of the program on their quality of life as measured by the Minnesota Living with Heart Failure Questionnaire© (MLWHFQ), the percentage of patients requiring readmission to the hospital within 30 days of initial hospitalization, and healthcare utilization. Thirty-six patients completed the MLWHFQ prior to and post enrollment to a 14-week transitional care program. Descriptive statistics were used to characterize the data obtained using the MLWHFQ. A paired samples t-test was used to determine if there was a statistically significant difference between the means of the the pre- and post- MLWHFQ assessments. No statistically significant difference was noted between the total MLWHFQ scores pre- and post-survey t (34) = 1.554, p= .13. Subscale evaluation on the physical and emotional dimensions were also analyzed with not statistical significance. Examination of pre- and post-mean scores however did demonstrate a decrease from pre- to post survey assessments for the total MLWHFQ (pre- M= 45, SE $\pm$4.9; post- M= 39, SE $\pm$4.6) values as well as the physical (pre- M= 19.86, SE $\pm$1.97; M= 17.31, SE $\pm$1.93) and emotional dimensions (pre- M = 7.74, SE $\pm$1.46; post- M =6.63, SE $\pm$ .947) of perceived quality of life. Examination of individual questions reveal that perceptions of participants' quality of life decreased in terms of their ability to perform activities such as household chores, working in the yard, and participating in recreational activities and hobbies. Additionally, they had more difficulty with concentration and memory, feeling out of control which impacted their socialization with family and friends. This led to a higher degree of

perceived social isolation. Of the participants, 9.5% utilized acute care services (emergency department) while 4.7% required readmission to the hospital within 30 days following their initial hospitalization. The lower rates for healthcare utilization may have been in part due to the student led transitional care program monitoring patients on a weekly basis allowing the cardiac advanced nurse practitioner to respond and address clinical changes in a timely manner.

Acknowledgments

Review of Literature

The World Health Organization defines quality of life as the "an individual's 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" (Hoekstra et al., 2013). The concept of quality of life is affected by the complexities of a person's physical health, psychological state, level of independence, social relationship, and personal beliefs along with the relationship they have with their environment. Congestive heart failure (CHF) is a chronic disease that causes impairment in quality of life (QoL) in approximately 5.8 million people in the United States and 1% to 2% of the adult population in other developed countries (Gastelurrutia et al., 2013; Moser et al., 2014). Congestive Heart failure has a significant detrimental effect on the longevity and quality of life of patients. Of note, decreased QoL is associated with a three year mortality in CHF patients.

Congestive heart failure has the highest risk for hospitalization among all medical conditions .Studies have found that 27% of CHF patients are readmitted to the hospital within 30 days post discharge and 50% within the first six months (Bui & Fonarow, 2012; Goodman et al., 2012;Vedel & Khanassov, 2015). A decline in health and increase in symptoms in CHF patients precedes 75% of hospitalizations. More than 90% of CHF patients suffer not only worsening of multiple physical symptoms but also impaired exercise capacity and psychological problems such as depression leading to a decline in social activities (Garin et al., 2013; Heo et al., 2014).

Symptoms can be grouped into the following clusters: physical capacity symptom cluster (dyspnea, difficulty walking or climbing, fatigue/increased need to rest and fatigue/low energy), emotional cognitive symptom cluster (worrying, feeling depressed and cognitive problems), and

edema and trouble sleeping which can fall into either clusters. Researchers and clinicians tend to focus on singular symptoms so that patients have great difficulty recognizing and responding to the multiple symptoms, critical in preventing hospitalization. Awareness of the symptom clusters and knowledge of their severity can contribute immensely to a patient's overall health outcome and reduce re-hospitalization. (Moser et al., 2014). One study found symptoms of edema and dyspnea were commonly seen in patients who delayed seeking medical attention. Patient characteristics included, older males with no prior history of heart failure and who lacked of knowledge in identify CHF symptoms (Darling et al., 2013). Therefore, use of both self and clinical assessment tools designed to identify CHF patient symptoms may aid clinicians in prioritizing treatment for patients with poor QoL in the clinical settings (Gastelurrutia et al., 2013).

