Using Video Education to Improve Outcomes in Heart Failure (VETiO-HF)

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Abstract

Background: Heart Failure (HF) education is a national quality measure of HF care. The optimal method of educating HF patients is not known but video education (VE) can provide a standardized method to teach HF patients, and was recommended by the 2010 Heart Failure Society of America guidelines. VE delivery via mobile technology can be an efficient and convenient way to deliver HF education as patients transition from hospital to home.

Purpose: This quality improvement project evaluated the effectiveness of supplementing usual HF patient education with VE in improving knowledge of HF, self-efficacy, self-care and reducing 30-day readmissions as well as assessed patients' satisfaction with VE.

Methods: A project using a pre-test/post-test design and convenience sampling was conducted over 11 weeks at an academic medical center in Virginia. Demographic and clinical data were collected via chart reviews and patient interviews. Participants completed the Atlanta Heart Failure Knowledge Test and the Self-care of Heart Failure Index before and after receiving VE, to measure HF knowledge, self-efficacy and self-care respectively. A video usage log and satisfaction questionnaire was completed. VE was accessed via a computer, smartphone, personal or loaned tablet computer. Participants received a *"Managing Your Heart Failure With Video Education"* booklet to aid accessing the videos. Seventy participants enrolled and 30 completed the study. All-cause 30-day readmission data was compared to a randomly selected historical group (September, 2016 – November, 2016) within the same hospital.

Results: Participant's HF knowledge and self-maintenance scores increased significantly (mean 1.70, SD 3.2, $p =.008$, mean 13.96, SD 20.99, $p =.001$ respectively). HF knowledge scores improved by at least 5% on 20 of the 30 questions across all domains assessed. Self-efficacy (self-care confidence) and self-care management did not significantly improve (mean 1.67, *SD*

26.69, *p* = .735; mean 9.43, *SD* 22.79, *p* =.073 respectively). All-cause 30-day hospital

readmissions did not significantly decrease (9/ 30% to 7/ 23.3%, *p*= .276). HF patients were

satisfied with the VE information (96.2%) and all would recommend the videos (100%). The

videos rated most helpful were: *Heart Failure Medications: Diuretics* (71.4%) and *Managing*

Heart Failure: Limiting Sodium (65%).

Conclusion: Supplementing usual HF education with VE significantly improved HF knowledge

and self-maintenance with high patient satisfaction. Evaluating the impact of using VE provides

useful information that may influence future patient education efforts and improve HF outcomes.

HF knowledge scores may be further used to tailor patient education based on identified

knowledge gaps. Future research is needed to investigate whether self-efficacy and self-

management improves with continued follow-up.

Practice Implications: In collaboration with the patient education officer, the videos were

aligned to HF teaching topics in the electronic medical record system (Epic) for future health

system-wide use, enabling nurses to easily access and provide HF teaching as well as supports

the health system in meeting national requirements for HF education. Motivated by the daughter

of a patient searching for HF information, the videos were added to the home screen of the

Patient and Family Library's home screen for improved access for patients/ families and staff.

Keywords: heart failure, patient education, video education, self-care, self-efficacy,

readmissions.

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Using Video Education to Improve Outcomes in Heart Failure

Heart Failure (HF) is a global epidemic affecting an estimated 38 million people worldwide (Braunwald, 2014). In the United States (U. S.), an estimated 6.5 million individuals 20 years of age and older have HF (Benjamin et al., 2017). This number is projected to increase to over eight million by 2030 (Heidenriech et al., 2013). HF is a complex syndrome that occurs from a "structural or functional impairment" in the filling of the ventricles or the pumping of blood to the body (Yancey et al., 2013, p.e153). It is associated with a high degree of morbidity and mortality. In patients 65 years and older in high-income countries, HF is the most common diagnosis for hospital admission (Braunwald, 2014). An estimated one million hospitalizations in the U. S. in 2010 were for HF, unchanged from 2000 (Hall, Levant, & DeFrances, 2012).

Patients who have had prior HF hospitalization have greater rates of cardiovascular death and rehospitalization (Benjamin et al., 2017). Although survival after HF diagnosis has improved, approximately "50% of people diagnosed with HF will die within 5 years" (cited in Benjamin et al., 2017, p. e380). Readmission data from U. S. hospitals in 2011 by the Healthcare Cost and Utilization Project showed that Congestive Heart Failure (CHF) had the largest number of 30-day all-cause readmissions among Medicare patients, 134,500 readmissions costing $1.7 billion (Hines, Barrett, Jiang, & Steiner, 2014). As of June 30, 2015, the HF readmission rate at the project location (academic medical center) was 22.7%, compared to the national average of 21.9% (Centers for Medicare & Medicaid Services [CMS], n. d. a).

The high financial burden of HF has led to close monitoring of HF readmissions. CMS monitors HF readmissions and publishes 30-day readmission rates to the public as part of the Hospital Compare program (Yancey et al., 2013). The Hospital Readmissions Reduction Program (HRRP) was established by the Affordable Care Act (ACA) in 2012 to create financial

incentives for hospitals that participate in the inpatient prospective payment system (IPPS) to reduce readmissions and associated costs. This program authorizes CMS to reduce Medicare payments to the IPPS-participating hospitals for readmission rates above the set standard. In 2015, the maximum penalty was set at 3% (CMS, n.d. b; McIlvennan, Eapen, & Allen, 2015).

Moreover, HF is included in the national health agenda. Healthy People 2020 outlines the ten-year national goals to increase the health of all Americans. One of the objectives of Healthy People 2020 is to "reduce hospitalizations of older adults with heart failure as the principal diagnosis" (HealthyPeople.gov, 2017). Hence, to achieve this national objective, reducing hospitalizations and improving HF outcomes, educating patients about HF and self-care behaviors is an integral component of any HF management plan.

The Purpose of the Project

The Heart Failure Society of America (HFSA) and the American College of Cardiology Foundation (ACCF)/ the American Heart Association (AHA) publish comprehensive guidelines that direct the medical care of HF patients. Both guidelines recommend patient education that focuses on self-care (Lindenfield et al., 2010; Yancey et al., 2013). Self-care is a process in which the patient is an active participant in their HF management (Lindenfeld et al., 2010). Through self-care, the patient performs behaviors that will facilitate optimal health and reduce risk of rehospitalization. The 2013 ACCF/ AHA Guideline for the Management of Heart Failure recommends, "patients with HF should receive specific education that facilitates self-care" (Yancey et al., 2013, p. e171). Yancey et al. (2013) further emphasized the importance of education for optimal transitions of care, a vulnerable period of time as the patient moves from inpatient to outpatient care. Furthermore, the 2013 ACCF/ AHA guideline recommends that during hospitalization, before discharge and in follow-up visits, "reinforcement of HF education,

self-care, emergency plans, and need for adherence" should be completed (Yancey et al., 2013, p. e290). Self-care education is a process measure that is recommended for inclusion in patients' plan of care (Yancey et al., 2013) and is registered as a national quality measure of HF care (Agency for Healthcare Research and Quality [AHRQ], 2013).

A concept pertinent to HF patients in making the best decisions for self-care is self-efficacy, from Bandura's social cognitive theory (Yehle & Plake, 2010). Perceived self-efficacy is the confidence in one's ability to perform a behavior and to have control of health practices. How much self-efficacy one has affects their level of commitment to performing desired behaviors and having control over their health. Studies have shown that when self-efficacy increases, self-care improves (Yehle & Plake, 2010). A vital component of HF education is empowering patients to perform healthy behaviors such as daily weight monitoring and medication adherence. However, there are no gold standard approaches to educating HF patients (Boyde & Peters, 2014). This education may be presented through various media, written, face-to-face, videos and web-based programs (Albert, Buchsbaum, & Li, 2007). Furthermore, the Heart Failure Society of America 2010 Comprehensive HF Practice Guideline recommends that patients should be offered a variety of learning options including video (Lindenfeld et al., 2010).

Utilizing video education (VE) may offer potential benefits such as being less resource intensive, more cost effective and provide a consistent messaging to patients, thus resulting in a more standardized health information (Tuong, Larsen, & Armstrong, 2014). VE may enhance retention of information. Additionally, 75% of information is absorbed visually and the rest via the other senses (Albert et al., 2007), thus making VE a practical option for sharing health information. VE may increase patients' confidence by including actual persons living with HF role modeling the desired behaviors, thus patients see that the requisite behaviors are achievable

(Albert et al., 2007). Furthermore, while written information may be easily misplaced, VE will be readily available once the patient has the required playing device. This prevents the inconvenience of searching for written material while at home, especially for the elderly HF population. Additionally, patients may replay the videos at their own time and pace in their desired setting until understood, thus VE is a patient-centered learning method. However, the use of VE in HF is not well studied (Albert et al., 2007; Veroff et al., 2012).

The purpose of this project is to evaluate the effectiveness of supplementing usual standard of HF patient education with VE in improving knowledge of HF, self-efficacy, self-care and reducing 30-day readmissions as well as assess patient satisfaction with VE. Helping patients understand HF and best methods to prevent and manage symptoms is important to reducing readmission and the morbidity and mortality of HF (Barnason, Zimmerman, & Young, 2011; Fredericks, Beanlands, Spalding, & Silva; 2010).

Theoretical Framework

The situation-specific theory of heart failure self-care was first published by Riegel and Dickson in 2008 (Riegel, Dickson, & Faulkner, 2016). The theory was selected as it addresses outcomes being measured in the project, specifically self-care and self-efficacy. The theory addresses the influence of three of the project's measures: knowledge of HF, self-care, self-efficacy on HF management. Moreover, the model is patient-centered, as it focuses on the patients' response to HF. The theory defines self-care as a "naturalistic decision-making process that influences actions that maintain physiologic stability, facilitate the perception of symptoms, and direct the management of those symptoms" (Riegel et al., 2016, p. 226). Self-care according to the theory contains three concepts (Figure 1) that are frequently mastered sequentially. The first concept is *maintenance*, which covers adhering to treatments and partaking in healthy

behaviors such as taking medications and exercising. The second concept, *symptom perception*, entails detecting physical sensations and interpreting them. Riegel et al. (2016) further described symptom perception as "body listening, monitoring signs, as well as recognition, interpretation and labeling of symptoms" (p. 227). The third concept *management,* encapsulates symptom response when they arise.

For patients, performing self-care entails making decisions pertinent to their HF and the theory addresses making decisions in real-world settings (naturalistic decision making [NDM]). Real-life decisions faced daily by patients are influenced by the interactions of person, problem, and the setting/ environment, thus making each decision situation specific (Riegel et al., 2016). At each stage of the self-care process, NDM is used. For example, a patient must decide how to respond to an increase in body weight, whether to continue to monitor themselves or call a healthcare provider. The model identifies factors that influence decisions about self-care; these include experience, knowledge, skill, and compatibility with values. According to Riegel et al (2016), two requisite skills are needed for HF self-care, tactical (how to) and situational (what to do when); for example, how to read food-labels and what to do when certain symptoms arise. Educational mediums like VE are invaluable in teaching patients these requisite skills.

The theory further addresses factors affecting decision making categorizing them as person, problem and environment. Person factors include socioeconomic status, health literacy and the influence of culture on how one perceives HF and performs self-care. According to the model, self-efficacy is a powerful factor in self-care decision making and is influenced by experience with prior situations, role modelling, social persuasion and physiological cues (Riegel et al., 2016). Problem factors influencing decision making includes multimorbidity, lack of knowledge, dealing with complexities of care, physical functioning and mild cognitive

impairment. Environmental factors include emotional and tangible support. Some of these factors may be addressed using VE including health literacy and lack of knowledge.

The situation-specific theory of heart failure self-care proposes theoretical assumptions and propositions that are of relevance to the project. The pertinent theoretical assumptions are "all self-care involve decision-making" and "self-care can be learned" (Riegel et al., 2016, p. 231). Propositions of relevance to the study include "as self-care efficacy increases autonomous self- care behaviors increase" (Riegel et al., 2016, p. 231). Integral to this project is the awareness that HF is a complex chronic condition that requires lifelong daily self-management and that for patients, optimal disease management is needed to maintain well-being. Implementing VE offers another method to increase patients' knowledge of HF, self-efficacy and self-care skills to enable patients to make healthy decisions.

Research Question

In adult patients with HF, does supplementing usual HF patient education with VE increase knowledge of HF, self-efficacy, self-care and reduce 30-day readmissions?

How satisfied are HF patients with VE?

Review of Literature

The total medical cost of HF is projected to increase from $31 billion in 2012 to $70 billion in 2030 (Heidenreich et al., 2013). Readmissions to hospitals are a major contributor to this cost. Noncompliance with recommended medication regimen, sodium and/ or fluid restriction may precipitate acute HF decompensation (Yancey et al., 2013) which may lead to hospitalization. In the OPTIMIZE-HF trial comprising 259 U. S. hospitals, 8.9% and 5.2% of patients reported nonadherence to medications and diet respectively as precipitating factors for readmission (Fonarow et al., 2008). Evangelista and Shinnick (2008) found that HF literature

consistently indicated that adherence and self-care behaviors reduce hospital readmission and results in positive outcomes.

In a systematic review of randomized control trials (RCTs) of self-management education programs for CHF, all studies reviewed that assessed knowledge and behavioral outcomes had significant improvement in at least one learning measure and at least one behavioral outcomes such as following sodium and fluid restriction (Boren, Wakefield, Gunlock, & Wakefield, 2009). Two of the four studies showed significant improvement in self-care. However, majority of HF self-management education studies utilized a verbal teaching method supplemented with written material; 34 of the 35 studies reviewed by Boren et al. (2009) used a verbal teaching method. Furthermore, in a literature review by Jaarsma et al. (2013), almost all HF home care programs used verbal educational methods. Yet, in the Need2Know-HF patient study that assessed the learning styles of HF patients, 64% of patients preferred a multi-modal style of learning (Boyde et al., 2009). Utilizing visual as well as written material for patient education is a multi-modal learning style (Boyde et al., 2009) and thereby meets patients' preferences. VE can be utilized to support HF patients with low health literacy (Hebert, Gogichaishvili, Gopie, & Arcement, 2011) who comprise 27% to 54% of the HF population (Evangelista et al., 2010).

Methodology of the Literature Review

An integrative review of the literature was conducted to find published research regarding VE as a strategy for HF patient education. This type of review includes "data from experimental and nonexperimental studies as well as theoretical literature" (Conner, 2014). An initial search of the literature via CINAHL was conducted to ascertain satisfactory key words to be used for a more detailed search. A medical librarian was consulted for guidance with the search strategy. An extensive search of the literature was first completed from April 29, 2017 to May 2, 2017

using the following databases: Cochrane Library, CINAHL, PubMED, Web of Science, Ovid

MEDLINE, Joanna Briggs Institute (JBI), PsycINFO and Google Scholar. Three RCTs and one

quasi-experimental study were retrieved in this search. From May 12, 2017 to May 14, 2017,

another comprehensive search of the following databases was completed: Cochrane Library,

CINAHL, Web of Science, Ovid MEDLINE, JBI, PsycINFO. The search was widened to include

ProQuest in addition to Google Scholar to locate grey literature. Additionally, national

organizations focused on quality improvement and cardiovascular health were searched. These

included the AHRQ, National Guideline Clearinghouse, Institute for Healthcare Improvement

(IHI), AHA and ACC.

A combination of key terms and medical subject headings (MeSH) were used for article

retrieval and applied to many fields such as title, abstract, keywords, and any field. The

following terms/ MeSH headings were used: heart failure, patient education, education, video

education, video, DVD, Digital Versatile Disc, videodisc recording, and video-audio media. The

Cochrane database was first searched using the terms "heart failure", "patient education", and

video; this yielded eight citations. Another search of the Cochrane database using the terms

"heart failure", "patient education", and DVD yielded three citations. Ovid MEDLINE was then

searched using the terms DVD, videodisc recording, video-audio media, video, heart failure, and

patient education yielded 16 citations. A search of CINAHL using the terms "Digital Versatile

Disc", "dvd", "video", "videorecording", "heart failure", "patient education" yielded 10 citations.

In PsycINFO, searching with the terms heart failure, patient education and video yielded seven

citations. Web of Science was searched using the terms heart failure, education and video, which

yielded three citations. Searching JBI, with the terms video, DVD, heart failure, and patient

education yielded eight citations. In ProQuest and Google Scholar, the terms heart failure,

education and video yielded two and three citations respectively. The terms "video education" and "heart failure" were used in searching the ACC and AHRQ, this yielded zero citation for ACC but returned one citation for AHA. Combining video education and heart failure, yielded one article for IHI and 26 articles for the National Guideline Clearing House when enclosed with apostrophe. The search was completed by conducting hand searching of the reference list of retrieved articles to identify additional publications, this yielded zero citation.

Search limitations were applied that were in keeping with the research question and study purpose. The inclusion criteria for articles were: studies that included adult HF patients, published in English from 2007 – 2017, included VE as an intervention, and addressed at least one or all the primary outcomes identified in the research question. Studies for exclusion were those not meeting the inclusion criteria in addition to using video and arcade games and studies with limited video-based intervention information such as details about the DVD/ video intervention and statistical measurements of the intervention to demonstrate the effect of the intervention on the population of study. For example, Davis et al. (2011) utilized a DVD/ VHS at discharged for HF patients but did not provide information on the content of the DVD. Additionally, the study did not report on statistical findings related to the outcomes specifically being measured in this integrative review.

A Word Document was created with the review purpose, research question, and search limits to document every step in the review process. Two comprehensive tables were created, one documented every database checked, key words and MeSH terms, the number of articles being included and excluded, duplicates and final article count while the other recorded databases, key words/ MeSH terms, excluded articles and rationale for exclusion. This aided in creating the flowchart (see Figure 2).

