Research Article

Assessing Knowledge Regarding Managing Congestive Health Failure Symptoms: Differences in Patient and Professional Scores

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Abstract

Objective: To assess whether patients with congestive heart failure (CHF) and health coaches agree about patient knowledge of health-enhancing practices related to CHF after ongoing telehealth coaching. **Methods:** Forty patients with CHF and eligible for both Medicare and Medicaid were recruited from a regional managed care organization for this pilot study. Tel-ecoaching sessions via a health insurance portability and accountability act(HIPAA)-compliant tablet-based platform focused on educational information designed to improve patient self-care. Social workers administered the 13-item Member Confidence Measure at baseline and at 30 and 180 days into the intervention. Patients and social workers provided separate ratings. **Results:** As expected at baseline, patient and coach scores differed, with patients reporting higher perceived knowledge scores ($P < .01$). Contrary to expectation, patient and coach scores did not converge at 30 and 180 days. Patient scores continued to increase at 30 and 180 days, while coaches' scores increased at 30 days, but not at 180 days. **Conclusion:** Overall, patients continued to overrate their understanding about CHF. A telecoaching platform provides an opportunity to enhance patient's knowledge of their chronic disease and for patients to sustain that knowledge over time. **Practice Implications:** Addressing a patient's misperception of their knowledge to manage a chronic disease is critical for enhancing well-being. Coaches' scores did increase at 30 days suggesting that telecoaching is effective, but more monitoring may be required to ensure that these gains persist over time.

Keywords

congestive heart failure, integrated health, telehealth, telecoaching

Introduction

Researchers have projected that by the year 2030 in the United States there will be 8.5 million people with congestive heart failure (CHF) with estimated costs exceeding US$50 billion (1). Congestive heart failure is challenging to treat and approximately half of these patients die within 5 years of their diagnosis (2). Congestive heart failure patients often have multiple comorbid medical and/or mental health conditions that can be exacerbated and difficult to manage due to their CHF diagnosis (3).

Successful self-management of one's chronic health condition is an important health behavior to promote among CHF patients (4). Nearly 30% of CHF patients discharged from the hospital are readmitted to the hospital within 60 to 90 days (5), and it is estimated that 75% of these readmissions are preventable (6). Several studies of patients with CHF have documented that patients who are involved in their care and medical decisions are more likely to adhere to medication instructions and dietary restrictions, monitor their symptoms, seek help when a health issue arises, and report a higher quality of life (7–10).

However, CHF patients can lack sufficient knowledge to effectively self-manage their symptoms (11,12) that can be further complicated by prescription medication management and a lack of communication between physicians and

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patients (13). Accurately assessing patient's health knowledge in order to assess comprehensive understanding has been a challenge for patients with heart disease (14). Additionally, the inaccurate perception of one's health status may influence a patient's health behavior (12,15,16). The tendency to overestimate knowledge about managing one's health conditions is common and has been reported among women with cardiovascular disease, patients at risk of stroke, breast cancer, hypertension, and mental health (12,16–21). In these cases, patients were determined to be clinically at high risk despite the patients' perception of their condition as low or moderate risk. These differences may result in patients denying that they need any intervention (18). The development of interventions that are targeted to improving the quality of life of patients with cardiovascular risk is predicated on accurately assessing risk perception (15).

An integrative review of the cost-effectiveness of health coaching identified that health coaching has the potential to improve chronic disease management and lower health-care expenditures (22). Health coaching offers an ongoing communication vehicle between health professionals and patients (23,24) and can increase patients' self-efficacy and engagement in preventative behaviors toward their diseases (24,25). Telecoaching, or telehealth coaching, has demonstrated some ability to improve patient outcomes for individuals with CHF, such as reduced hospitalizations and mortality (26) and an increased connectedness to their health-care provider (27). Systematic reviews of health coaching have documented a variety of levels of training and qualifications but have documented health coaching as an effective patient education method (28).

Advances in face-to-face telehealth communication via computer tablet platforms allow for more frequent interactions and offer the opportunity to enhance the patient–provider interaction through visual observations of health (eg, labored breathing, fatigue, etc), mental health (eg, observable changes in mood and affect), and cues to provide instantaneous education and support. Patient educational support can provide knowledge acquisition that is an important first step in health behavior change (29,30).