The Minnesota Living with Heart Failure Questionnaire$^{©}$ (MLWHFQ) is a widely used tool to assess how heart failure affects the patient's daily life (Garin et al., 2013). The questionnaire was used with permission from the developers at the University of Minnesota. The questionnaire consists of 21 questions with the total score taken as the best measure of how heart failure and treatments impact quality of life. Questions assess the impact of physical symptoms of CHF (shortness of breath, fatigue, swollen ankles and difficulty sleeping). Additionally two subgroups of questions describe two important aspects (physical and emotional) of quality of life. Items ask about the effects of CHF on physical and emotional functioning such as walking and climbing stairs, household work, the need to rest, working to earn a living, going places away from home, doing activities with family or friends, recreational activities, sexual activities, eating enjoyable foods. Additionally mental and emotion functions such as concentration and memory, worry, loss of self-control and being a burden to others are assessed. The tool uses a

Likert scale ranging from zero to five, with zero signifying no limitation and five maximal limitation. Higher scores equate to poorer QoL. There are three scores which are calculated, including a total score, and a score evaluating the physical domain and emotional domain. The questionnaire has been tested for content and construct validity and correlates with other measures according to the degree of conceptual overlap (Bennett et al., 2002). Additionally the reliability for test-retest was demonstrated with an r =0.87 and an internal consistency demonstrating a Chronbach's alpha for all items equal to 0.92 (Rector & Cohn, 1992) The questionnaire administration to the patient takes approximately 10 minutes.

Having a poor QoL affects not only the physical aspect of the patient, but also the CHF patient's emotional state. This can result in depressive symptoms, which can adversely affect patients' self-care. Without proper self-care patients can quickly deteriorate and become fragile regardless of age. Fragility in patients with CHF makes them more vulnerable and at greater risk of physical, functional, cognitive and emotional decline (Bunyamin, Spaderna & Weidner, 2013; Gastelurrutia et al., 2013; Hoekstra et al., 2013; Hwang, Liao & Huang, 2014).

Using a transitional care program, in congruence with the medical care plan, can greatly benefit the QoL in CHF patients. These programs are designed to bridge patients' needs and access to medical services. CHF patients can face a variety of obstacles once discharged, such as complex medicine schedules, follow-up appointments and lifestyle changes which can become overwhelming to the patient due to the new responsibilities. Transitional care programs are there to facilitate learning about disease process, for both the patients and caregivers, to facilitate appointment scheduling and follow up care, and provide financial and emotional health counseling. Bui and Fonarow's research demonstrated that a transitional program which provided a cardiology nurse, dietician, social worker, cardiologist and a study team to provide follow-up

home care visits and telephone contact reduced the patients' hospitalization rate by 44%, as well as improved their QoL scores and reduction in the cost of care (2012). Transitional care programs were also found to reduce the risk of readmissions by 8% and emergency department visits by 29% (Vedel & Khanassov, 2015). A review of 94 studies, between 1985-2001, found the transition from hospital to home was associated with high rates of preventable poor post-discharge outcomes. This time period is crucial for the CHF patient in which knowledge of self-management and symptoms recognition can determine whether the patient will remain home or require readmission to the acute care facility. Factors contributing to negative outcomes include functional deficits, cognitive impairments, emotional problems and poor general health behaviors. Breakdowns in communication between providers and healthcare agencies, inadequate patient and caregiver education, poor continuity of care and limited access to services are also factors that can affect QoL negatively. Therefore, the major focus of these programs has been on early intervention. Studies have found that CHF patients will wait up to an average of 31.9 days after onset of early heart failure symptoms before seeking medical attention (Darling et al., 2013). These factors are costly to the patients' health and financial stability, as well as taxing healthcare resources. Having access to a transitional care program for CHF patients may prolong the patient's stay at home, reduce re-hospitalization and maintain their QoL (Naylor et al., 2004).

Research Questions

The purposes of this study were to describe the effects of class II and III congestive heart failure on quality of life as evaluated by the Minnesota Living with Heart Failure Questionnaire. The following research questions were addressed: (1) Is there a difference between CHF patients' pre- and post- MLWHFQ scores? (2) Is there an association between CHF patients' scores, determined by the MLWHFQ, who participated in the student transitional care project

and the percent of 30-day readmissions to an acute care setting? and; (3) Is there an association between quality of life measures in CHF patients and utilization of emergency department services?