Findings of the integrative review

Eighty eight studies were retrieved. After removing 16 duplicates, the remaining 72 studies were evaluated for inclusion with five studies meeting inclusion criteria (see Figure 2). A description of the included studies with information about study/ sample characteristics, findings and limitations is presented in Table 1. Three studies were RCTs (Albert et al., 2007; Maddison, Prapavessis, Armstrong, & Hill, 2008; Veroff et al., 2012), one quasi-experimental study (Liou et al., 2015) and one pre-test/ post-test design (Boyde et al., 2012).

All studies included both male and female participants diagnosed with HF, with sample sizes ranging from 20 to 480 participants. Information on race/ ethnicity was not provided in three studies (Boyde et al., 2012; Liou et al., 2015; Veroff et al., 2012). For the studies by Albert et al. (2007) and Maddison et al. (2008), mostly Caucasians and New Zealand European were reported respectively. Study participants were predominantly seniors, with three studies reporting mean age of 64 years and older (Boyde et al., 2012; Maddison et al., 2008; Veroff et al., 2012). Overall, the age range in the studies was from a mean of 59 ± 13.7 (Albert et al., 2007) to 75 years and older (Boyde et al., 2012; Veroff et al., 2012). New York Heart Association (NYHA) functional class was determined in three studies but complete data only reported in two (Liou et al., 2015; Maddison et al., 2008) with Maddison et al. (2008) only providing data on NYHA class II and III. While accounting for this limitation, between the two studies, majority of the patients were noted to be NYHA functional class II (67) and III (70).

Impact of video education on improving knowledge of heart failure. Two studies of different study design assessed knowledge of heart failure as an outcome, Boyde et al. (2009), a pretest/ post-test design and Liou et al. (2015), a RCT. Post intervention, there was a statistically significant increase (p <.0001) in post-test knowledge scores indicating that patients had

improvement in knowledge of HF (Boyde et al., 2012). In the study by Liou et al. (2015), both intervention and control groups displayed a significant increase ($p<.001$) in knowledge of HF from pre- to post intervention. However, the intervention group had a statistically significant greater increase ($p <.05$) in knowledge of HF than the control group (Liou et al., 2015).

Impact of video education on self-efficacy. Only one study, a RCT by Maddison et al. (2008), measured self-efficacy. The intervention group had significantly higher self-efficacy scores ($p< .05$), an improvement of 28.6% from pre to post intervention as compared to 1.5% for the control group.

Impact of video education on improving self-care. Participants exposed to VE in four studies showed improvement in self-care. Mean number of signs and symptoms at 90 days after hospitalization decreased in both control and intervention groups in Albert et al. (2007) with greater change noted in the intervention group ($p < .04$) especially with regards to edema and profound fatigue. The intervention group responded more to symptoms of edema and dyspnea with exercise or rest, showing better adherence to HF recommendations (statistically significant). The RCT by Veroff et al. (2012) also showed a statistically significant increase in adherence to weight monitoring in the intervention group of the HF population studied. Forty-four percent of the intervention group reported weighing themselves daily versus 37% of the control group ($p = .05$) and when daily weight monitoring was combined with monitoring on most days, 67% of the intervention group versus 57% of the control group reported this self-care behavior ($p =.05$). Although these findings were not statistically significant, 47% of the intervention group in comparison to 44% of the control group was more likely to monitor their fluid intake every day or on most days, and 83% of the intervention group was more likely to follow a low-sodium diet as compared 77% of the control group (Veroff et al., 2012).

While there was a significant difference in self-care between intervention and control

group in the Liou et al. (2015) study, with the intervention group having a higher mean than the

control group, the self-care maintenance subscale of the Self-care of Heart Failure Index

(SCHFI) did not improve post intervention. In the SCHFI, higher self-care is observed by a score

greater than 70 on any subscale (Liou et al., 2015). The self-care maintenance subscale remained

less than 70 at three months after hospital discharge, with the lowest score reported for forgetting

to take medications and a low-salt diet. Likewise Boyde et al. (2012) evaluated self-care with the

SCHFI scale but reported a statistically significant (p = .027) increase in self-care maintenance

post-test scores.

For Liou et al. (2015), the other SCHFI subscales, self-care management and self-care

confidence had higher mean scores in the intervention group three months post hospital

discharge. Of note, the intervention had the most visible effect on the self-care confidence

subscale. Moreover, Liou et al. (2015) further showed that self-care confidence could explain

self-care management behaviors. Similarly, Boyde et al. (2012) reported statistically significant

increase in self-management scores (p < .0001) but self-confidence only trended towards

statistical significance (p = .051). Overall, improvements were seen in all subscales of the SCHFI

in both studies (Boyde et al., 2012; Liou et al., 2015).

Video usage and satisfaction with video by HF patients. Of the five studies, two

studies provided clear data on video usage of participants. This data is useful to determining

patients' preferences and for making modifications to programs as needed. In the Albert et al.

(2007) study, 29 of the 37 (78.4 %) intervention group participants watched the video. Of the 29

participants, 93% watched all six chapters, 56 % watched it with family/ friends and 29%

watched all six chapters more than once. When asked if the video taught them new things, 36%

strongly and fully agreed. Additionally, 21% strongly and fully agreed when asked if they had made changes in lifestyle based on the information and 89% strongly and fully agreed that they would recommend the video to others with HF.

In the study by Veroff et al. (2012), 14% reported that they did not have a DVD player. Further data on usage was not provided but satisfaction with the DVD was reported. Of the 50 respondents that provided satisfaction ratings for the DVD, 26% and 30% gave an excellent and very good rating respectively (Veroff et al., 2012). Forty-two percent rated the DVD as good. Patients in Boyde et al.'s (2012) study did not document video usage or specific data for DVD satisfaction but the study's focus group data indicated that patients used the resources in the study (manual and DVD) and found them usefulness and beneficial.

The impact of video education on other health-related outcomes. Other outcomes assessed in the studies reviewed were: healthcare utilization, NYHA functional class, PVO_2, health status, heath care provider interaction, and health care costs. The study by Albert et al. (2007) assessed healthcare utilization and found that hospitalization, emergency care, office visit and laboratory testing rates remain unchanged between the intervention and control groups but the intervention group required less telephone advice ($p < .04$), less extra diuretic dosing ($p < .02$) and were significantly more likely to request HF literature from healthcare providers ($p < .03$).

Liou et al. (2015) reported no significant difference in 30-day hospital readmission and mortality rate between control and experimental group. However, in comparison to the control group, the experimental group had a tendency towards a lower three month hospital readmission and mortality rate. There were mixed results for NYHA functional class. In Liou et al. (2015), there were significant improvements in the experimental group post intervention but in Albert et

al. (2007), non-significant changes in the intervention group at 90-day follow-up. Maddison et al. (2008) reported significant differences in PVO_2, with higher PVO_2 values found in the intervention group (adjusted mean = 22.46) versus the control group (adjusted mean = 19.96). A 6.3% improvement in PVO_2 was reported in the intervention group from pre to post intervention whilst the control group decreased by 1.3%.

In assessing health status, no difference was found between intervention and control groups in physical and mental functioning levels (Veroff et al., 2012). In further assessing healthcare provider interaction, whether participants discussed the contents of the DVD or booklet with a doctor or health professional, only five percent reported discussing the DVD and booklet but 47% intended to discuss them in the future. Additionally, no statistical differences were found in any claims-based cost measure in ascertaining healthcare costs between the groups, (Veroff et al., 2012). However, it was noted that "the study was not powered to detect reasonable differences in medical costs or utilization" (Veroff et al., 2012, p. 41).

Features of video education. Four of the studies except Albert et al. (2007) developed their own videos used for VE. Albert et al. (2007) utilized the Milner-Fenwick, Inc. Living with Heart Failure: A Home Video Guide to Self Care Video. Of the five studies, only two utilized a theory in developing VE. Liou et al. (2015) used Riegel's self-care heart failure model and Boyde et al. (2012) used Knowles's principles of andragogy. Two studies mentioned use of HF guidelines (Albert et al., 2007; Liou et al., 2015) and three mentioned use of medical experts in the development of the videos used for video education (Albert et al., 2007; Liou et al., 2015; Veroff et al., 2012). Interestingly, two studies (Boyde et al., 2012; Veroff et al., 2012) mentioned including HF patients in video development thereby integrating the viewpoint of patients and HF experts.

Four studies provided details on the topics presented in the videos. Altogether, 14 topics were identified: self-care behaviors, hospital experience, medicines, daily weighing, rest and relaxation, food, exercise, association between fluid build-up and symptoms of HF, CHF definition and symptoms, treatment plan including dealing with psychosocial issues, purpose of peak oxygen uptake (PVO_2), strategies to cope with and overcome discomfort during PVO_2 testing, procedural safety, and the body's response to exercise. The studies captured a total of 13 outcomes: knowledge, self-care, healthcare resource utilization, change in signs and symptoms, change in NYHA functional class status, PVO_2, self-efficacy, hospital readmissions, mortality rate, health care provider interaction, health status, program satisfaction, and health care costs. The outcome most commonly measured was self-care. Three studies conducted telephone follow-up while the remaining two conducted follow-up in person. Every study reported a different follow-up timing to evaluate outcomes, from as short as one week post intervention to three months after discharge. Unique to follow-up by Albert et al. (2007), was mailing patients a letter informing them of the upcoming telephone follow-up and a copy of the interview questions two weeks prior to being called.

Three studies reported duration of the videos used. A 10-minute DVD with CHF patient models and a cardiologist was provided by Maddison et al. (2008). Albert et al. (2007) used a tape lasting 60 minutes divided into six chapters, introductory and summary sections with information delivered by actual patients; and Veroff et al. (2012) used a DVD that lasted 29 minutes.

Summary of the Literature Review

Five articles were evaluated during the integrative review to determine the efficacy of VE. Four studies evaluated self-care as an outcome of study, one study evaluated self-efficacy and

two studies evaluated knowledge of HF. The finding of all four studies indicate that VE

significantly improved self-care behaviors of HF patients (Albert et al., 2007; Boyde et al., 2009;

Liou et al., 2015; Veroff et al., 2012). The findings in Maddison et al. (2008) indicated that

patient education supplemented with VE was more effective than the usual standard of patient

education for improving self-efficacy of HF patients. Patient education supplemented with VE

was shown to be more effective in increasing HF patients' knowledge of HF (Boyde et al., 2012;

Liou et al., 2015).

In assessing other outcomes, mixed results were found on the effect of VE. VE was not

found effective for reducing emergency care (Albert et al., 2007) and claims-based cost (Veroff

et al., 2012) but the intervention group in one study notably required less telephone advice

(Albert et al., 2007). The two studies (Albert et al., 2007; Veroff et al., 2012) provided

participants' satisfaction with VE showing that VE was well received by the participants. This

finding is keeping with HF patients' preference for a multimodal learning style (Boyde et al.,

2009).

The results of the integrative review indicate that the use of VE in HF is not well studied

as only five articles were retrieved after searching well-known databases, grey literature and

national organizations specific to cardiovascular health and quality improvement in healthcare.

Only one study researched the effects of VE on self-efficacy. Furthermore, of the five studies,

only one study explicitly reported its setting as within the U. S. (Albert et al., 2007). Although

not clearly stated, from thorough review of the article, the setting of one other is likely the U. S.

(Veroff et al., 2012). Thus, the generalizability of the findings for practice within the U. S.

should be considered; particularly, considerations should be given to the nuances of the practice

setting. Albert et al. (2007) and Veroff et al. (2012) were published five years apart and both findings significantly showed that VE improved self-care behaviors in HF patients.

Two studies had small sample sizes (Boyde et al., 2012; Maddison et al., 2008) and Albert et al. (2007) was affected by a high non-completion rate. Some studies had limited data on patient and clinical characteristics needed to describe the population such as race (Liou et al., 2015; Veroff et al., 2012). Insufficient data on NYHA functional class status was noted, to indicate whether VE is applicable to all classes or required tailoring to meet the needs of specific NYHA functional class. Only two studies (Liou et al., 2015; Maddison et al., 2008) provided clear details on NYHA functional class of participants.

Limited data was shared on video usage of patients and satisfaction with video education. Fourteen percent of the intervention group in Veroff et al. (2012) did not have a DVD player and 22% did not watched the video in Albert et al. (2007). Although the reason for the participants not watching the video was not reported by Albert et al. (2007), access to a DVD player may have been a factor. Considerations for practice implementation or future study of VE include patients' access to the required technology (e.g. DVD players, internet connectivity) and how to overcome potential barriers to ensure access; so that on the one hand, the benefits of VE may be achieved by patients and on the other hand, researchers have this information for replicating studies or for effective translation into practice.

Implications for Nursing

The most common method of initially educating HF patients has been a one-on-one didactic format (Boyde, Turner, Thompson, & Stewart, 2011). VE is an additional evidence-based format that nurses may offer to patients to increase their knowledge and understanding of managing HF. HF patients were satisfied with VE as a format of HF education delivery, thus as

nurses seek to deliver patient-centered care, incorporating VE as a strategy for improving HF

outcomes is a viable strategy to be pursued.

Implications for the Present Project

All five studies reviewed showed that VE was efficacious in increasing HF knowledge

(Boyde et al., 2012; Liou et al., 2015), self-care (Albert et al., 2007; Boyde et al., 2012; Liou et

al., 2015; Veroff et al., 2012), and self-efficacy (Maddison et al., 2008). This indicates that VE

can serve as an additional method of learning that is patient-centered, evidence-based and cost-

effective. The content of the videos being viewed (see Appendix A) will inform patients about

best practices to care for themselves. This is critical as many HF patients lack the knowledge

required to manage their HF. While knowledge of HF is not enough, it may affect the patients'

confidence/ self-efficacy and result in adherence to the prescribed self-care regimen (Chen et al.,

2014).

Research Question

In adult patients with HF, does supplementing usual HF patient education with VE

increase knowledge of HF, self-efficacy, self-care and reduce 30-day readmissions?

How satisfied are HF patients with VE?

Methods

Rationale for the Project

HF is associated with high rates of morbidity and mortality. Providing self-care skills,

improving patients' self-efficacy and knowledge of HF are important components in helping

patients empower themselves to manage their own self-care. Supplementing standard HF

education with VE is a patient-centered evidenced-based method of improving outcomes. The

aim of this study was to supplement the usual standard of HF patient education with VE on two

acute care units that care for HF patients and evaluate changes in knowledge of HF, self-efficacy,
self-care and 30-day readmissions. Patient satisfaction with VE was also evaluated. This project
adds to current limited literature on the use of VE for HF patient education. Moreover, the
project utilized information technology platforms (computer, tablet, smartphone) not mentioned
in the studies reviewed. Furthermore, the project provided sufficient details needed for
replication in practice settings.

Research Design

A one group pretest/ post-test design was used to examine the effectiveness of
supplementing usual HF patient education with VE on improving knowledge of HF, self-
efficacy, self-care and reducing 30-day readmissions. The 30-day readmission rate was
compared to a randomly selected historical group of HF patients (September 2016 – November,
2016 cohort) who did not receive the intervention.

Research Questions

In adult patients with HF, does supplementing usual HF patient education with VE
increase knowledge of HF, self-efficacy, self-care and reduce 30-day readmissions?

How satisfied are HF patients with video education?

Definition of Terms

Electronic Health Record: A longitudinal electronic record of patient health data
generated by one or more encounters in any care-delivery setting (Sylvia, 2014, p. 30).

Heart Failure: A complex clinical syndrome that results from any structural or functional
impairment of ventricular filing or ejection of blood (Yancey et al., 2013, p. e153).

Heart Failure Patient Education: The communication of information about the
management of heart failure (Fredericks et al., 2010, p. 31)

Heart Failure Clinic: A disease management program in which service is provided primarily in an outpatient clinic setting where patients come to receive care from practitioners with expertise in HF (Lindenfield et al., 2010, p.e102).

Heart Failure related self-care behavior is the actions that a HF patient undertakes to maintain life, healthy functioning, and well-being (Jaarsma, Arestedt, Martensson, Dracup & Stromberg, 2009, p. 99).

Learning style: The way in which a person receives, processes and understands information (as cited in Boyde et al., 2009).

Patient centered care: Providing care that is respectful of and responsive to individual patient preferences, needs, and values and ensuring that patient values guide all clinical decisions (Institute of Medicine [IOM], 2001, p.6).

Readmission: A patient is considered "readmitted" if he or she has one or more unplanned inpatient admissions at a short-term acute care hospital within 30 days of discharge from the original index admission (regardless of whether the readmissions occurred at the same or a different hospital) (CMS, 2017, p. 17).

Self-care: A naturalistic decision making process that influences actions that that maintain physiologic stability, facilitate the perception of symptoms, and direct the management of those symptoms (Riegel et al., 2016, p. 226).

Unplanned readmission: Acute clinical events a patient experiences that require urgent rehospitalization. Unplanned readmissions are what make up the outcome of the readmission measures (CMS, 2017, p. 56).

Usual HF patient education consists of verbal education by nurses and written patient education material on managing HF, entitled "*Understanding Heart Failure*". Verbal education consists of 60 minutes of HF education given during the course of a patient's hospitalization.

Video education: The use of video as an educational medium (Tuong et al., 2014, p. 218).

Setting

The project was conducted at a 600-bed academic medical center (AMC) with a nationally recognized HF clinic in central Virginia (UVA Health System, 2017). Participant enrollment was conducted on two inpatient units to effectively reach the target population: HF patients. Unit one is a 28 bed acute cardiology medical unit with telemetry that provides care to patients with cardiac diagnoses including HF, acute myocardial infarction, and dysrhythmias. Patients requiring cardiac related procedures such as pacemaker insertion, electrophysiology studies, and left ventricular assist devices are also admitted to this unit. Unit Two is a 28 bed vascular and acute cardiology unit that provides care to patients with medical and surgical vascular conditions as well as cardiac diagnoses such as HF. As both units focus on care of HF patients and receive majority of HF hospitalizations, the project was best suited for these units so that a greater numbers of HF patients would be enrolled in the project as well as derive the likely benefits of the intervention. Furthermore, a larger sampling of patients allows for a more effective analysis of the implementation of VE among HF patients.