This study describes a telehealth coaching approach utilizing face-to-face video chat and daily symptom monitoring plus patient education to support primarily low-income patients with CHF. The telehealth coaching intervention uses a video platform to engage patients and personalize their health education goals. Utilizing a measure to assess patient knowledge, this study assesses whether a face-to-face, telehealth-coaching approach enables patients to develop a realistic perception of CHF and their ability to manage the symptoms of their chronic disease. We examine 2 hypotheses: (1) at baseline, patients' perception scores about their ability to manage their symptoms will be statistically different than the perception scores provided by a trained health coach and (2) after an ongoing telehealth-coaching intervention, there will be no statistically significant differences between patients' perceptions about their ability to manage their symptoms and health coach's perceptions.

Methods

A care management company, focused on managing a high-risk patient population, provided the administrative data for the study. This company employed master-level social workers as health coaches to interact with patients and conduct the intervention via a computer tablet platform. The university institutional review board deemed the study quality improvement and identifying information was removed from the data set.

Study Population and Sample

The care management company, located in a mid-Western urban city, recruited potential patients among Medicare and Medicaid members in a managed care organization (MCO). Inclusion criteria included a CHF diagnosis, an age of 30 years or older, having been hospitalized within the last 6 months, and residence in the county (which is a major urban center in the region) served by the MCO. Exclusion criteria included diagnoses of end-stage renal disease or kidney failure and/or those currently in hospice care.

The MCO provided an ordered list of 358 members based on an internal risk scoring measure (from highest risk score to lowest risk score) that met the preestablished inclusion criteria. The care management company contacted potential participants according to their order on the list provided by the MCO. Over a 5-month period, different batches of members were contacted through the mail with a follow-up phone call to gauge interest in participation. Recruitment was staggered in order to control the number of members in need of an intake visit to start the intervention. Recruitment continued until there were 50 patients providing initial agreement to participate; this number was established by the MCO as sufficient to meet their information needs to assess the efficacy of the intervention.

Over the course of the study, 3 patients decided not to participate after intake due to personal reasons and 2 individuals became ineligible after moving out of the county and into hospice care. An additional 5 patients missed either the second or third data collection time points and were removed from the analytic sample. The first 5 participants were removed given that they had no exposure to the intervention and the latter 5 were removed given difficulty in predicting what might have been their missing response. Therefore, 40 patients comprised the study sample over a 6-month time period.

Dependent Variable: Member Confidence Measure

The Member Confidence Measure (MCM) assesses patients' perceived understanding of CHF, knowledge of the disease and related symptoms, and behaviors necessary to prevent

worsening symptoms. The content areas, based on existing CHF literature, related to chronic disease management.

The MCM is composed of 13 items that are organized within 5 subscales: CHF symptoms (3 items), medications (2 items), seeking medical attention (3 items), making healthier choices (4 items), and safety (1 item). Clinically trained social workers in an interview format deliver the MCM to each patient. The MCM takes approximately 15 minutes to administer. To assess patients' degree of confidence about their knowledge, patients respond to each item using a 4-point Likert scale, ranging from 1 = no knowledge to 4 = complete knowledge. Answers were aggregated to generate an overall *patient perception* score. For the purposes of this study, we calculated the average response for the overall scale score as well as the average for each of the subscales; therefore, scores range from 1 to 4.

In addition to the patient perception, the MCM allows the telehealth coach to provide their perception of the patients' knowledge. The *coach perception* score is generated by the coach's evaluation of the 13 items as informed by a content assessment of qualitative responses elicited from the patient at the time of the MCM administration. Specifically, the social worker asked patients to provide concrete examples that embody the patients' choice of responses to the 13 items. The social workers score the patients' knowledge and understanding of a particular item using the same 4-point scale ranging from 1 = no knowledge to 4 = complete knowledge. An aggregate of these 13 items would then generate an overall *coach perception* score. Similar to the patient perception score, average scale scores were calculated for the coach perception score.

Social workers were trained to use the MCM tool before conducting patient assessments. The training encompassed reading about the measure and different aspects of CHF chronic disease management, watching an experienced social worker use the MCM tool, and then practicing with role-playing and scoring. Practice runs using the scale were obtained and reviewed by the clinical supervisor to ensure accuracy. The MCM was administered at 3 time points of the intervention: baseline entry into the intervention, 30 days into the intervention, and 180 days into the intervention.