Methodology

This research project was conducted following approval of the University of Arkansas and the study hospital Institutional Review Boards. The subjects consisted of New York Heart Association (NYHA) type II and III CHF patients over the age of 18 years admitted to the transitional care project with the primary diagnosis of CHF. Patient eligibility also included ability to speak English, be alert and oriented, reachable by telephone after hospital discharge, and resided within Washington or Benton counties of Northwest Arkansas. Patients diagnosed with end-stage renal disease, those receiving home health care services, hospice or palliative care or who resided in an extended care facility were excluded from the study. The Minnesota Living with Heart Failure Questionnaire was administered at the beginning and end of the 14 week period the transitional care subjects were followed. All patient data was de-identified according to the guidelines of the Health Insurance Portability and Accountability Act (HIPAA) to protect patient identity.

Statistical Analysis

Evaluation of the MLWHFQ followed the MLHF User Manual guidelines (2004). Descriptive statistics were used to characterize the sample with data obtained using the Minnesota Living with Heart Failure Questionnaire. Values are reported as mean and standard error for data. A dependent paired t-test analysis was used to determine if there was a statistically significant difference between the means of the pre- and post- MLWHFQ

administrations.   The number of readmission, emergency department for the patients was determined. Statistical significance will be established at $p \leq .05$.

Results

According to the guidelines established by the authors of the MLWHFQ, survey the total questionnaire score was evaluated as well as the scores on the physical and emotional domains. The questionnaire item numbers by domain are listed in Appendix A.

A paired samples t-test was used to determine whether there was a statistically significant difference in the mean scores between patients' pre- and post- total MLWHFQ scores. No statistically significant difference was noted between the total MLWHFQ scores pre- and post-survey t (34) = 1.554, p= .13. As noted in Figure 1, although the mean score in the post survey (M= 39, SE $\pm$4.6) did decrease from the mean score seen on the pre-MLHQ (M= 45, SE $\pm$4.9) it did not reach statistical significance.
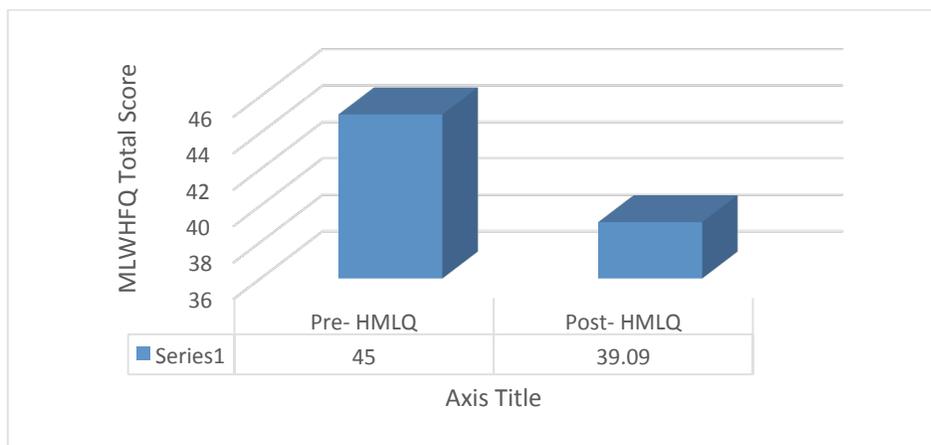

Figure 1. Pre- and Post- MLHQ Scores

Examination of the sub scores for the physical domain revealed a decrease in the mean scores from pre-MLWHFQ (*M*= 19.86, *SE* ±1.97) and post-MLWHFQ (*M*= 17.31, *SE* ±1.93). However a paired samples *t* test did not demonstrate a statistically significant difference between pre- and post-MLWHFQ *t* (34)= 1.55 , *p*= .13. Similarly, examination of the sub scores for the emotional domain revealed a decrease in the mean scores from the pre- MLWHFQ (*M* = 7.74, *SE* ±1.46) to post-MLWHFQ (*M* =6.63, *SE* ± .947) administration. However, a paired samples *t* test did not reach statistical significance *t* (34)= 1.34, *p*= .19 (Figure 2).