At discharge, patients without geographic limitations have follow-up appointments at the HF Clinic to evaluate their health status post hospitalization, assess response to therapy, and modify treatment as necessary. Patients with geographic limitations visit with private healthcare providers of their choice or are assisted in locating one closest them. Thus, in addition to the units, the HF Clinic served as another setting due to the potential to conduct some of the follow-

ups with patients enrolled in the study. Approval for the project was obtained from the managers

of both units and the HF clinic, quality manager (Appendix B, C and D).

Project Description

The VETiO-HF project evaluated the introduction of VE as an intervention to optimize

current HF patient education being offered on two acute care units that served as the setting of

the project. Nurses on both units already offer patients verbal education and written material as

the standard of practice for HF patients. VE was introduced as a supplement to this standard of

practice and the key HF outcomes of interest were measured to evaluate the intervention.

The HF videos used for the VE intervention were created by Milner-Fenwick, Inc. (Milner-

Fenwick) a health education company with decades of experience in health education. In May

2017, Milner-Fenwick became a subsidiary of the largest in-hospital television network, The

Wellness Network (Milner-Fenwick, 2017a). Milner-Fenwick has a reputation in the medical

community for quality and service and has presence in over 2000 hospitals and other health care

facilities (Milner-Fenwick, 2017b). Milner-Fenwick is viewed as the "gold standard of health

education video production" and the company's HF patient education videos have been cited in

prior HF studies and disease management programs (Albert et al., 2007; Hebert et al., 2011;

Milner-Fenwick, 2017c). The videos produced are based on "evidenced based medicine and self-

care strategies" and include real life patients living with the medical conditions featured (Milner-

Fenwick, 2017b). Further evidence of the company's attention to quality is seen in the

characteristics of the videos. These videos are short in duration, offering concise information for

the health status of HF patients. The HF videos are available in Spanish and English.

Additionally, the videos contain representation from various ethnic groups and display patients

in real world settings such as home and visiting with a health care provider.

The videos were vetted for content validity by nurses and physicians at the hospital with expertise in cardiovascular care. Additionally, the videos were screened by the Patient Education committee of the hospital to ensure suitability for HF patients, have met the hospital's patient education guidelines and are packaged for accessibility by ensuring the HF library's uniform resource locator (URL) contains components of the hospital's URL. Modifications were made to the URL to ensure that it connected the videos to the hospital.

Assuring fidelity. Efforts were undertaken to assure fidelity and quality of the project to prevent variation in processes and to ensure replication of the project. The staff on the units in which patients were recruited were informed of the project through face to face communication, email, and unit team huddles and staff meetings. A PowerPoint presentation outlining the project (see Appendix E) and contact information for the project lead were presented to the unit staff. Staff members on both units were informed that the intervention was a supplement to the current standard of delivering HF education. A written brief of the project was presented to the HF Quality Team and HF medical team. The project protocol guided all participant interactions and the flow of the project to ensure consistency. An inclusion/ exclusion checklist and protocol checklist was completed for each participant to facilitate adherence to protocol. Telephone conversations during follow-up were scripted. Notes were made by the data collector (first author) during enrollment and follow-up as needed (e.g. noting patients' experiences with the videos, reasons for not completing the study). Use of the various checklists and aforementioned strategies helped to provided quality assurance for the project (Song & Ward., 2015).

Usual HF Patient Education

Usual HF patient education consists of verbal education by nurses and written patient education material on managing HF, entitled "*Understanding Heart Failure.*" VE consists of 60

minutes of HF education given during the course of a patient's hospitalization. Completion of

HF education is documented in the patient's electronic health record (EHR). On the day of

admission, patients receive the initial ten minutes of teaching on the basics of HF and the reason

for admission. Prior to discharge, patients are screened for inclusion in the hospital's transitional

care programs:

1. The Hospital to Home (H2H) program is a nurse practitioner led clinic for patients who

   live within 90 miles of the hospital. Patients attend the clinic within four to seven days

   after discharge for follow-up. Adjustments to medications are made as needed. Patients

   are followed for 30 days. Twenty-one (70%) of the 30 participants who completed the

   project had H2H appointments at discharge, with only 16 (76.2%) attending the clinic

   visit.

2. The Heart Health at Home (3H) program is a nurse practitioner supervised program that

   provides regular follow-up visits by a certified nursing assistant for patients living within

   60 miles of the AMC. Patients are followed for one year. Three (10%) of the 30

   participants completing the project had this program at discharge. One of three patients

   was already enrolled in the 3H program prior to hospital admission and continued at

   discharge.

3. Locus Health is a remote monitoring program that captures patient data such as blood

   pressure, weight, and heart rate. This program is for patients with a primary diagnosis of

   Acute Myocardial Infarction, HF, Chronic Obstructive Pulmonary Disease, Coronary

   Artery Bypass Grafting or any patient 65 and over with Medicare as primary insurance.

   A nurse follows the patients for 30 days. Seventeen (56.7%) of the 30 participants who

completed the project had remote monitoring at discharge, with one participant already

enrolled prior to hospital admission and continued with the service upon discharge.

Altogether, 24 of the 30 (80%) participants were enrolled in a transitional care program. Of

the 24, 16 (66.7%) were enrolled in two or more transitional care services; two of these

participants did not attend H2H clinic appointments. Two patients were enrolled in all three

programs. Of note, six (20%) of the 30 participants were not assigned to any of these transitional

care programs. A nurse navigator with expertise in HF care, screens patients daily for admission

into these HF transitional care programs. At discharge, patients also receive an after visit

summary (AVS). The AVS consists of written sheets that details the hospital stay including

reason for admission, treatment received, discharge education and follow-up appointments.

Measures

      The Self-care of Heart Failure Index v.6 (SCHFI). The SCHFI a 22-item instrument

was used to measure self-care (see Appendix F). The instrument has been used in at least 17

studies and translated into numerous languages (Riegel, Lee, Dickson, & Carlson, 2009; Vellone

et al., 2013). SCHFI is divided into three scales that reflect the components of HF self-care; a 10-

item self-care maintenance scale, a six-item self-care management scale and a six-item self-care

confidence scale (Vellone et al., 2013). The self-care confidence scale is used to measure self-

efficacy as conceptualized by Bandura and has been utilized as a measure of self-efficacy in

prior HF studies (Buck et al., 2015; Tovar et al., 2016). The concepts reflected by the three

scales are highlighted in the situation specific theory of heart failure self-care (Vellone et al.,

2013), the theoretical framework used for the project. Each scale is "standardized to a 0- to 100-

point range" and a score of 70 or greater can be used to indicate adequate self-care (Riegel et al.,

2009, p. 493).

Earlier psychometric tests done on the scale found weaknesses in some subscales. The Cronbach alpha for the self-care maintenance scale was .553, the self-care management scale .597 while the self-care confidence scale was .827. Additionally, the overall model fit was weak (SCHFI v.6: $[chi]^2$ = 356.92)(Riegel et al., 2009). Recent psychometric tests analyzing the construct validity of the individual subscales instead found that the SCHFI v.6.2 had "evidence of construct validity, contrasting groups validity, internal consistency and test-retest reliability" (Vellone et al., 2013, p. 508). The Self-care Maintenance and Management Scales of the SCHFI were found to not be unidimensional and likely the reason for the prior low reliability scores. Consequently, Cronbach alpha should not be used to assess the reliability of the SCHFI (Barbaranelli, Lee, Vellone & Riegel, 2014). For this study, the Cronbach alpha for self-care maintenance, self-care management, and self-confidence were .77, .66 and .78, respectively. This indicates the reliability of the scales was relatively satisfactory given the authors' concern for using Cronbach alpha to calculate reliability of the scales. Permission was not required for use of this scale (Riegel et al., 2009).

The Atlanta Heart Failure Knowledge Test (AHFKT). The AHFKT was used to evaluate patients' knowledge of HF (see Appendix G). This instrument was initially a 27 item questionnaire but has since been revised and now "contains 30 multiple-choice items, with 2 questions concerning pathophysiology, 12 questions concerning nutrition, 6 questions regarding behaviors, 4 questions regarding symptom management, and 6 questions regarding medications" (Reilly et al., 2009, p. 507). Content validity has been assured by nationally known HF nursing experts. AHFKT has been used in multiple studies (Butts, Higgins, Dunbar, & Reilly, 2017). In a systematic review of questionnaires used to assess knowledge of HF patients, after a review of the psychometric tests of various instruments, AHFKT was rated as the most applicable

questionnaire to test HF knowledge (Marques Vieira, Ziesemer Costa, Oh, & Lima de, 2016).

AHFKT Version 2 was calculated to "have a Flesch-Kinkaid reading level of 5.8 and a Fry

Readability fourth-grade reading level" (Butts et al., 2017, p.4). The AHFKT was noted to have a

Cronbach's alpha of 0.87 (Butts et al., 2017). In this project, the Cronbach's alpha for the pretest

was .70, the post-test .78, and the combined pre-test and post-test, .75. Permission was not

required for use of the AHFKT v.2 (Butts et al., 2017).

30-day readmission. The rate of unplanned readmission to the hospital within 30 days of

hospital discharge was calculated to determine 30-day readmissions. Hence, all adult HF patients

who received the intervention with an unplanned readmission to the AMC within 30 days of

hospital discharge were counted as a 30-day readmission (IHI, 2013; Sylvia & Terhaar, 2014).

Patient satisfaction with VE. This was measured using an eight-item instrument (see

Appendix H) developed by the project lead due to the absence of a published validated

instrument in the literature and after consultation with a national HF expert who previously

published on the use of VE in HF to verify this. Five statements are rated on a four point Likert

scale and the remaining three items are open-ended questions. The questionnaire evaluated the

patients' overall experience with VE, evaluating satisfaction with the videos and accessibility of

the videos, being an online format. Patients were provided with the opportunity through the

questionnaire to provide feedback about the videos that may be used to make future

modifications. The instrument was reviewed by two cardiovascular patients in the development

stage and reviewed by HF experts for validity. The patient experience officer and the patient and

family education librarian reviewed the questionnaire to ensure suitability for patients and that

considerations were given to patients with low health literacy. The questionnaire has a Flesch-

Kincaid reading level of 6. 1.

Additionally, a video usage and rating log was used to track the patients' video usage. Patients were able to select the videos watched and provide a rating on the helpfulness of each video to them in managing their HF. This self-reported log provided information on the specific number of videos watched by each patient and the specific videos patients found helpful in managing HF. The log template was reviewed by HF experts, the patient education and patient experience experts at the AMC prior to the study. The log has a Flesch-Kincaid reading level of 6.2.

Demographic and clinical data. Data collected included age, gender, race/ ethnicity, and marital status, living arrangements, level of education, annual income, insurance payer and time / distance away from the hospital. Clinical data collected included patients' comorbidities to determine the Charlson Comorbidity Index which predicts risk of death from comorbid diseases (Charlson, Pompei, Ales & Mackenzie, 1987), the New York Heart Association (NYHA) functional classification, left ventricular ejection fraction (LVEF) score, length of hospital stay, date of HF diagnosis/ time since diagnosed, medication classes, number of HF related hospitalizations during previous year, date of hospital discharge and date of readmission. The NYHA functional classification provides details on the severity of symptoms in those with structural heart disease. Thus, a patient with NHYA Class I has no limitations in physical activity while a patient with NYHA Class IV is unable to perform any physical activities without symptoms of HF or has HF symptoms at rest (Yancey et al., 2013).

Procedures

Participants who were recruited for the project met the following criteria for enrollment: patients admitted to the designated acute cardiology units who were diagnosed with HF and were 18 years of age or older. Informed by prior studies, patients were excluded from the project if

they were under observation, medically certified as blind, diagnosed with a cognitive impairment

(Alzheimer's, Dementia etc.), unable to give consent, unable to read and write in English, and/ or

being discharged to a skilled nursing facility, rehabilitation facility, hospice care/ hospice facility,

long term acute care facility or to a prison.

HF patients meeting eligibility criteria were recruited during admission, with the aim

being to recruit patients within 48 hours of admission if medically stable. Admissions that may

be eligible for inclusion were identified through daily rounds, recommendations from the unit

staff and HF nurse navigator. Additionally, posters were placed on both units to recruit patients

for the project (see Appendix I). Upon identifying patients, an inclusion/ exclusion criteria

checklist was used to screen patients to ensure strict adherence to the project protocol (Appendix

J). All eligible patients were then approached and assent was obtained from each participant who

was included in the project. Permission was sought to conduct a telephone reminder after

hospital discharge regarding watching the videos. After gaining permission, telephone numbers

and email addresses when available, were collected. Additionally, demographic and HF related

data were collected through medical record reviews and patient interviews using structured forms

(see Appendix K and Appendix L) (Hasnain-Wynia et al, 2007; Stanford Patient Education

Research center, 2007). For patients without NHYA classification documented in the medical

record, a NYHA class was assigned utilizing the patient presentation on admission found in the

medical record. The NYHA classification designated after medical chart review was verified by

a practicing board certified HF Nurse Practitioner. Participants were administered the SCHFI to

collect baseline measures for self-efficacy and self-care, and given the AHFKT to obtain baseline

knowledge of HF.

Computers in the patients' rooms, a tablet computer on Unit One and loaned tablet computers from the Advanced Heart Failure Center were used to demonstrate how to access the videos and to show patients the intervention. A patient guide created by the project lead was used as necessary to facilitate this process. This patient guide is a standardized way for patients to easily access the videos, especially post hospitalization when they are away from the clinical support of the hospital setting (Appendix M). In addition, the guide provides a consistent method that nursing staff may later use to teach patients how to access the videos.

The HF videos are located within the Heart and Vascular Patient Education Video Library of the AMC's website. Each video contained a transcript that provided written descriptions of the video that was watched. The videos displayed real world scenarios that HF patients may navigate, which require knowledge of HF and decision making regarding self-care. Videos are grouped into three main categories: *HF Basics* which defines the diagnosis of HF, common tests for HF, the composition of a HF management plan, visiting with the HF healthcare team, how to make lifestyle changes, monitoring for signs and symptoms, energy conservation, smoking cessation, handling flare-ups and the emotions of HF. The *HF Basics* section contains 12 videos totaling 39.16 minutes. The *HF Medications* category describes for patients how to taking their medications, understand HF medications, and contains information on major HF medications including Angiotensin Converting Enzyme (ACE) inhibitors, Angiotensin Receptor Blockers (ARBs), Beta-Blockers, Diuretics, Aldosterone Antagonists, and Digitalis. The HF medications section contains seven videos totaling 24.17 minutes. The *HF Lifestyle Changes* category describes how to limit sodium, information on fat and cholesterol, using a food label, dining out, fluid guidelines, how to get active and exercise safety. This third category contains seven videos totaling 20.32 minutes. Altogether, the HF video library has 26 videos with a total

video content duration of 1 hour 24 minutes and 5 seconds. Of note, individual videos are kept

mainly to a three to four minute duration, as this is more suitable for patients who are not well

and have limited attention span (Milner-Fenwick, 2017b). A list of the videos is provided in

Figure 3.

The demonstration device was used to play the first video entitled *"What is Heart

Failure?"* for approximately 60 seconds to introduce the patient to VE. Patients were informed

of all three HF video categories and an overview provided of the contents of each category.

Patients had access to all 26 HF videos that comprised the VE intervention and were encouraged

to watch all the videos within seven days of hospital discharge. Patients were informed that they

may watch the videos at their own pace, alone or with company while in hospital as well as post

hospitalization and that videos may be watched repeatedly. In addition, patients were informed

that they are not required to watch them all at once and that videos may be watched in the setting

of their choice. The videos may be viewed on a personal computer, tablet computer or on a

cellular phone with video and internet capabilities (such as smartphones). Patients were shown

how to create internet shortcuts or bookmarks of the videos on their devices when permitted, to

facilitate quick retrieval of the videos. A video usage and rating log (Appendix N) were given to

participants to document all videos watched. Patients were informed to select and rate all videos

watched based on its helpfulness.

Patients without access to the internet and/or a device to watch the videos were provided

with a loaned tablet computer (iPads) with charging equipment from the Advanced Heart Failure

Center with internet access imbedded. The limitations of these loaned tablet computers for web

browsing beyond the hospital's website were shared with patients. Teaching was provided on

how to use the tablet computers which included the ability to power on/ off, access and play

videos, and charge the devices. Teach-back used to verify understanding. Patients were informed

to call for assistance if experiencing any challenges with the equipment or using the equipment.

The tablet computers and charging equipment were returned to the HF clinic during the patients'

follow-up appointment. A device agreement form was completed by patients receiving loaned

devices (Appendix O). Patients who owned a personal device that was not with them during

enrollment, were loaned a tablet computer.

At the end of the VE demonstration, patients were provided with a video guide for

accessing the videos and were given a hospital card with the website address for the videos

(Appendix P). This was to facilitate easy retrieval of the videos, offer a standardized way of

accessing the videos and reduce the likelihood of future burden to nursing staff in providing

guidance to locate the website. Patients were given a copy of the *Managing Your Heart Failure*

With Video Education booklet (Appendix Q), developed by the project lead, which contained the

video guide, video watching tips, and the need to know HF topics (recommended by the AMC in

keeping with current HF guidelines) with corresponding videos. This booklet was reviewed by a

HF expert for suitability for HF patients, the patient and family education librarian for assessing

readability/ health literacy considerations and one of the project authors for overall presentation.

Patients were informed of the questionnaires (SCHFI, AHFKT and Heart Failure Video Survey)

to be completed post intervention. Patients were given time to express concerns or ask questions

regarding the intervention. Contact for the project leader was provided to all participants for any

questions or concerns identified. Patients were informed that they would continue to receive the

usual standard of HF patient education in addition to VE. After each patient enrollment, a

checklist outlining the project protocol components was completed (Appendix R).