Intervention

Over the course of the intervention, the telehealth coaching intervention required clinically trained social workers to educate patients in the appropriate type of self-care necessary for patients to manage their CHF symptoms and remain living at home. Social workers charged with the delivery of this intervention were trained on topics focused on the relationship between CHF symptoms and medication adherence, diet and lifestyle requirements, mental health, and barriers to interacting with the health-care system. Consistent with the foundations of social work professional training, this telehealth coaching intervention allowed social workers to use a person-in-environment framework, consider the patients' strengths and challenges, and consider environmental factors that may present limitations such as personal income, family support, and relationship with medical professionals. The MCM assessment that measured the difference between patient and coach score took into account the increased level of knowledge that was expected for the patient as the intervention progressed.

As previously noted, this telehealth coaching intervention utilized a tablet platform. An initial intake visit was conducted to train patients to use the video chat/call feature and accompanying software application that was specifically designed for a population with low medical literacy. This initial in-home assessment included the baseline MCM scores that guided the social work staff in developing a personalized education and goal plan with the patient.

Additional components of the telehealth coaching intervention focused on health education and patient monitoring and included:

1. Weekly video chat/calls: Video chat/calls followed a preestablished protocol that focused on education, behavior change, and goal setting in order to identify and address the barriers to care. These sessions between the social workers and patients lasted on for an average of 15 minutes and focused on reviewing educational materials related to CHF symptom management (eg, maintaining low sodium diet, fluid restriction). Specifically, the weekly video chat sessions are developed and updated with the goal of creating an individualized care plan. The health coach focuses on addressing care gaps, setting care goals including those related to preventative care, providing education related to medications and symptoms, and delivering health coaching related to behavior change and healthy choices.
2. Daily self-reports on CHF symptoms: Self-reports were communicated through the software on the tablet platform that allowed social workers to monitor a patients' progress.
3. Ongoing assessment data collection: On days 30 and 180 of the telehealth coaching intervention, social workers readministered the MCM via a video chat/call.

Statistical Analysis

To assess the first hypothesis that at baseline coach and patient scores would differ, a paired sample *t* test was performed on all 40 patients' MCM score and the matched perception score of their coaches. This analysis included the average overall scale score as well as the average scores for each of the 5 subscales.

To test hypothesis 2, that coach and patient scores would converge, a profile analysis was performed as a function of

Table 1. Baseline Comparison of Coach and Patient Perceived Confidence Measure Scores.

	Coach		Patient				95% CI	
Variable	M	SD	M	SD	*t*(39)	*P*	Lower	Upper
Total	2.87	.40	3.67	.35	14.99	.000	.70	.91
CHF symptoms	2.29	.66	3.53	.74	12.91	.000	1.05	1.44
Medications	3.09	.84	3.60	.59	4.50	.000	.28	.74
Medical attention	3.34	.47	3.89	.23	8.34	.000	.42	.68
Healthy choices	2.86	.58	3.59	.46	10.43	.000	.59	.87
Safety	2.75	1.06	3.88	.52	6.99	.000	.80	1.45

Abbreviations: CHF, congestive heart failure; CI, confidence interval; M, Mean; SD, standard deviation.

Table 2. Comparison of Transformed Coach and Patient Perceived Confidence Measure Scores.[a]

	M (SD)	Effect Size *r* (Coaches vs Patients)	95% Confidence Interval	
			Lower	Upper
Coaches				
Baseline	3.91 (0.65)		3.66	4.16
30 days	3.09 (0.81)		2.84	3.33
180 days	3.40 (0.86)		3.15	3.65
Patients				
Baseline	2.11 (0.92)	.75	1.86	2.36
30 days	1.81 (0.75)	.63	1.57	2.06
180 days	1.74 (0.71)	.72	1.49	1.99

Abbreviations: M, mean; SD, standard deviation.
[a]N = 40. Due to the nature of the transformation, lower scores represent higher confidence and higher scores represent lower confidence.