	Pre Physical	Post Physical	Pre Emotional	Post Emotional
■ Series1	19.86	17.31	7.74	6.63

MLWHFQ Subset Score
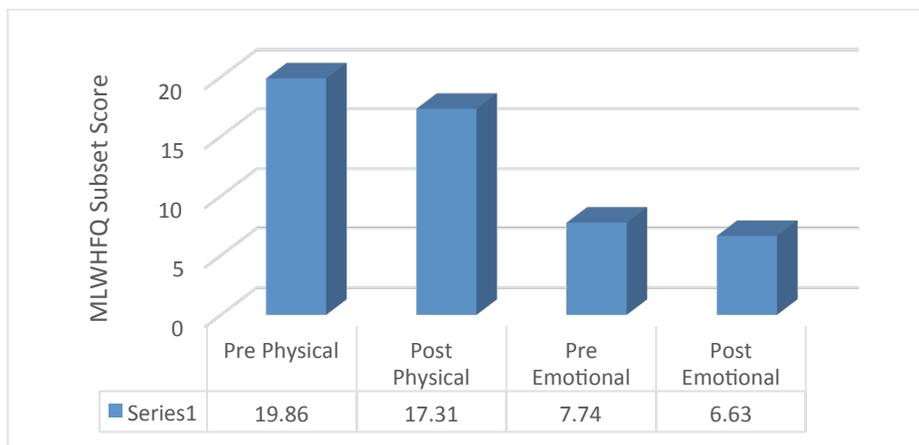
Figure 2. Pre- and Post- MLHQ Scores for the Physical and Emotional Domains

Analysis of hospital readmission rates and utilization of acute care services (emergency department [ED]) revealed that 4.7% of patients were re-admitted to the hospital within 30 days for worsening of CHF. Regarding use of the ED, 9.5% of patients were seen in the ED within 30 days of discharge for cardiac reasons.

Discussion

In our study, overall, patients' scores demonstrated slight improvement in patients' MLWHFQ scores post enrollment in the student led transitional care program. Although the data did not reach the level of statistical significance, there appears to have been a degree of impact

from the transitional care program on patients' scores. This finding is consistent with research by Vedel and Khanassov (2015) which has shown that interventions implemented by transitional care programs will decrease the burden of care and subsequently, decrease hospital admissions. Total scores in the pre-MLWHFQ survey were already relatively low indicating that the impact of their condition was little. Pre-survey scores (M= 45), although not statistically significant, declined slightly at post-survey (M= 39). The total scores on the pre- and post-MLWHFQ are within the range of reported mean scores in the US for NYHA classes II (M= 27.50) and III (M= 43.5) (Pietri et al., 2004).

Similar results were seen when grouping the questions and scores into the respective physical and emotional subgroups. Pre- (M= 19.86) MLWHFQ survey scores for physical dimension demonstrated a decrease at the post- (M= 17.31) assessment. These mean scores were also within the range of mean scores for NYHA Class II *(M*= 12.39) and III *(M*= 21.05). Post-scores (M = 6.63) on the emotional dimension of the MLWHFQ also demonstrated a decrease from pre-scores (M = 7.74). Correlations with the NYHA functional classifications is not applicable. Patients' quality of life appeared to improve through benefits of the transitional care program. As CHF patients' quality of life inevitably deteriorates due to the progressive nature of the disease process, even slight improvements the dimensions of patients' lives (physical, emotional, social and mental) impact their perceptions of quality of life (Hwang, Liao & Huang, 2014). Although this study was only implemented for a 14-week period, it provides a promising method to assist patients surviving the first three months post hospitalization and improving their quality of life (Goodman et al., 2012).