Most patients received a scripted telephone call (see Appendix S) within 48 to 72 hours post hospital discharge, as a reminder to watch the videos and to identify any challenges with watching the videos such as a loss of internet or a malfunctioning device. During the telephone call, patients who received loaned tablet computers were reminded to return the equipment at the next hospital visit. Post intervention evaluation of primary measures and satisfaction with VE was conducted via electronic or paper-based questionnaires. For the electronic method, patients were given a secure website link to complete the post-test questionnaires (SCHFI, AHFKT and Heart Failure Video Survey) in Qualtrics, a secure online survey platform offered by the university. On the loaned tablet computers, the post-test questionnaires were embedded on the home screen for easy retrieval for patients who received those devices and had no email access on the device due to the built-in internet browsing restrictions. Patients who did not complete the questionnaires electronically had the option to complete paper-based questionnaires and return them in the postage paid preaddressed envelope provided.

Medical records of participants were reviewed to identify patients returning to AMC within 30 days to determine the 30-day readmission rate for the sample. Patients with an unplanned readmission within 30 days from date of hospital discharge were counted. The multidisciplinary rounds conducted on the units and daily census review of the units facilitated identification of possible readmissions.

Protection of Human Subjects

The Collaborative Institutional Training Initiative (CITI) training was completed as per the institution's IRB protocol by the project lead (see Appendix T). The study proposal was submitted to the University of Virginia's Institutional Review Board for Health Services Research (IRB-HSR) for approval and was determined to not meet the criteria of Research with Human Subjects or a Clinical Investigation and was designated a Quality Improvement Project, thus exempted

from further IRB-HSR Review (Appendix U). Subject consent was thus not required. Assent was

obtained from each participant by the project leader. All participants were informed of the

purpose of the study, duration of the study, data collection procedures, information to be

collected and how the data would be used, and any potential inconvenience/ emotional distress.

Patients were given the opportunity to ask questions and seek clarifications. Moreover, patients

were informed of their right to refuse to participate and that refusing to participate would not

affect care being received now or in the future. Additionally, patients were informed of their

right to withdraw from the project at any time without incurring any penalty.

Overall, the project posed minimal risk to participants and unintended adverse effects

were not discovered during the project. Patients were provided with contact information

including email address and personal mobile number of project leader to address any concerns.

Data collected was de-identified and stored in Qualtrics and UVA's data storage software

for analysis (UVA Box). The data was accessible only to selected individuals that were directly

involved with the study including the statistician and project lead. Findings were reported at the

aggregate level only.

Data Collection

Data was collected from September 03, 2017 to November 21, 2017 by the project leader

(first author). A copy of the study protocol and script for telephone follow-up was kept readily

available for use during data collection and during the follow-up phase.

Data Analysis

Data were analyzed using SPSS Statistics for Windows, Version 24.0. (Armonk, NY:

IBM Corp). A two-sided p value of $< .05$ was used to establish statistical significance. Standard

deviations, frequencies and percentages are reported for descriptive data as appropriate. The data

for the ejection fraction were recoded to enable categorization of participants according to the

2013 ACC/ AHA guidelines (Yancey et al., 2013) into HF with reduced ejection fraction, HF

with preserved ejection fraction and HF with preserved ejection fraction borderline.

A paired samples t-test was used to analyze changes in scores from pre-test to post-test

for the primary outcome measures – knowledge of HF, self-efficacy, and self-care (self-care

maintenance, self-care management).

To determine the 30-day readmission rate, the number of all the 30-day readmissions by

the patients who completed the study (numerator) was divided by the total number of patients

who completed the study (denominator) (IHI, 2013; Sylvia & Terhaar, 2014). For comparison, a

randomly selected sample of 30 patients (not exposed to VE) was drawn from HF patients

admitted 12 months earlier to the same hospital (September 2016 – November 2016). The 30-day

readmission rates for this sample and the study sample were compared using an exact two sided

chi-square test.

The Exact Mann-Whitney U Test was used to examine the relationship between most

demographic variables and the pre and post-test changes due to the presence of small group sizes

and the lack of normality of most distributions. To enable use of the Exact Mann-Whitney U

Test, for categorical demographic variables with more than 2 categories, some categories with

very small frequencies were combined with each other or combined with larger categories, so

that there would only be two categories for the variable. The race variable was collapsed to

white and non-white, where non-white included one Asian and the remaining were Blacks. The

travel time to the hospital variable was categorized into less than 1 hour and 1 hour or more. The

NYHA Classification variable was collapsed to Classes I and II in one group and Classes III and

IV in the other group. The education variable was collapsed to high school graduates/GED or less versus college graduate.

The Spearman Rank Correlation was computed in order to investigate the relationship between the ordinal demographic variables – travel distance in miles and the Charlson Comorbidity Index, and the pre-post changes in self-management, self-maintenance, self-confidence and the Atlanta Heart Failure Knowledge Test.

Descriptive statistics was reported for video satisfaction and video usage as appropriate. Using Qualtrics, patients' responses to the three open-ended questions on the Heart Failure Video Survey were aggregated and analyzed to evaluate for the presence of themes related to the experience of watching the videos. During the first stage emerging themes (initial) were identified (Miles & Huberman, 1994). This was achieved by identifying the commonly occurring words among the participants' responses using the Text iQ function of the data analysis section in Qualtrics and themes subsequently delineated. This was then visually represented using bar graphs. Further analysis of the responses was again completed using the common words identified to distinguish the initial themes (Miles & Huberman, 1994). In the second phase, the initial themes were collapsed into three major themes (Miles & Huberman, 1994).

Results

Research Question

The project was guided by the following research questions: (1) In adult patients with HF does supplementing usual HF patient education with VE increase knowledge of HF, self-efficacy, self-care and reduce 30-day readmissions? (2) How satisfied are HF patients with VE?

Sample Characteristics

Two hundred and one patients were screened for the project from September 3, 2017 to November 21, 2017 (Figure 23). Sixty four patients (31.8%) did not meet eligibility criteria; of the 64, the reasons included: cognitive impairment (16/ 25%), discharged to skilled nursing facility (17/ 26.6%), discharged to rehab (13/ 20.3%), illiterate (7/ 10.9%), discharged to hospice (4/ 6.3%), did not speak/ write in English (3/ 4.7%), inability to give voluntary consent (2/ 3.1%, blind (1/ 1.6%), and discharged to prison (1/ 1.6%). Fifty three patients (26.4%) refused; of the 53, the reasons included: already aware of HF information (17/ 32.1%) , not tech savvy (8/ 15. 1%), not interested in participating (7/ 13.2%), family/ social issues (2/ 3.8 %), involved in other/ prior surveys (2/ 3.8%), have health issues/ procedures (2/ 3.8%), in another HF program (2/ 3.8%), did not want to complete surveys (1/ 1.9%), not interested in videos (1/ 1.9%), and had similar videos at home (1/ 1.9%). The reasons are unknown for 10 patients (18.9%). Fourteen patients (7%) were not able to participate, one patient had no electricity at home and 13 patients did not have devices to play the videos. A majority of these patients without devices were not returning to the HF clinic for follow-up due to geographic constraints and/ or post discharge follow-up with their primary care provider, which hindered loaning a device.

Seventy patients (34.8%) who met eligibility criteria were enrolled in the project. Thirty patients (42.9%) completed the study and 40 patients (57.1%) were lost to follow-up. The reasons for the lost to follow-up included: having health issues, including hospitalizations (10/ 25%), busy/ travelling (6/ 25%), admitted to skilled nursing facility (3/ 7.5%) and hospice care/ facility after enrollment (3/ 7.5%), dealing with death/ illness of family members (3/ 7.5%), having surgery/ other invasive procedures (2/ 5%), change in mental status (1/ 2.5%), participating in another HF program (1/ 2.5%), no longer wanted to participate (1/ 2.5%) and reasons are unknown for 10 (25%) participants who gave no indication that they would not be

completing the project. Additionally, contact could not be made via telephone for eight

participants (20%), four of which could not be reach via email as well, three had no email access,

and one participant had not provided email. The reasons provided are more than 40 due to

persons having multiple circumstances.

The differences between the loss to follow-up group and those completing the study were

evaluated using Pearson's Chi-Square Test. There were no statistically significant differences

between the people completing the study and those lost to follow-up when compared based on

race, marital status, insurance, income, employment status, educational level, travel miles/ time

to hospital, time since HF diagnosis, hospitalizations in the past 12 months, Charlson

Comorbidity Index, NYHA classification status, 30-day readmissions, and ejection fraction.

However, when compared based on gender, a statistically significant difference was observed (p

= .002, two-tailed). A higher proportion of males were lost to follow-up (75% of males versus

38% of females were lost to follow-up).

For the 30 patients completing the study, the mean age was 66.3 (SD 11.7) compared to

the mean age of 65.0 (SD 12.9) for all participants; 21 (70%) were female, 20 (66.7%) were

white, nine (30%) Blacks and one (3.3%) Asian. Fifteen (50%) were married and participants

predominantly lived with spouse/ partner (14/ 46.6%) or with other family (10/ 33.3%). Most

had primarily high school education and less (19/ 63.3%) and earned less than $24, 999 (13/

43.3%). Four medication classes – diuretics (22/ 73.3%), Beta-blockers (21/ 70%), Statins (19/

63.3%) and Anticoagulants (11/ 36.7%) were primarily being taken by patients. Patients were

mainly classified as NYHA Classification level II or III, with more than half noted to be a Class

III (17/ 56.7%). Fifteen patients (50.0%) had HF with reduced ejection fraction while eleven

(36.7%) had HF with preserved ejection fraction. Most patients were newly diagnosed with HF

(12/ 40%) and altogether, 21 (70%) had HF for five years or less. Half of the patients were

hospitalized in the past 12 months. The median length of stay of index admission was 5 days.

Most patients (22/ 73.3%) were Medicare enrolled. Table 2 displays the sociodemographic and

clinical data for all participants and the patients who completed the project. Figure 3 outlines the

project flow diagram.

In adult patients with HF does supplementing usual HF patient education with VE increase

knowledge of HF, self-efficacy, self-care and reduce 30-day readmissions?

      Knowledge of HF. Knowledge scores significantly increased from pre-test (mean score

22.67, SD 3.99) to post-test (mean score 24.37, SD3.61), $p = .008$ as shown in Table 3. The

mean improvement in score was 1.7, 95% CI [.47, 2.93]. Participants' scores improved by at

least 5% on 20 of the 30 questions on the knowledge test.

      Examination of pre-test answers. On the pre-test, the percentage of persons answering

individual knowledge questions correctly ranged from 24% to 100%. Sixteen of the 30 questions

were answered correctly by more than 80% of participants and eight questions were answered

correctly by more than 90% of the participants. All 70 participants answered question seven

correctly – this question assessed the domain of medication, specifically participants' knowledge

of not skipping medications when feeling better. Four questions were answered correctly by less

than 50%. Two questions in particular were answered correctly by less than 30% of participants;

these two questions focused on the domains (1) nutrition specifically sodium and (2) behavior

specifically exercise. The other two questions which performed somewhat better, focused on the

medications domain (question 9, 40% and 13, 47%).

      Examination of post-test answers. For the post-test 10% to 100% of participants

answered individual questions correctly. Eighteen of the 30 questions were answered correctly

by more than 80% of participants and fifteen questions were answered correctly by more than

90% of the participants. All 30 participants who completed the post-test answered six questions

correctly – questions three, six, twelve, seventeen, eighteen and thirty. Questions three, six and

thirty assessed the domains of behavior; daily weight, alcohol use, self-maintenance behaviors

focused on prevention respectively. While question twelve and seventeen assessed the domain of

symptoms; recognizing significant weight gain and its meaning, and recognizing when to stop

and rest during physical activity respectively. Two questions were answered correctly by less

than 50%, with only 10% of participants answering question 25 correctly. Question 25 assessed

the domain of nutrition specifically knowledge of the total daily amount of sodium.

Altogether, participants consistently performed poorly on question 25 on both pre and

post-tests. This question assessed the domain of nutrition (sodium). Fifteen questions had an

increase of at least 10% from pre to post tests. Greatest gains were seen in scores for questions

two, four, 11, 12, 16, 18, 21, 22, and 24 which all saw a 15% or greater increase in scores.

Question two assessed the domain of pathophysiology; questions four, 18, 21, and 22 assessed

nutrition; questions 11 and 24 assessed medication; question 12 assessed symptoms, and

question 16 assessed behavior. Full item analysis is outlined in Table 4.

Self-efficacy. Self-efficacy was evaluated by the self-confidence scale of the SCHFI.

Participants started with a mean self-confidence score of 69.31 (SD 21.64) and improved to a

mean post-test score of 70.98 (SD 18.6). The mean change in scores was 1.67, 95% CI [-8.29,

11.63]. However, this increase in self-confidence scores from pre to post-test was not statistically

significant ($p = .735$).

Self-care. The self-care maintenance scores had a statistically significant increase from pre to post test (p = .001). The mean scores at baseline was 67.22 (SD 18.65) and at post-test, the mean score was 81.18 (SD 14.17). The mean difference was 13.97, 95% CI [6.13, 21.81].

The scores for only 21 patients for the self-care management scale could be computed, as nine participants did not report symptoms of difficulty breathing and/ or ankle swelling in the last month. This scale requires participants to express having one or both symptoms to be computed, thus excluding asymptomatic patients (Riegel et al., 2004; Riegel et al., 2009). For the 21 participants who completed the self-care management scale, while there was improvement of self-care management among the sample from pre-test (mean 58.95, SD 23.98) to post-test (mean 68.38, SD 20.56) with mean difference of 9.43, 95 % CI [-.95, 19.81], these findings were not statistically significant (*p* = .073).

Relationship with demographic variables. The relationships between the pre-post changes and the following demographic variables were examined: education, age, race (white/ non-white), gender, Charlson Comorbidity Index, travel time to hospital, travel miles to hospital, NYHA classification, whether hospitalized during previous year or not, and length of hospital stay. The only significant relationships found were between length of stay and pre-post change in self-management, education and pre-post change in self-confidence and between the Charlson Comorbidity Index and the pre-post change in self-confidence. An Exact Mann-Whitney U test , comparing the distribution of the pre-post change in self-confidence over college graduates versus those with high school/GED or less, was significant (*p*=.047). A positive Spearman rank correlation coefficient of .382 (*p*=.037) was found between the pre-post change in self-confidence and the Charlson comorbidity index. Additionally, a negative Spearman rank

correlation coefficient of -.459 (*p*= .036) was found between length of stay and the pre-post change in self-management.

30-day readmissions. Seven of the 30 patients who completed the study were readmitted, an all cause readmission rate of 23.3%. Three (42.9%) of these readmissions were HF related and four (57.1%) were not HF related. For comparison, 122 persons with HF were discharged from the same hospital in the period Sep – Nov, 2016. A random sample of 30 patients was chosen and a chart review determined that nine were readmitted within 30 days, an all-cause readmission rate of 30%. Five of the nine (55.5%) admissions were HF related and four (44.4%) were not HF-related. An exact two sided chi-square test comparing the two rates was not significant (*p*= .276).

Since several significance tests were performed, it is possible one or more was significant due to chance alone.

How satisfied are HF patients with VE?

Video Usage. Eighty percent (24/30) of the participants who completed the project (N = 30) provided data on the videos watched. Seventy five percent (18/24) of this number watched 20 or more of the 26 videos, and as seen in Table 5, 22 participants (91.7%) watched at least 16 (61.5%) of the videos. All 24 participants watched: *What is Heart Failure?, Managing Heart Failure: Energy Conservation* and *Managing Heart Failure: Handling Flare-ups*. Over 95% (23/24) watched *Heart Failure: Making Lifestyle Changes, Managing Heart Failure: Finding Support* and *Managing Heart Failure: Limiting Sodium*. Table 6 provides details on the videos watched.

Heart Failure Video Survey. Of the 30 patients completing the project, 26 (86.6%) provided data on their overall satisfaction with the videos. Seventeen patients (65.4%) strongly

agreed that the videos were easy to find, eight (30.8%) agreed that the videos were easy to find

and one (3.9%) disagreed.

For the statement, "I would recommend these videos to another patient with HF,"

seventeen patients strongly agreed (65.4%) and nine agreed (34.6%).

Eleven patients (42.31%) strongly agree and thirteen patients (50%) agreed that the

videos were meaningful to them, with two patients (7.7%) disagreeing that the videos were

meaningful to them.

When asked if they learned something new about HF, fourteen patients (53.9%) strongly

agreed and eleven patients (42.3%) agreed while one patient (3.9%) patient disagreed.

For the statement, "I am satisfied with the information in the videos," fourteen patients

(53.9%) strongly agreed, eleven patients (42.3%) agreed and one patient (3.9%) disagreed. The

complete responses are shown in Table 7**.**

The Heart Failure Video Survey contained three open-ended questions at the end of the

survey with purpose being to obtain the participants' personal experiences of watching the

videos. These questions included: (1) What were the most important things you learned from

watching the videos? (2) After watching the videos, what changes will you make in taking care

of yourself with Heart Failure? (3) Do you have any comments about using the videos as a part

of your Heart Failure education?

What were the most important things you learned from watching the videos? Twenty

four participants provided responses to the open-ended questions. The responses were examined

and three main themes were identified: gaining knowledge of and understanding of HF, personal

role in symptom recognition and surveillance, and awareness of the need for self-care.

Gaining knowledge of and understanding what HF is. As indicated in the exemplars, participants noted becoming aware of what heart failure is and understanding HF as the most important things learned.