time (baseline, 30-day assessment, and 180-day assessment) and person type (coach or patient). Profile analysis is an appropriate analysis, given that our study was interested in the profiles of different groups of respondents on the confidence measure. Profile analysis allows for comparison of mean differences across dependent variables and relevant differences in groups (31). This profile analyses asked 3 research questions of these patterns: (1) Do the confidence measure scores remain constant across time? (2) Ignoring time, are the average confidence measure scores the same between coaches and patients? (3) Are the patterns of change in the confidence measure scores over time the same in the 2 groups? Significant effects result when any of these questions are rejected. Due to the requirements of meeting the assumptions for a profile analysis, these analytic models included data transformations of all average scores of patients and coaches at the 3 time points. All results pertaining to the profile analysis are presented using transformed data. The analyses for this study were conducted as a complete case analysis. All statistical tests in this study were performed at the .05 level of significance, and all analyses were conducted using SPSS version 24.

Results

Females comprised 70% of the sample (n = 28), and slightly over half of the sample identified as Caucasian (55%; n = 22) and the remaining identified as African American (45%; n = 18). The average age of the sample was 61.12 years (standard deviation, [SD] = 11.65) and ages ranged from 43 to 86 years. Finally, patients in the analytic sample did not statistically differ in average age, gender, or ethnicity from patients dropped from the sample.

As expected at baseline (hypothesis 1), patients had more confidence in their knowledge about CHF than the level of knowledge perceived by the coaches (see Table 1). Specifically, patient perception ratings were significantly higher on the total scale score (mean [M] = 3.67, SD = .35) compared to coaches' ratings (M = 2.87, SD = .40, $t(39) = 14.99$, $P < .001$). Patient perception ratings were also statistically significantly higher than coaches' ratings on all 5 subscales (see Table 1).

To statistically test changes in scores, a profile analysis was performed on confidence measure scores as a function of time (baseline, 30-day assessment, and 180-day assessment) and role (coach and patient). Due to the negative moderate skew for each dependent variable, the 3 confidence measure scores were reflected and then transformed using a square root transformation. The assumption of homogeneity of covariance matrices was met, Box M = 11.197, $F(6, 44080.302) = 1.788$, $P = .097$. All other assumptions in the analyses were met.

There was a significant pattern of difference on confidence measure scores across time between patients and coaches, Pillai trace = .130, $F(2,77) = 5.760$, $P = .005$, $\eta_p^2 = .130$. Ignoring person type, there was also a significant difference in confidence measure score over time, Pillai trace = .409, $F(2,77) = 26.693$, $P < .001$, $\eta_p^2 = .409$.

In order to find the pattern of differences on confidence measure scores among roles, a simple main effect of confidence score was conducted for each person type. The results indicated that there were significant differences in confidence measures at baseline between the patient and coach, $F(1,78) = 103.162$, $P < .001$, $\eta_p^2 = .569$; at the 30 day assessment between patient and coach, $F(1,78) = 53.636$, $P < .001$, $\eta_p^2 = .407$; and at 180 day assessment between patient and coach, $F(1,78) = 88.351$, $P < .001$, $\eta_p^2 = .531$. Across all 3 time points, coaches continued to have a lower perception of patients' knowledge compared to patients' perception (Table 2).

As the confidence measure scores did not converge between the 2 groups, 2 separate post hoc exploratory within-subject analyses of variance using Bonferroni adjustment were conducted to test whether coaches' scores experienced any improvement over time and whether patients'

scores improved over time. For coaches, we found that across time, there was a statistically significant change in their perception scores between baseline and 30 days ($P < .001$) and baseline and 180 days ($P < .001$), but not between 30 days and 180 days ($P = .068$). For patients, we found a similar pattern that across time, there was a statistically significant change in their perception scores between baseline and 30 days ($P = .03$) and baseline and 180 days ($P = .03$), but not between 30 days and 180 days ($P = 1.00$).

Discussion and Conclusion

Discussion

The findings indicate that patients' and coaches' scores differ from each other at each data time point. Specifically, as expected at baseline, patients' measures of confidence scores were higher than coaches' scores and these differences persisted across time. Further, the scores of patients' perceptions and coaches' perceptions did not converge over time, but patient's perception did increase initially over time with a parallel increase in perceptions from the score of the coach.

That patients tended to score their knowledge higher than coaches is consistent with comparable findings of studies focused on other health conditions. Differences in ratings have been shown in assessing patient risk for chronic conditions, as patients tend to underrate their risk in comparison to health providers (16–18,20,32).