Looking closer at individual questions revealed data worth mentioning. The majority of patients rated their pre- and post-survey questions on physical CHF symptoms as having no

impairment to living as desired. Additionally, the majority of patients (60% in pre- and 62% in post- survey) reported CHF caused no swelling in their ankles or legs. This may be attributed to the fact that the majority of patients within the study were NYHA Class II patients rather than higher classifications in which more physical symptoms are seen. Goodman et al. (2013) noted several factors can influence how much patients' perceive the impact of CHF on their lives which may have impacted the responses in our study. Our patients' NYHA functional classifications ranged from Class II and III. According to Goodman et al. (2013) the actual severity and nature of the underlying condition along with the short, medium and long-term impact on the ability to perform tasks of daily living impact patients' perception of quality of life. An additional factor that may have influenced the participant responses includes the belief, understanding and expectations concerning CHF along with the perceived support form healthcare providers. This may have impacted participant scores with weekly telephone contact and home visits by student nurses along with earlier follow-up by the nurse practitioner on issues that arose during visits. Additionally, Goodman et al. (2013) noted that the healthcare professionals' beliefs and expectations in providing care and support may impact the perception of quality of life in patients. Student attitudes may have impacted patient perceptions of quality of life. Few students who participated in this study had experience caring for patients with a chronic debilitating disease in the home setting. Student perceptions of the clinical environment are dependent upon the feeling of being welcome. The majority of participants in this study expressed gratitude that someone was checking on them. Thus, this mutual gratification may have impacted the post-survey scores slightly.

Approximately 48% of CHF patients reported marked difficulty in walking about or climbing stairs. Following the implementation of the transitional care program patients a slight

improvement was noted with a reported decrease in difficulty walking about or climbing stairs reported in 37% of patients. The same trend was seen in questions related to *"CHF making your fatigued or low on energy"* with 34.3% of patients indicating "very much effected" on the pre-MLWHFQ scores as opposed to 22.9% of patients indicating "very much effected" on the post-MLWHFQ scores. Although 22.9% of the patients still reported significant fatigue in the post-MLWHFQ survey, a small increase was achieved in patients reporting no limitation for this question on the post-survey (20%) versus the pre-survey (11.4%).

A focus on dietary restrictions was a major goal of the student transitional care program. The pre-survey response to the question *"Did your HF prevent you from living as you wanted during the past month by making you less of the foods you like?"* indicated that 25.7% of patients felt greatly affected. Following the transitional care program with nursing students focusing on creative methods to limit salt in the patients' diets, the post- survey response found a shift of 25.7% of patients indicating that they eating less of the foods they likes had not impacted their quality of life.

Examination of the question *"Did your HF prevent you from living as you wanted during the past month by costing you money for medical care?"* revealed that 40% of patients responded being "very affected" in the pre-survey analysis. However, in the post-survey analysis, 31.4% of patients felt greatly impacted by medical care costs. Additionally, when asked if the participants' felt HF made them stay in the hospital during the past month, 42.9% of post-survey responses indicated no versus 31.4% who answered *"no"* initially. This may have been related to the decreased acute care hospital readmission and emergency department visits experienced by patients in this study. The percentage of patients (4.7%) readmitted to the hospital during the

initial 30 days post hospitalization was significantly lower than the study hospital's readmission rate or national percentages (22%) (Centers for Medicare & Medicaid Services, 2014).

Two survey questions related to activity tolerance revealed patients had more difficulty at the end of the transitional care program than at the beginning. More participants reported more their HF made them sit or lie down to rest during the day at the end of the transitional care program (34.3%) than at the beginning (28.6%). Additionally, participants (40%) responded to having more difficulty working around their home or yards at the conclusion of the transitional care program than at the beginning (34.3%). This slight change may be due to the slow progression of the disease process of the 3 month period. This might also explain the result that that 34.3% of patients reported more shortness of breath at the conclusion of the program than at the beginning (28.6%). Results also demonstrated that at the end of the study 42.9% of participants felt their CHF impacted their ability to do things with friends and family making it more difficult than previously (34.3%). This may also be related to the gradual decline due to their disease process. This was also reflected in their response that at the end of the program a greater percentage of patients felt their CHF had prevented them from living as they wanted by impacting their ability to participate in recreational pastimes and hobbies (40% post- versus 34.3% pre-survey).