> *"As a newly diagnosed heart failure patient, the videos provided me with basic*
>
> *information about heart failure and related topics that included diet and medications."*
>
> *"what heart failure is and understanding it."*

Personal role in symptom recognition and surveillance. The first exemplar is a reflective statement of a patient relaying how the videos could have changed the trajectory of his HF, that he would have been able to recognize the symptoms earlier to avoid HF exacerbation and hospitalization. Additionally, the need for surveillance of self and paying attention to physiological changes arose in patients' comments.

> *"If I had seen the videos after my initial cardiac hospitalization in February 2016 I would*
>
> *have recognized the symptoms I was having sooner and avoided the second*
>
> *hospitalization November 12, 2017 for pulmonary edema. Re: weight gain, shortness of*
>
> *breath, fatigue, increased thirst"*
>
> *"Pay attention to what you see and hear"*
>
> *"always check herself daily"*

Awareness of the need for self-care in preventing HF symptoms and hospitalization. Patients commented on the HF management topics learned. These included medication management, managing fluid, dining out, understanding food labels, sodium intake, and exercise.

> *"Do's and Don'ts. Proper management of my conditions. Importance of med-*
>
> *management."*

"How to manage fluid intake. How to make choices and ask questions when dining out. Better understanding of food labels."

"Sodium and fluid intake Exercise"

"Cautions"

"learning how to take care of yourself"

After watching the videos, what changes will you make in taking care of yourself with heart failure? Twenty five patients responded. Participants were very specific in their replies with responses being actionable as depicted in the examples. The common theme throughout the responses was the notable shift from being passive to an active HF self-care maintenance.

Shifting from passive to active self-care maintenance. A multiplicity of self-maintenance skills needed to stay well was provided. Patients outlined concrete steps they could take in their daily lives to manage living with HF including checking food-labels and incorporating exercise. In addition, patients shared psychosocial self-care changes that they were making for overall well-being as seen in the first exemplar.

"I never weigh myself, I just know about it during my appointments. Now I do it every day as well as taking my blood pressure wherein I list them and show these to my medical team. I now watch my medicine intake, take regular exercise much longer, involve family with my health problems, socialize more with friends."

"Check food labels for sodium. Limit salt intake, limit fluid intake. try to exercise. Try to eat fast food that has the lowest sodium like a Veggie Delite sub on wheat grain bread."

"watch weight, decrease fluid intake, decrease alcohol consumption, accept the fact that I can't do as much as before I had the initial MI in Feb. 2017 - slowdown and conserve energy."

"Limit sodium and fluid Enroll in cardio rehab…"

"manage my heart program a little more actively"

"when eating out, I will ask for a nutrition guide. Also when eating salads, I will reduce the amount of salad dressing."

Do you have comments about using the videos as a part of your heart failure education? Twenty three participants responded. Of the 23, six stated "no" and one stated "no, I do not have any comments." The main themes arising from content analysis using the primary words, were (1) length and quality of the videos ("*…They were short – didn't bombard you with too much information at one time…*") and (2) the quality of the information presented ("*The videos were short enough, but informative enough to keep ones attention*").

The words used to describe the quality of the videos were *"repetitive," "repetitious," "informative," "important," "helpful," "great tool," "educational," "convenient,"* and *"good."* In writing about the information found in the videos, patients focused on the quality of the information. This response incorporates both themes found – length and quality.

"I consider the info an excellent and easily accessible resource. The videos are short enough to pack the important info into a space that is not boring. The headings allow the user to access exactly the info needed."

Video Rating Log. Twenty four of the thirty patients (80%) rated the videos watched. The videos with the highest ratings were *Heart Failure Medications: Diuretics* (71.4%, extremely helpful), *Managing Heart Failure: Limiting Sodium* (65%, extremely helpful), *Taking Your Heart Failure Medications* (61.9%, extremely helpful) and *Heart Failure: Monitoring for Signs and Symptoms* (60%, extremely helpful). The ratings for all the videos are provided in Table 8.

Discussion

This quality improvement project evaluated the effect of VE on increasing HF knowledge, self-efficacy, self-care and reducing 30-day readmissions. Additionally, patients' satisfaction with using VE was evaluated. In our study, HF knowledge and self-maintenance improved significantly. The findings support current literature that using videos is a patient-centered evidence-based intervention. Participants overwhelmingly found the videos meaningful and were satisfied with the information. Through detailed analysis of participants' performance on the knowledge survey and gathering participants' perceptions of VE, the findings further inform those designing patient education on ways in which VE may successfully impact HF education.

Interestingly, a large percentage of the sample had HF for less than a year. Using videos for these patients are a prime way of engaging patients early to reduce complications. Additionally, these recently diagnosed patients may have an increased interest in learning about HF, thereby a heightened readiness to learn. Most of the patients had more severe HF symptoms (NHYA III), and hence, may be motivated in learning how to manage their condition.

Findings from the project indicate that VE is beneficial to improving patients' knowledge of HF. Participants started with insufficient HF knowledge with average scores of 75.56% (mean of 22.67) and post-test achieved the cut point for the AHFKT of 80%, with mean score being 81.23 (mean 24.37). This improvement in HF knowledge from pre to post test is in keeping with prior studies (Boyde et al., 2012; Liou et al., 2015). Of note, improvements were seen in 20 of the 30 questions across the multiple domains being evaluated by the AHFKT, indicating that VE can help in achieving adequacy in knowledge related to various components of HF self-care. For clinical practice, this helps practicing nurses and others delivering HF education understand what concepts VE may be most useful for as an educational delivery method.

Although great gains were documented, the lowest performing question on both pre and post-test was related to sodium. HF patients have provided narrative accounts that the skill they found most challenging is adherence to a low sodium diet. As narrated "no sugar, no fat, no salt…what's left" (Dickson, Buck & Riegel, 2011, p. 414), the comment shows the additive impact as well of multiple comorbidities with resulting pressures to patients for dietary lifestyle changes. Patients may have difficulty assimilating and applying the multiple instructions received for different medical conditions (Dickson et al., 2011). Family members may play a vital role in supporting patients to adhere to sodium restrictions, and thus their knowledge of HF is vital to achieving this end (Wu et al., 2017). Nurses in collaboration with patients should consider including families in teachings on sodium and other dietary restrictions. Furthermore, HF patients may need regular consultation/ referral to a nutritionist while in hospital and on an outpatient basis to promote increased adherence to dietary restrictions.

While statistical significance was not achieved at the .05 level for the changes in self-confidence and self-management, the changes in the pre-post test scores are of relevance clinically. The authors of SCHIFI posit a cut-point of 70 or greater to judge achievement of self-care adequacy (Riegel et al., 2009). However, the authors stipulated that evidence has indicated that "benefit occurs at even lower levels of self-care." (Riegel et al., 2009, p. 495). The changes in self-confidence also saw persons achieving the cut-point of 70, increasing from 69 to 70. Self-efficacy is not well studied in HF (Yehle & Plake, 2010), further studies with a more prolonged period of follow-up will be needed to determine if self-efficacy improves. Another possible contributor to the non-significant self-efficacy results found may be the high comorbidity burden within the final sample, a mean Charlson Comorbidity Index of 6.2. Prior studies have established the effect of comorbidity on self-efficacy, revealing that comorbity decreases self-

efficacy. As the level of comorbity increases, a decline in the relationship between self-efficacy and self-maintenance occurs (Buck et al., 2015). In our findings, the improvements in self-maintenance were statistically significant (p = .001), but a corresponding change in self-confidence did not occur. The multiple needs of the other chronic conditions that HF patients may have challenges their ability to execute adequate self-care leaving them vulnerable to poor self-care (Dickson, Buck & Riegel, et al., 2011). Recommendations from the literature to mitigate the impact of comorbidity on patients' self-efficacy includes optimizing caregiver education and support, and initiating supportive or palliative care early (Buck et al., 2015).

For self-management, mean score prior to exposure to the videos was 58.95 (SD 23.98), post exposure to the videos mean scores had increased by 9.43 points to 68.4 (SD 20.56). Participants may need more time than the study period to apply the knowledge being gained to improve self-management skills, and utilize problem solving and critical thinking to respond to changes in medical condition. Additionally, the time interval on the management scale was a follow-up of one month, this was not altered. Patients took an average of 18 days from pre to post test, hence patients could have reflected on and responded based on the time period pre intervention when they were possibly symptomatic. Statistical significance for self-care management (p<.0001)was achieved in the study by Boyde et al (2012), which used SCHFI to assess self-care for patients who received VE and self-confidence trended towards significance (p = .051) (Boyde et al., 2012). Of note, the follow-up period for this study was 8 weeks (Boyde et al., 2012). Another study using SCHFI with a follow-up of 3 months and having a Time 0, 1, 2, and 3 post intervention, achieved high mean scores for self-care confidence and self-care management. Thus, continued delivery of VE and follow-up may be needed in this sample to adequately evaluate the possible effect on self-care management and self-confidence.

A reduction was observed in the 30-day all-cause readmission rate and HF related

readmissions in the sample versus the historical group. This result is similar to the study by Liou

et al. (2015), which reported no significant difference in 30-day readmissions in patients who

received supplemental VE and those that did not. Although, this finding is not statistically

significant, any reduction in 30-day readmissions for HF patients has clinical implications for a

condition with high associated morbidity and mortality rate as well as high economic burden on

health systems (Braunwald, 2014; Benjamin et al., 2017). Every admission avoided is a cost

saving of $10,900 U.S, the average cost of hospital stay for HF admission (Pfuntner, Wier &

Steiner, 2013).

Patient satisfaction with VE was consistent with prior studies that used video education,

and specifically used videos created by Milner Fenwick (Albert et al., 2007). Most of the patients

easily found the videos, and a participant even commented that the videos were accessible. This

is important in understanding HF patients' ability to use technology, especially in an older

patient population, as the use of technology in HF care increases. Ninety six percent of patients

learned something new and all participants overwhelming would recommend the videos to

another patient with HF. This is much higher than previously reported in the only other study

that asked patients this question (Albert et al., 2007). Ninety two percent found the videos

meaningful. This is the first evaluation of VE to assess HF patients' perceived meaningfulness

and helpfulness of using videos to learn about HF and self-care management.

The multiple themes emerging in the patients' responses to the open-ended questions also

indicate that multiple concepts may be learned by patients through use of this modality – need

for self-monitoring, symptom recognition and making self-care maintenance changes. The

Need2Know-HF study found similar findings where HF patients identified signs and symptoms

as the most important topic for learning then prognosis, risk factors, medications (Boyde et al., 2009). Furthermore, the naturalistic decision making described by the situation specific theory of heart failure self-care could be seen – patients spoke about the need for making better decisions regarding their health, a need for self-maintenance e.g. doing "cardio rehab." The videos awaken many patients' need not only for better physiological maintenance but also to the need to engage with family and friends, addressing the psychosocial component to their HF. Depression has been reported in HF patients and is identified with self-efficacy and social support as a significant predictor of self-care adherence for HF patients (Tovar et al., 2016); 30% of the sample completing the study had a diagnosis of depression.

Even though one patient commented on the videos being an "…*easily accessible resource,*" access to the internet remains a challenge for some patients – some patients either had no internet or limited internet. As one patient noted, "*All the ones I have watched very helpful. The biggest problem for me is I have limited access to internet…*" Although attempts were made to reduce this barrier as much as possible by loaning tablet computers; however, for those who were not returning to the HF clinic at the study site, this barrier remained. Future considerations may include having the videos in both an online and downloadable format to facilitate transferring to a DVD format to meet the needs of as many patients as possible.

Patients commented on appreciating the short nature of the videos. Although two patients commented on the repetitiveness of some of the videos, another patient found this to be beneficial in reinforcing the information being learned. Repetition may be a useful teaching technique to reinforce learning, particularly for patients with low health literacy and cognitive impairment. The L-HF patient study comprised of only HF patients, commented on repetition (Boyde et al., 2009) reinforcing information and aiding persons to learn and remember disease

related information. Benefit of VE in educating newly diagnosed HF patients may also be derived as noted by a patient "*as a newly diagnosed heart failure patient, the videos provided me with basic information about heart failure and related topics that included diet and medications*."

In aiming to provide efficient, effective and patient-centered care in keeping with the IOM aims for improvement in healthcare (IOM, 2001), the desires expressed ("*I wish they were on DVD*") and the recommendations made by patients ("*there are TVs all over* [study site]*, use these videos frequently for viewing*") are useful for the institution to consider in enhancing HF patient education. Use of the videos may be expanded to the outpatient settings where HF patients receive much of their care – access to the videos may be given to patients during their clinic visits and videos may be played on the waiting room televisions so that not only patients are informed but also caregivers and visitors. One patient also expressed a wish to have information on related devices used by HF patients "*pacemakers/ defibrillators*" – thus the institution may consider conducting further needs assessment of the HF patient population and expanding the videos to other aspects of HF and overall chronic disease management. In supporting HF education, these various strategies should be considered.

Strengths and Limitations of the Design

This project is the first to have evaluated the effects of video education delivered via mobile technology, tablet computer and patients' personal computer. Prior studies used videotape and DVD formats. Furthermore, this project incorporates the latest research on the learning style of HF patients and focuses on translating an evidence-based intervention into practice with patients transitioning from hospital to home. Another strength of the project is that it was highly collaborative with the project lead collaborating with caregivers at the frontline of

HF care, HF practice experts, patient experience/ education experts. Working in this collaborative manner, avoids the pitfalls of working in isolation, strengthens the quality of the project and increases acceptability of the intervention by the health care institution. The careful attention given to health literacy in the design of questionnaires was also born out of working collaboratively.

This project contains an item analysis of HF knowledge unlike prior studies that evaluated the impact of using VE for improving HF knowledge. This aspect helps clinicians to better determine the focus of interventions at an individual, and/ or local unit/ hospital level by identifying the specific knowledge gaps that exists for patients. Additionally, this approach allows for targeted yet strategic use of limited resources and nursing time enabling increased efficiencies in patient education.

The project overcame some of the challenges that often restrict eligibility of patient participation such as not having access to internet or the requisite technology. Furthermore, the project builds on the limited work done in this area of HF education. Only two studies have been conducted in the U.S., a RCT (Albert et al., 2007) and a quasi-experimental study (Veroff et al., 2012) that examined the effects of VE in HF on key outcomes such as self-care. Additionally, the project examined 30-day readmissions using readmission data that was not self-reported but derived from the electronic health records. Using a randomized sample with the same ICD10 codes as the study sample from the previous months and year who were not exposed to VE helps to reduce the effect of seasonality, selection bias, and attributing the findings in the historical group to exposure to the intervention.

Prior studies (Albert et al., 2007; Veroff et al., 2012) that evaluated patients' satisfaction with VE only reported quantitative data of patients' satisfaction. This project in addition to

offering ratings of the videos, is the first to also provide narratives of the patients' experiences of using VE. In striving for patient centered care, obtaining the subjective experiences of HF patients facilitates an increased understanding of what is meaningful to HF patients in optimizing their own self-care, and possible barriers from their perspective to achieving improved HF self-care. Furthermore, an evaluation was conducted of all 26 videos to determine what patients found the most meaningful. This data may guide the provision of targeted interventions – 22 of the 30 participants (73.3%) were taking diuretics and interestingly, the *Heart Failure Medications: Diuretics* was one of the most watched (22/24, 91.7%) and highly rated videos in terms of helpfulness (71.4%, extremely helpful; 19.1% very helpful). This data may be beneficial to health systems facing cost constraints to strategically focus on what may bring the biggest value to their patients, as well as achieve satisfactory outcomes and cost efficiency.

The project was in keeping with national HF guidelines regarding patient education to improve HF care. Providing VE to HF patients who are hospitalized and transitioning home using a technology-based platform is a novel initiative. This provides opportunity for future research to compare the delivery of HF patient education completely in this format or in a combined written and technology-based platform versus the usual method of primarily verbal education with written material. HF patient outcomes may then be compared along with patient perspectives on the new format to determine acceptability and comfort with technology.

The design of this project is limited by several factors. A pre-test/ post-test design was used to determine the effect of the intervention on the primary measures. With this design, there is the possibility of the outcomes experienced being attributed to events unrelated to the intervention. Furthermore, the lack of a control group for measuring knowledge of HF, self-efficacy, and self-care further compounds this issue. Convenience sampling was utilized; hence,

the risk for bias or confounding factors being introduced into the study. An inclusion and exclusion criteria along with a clearly outlined project protocol (Appendix V) was used to introduce objectivity and reduce selection bias.

The attrition experienced may have affected the findings particularly with more men being loss to follow-up. Some patients returned surveys beyond the intended seven days due to various circumstances such as having procedures, travelling, and multiple follow-up appointments. The median days taken from pretest to post-test completion was 13.5 days, with range being 1-71 days. In addition, during project implementation, the HF clinic moved away from the main study location eliminating the possibility of face to face follow-up with patients during their first appointment post hospital discharge.

The study only had a Time 1, and therefore unable to determine if improvements seen in HF knowledge and self-care maintenance would be sustained or whether self-management or self-confidence would improve. In addition to these factors, the study was conducted at a single site facility with a demography that may not be similar to other locations thus generalizing to other settings/ populations may not be possible. For 30-day readmission, only data at the AMC was used, thus admissions to other acute care hospitals may have been missed.

Nursing Practice Implications

Nurses play an integral role in the education of HF patients, spending many hours delivering information on HF self-care (Dickson & Riegel, 2009). Providing patient education with VE is congruent with HF patients' preference for a multi-modal style of learning (Boyde et al., 2009). The combination of VE with verbal/ written education also supports nurses offering a patient-centered evidenced-based intervention that is in keeping with current HF guideline recommendations. Thus, nurses will be able to contribute in an efficacious way to improving the

outcomes of HF patients. Adding VE as an educational strategy builds on and enhances the

patient education delivered by nurses and other healthcare professionals while patients are

hospitalized and post discharge. Moreover, with the videos patients can continue to receive HF

education during a critical time of transition from the hospital. This ensures the continued

delivery of pertinent HF specific health information post hospitalization.