Consistent with other reviews of health coaching improving the management of chronic disease (28), patient scores continued to increase from baseline to 30 days and from 30 days to 180 days. That patients report consistently improving scores may indicate the positive impact of the educational component of the telehealth intervention. As the intervention was designed to increase patients' knowledge of managing the symptoms of their chronic condition, it may not be surprising that patients' scores increased over the course of the treatment intervention.

The improvement in patient scores from baseline to 30 days was confirmed by the concomitant improvement in coach scores; such confirmation did not occur between 30 and 180 days as coach scores slightly declined while patient scores continued to increase. Therefore, an alternative explanation is that the pattern of patient scores may reflect that patients, who already were scoring their knowledge as high, expected that since they were getting health coaching their scores should increase. In other words, this may be a self-fulfilling prophecy in that patients felt they already had high confidence in their knowledge and believed that since the coaching was designed to help them with managing their CHF, their confidence about CHF knowledge naturally increased.

Another consideration to possibly explain the nonconvergence of confidence scores is the latent constructs of motivation or socialization. The telehealth coaching intervention may indirectly have focused on the underlying motivations of the patients to remain living in the community. It may be that over time, patients may have integrated their self-care practices to become more routinized in their lives. Additionally, the pattern across time suggests the ongoing importance of the mutually sustaining relationship, or socialization, between the coach and patient. Thus, patient confidence measure scores may be measuring the influence of these latent constructs regardless of knowledge dissemination.

Limitations

A number of limitations could have influenced the outcomes of this study. First, the number of patients is small ($N = 40$), and since the sample size was not predicated on statistical power, it may be insufficient to identify an effect. Second, since the selection method is a nonprobability sampling technique, the findings lack generalizability and may be particular to the group analyzed. Third, there may be a self-selection bias as those volunteering to participate in the pilot study may be different in terms of motivation or other unknown factors than those patients choosing not to participate in the study. Perhaps, the level of intensity at the start of the intervention period was more pronounced in efforts to engage and retain clients, but over time intensity may have waned.

This study was conducted as a complete case analysis. We may have lost some data due to our decision to remove individuals without scores from all 3 data points from the analysis. However, it was important to identify prolonged scores over time. A future study could examine a mixed model to account for individual-level differences in attrition. Finally, the lack of a control group, and in particular 2 groups with randomized assignment, precludes attributing the findings to the intervention itself.

Conclusion

Results from this study indicate that health coaches could potentially benefit from more frequent tracking of patient's knowledge. Perhaps, with more data collection points, health coaches would have the ability to identify the need for focused booster sessions to support ongoing self-care and knowledge building. The identified increases in coaches' scores in the present study were limited to the first 30 days, and by the 180-day assessment, coaches documented a slightly lower confidence measure score. The gap in the measurement from time point 2 (30 days) to time point 3 (180 days) was too long for coaches to identify the educational domains where patients needed more support. Thus, a more frequent measurement of the MCM scores may produce a more accurate picture of changes in patient knowledge.

Additional research should examine the relationship between patient/coach scores and health-related outcomes including reduced hospitalization for CHF-related conditions or the ability to lower medical costs associated with

CHF. Documenting the relationship between increased health behavior knowledge and reduced health care–related costs will assist in refining health education materials that influence health behavior. In addition, health systems will rely on data related to cost savings and improved patient outcomes to justify the enhancement of patient education initiatives on a broader scale.

Practice Implications

Self-care behaviors and increased knowledge of managing the symptoms of CHF are often challenging for patients and it is difficult to assess the impact of these efforts (33). Concerns about issues such as readmission are complex and likely extend beyond simply knowledge or perceptions of knowledge by patients. Yet, enhanced knowledge of managing CHF is the first step in patients becoming partners in their own health care. Practitioners need to integrate the variety of health and mental health challenges faced by people with CHF as they begin the process of patient education. Tools such as the MCM provide a method of documentation and feedback to practitioners on their ability to foster health behavior change with the knowledge of where to target enhanced health education. Specifically, practitioners should focus on reducing the gap between patients' perceived knowledge and their measured knowledge with tools such as the MCM.

Authors' Note

Dr Rosen has an equity stake in the company that conducted the intervention. Therefore, he was not involved in the collection or analysis of the data.

Declaration of Conflicting Interests

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