When asked if they perceived themselves as a burden to their family and friends, 37.1% answered "*no*" during the pre-survey assessment versus 45.7% in the post-survey assessment. Additionally a higher percentage of participants felt that they had a loss of self-control in their life at the end of the study (51.4%) versus the beginning (48.6%). Over 50% of participants reported difficulty in both concentration and remembering things which may have impacted their feelings of loss of self-control and becoming a burden on friends and family. Approximately

46% of participants also feeling depressed throughout the transitional care project. These results present healthcare providers and caregivers with the challenge of fully addressing the emotional aspects of the CHF patient healthcare needs. Lossnitzer et al. (2014) noted that depressive symptoms accompany CHF and can further impact the rate of decline in health. Depression is common among CHF patients due to the physical impairments experienced with the disease which lead to decrease ability to perform daily activities and maintain social relationships. This may lead to social isolation. Loussintzer et al. (2014) found that patients preferred regular supportive talks, with topics regarding quality of life, financial stressors, overall health and social relationships. A multidimensional approach to transitional care can provide patients with access to these support, education, and resource identification on these topics.

Limitations

Certain limitations of our study should be noted. The sample size consisted of only 36 patients completing both the pre- and post- surveys. This limited sample size affects the representativeness of our population and generalizability. The time period in which the data was collected was also a relatively short time period at 14-weeks. Following participants in a longer term transitional care program may have resulted in different results. Additionally, due to the fact that the program was designed around the constraints of an educational program, fragmentation of continuity of care was caused by the change in the clinical rotation of nursing students after 8 weeks. Participants were not seen during the certain periods of the semester due to clinical rotation orientation and holidays which also impacted continuity of care provision. The inexperience of students administering the survey and providing care to participants may have also impacted the results of the study.

Conclusion

This study only looked at the impact on quality of life of CHF patients participating in a 14-week implementation of a transitional care program provided by nursing students. Results of this study did not find significant changes in quality of life as measured by the Minnesota Living with Heart Failure questionnaire administered at the beginning and end of the program. However, evaluation of individual questions did indicate a change in several aspects related to quality of life. As study participants were classified by the NYHA functional classification II and II, no change was noted in quality of life in terms of symptoms. However, a gradual increase in difficulty in being able to perform activities such as working around the house or yard, participation in recreational activities and hobbies was noted at the end of the study. This may have been related to the gradual decline seen in the disease process. Participants also noted their quality of life was not impacted by their stay in the hospital with the past 30 days. Readmission rates were 9.7% and emergency department visits 4.5% for participants during the 30 days post initial hospitalization for CHF. This decline in utilization of healthcare may have in part been associated with the student led transitional care received by the patient. Participants increasing feelings loss of self-control and ability to concentrate may have also contributed to the increasing feelings of becoming a burden on family and friends and depression. Further research in the area of how to maintain socialization and cognitive ability could decrease the feelings of depression associated with this chronic disease. Although this study failed to demonstrate statistical significance in terms of change in quality of life, based on the data collected and analyzed, it shows great promise and should be strengthened by expanding the study.

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Appendix A

Description of the Minnesota Living with Heart Failure Questionnaire Contents

Did your heart failure prevent you from living as you wanted during the past 4 weeks by-?

MLHQ Scales Items' Number	Entire Item	Response=0 (Lowest possible value)	Response = 5 (Highest possible value)
Physical Factor			
2	Resting during the day	No impairment to living as desired	Very much impairment to living as desired
3	Walking and climbing stairs		
4	Working around the house		
5	Going away from home		
6	Sleeping		
7	Dong things with others		
12	Shortness of breath		
13	Fatigue, tiredness, low on energy		
Emotional Factor			
17	Feeling burdensome	No impairment to living as desired	Very much impairment to living as desired
18	Feeling a loss of self-control		
19	Worry		
20	Difficulty remembering & concentrating		
21	Feeling depressed		
Others			
1	Swelling in ankles, legs	No impairment to living as desired	Very much impairment to living as desired
8	Working to earn a living		
9	Recreational pastimes		
10	Sexual activities		
11	Eat less of the food liked		
14	Stay in the hospital		
15	costing money for medical care		
16	Side effects from medication		