The study showed that VE can help improve patients' knowledge of various components

of HF self-care. For clinical practice, this helps advanced practice nurses and others delivering

HF education understand how best to use VE in teaching patients and for tailoring of the

intervention. This may help to improve adherence to required self-care maintenance including

taking medications and sodium restriction reduce risk of hospitalizations and other health risks.

Impact of the Doctor of Nursing Practice (DNP) prepared advanced practice

registered nurse. This project highlights the role of a DNP prepared advanced practice

registered nurse working collaboratively in leading the integration of evidence-based practice

and change across a health system for a targeted population. Systematic change to integrate VE

for HF is challenging and possibly unachievable without a champion/ leader to foster this change.

By applying the DNP essentials into practice, this DNP prepared change agent was able to

demonstrate the benefits of adding VE to improve outcomes for HF patients and foster continued

sustainability of the intervention in the practice settings. In addition, by using methods that

enabled patients' voices to be heard, there is an increased understanding by the health system of

what is needed for VE to be even more successful in helping HF patients. From this, the

development of an interactive TV system is being considered by the patient education

coordinator as well as expanding VE for other medical conditions. Through DNP prepared

nurses, not only will best practices be integrated into systems but the patients' experience of care

– patient centeredness will improve, enabling health systems to achieve one of the fundamental aims of quality improvement which has financial implications.

Implications for Future Research

As the literature review revealed, there are limited studies on the effects of VE in the HF population. Future studies are needed to further evaluate VE in light of the technological advances that have since occurred after many of the RCTs evaluating VE were conducted. Patients now have increased access to mobile health technologies, enabling them to download education material on the go. Furthermore, HF patients are becoming increasingly exposed to telehealth technologies which along with the rise in mobile health technology, has the potential to improve patients' comfort with technology.

A well designed research may help us further determine the impact VE may have on outcomes that were not statistically significant (self-efficacy, self-management, 30-day readmission), to see if a longer duration of exposure to the intervention with repeated follow-up improves these outcomes. Additionally, future research is needed to determine if education level affects the self-efficacy of HF patients and what impact this may have on acquisition of HF related information by HF patients and for those educating patients, who may need to consider modifying the method and style of teaching. A research design including a control and comparison group such as a RCT may best determine the suitable time frame to evaluate outcomes post intervention. For future work, strategies for retention of males will need to be considered. These strategies may include but are not limited to offering incentives for participating in the project, and including other means of follow-up with participants to complete the post-tests such as via telephone and/ or face to face follow-up at a place and time that is convenient for participants.

Conclusion

The findings of the project indicate that VE significantly improved patients' knowledge of HF and self-maintenance. In addition, VE is a useful and convenient way to deliver HF education, which patients found to be meaningful and satisfactory. The project demonstrates the *DNP Essentials* (American Association of Colleges of Nursing, 2006) pivotal role in developing doctorally prepared advanced practice nurses to transition best evidence into practice through interprofessional collaboration, and to sustain practice change. Ongoing sustainability of the project continues by the DNP project leader, working collaboratively with the HF Navigator to maintain stock of the VE website card and championing of VE on the units that predominantly admit HF patients. This author has also collaborated with the Patient Education Coordinator to match the videos to the required HF teaching topics in Epic (hospital's electronic health record system) for nurses to easily retrieve the videos from Epic in the future and to validate the delivery of HF education. VE can currently be documented in the patients' medical chart to record HF education provided for future auditing to verify compliance with national HF quality measures. The videos have been added to the home screen of the Patient and Family Library's website by the Patient and Family Library Manager for improved access for patients/ families and staff. By executing these actions systematically integrating VE, VE may become a part of usual care for HF patient education in this setting.

Products of the Scholarly Project

A comprehensive report was submitted to the University of Virginia School of Nursing towards the completion of the DNP program. The products of the projects including the video instruction guide sheet (to help patients access the videos) and the booklet created were given to the units for aiding ongoing HF VE and for future replication on other units. A PowerPoint

presentation of the project findings was conducted at staff meetings for both units (April 25 and 26, 2018). The findings will be shared with the patient education coordinator and the manager, Advanced Heart Failure (Heart and Vascular Center, Quality) in a meeting on May 2, 2018 to inform decisions regarding improving patient education delivery with use of the videos. In addition, the findings will be disseminated at the interdisciplinary Heart Failure Quality Team meeting on May 16, 2018. A manuscript was prepared for submission to the peer-reviewed journal, *Journal of Cardiovascular Nursing* for publication according to the journal guidelines (see Appendix W).

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Table 1

Description of the studies

Author, Year	Subjects, age, gender, race Sampling method	Design, Setting, purpose theory	Intervention, comparison intervention	Data collection tool/ instrument and times/ statistical methods	Outcomes and findings.	Limitations
Albert et al., 2007	112 patients hospitalized for acute decompensation of Congestive Heart Failure (CHF). Mean age of intervention group (IG): 59 ± 13.7 years and comparison group (CG): 61 ± 14.2 years. 32% of CG: female. 15% of IG: female 87% of CG: Caucasian. 80% of IG:	Prospective, experimental Conducted in a large urban 1000 plus bed tertiary medical center in a Midwestern United States City and in patients' home. To determine if video education in addition to standard education reduces urgent healthcare resource consumption; specifically,	IG: Standard education (SE) during hospitalization plus video education (VE) at home. CG: SE given by a variety of healthcare providers, discharge instruction sheet and a HF handbook for newly diagnosed or new patients to the hospital.	36-item Likert scale tool to determine current self-care and lifestyle behaviors.	Self-care behavior scores at 90-day follow-up was significantly higher for the VE group (p < .01) than the comparison group. VE group had a greater reduction in mean number of symptoms (p < .04), with one sign, any edema and one symptom, profound fatigue with exertion significantly reduced at 90 days (p < .01 for both).	Most but not all patient characteristics were similar. High rate of non-completion (only able to follow-up and analyze 76 of 112 subjects). The sample was limited to one hospital and derived by convenience sampling which affects generalizability of findings. 22 % of the IG did not watch the video.

	Caucasian. Convenience sampling	emergency care and hospitalization and improves post-discharge self-care and lifestyle behaviors including patient-initiated actions for signs and symptoms of volume overload or fatigue within 3 months of the index hospitalization. No theory stipulated.				
Boyde et al., 2012	40 CHF patients enrolled in a CHF management program $\leq$ 64years:18.4% 65-74years: 50% $\geq$ 75years:31.6% 71% males.	Pre-test/ post-test Partly in participants home with session location unspecified. Trial the efficacy of a self-care manual	Each participant attended an initial session, completed questionnaires, introduced to a manual, watched a DVD, and then participated in a focus group. Participants	Evaluation of Knowledge: Dutch Heart Failure Knowledge Scale (DHFKS) - assessed at beginning and end of study. Evaluation of Self-care	DHFKS mean pre-test score was 11.53 $\pm$ 3.2; mean post-test score 13.13 $\pm$ 2.0 (p < .0001). Mean difference between pre- and post-test scores was 1.61$\pm$ 2.2 (95% CI, 0.866 to 2.344). SCHFI subscales	Pilot study – uncontrolled study, with one group pre-test/post-test design without a control group. Thus outcome could be attributed to other events.

28.9% females Race not reported. Convenience sampling	with the addition of a DVD Theory not stipulated.	encouraged to focus on 1 topic within the manual each week, and use multiple choice at end. Then attend a concluding session at 8 weeks after receiving the resources, completed questionnaires and participated in a focus group about the DVD.	behaviors – Self-care of Heart Failure Index.	showed improvement from pre- to post-tests results. Self-care maintenance, average post-test score (84.73 ± 11.72), pre-test 78.85 ± 18.28 ($p =.027$). Self-care management, average post-test score (74.22 ± 21.85), pre-test score (57.66 ± 24.66) ($p< .0001$). Self-care Confidence - average post-test score (66.72 ± 18.64), pre-test score (60.14 ± 24.59) ($p=0.051$). Difference between the pre- and post-test score means for the three subscales of self-care was maintenanc5.88 ± 15.72 (95% CI, 0.710 to 11.043); management 16.56 ± 22.48 (95% CI, 8.456 to 24.669); and confidence 6.58 ± 20.14 (95% CI, 0.037 to 13.21).	Convenience sampling. Testing effect. Sample bias arising from participants being likely more interested to learn having responded to the invitation. Short follow-up period (8 weeks). Primarily male and age > 65 years of age.

| Liou et al., 2015 | 131 HF patients

Mean age of patients 62.7± 15.3 and 62. 9± 13.7 in the control and intervention group respectively.

Convenience sampling | Quasi-experimental

Taipei Veterans General Hospital and also patients' home. | IG: Self-care program consisting of a self-care video-tape and booklet.

CG: Usual care | Knowledge of CHF Questionnaire pre and post education intervals.

Self-care of HF Index pre-education, at week 1, 1 month and 3 months after discharge. | IG displayed greater increase in HF knowledge between pre and post education. Pre education mean of the intervention group 58.3± 19.8, post education 75.8± 16.8 and control group pre education was 50.8± 22.1 with post education 70.8± 17.4. Increase was statistically significant at $p < .05$.
The four series of self-care measurements done – pre-education (T0), 1 week (T1), 1 month (T2) and 3 months (T3) after hospital discharge showed the intervention group having higher mean self-care scores that were statistically significant. P values for Self-care maintenance at T1, T2 and T3 as compared to | Participants were allocated to intervention or comparison group by convenience sampling, no randomization and no blinding applied increasing potential for bias. Utilized a pre- and post-test design. No power analysis was reported. Results may not be generalizable as the study was limited to one medical center and following loss of subjects at follow-up, the study population consequently had more females enrolled. Note: loss to follow-up was 13.7%. |

					before education (T0) were p< .05, p < .001 and p< .001 respectively. P values for Self-care management at T1, T2 and T3 as compared to before education (T0) were p< .05, p < .01 and p< .01 respectively. P values for Self-care confidence at T1, T2 and T3 as compared to before education (T0) were p< .05, p < .01 and p< .01 respectively.	
Maddison et al. 2008	20 participants with diagnosis of CHF. Mean age 63.80± 12.93 SD. 75% were male.	Randomized Control Trial A metropolitan hospital in the Auckland region of New Zealand.	IG: Watched a behavioral modeling DVD following first Peak Oxygen Uptake test (T1) then completed a second test two weeks later (T2). CG: Following T1, control	Scale adapted from the Self-Efficacy Scale. Self-efficacy measured prior to first test, then completed again before the second test.	Significant difference in self-efficacy scores at T2 with intervention group showing higher self-efficacy scores, $F (1, 19) = 5.80$, $p < .05$, $\acute{\eta}^2 = 0.25$.	Small sample size. Study included those with NYHA functional class II or III and stable heart failure so may not be generalizable to the other NYHA classes or to

			group did not watch the DVD.			those with decompensated HF.
Veroff et al., 2012	2439 HF patients, who purchased Medicare Advantage coverage offered by a large not-for-profit plan. Mean age in IG was 79.8 ± 8.6 and in CG: 80 ± 8.7. IG: male – 45.1%, female – 54.9% CG: male – 45.2%, female – 54.8% Race not reported.	Randomized control study Home based – outreach materials mailed to participants.	IG: Standard materials plus a medical decision aid (an evidenced-based DVD and booklet highlighting daily self-management steps for HF patients to manage their condition, prevent hospital admission and improve quality of life. CG: basic program information and a simple fact sheet about heart failure (standard materials)	Did not specify which self-care instrument used.	Self-care with daily weight monitoring as primary outcome. 44% of intervention group versus 37% of comparison group reported weighing themselves daily; difference between the groups was statistically significant (p = .05). Other aspects of self-care were reported as secondary measures (monitor fluid intake, follow a low-sodium diet, engage in physical activity).	Low telephone survey response rate (20% or 480 of 2439 survey respondents) reducing the power of the study. Majority of the participants were 75 years of age or older. This impacts generalizability to other age groups living with HF.

Table 2

Sociodemographic and clinical characteristics

Variable	All enrolled participants (n = 70)	Participants completing study (n = 30)	Lost to follow-up (n=40)	*p* value*	Test
Age (years), mean (SD)	65. 0 (12.9)	66.3 (11.7)	64.0 (13.8)	.448	1
Gender, n (%)				.002	2
Female	34 (48.6)	21 (70.0)	13 (32.5)		
Male	36 (51.4)	9 (30.0)	27 (67.5)		
Race, n (%)				.817	3
Black	21 (30.0)	9 (30.0)	12 (30.0)		
White	47 (67.1)	20 (66.7)	27 (67.5)		
Asian	1 (1.4)	1 (3.3)	0 (0.0)		
Hispanic	1 (1.4)	0 (0. 0)	1 (2.5)		
Marital status, n (%)				.511	3
Never married	7 (10.0)	2 (6.7)	5 (12.5)		
Married	35 (50.0)	15 (50.0)	20 (50.0)		
Divorced	14 (20.0)	5 (16.7)	9 (22.5)		
Separated	1 (1.4)	0 (0. 0)	1 (2.5)		
Widowed	13 (18.6)	8 (26.7	5 (12.5)		

Variable	All enrolled participants	Participants completing study	Lost to follow-up	*p* value*	Test
	(n = 70)	(n = 30)	(n=40)		
Living Arrangement, n (%)				.326	3
Living with spouse/ partner	39 (55.7)	14 (46.7)	25 (62.5)		
Living with other family	18 (25.7)	10 (33.3)	8 (20.0)		
Living alone	12 (17.1)	5 (16.7)	7 (17.5)		
Living with friends	1 (1.4)	1 (3.3)	0 (0.0)		
Education level, n (%)				.658	2
Did not complete high school	16 (22.9)	7 (23.3)	9 (22.5)		
High School Graduate/ GED	32 (45.7)	12 (40.0)	20 (50.0)		
College Graduate	22 (31.4)	11 (36.7)	11 (27.5)		
Employment Status, n (%)				.491	3
Unemployed	5 (7.1)	2 (6.7)	3 (7.5)		
Full-time	8 (11.4)	1 (3.3)	7 (17.5)		
Part-time	4 (5.7)	2 (6.7)	2 (5.0)		
Retired	35 (50.0)	16 (53.3)	19 (47.5)		
Disabled	18 (25.7)	9 (30.0)	9 (22.5)		
Income, n (%)				.943	3
Less than $ 24, 999	30 (42.9)	13 (43.3)	17 (42.5)		

Variable	All enrolled participants	Participants completing study	Lost to follow-up	p value*	Test
	(n = 70)	(n = 30)	(n=40)		
$25, 000 – $49, 999	16 (22.9)	8 (26.7)	8 (20.0)		
$50, 000 - $74, 999	2 (2.9)	1 (3.3)	1 (2.5)		
More than $75, 000	5 (7.1)	2 (6.7)	3 (7.5)		
Prefer not to state	17 (24.3)	6 (20.0)	11 (27.5)		
Type of Insurance, n (%)					
No insurance	8 (11.4)	3 (10.0)	5 (12.5)	1.000	3
Private Insurance	28 (40.0)	11 (36.7)	17 (42.5)	.622	2
Medicare	51 (72.9)	22 (73.3)	29 (72.5)	.938	2
Medicaid	13 (18.6)	7 (23.3)	6 (15.0)	.375	2
Other Insurance	3 (4.3)	2 (6.7)	1 (2.5)	.573	3
Charlson Comorbidity, mean (SD)	5.8 (2.8)	6.2 (2.3)	5.5 (3.1)	.246	1
Comorbidities, n (%)					
Hypertension	55 (78.6)	25 (83.3)	30 (75.0)	.400	2
Diabetes Mellitus	38 (54.3)	19 (63.3)	19 (47.5)	.188	2
Hyperlipidemia	37 (52.9)	14 (46.7)	23 (57.5)	.369	2
Atrial Fibrillation	30 (42.9)	14 (46.7)	16 (40.0)	.577	2
Coronary Artery Disease	30 (42.9)	11 (36.7)	19 (47.5)	.365	2

Variable	All enrolled participants (n = 70)	Participants completing study (n = 30)	Lost to follow-up (n=40)	p value*	Test
Chronic Kidney Disease	27 (38.6)	11 (36.7)	16 (40.0)	.777	2
Obstructive Sleep Apnea	23 (32.9)	7 (23.3)	16 (40.0)	.142	2
Other cardiac arrhythmias	20 (28.6)	10 (33.3)	10 (25.0)	.445	2
Previous MI	17 (24.3)	6 (20.0)	11 (27.5)	.469	2
Depression	15 (21.4)	9 (30.0)	6 (15.0)	.130	2
Solid Tumor	14 (20.0)	8 (26.7)	6 (15.0)	.227	2
Valvular Heart Disease	12 (17.1)	3 (10.0)	9 (22.5)	.170	2
COPD	12 (17.1)	6 (20.0)	6 (15.0)	.583	2
Previous CVA/ TIA	10 (14.3)	3 (10.0)	7 (17.5)	.498	3
Peripheral Vascular disease	10 (14.3)	3 (10.0)	7 (17.5)	.498	3
Liver Disease	4 (5.7)	3 (10.0)	1 (2.5)	.307	3
Obesity	14 (20.0)	5 (16.7)	9 (22.5)	.546	2
Current history of substance use	4 (5.7)	1 (3.3)	3 (7.5)	.630	3
Malignant Lymphoma	2 (2.9)	0 (0.0)	2 (5.0)	.503	3
Peptic Ulcer Disease	1 (1.4)	1 (3.3)	0 (0.0)	.429	3

Variable	All enrolled participants	Participants completing study	Lost to follow-up	*p* value*	Test
	(n = 70)	(n = 30)	(n=40)		
Medication class, n (%)					
Diuretics	52 (74.3)	22 (73.3)	30 (75.0)	.875	2
Beta Blockers	51 (72.9)	21 (70.0)	30 (75.0)	.642	2
Statins	47 (67.1)	19 (63.3)	28 (70.0)	.557	2
Anticoagulants	24 (34.3)	11 (36.7)	13 (32.5)	.716	2
ACE Inhibitors	19 (27.1)	8 (26.7)	11 (27.5)	.938	2
Aldosterone Antagonist	13 (18.6)	6 (20.0)	7 (17.5)	.790	2
Angiotensin Receptor Blockers	10 (14.3)	5 (16.7)	5 (12.5)	.735	3
Digitalis	5 (7.1)	3(10.0)	2 (5.0)	.645	3
NYHA Classification, n (%)				.477	3
Class I	1 (1.4)	1 (3.3)	0 (0.0)		
Class II	14 (20.0)	7 (23.3)	7 (17.5)		
Class III	39 (55.7)	17 (56.7)	22 (55.0)		
Class IV	16 (22.9)	5 (16.7)	11 (27.5)		
Ejection Fraction, n (%)				.098	2
HF*r*EF (EF ≤ 40%)	45 (64.3)	15 (50.0)	30 (75.0)		

Variable	All enrolled participants (n = 70)	Participants completing study (n = 30)	Lost to follow-up (n=40)	p value*	Test
HF*p*EF, borderline (EF 41% – 49%)	7 (10.0)	4 (13.3)	3 (7.5)		
HF*p*EF (EF ≥ 50%)	18 (25.7)	11 (36.7)	7 (17.5)		
Ejection Fraction within last six months 6 months, n (%)	65 (92.9)	28 (93.3)	37 (92.5)	1.000	3
Time since HF diagnosis, n (%)				.581	3
Less than 12 months	26 (37.1)	12 (40.0)	14 (35.0)		
1 - 5 years	26 (37.1)	9 (30.0)	17 (42.5)		
6 - 10 years	10 (14.3)	4 (13.3)	6 (15.0)		
Greater than 10 years	8 (11.4)	5 (16.7)	3 (7.5)		
Length of stay, median (IQR)	5.0 (6)	4.5 (6)	5.0 (8)	.541	4
Hospitalizations in the past 12 months	34 (48.6)	15 (50.0)	19 (47.5)	.836	2
Miles traveled to hospital, median (IQR)	40.0 (53.5)	40.0 (59.8)	40.0 (60.0)	.725	4
Travel time to the hospital				1.000	3
Less than 1 hour	37 (52.9)	16 (53.3)	21 (52.5)		
1-2 hours	22 (31.4)	9 (30.0)	13 (32.5)		
3 – 4 hours	6 (8.6)	3 (10.0)	3 (7.5)		

Variable	All enrolled participants (n = 70)	Participants completing study (n = 30)	Lost to follow-up (n=40)	p value*	Test
5 hours and more	5 (7.1)	2 (6.7)	3 (7.5)		

Note. *p* values of tests comparing those who completed (n=30) with those lost to follow-up (n=40); 1 = computed using two-sided independent samples t-test; 2 = computed using two-sided chi-square test; 3 = exact two-sided chi-square test; 4 = computed using the Mann-Whitney U test. Some patients had multiple types of insurance payment; most patients had multiple conditions and were taking multiple medications; HFrEF = HF with reduced ejection fraction; HFpEF, borderline = HF with preserved ejection fraction, borderline; HFpEF= HF with preserved ejection fraction; EF = ejection fraction; IQR = Interquartile Range.

Table 3

Results of Primary Measures

Variables	Frequency	Pre-test Mean (SD)	Post-test Mean (SD)	*p* value
Knowledge of Heart Failure	30	22.67 (3.99)	24.36 (3.61)	**.008***
Self-care maintenance	30	67.22 (18.65)	81.18 (14.16)	**.001***
Self-care management	21	58.95 (23.98)	68.38 (20.56)	.073
Self-care confidence	30	69.31 (21.64)	70.98 (18.16)	.735

Note. *p< .05

Table 4

Item analysis of the Atlanta Heart Failure Knowledge Test

Questions	Domain	Pretest N, %	Post-test N, %	Difference	Better than 5% improvement in scores
Q1	Pathophysiology	62 (86%)	29 (97%)	11	Yes
Q2	Pathophysiology	52 (72%)	29 (97%)	25	Yes
Q3	Behavior	69 (96%)	30 (100%)	4	No
Q4	Nutrition	49 (68%)	26 (87%)	19	Yes
Q5	Behavior	66 (92%)	29 (97%)	5	Yes
Q6	Behavior	69 (96%)	30 (100%)	4	No
Q7	Medications	72 (100%)	29 (97%)	-3	No
Q8	Symptoms	44 (61%)	18 (60%)	-1	No
Q9	Medications	29 (40%)	15 (50%)	10	Yes
Q10	Medications	52 (72%)	23 (77%)	5	Yes
Q11	Medications	51 (71%)	26 (87%)	16	Yes
Q12	Symptoms	61 (85%)	30 (100%)	15	Yes
Q13	Medications	34 (47%)	15 (50%)	3	No
Q14	Behavior	66 (92%)	29 (97%)	5	Yes
Q15	Symptoms	64 (89%)	29 (97%)	8	Yes
Q16	Behavior	21 (29%)	14 (47%)	18	Yes
Q17	Symptoms	69 (96%)	30 (100%)	4	No

Questions	Domain	Pretest N, %	Post-test N, %	Difference	Better than 5% improvement in scores
Q18	Nutrition	60 (83%)	30 (100%)	17	Yes
Q19	Nutrition	63 (88%)	28 (93%)	5	Yes
Q20	Nutrition	68 (94%)	29 (97%)	3	No
Q21	Nutrition	38 (53%)	22 (73%)	20	Yes
Q22	Nutrition	44 (61%)	23 (77%)	16	Yes
Q23	Nutrition	62 (86%)	26 (87%)	1	No
Q24	Medications	37 (51%)	23 (77%)	26	Yes
Q25	Nutrition	17 (24%)	3 (10%)	-14	No
Q26	Nutrition	59 (82%)	28 (93%)	11	Yes
Q27	Nutrition	51 (71%)	22 (73%)	2	No
Q28	Symptoms	30 (42%)	16 (53%)	11	Yes
Q29	Medications	39 (54%)	20 (67%)	13	Yes
Q30	Behaviors	65 (90%)	30 (100%)	10	Yes

Note: Domains are as outlined in the Atlanta Heart Failure Knowledge Test (Reilly et al., 2009).

Table 5

Overall Video Usage Out of 26 Videos

Total watched	Frequency (n = 24)	Percent
11.00	2	8.3
16.00	1	4.2
17.00	1	4.2
18.00	2	8.3
20.00	1	4.2
21.00	1	4.2
22.00	2	8.3
23.00	1	4.2
24.00	2	8.3
26.00	11	45.8
Total	24	100.0

Table 6

Tally of Videos Watched by the 24 Patients Who Reported on Videos Watched

Name of Video	Number	Percent
Heart Failure Basics		
What is Heart Failure?	24	100
Your Heart Failure Management Plan	22	91.7
Heart Failure Making Lifestyle Changes	23	95.8
Managing Heart Failure: Energy Conservation	24	100
Managing Heart Failure: Handling Flare-ups	24	100
Managing Heart Failure: Finding Support	23	95.8
Common Tests for Heart Failure	20	83.3
Heart Failure: Your Heart Failure Healthcare Team Visits	22	91.7
Heart Failure: Monitoring for Signs and Symptoms	20	83.3
Managing Heart Failure: Quit Smoking	15	62.5
Emotions of Heart Failure	19	79.2
Managing Heart Failure: At Hospital Discharge	21	87.5
Heart Failure Medications		
Understanding Heart Failure Medications	22	91.7
Heart Failure Medications: ACE Inhibitors and ARBs	22	91.7
Heart Failure Medications: Diuretics	22	91.7
Heart Failure Medications: Digitalis	16	66.7
Taking Your Heart Failure Medications	21	87.5
Heart Failure Medications: Beta-Blockers	22	91.7
Heart Failure Medications: Aldosterone Inhibitors	15	62.5
Heart Failure Lifestyle Changes		
Managing Heart Failure: Limiting Sodium	23	95.8

Using the Food Label When You Have Heart Failure	18	75.0
Managing Heart Failure: Fluid Guidelines	21	87.5
Managing Heart Failure: Exercise Safety	19	79.2
Managing Heart Failure: Beware of Fat and Cholesterol	18	75.0
Managing Heart Failure: Dining Out	19	79.2
Managing Heart Failure: Getting Active	18	75.0

Note. ACE = Angiotensin Converting Enzyme; ARBs = Angiotensin Receptor Blockers

Table 7

Patient Satisfaction with Video Education Survey Results (N=26)

Statements	Strongly agree n (%)	Agree n (%)	Disagree n (%)	Strongly disagree n (%)
It was easy to find the videos	17 (65.4)	8 (30.1)	1 (3.9)	0 (0.0)
I would recommend these videos to another patient with heart failure	17 (65.9)	9 (34.9)	0 (0.0)	0 (0.0)
The videos were meaningful to me	11 (42.3)	13 (50.0)	2 (7.7)	0 (0.0)
I learned something new about managing heart failure	14 (53.9)	11 (42.3)	1 (3.9)	0 (0.0)
I am satisfied with the information in the videos	14 (53.9)	11 (42.3)	1 (3.9%)	0 (0.0)

Table 8

Patients' Rating of Videos (N=24)

Name of Video	Not helpful n (%)	Somewhat Helpful n (%)	Very Helpful n (%)	Extremely Helpful n (%)
Heart Failure Basics				
What is Heart Failure?	0 (0.0)	3 (12.5)	11 (45.8)	10 (41.7)
Your Heart Failure Management Plan	0 (0.0)	4 (18.2)	9 (40.9)	9 (40.9)
Heart Failure Making Lifestyle Changes	0 (0.0)	4 (17.4)	10 (43.5)	9 (39.1)
Managing Heart Failure: Energy Conservation	1 (4.2)	4 (16.7)	10 (41.7)	9 (37.5)
Managing Heart Failure: Handling Flare-ups	1 (4.2)	5 (20.8)	7 (29.2)	11 (45.8)
Managing Heart Failure: Finding Support	0 (0.0)	3 (13.0)	9 (39.1)	11 (47.8)
Common Tests for Heart Failure	1 (5.3)	4 (21.1)	8 (42.1)	6 (31.6)
Heart Failure: Your Heart Failure Healthcare Team Visits	0 (0.0)	7 (33.3)	7 (33.3)	7 (33.3)
Heart Failure: Monitoring for Signs and Symptoms	0 (0.0)	3 (15.0)	5 (25.0)	12 (60.0)
Managing Heart Failure: Quit Smoking	3 (20.0)	3 (20.0)	3 (20.0)	6 (40.0)
Emotions of Heart Failure	1 (5.3)	3 (15.8)	6 (31.6)	9 (47.4)
Managing Heart Failure: At Hospital Discharge	0 (0.0)	6 (28.6)	9 (42.9)	6 (28.6)
Heart Failure Medications				

Name of Video	Not helpful n (%)	Somewhat Helpful n (%)	Very Helpful n (%)	Extremely Helpful n (%)
Understanding Heart Failure Medications	0 (0.0)	3 (13.6)	6 (27.3)	13 (59.1)
Heart Failure Medications: ACE Inhibitors and ARBs	0 (0.0)	4 (19.1)	6 (28.6)	11 (52.4)
Heart Failure Medications: Diuretics	0 (0.0)	2 (9.5)	4 (19.1)	15 (71.4)
Heart Failure Medications: Digitalis	0 (0.0)	4 (26.7)	4 (26.7)	7 (46.7)
Taking Your Heart Failure Medications	0 (0.0)	4 (19.1)	4 (19.1)	13 (61.9)
Heart Failure Medications: Beta-Blockers	0 (0.0)	5 (22.7)	5 (22.7)	12 (54.6)
Heart Failure Medications: Aldosterone Inhibitors	0 (0.0)	3 (20.0)	5 (33.3)	7 (46.7)
Heart Failure Lifestyle Changes				
Managing Heart Failure: Limiting Sodium	0 (0.0)	3 (13.0)	5 (21.7)	15 (65.2)
Using the Food Label When You Have Heart Failure	0 (0.0)	2 (11.1)	8 (44.4)	8 (44.4)
Managing Heart Failure: Fluid Guidelines	0 (0.0)	4 (19.1)	7 (33.3)	10 (47.6)
Managing Heart Failure: Exercise Safety	0 (0.0)	3 (15.8)	5 (26.3)	11 (57.9)
Managing Heart Failure: Beware of Fat and Cholesterol	0 (0.0)	4 (22.2)	7 (38.9)	7 (38.9)
Managing Heart Failure: Dining Out	0 (0.0)	2 (10.5)	8 (42.1)	9 (47.4)
Managing Heart Failure: Getting Active	0 (0.0)	5 (27. 8)	4 (22.2)	9 (50.0)

Note: ACE = Angiotensin Converting Enzyme; ARBs = Angiotensin Receptor Blockers

Figure 1. The situation-specific theory of heart failure self-care. Riegel, B., Vaughan Dickson,

V., & Faulkner, K. M. (2016). The situation-specific theory of heart failure self-care. *Journal of*

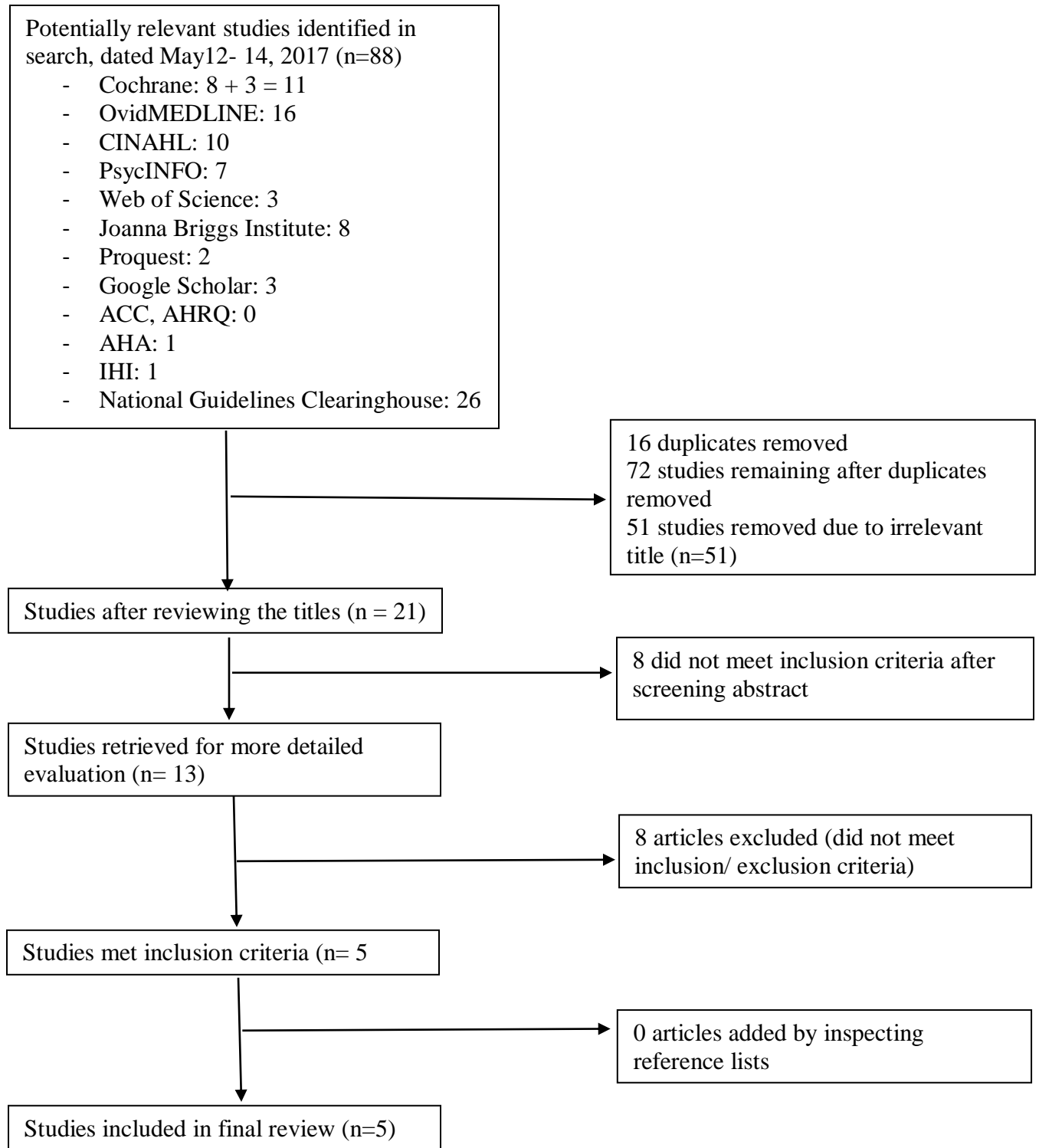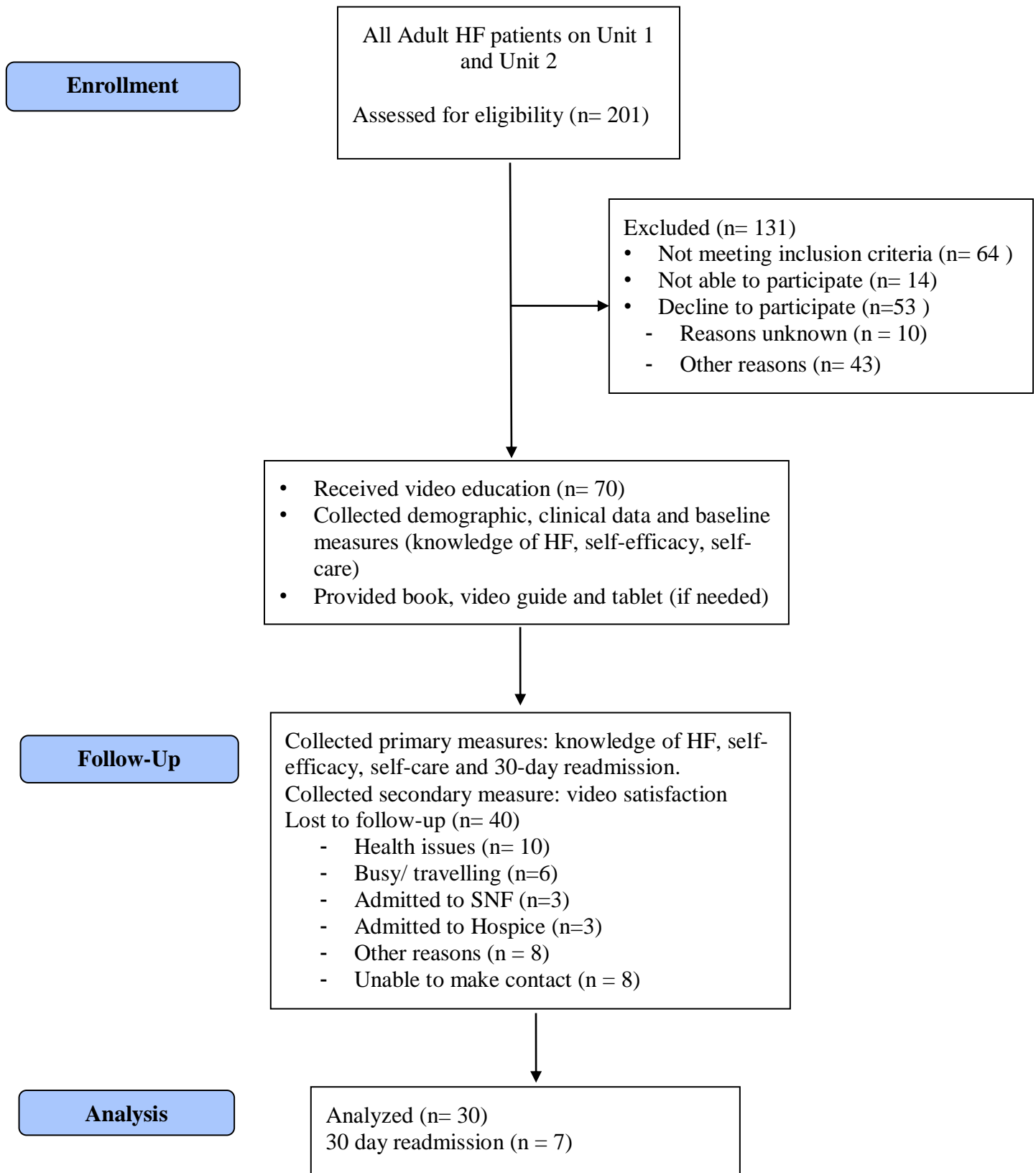*Cardiovascular Nursing, 31*(3), 226-235. doi:10.1097/JCN.0000000000000244

Potentially relevant studies identified in
search, dated May12- 14, 2017 (n=88)
- Cochrane: 8 + 3 = 11
- OvidMEDLINE: 16
- CINAHL: 10
- PsycINFO: 7
- Web of Science: 3
- Joanna Briggs Institute: 8
- Proquest: 2
- Google Scholar: 3
- ACC, AHRQ: 0
- AHA: 1
- IHI: 1
- National Guidelines Clearinghouse: 26

16 duplicates removed
72 studies remaining after duplicates
removed
51 studies removed due to irrelevant
title (n=51)

Studies after reviewing the titles (n = 21)

8 did not meet inclusion criteria after
screening abstract

Studies retrieved for more detailed
evaluation (n= 13)

8 articles excluded (did not meet
inclusion/ exclusion criteria)

Studies met inclusion criteria (n= 5

0 articles added by inspecting
reference lists

Studies included in final review (n=5)

Figure 2. The integrative review flowchart

Figure 3. Project flow diagram. Adapted from the Consort 2010 Flow diagram.

Appendix A. Content of the Videos

Heart Failure Basics

What is Heart Failure?
Duration: 4:14

Common Tests for
Heart Failure
Duration: 2:33

Your Heart Failure
Management Plan
Duration: 5:33

Your Heart Failure
Healthcare Team Visits
Duration: 2:36

Heart Failure: Making
Lifestyle Changes
Duration: 4:31

Heart Failure: Monitoring
for signs and Symptoms
Duration: 2:23

Managing Heart Failure:
Energy Conservation
Duration: 2:35

Managing Heart Failure:
Quit smoking
Duration: 2:38

Managing Heart Failure:
Handling flare-ups
Duration: 2:29

Emotions of Heart Failure
Duration: 3:39

Managing Heart Failure:
Finding Support.
Duration: 3:50

Managing Heart Failure:
At Hospital Discharge
Duration: 4:55

Heart Failure Medications

Understanding Heart
Failure Medications
Duration: 6:17

Taking Your Heart Failure
Medications
Duration: 4:12

 Heart Failure Medications:
ACE Inhibitors and ARBs
Duration: 2:59

 Heart Failure Medications:
Beta-Blockers
Duration: 2:44

 Heart Failure Medications:
Diuretics
Duration: 3:37

 Heart Failure Medications:
Aldosterone Antagonists
Duration: 3:34

 Heart Failure Medications:
Digitalis
Duration: 2:14

Heart Failure Lifestyle Changes

 Managing Heart Failure
Limiting Sodium
Duration: 4:45

 Managing Heart Failure:
Beware of Fat and
Cholesterol
Duration: 2:08

 Using the Food Label When
You Have Heart Failure
Duration: 2:49

 Managing Heart
Failure: Dining Out
Duration: 2:33

 Managing Heart Failure:
Fluid Guidelines
Duration: 2:39

 Managing Heart Failure:
Get active
Duration: 2:55

 Managing Heart Failure:
Exercise Safety
Duration: 4:03

Appendix B. Permission Letter: Four East

UNIVERSITY of VIRGINIA

kimone reid <krr5nt@virginia.edu>

Heart Failure DNP Project

Batman, A. Brannelly *HS <ABT5S@hscmail.mcc.virginia.edu>   Wed, Jun 14, 2017 at 5:29 PM
To: "Reid, Kimone R" <krr5nt@virginia.edu>

Kimone,

I grant permission for your to proceed with your project.

Wishing you the best of luck,

Brannelly

A. Brannelly Batman, MSN, RN, NEA-BC
Nurse Manager
4 East & Central Cardiac Monitoring Center
University of Virginia Health System
434-982-0291 office   540-241-4053 cell

From: kimone reid [mailto:krr5nt@virginia.edu]
Sent: Wednesday, June 14, 2017 5:16 PM
To: abt5s@virginia.edu
Subject: Heart Failure DNP Project

[Quoted text hidden]

Appendix C. Permission Letter: Four Central

Joan Tepper, MSRN
University of Virginia Health System
4 Central Nurse Manager
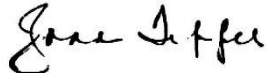PO BOX 801446
Charlottesville, VA 22908-0788

June 20, 2017

Kimone Reid
c/o The University of Virginia School of Nursing
225 Jeanette Lancaster Way
Charlottesville, VA 22903

Dear Kimone,

I hereby grant you permission to conduct your Doctor of Nursing Practice (DNP) project focusing on Video Education for Heart Failure patients on Four Central. My team and I look forward to working with you.

Sincerely,

Joan Tepper, MSRN
University of Virginia Health System
4 Central Nurse Manager

Appendix D. Advanced Heart Failure Center

UNIVERSITY *of* VIRGINIA

kimone reid <krr5nt@virginia.edu>

DNP Project with Heart Failure Patients

Lawson, Marian B *HS <MMB3Y@hscmail.mcc.virginia.edu>   Fri, Jun 16, 2017 at 3:33 PM
To: "Reid, Kimone R" <krr5nt@virginia.edu>

Hi Kimone,

I am very happy to send a note giving approval and support to conduct the DNP project focusing on Video Education for Heart Failure patients. I look forward to following the outcome on this

Marian

Marian Lawson, RN

Manager, Advanced Heart Failure

Heart and Vascular Center, Quality

University of Virginia Health System

P.O. Box 800134

Charlottesville, VA 22908

Office phone: 434 924-6985

Cell phone: 434 465-5938

Email: mmb3y@virginia.edu

From: kimone reid [mailto:krr5nt@virginia.edu]
Sent: Friday, June 16, 2017 12:25 PM
To: Lawson, Marian B *HS
Subject: DNP Project with Heart Failure Patients

[Quoted text hidden]

Appendix E. Unit Presentation

Video Education to Improve Outcomes in Heart Failure (VETiO-HF)

DNP Student: Kimone Reid, MSPH, BSN, RN, CCRN
DNP Advisors: Dr. Cathy Campbell, PhD, RN; Dr. Kathryn Reid, PhD, RN, FNP-c
Practice Mentor: Craig Thomas, MSN, NP, ACNP-BC, ACNS-BC, CHFN

Heart Failure Facts

- HF is the most common diagnosis for hospital admission (Braunwald, 2014).
- An estimated one million hospitalizations in the U. S. in 2010 were for HF, unchanged from 2000 (Hall, Levant and DeFrances, 2012).
- Patients with prior HF hospitalization have greater rates of cardiovascular death and rehospitalization (Benjamin et al., 2017).
- UVA Health System HF readmission rate according to the Center for Medicaid and Medicare Services (CMS) was 22.7%, while the national average was 21.9%.
- Maximum penalty for excess readmissions by CMS is set at 3%.

Overview of VETiO-HF

Project Objectives:
- Evaluate the Effect of supplementing usual HF patient education with Video Education (VE) in increasing self-efficacy, self-care and knowledge of HF.

- Evaluate the Effect of usual HF patient education supplemented with VE on 30-day readmission rate for adult patients with HF who received the intervention.

- Evaluate patients' satisfaction with VE

Why video education?
- Evidenced-Based
- Patient centered.
- 75% of information is absorbed visually.
- Promotes Multi-modal learning, which 64% of HF patients prefer.
- Great for patients with Low Health Literacy.
- Patient can replay information unlimited.
- Enhances retention.
- Cost-effective

Study Design: 1 group pretest/post-test design
Projected start date: after IRB approval.

Study Eligibility

- Inclusion Criteria
- Patients diagnosed with HF who are 18 years of age or older
- Patients admitted to the acute cardiology (Four East) and the vascular and acute cardiology (Four Central) units.

- Exclusion Criteria
- Patients under observation
- Medically certified as blind,
- Diagnosed with cognitive impairment (Alzheimer's, Dementia etc.)
- Unable to give consent, unable to read and write in English
- Being discharged to a skilled nursing facility, rehabilitation facility, hospice facility, long term acute care facility or to a prison.
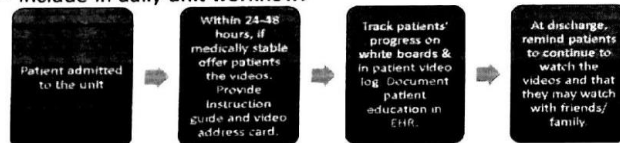
The Videos

- Videos are grouped into 3 main categories:
- HF Basics: 12 videos = 39.16 minutes,
- HF Medications: 7 videos = 24.17 minutes
- HF Lifestyle Changes: 7 videos = 20.32 minutes.
- The total video content duration is 1 hour 24 minutes and 5 seconds.
- Individual videos are kept mainly to a 3 to 4 minute duration, as this is more suitable for patients who are not well and have limited attention span (Milner-Fenwick, 2017b).
- Videos can be watched at http://uva.videosforhealth.com/ on any computer, tablet or smart phone.

How does the project benefit nursing (WIIFM)?

- Saves nursing time. Thus, increases nurses efficiency.
- Provides consistent message to all patients. Avoids variation in patient education.
- Providing video education gives patient some of the accountability and responsibility for maintaining their health.
  - ➢ Patient tracks videos watch in a video log, which can be seen as a contract to improve their self-care.
- Contribute to the health and well-being of patients.
- Contribute to financial well-being of hospital.

Sustainability of the project

- Tell patients about the videos as soon as possible after admission to routinize the videos. Video education will likely increase the efficiency of nurses, concepts will be familiar thus less repetition.
- Whiteboard Patient Reminder: Have you watched a video today?
- Include in daily unit workflow:

| Patient admitted to the unit | ⇒ | Within 24-48 hours, if medically stable offer patients the videos. Provide Instruction guide and video address card. | ⇒ | Track patients' progress on white boards & in patient video log. Document patient education in EHR. | ⇒ | At discharge, remind patients to continue to watch the videos and that they may watch with friends/ family. |

Example of Video Education Workflow

Sustainability of the project

- Keep administration of VE simple and easy to understand by using scripted tools.
- Identify unit champions for ongoing utilization of VE.
- Involve unit leadership and practice experts.
- Identify any barriers/ challenges to VE plus usual care becoming the new standard of HF patient education.
- Tell patients about the videos as soon as possible after admission to routinize the videos.
- Utilize Whiteboard patient reminders; for example, have you watched a HF video today?
- Include in unit's daily workflow (see figure for Patient Education Workflow).
- Discuss using VE at units' huddles, daily rounds and staff meetings.
- Share project findings on the effectiveness of supplementing usual HF patient education with VE.

Appendix F. Self-care of heart failure index

All answers are confidential.

Think about how you have been feeling in the last month or since we last spoke as you complete these items.

SECTION A:

Listed below are common instructions given to persons with heart failure. How routinely do you do the following?

	Never or rarely	Sometimes	Frequently	Always or daily
1. Weigh yourself?	1	2	3	4
2. Check your ankles for swelling?	1	2	3	4
3. Try to avoid getting sick (e.g., flu shot, avoid ill people)?	1	2	3	4
4. Do some physical activity?	1	2	3	4
5. Keep doctor or nurse appointments?	1	2	3	4
6. Eat a low salt diet?	1	2	3	4
7. Exercise for 30 minutes?	1	2	3	4
8. Forget to take one of your medicines?	1	2	3	4
9. Ask for low salt items when eating out or visiting others?	1	2	3	4
10. Use a system (pill box, reminders) to help you remember your medicines?	1	2	3	4

SECTION B:

Many patients have symptoms due to their heart failure. Trouble breathing and ankle swelling are common symptoms of heart failure.

In the past month, have you had trouble breathing or ankle swelling? Circle one.

    0) No

    1) Yes

11. If you had trouble breathing or ankle swelling in the past month…

(circle **one** number)

	Have not had these	I did not recognize it	Not Quickly	Somewhat Quickly	Quickly	Very Quickly
How quickly did you recognize it as a symptom of heart failure?	N/A	0	1	2	3	4

Listed below are remedies that people with heart failure use. If you have trouble breathing or ankle swelling, how likely are you to try one of these remedies?

(circle **one** number for each remedy)

	Not Likely	Somewhat Likely	Likely	Very Likely
12. Reduce the salt in your diet	1	2	3	4
13. Reduce your fluid intake	1	2	3	4
14. Take an extra water pill	1	2	3	4
15. Call your doctor or nurse for guidance	1	2	3	4

16. Think of a remedy you tried the last time you had trouble breathing or ankle swelling,

(circle **one** number)

	I did not try anything	Not Sure	Somewhat Sure	Sure	Very Sure
How <u>sure</u> were you that the remedy helped or did not help?	0	1	2	3	4

SECTION C:

In general, how confident are you that you can:

	Not Confident	Somewhat Confident	Very Confident	Extremely Confident
17. Keep yourself <u>free of heart failure symptoms?</u>	1	2	3	4
18. <u>Follow the treatment advice</u> you have been given?	1	2	3	4
19. <u>Evaluate the importance</u> of	1	2	3	4

your symptoms?				
20. <u>Recognize changes</u> in your health if they occur?	1	2	3	4
21. <u>Do something</u> that will relieve your symptoms?	1	2	3	4
22. <u>Evaluate</u> how well a remedy works?	1	2	3	4

Appendix G. Atlanta Heart Failure Knowledge Test

(Correct answers are marked with an asterisk)

We have some questions about heart failure. Select <u>one</u> response for each question. Don't worry if you are not sure of the answers; just do the best you can.

1. Heart failure is a problem in which: (Patho)

○ a. There is too much blood in the body

○ b. The heart is unable to pump enough blood *

○ c. The blood vessels in the heart are clogged

○ d. The heart skips beats

2. Which of the following statements about heart failure is TRUE? (Patho)

○ a. It can be cured with drugs and other treatments.

○ b. A person with heart failure cannot live a normal life.

○ c. Heart failure cannot be cured but it can be controlled.*

○ d. Heart failure means the heart has stopped beating.

People with heart failure can do many things to help themselves. Think about each of these activities and decide if they would be <u>helpful</u> for someone with heart failure.

	Yes	No
3. Weigh themselves everyday (behavior)	*	
4. Drink lots of fluids (nutrition)		*
5. Stop smoking (behavior)	*	
6. Drink alcoholic drinks each day to relax (behavior)		*
7. Skip heart failure medicines when they feel better (Medication)		*
8. Call their doctor to report loss of 2 pounds in 1 night (symptoms)		*

9. ACE inhibitors (ex. Capoten, Vasotec, Lisinopril, or Zestril) are medicines used to treat heart failure. These drugs help the heart pump stronger by: (medication)

○ a. Slowing down the heart rate

○ b. Causing blood vessels to get smaller

○ c. Relaxing tight blood vessels and blocking salt retention*

○ d. Improving blood counts (reducing anemia)

10. People who have heart failure take diuretics (Lasix, "water pills") so that: (medication)

○ a. Their kidneys will make more urine and pass more water*

○ b. Their heart will beat more steady

○ c. The blood vessels in their body will widen or relax

○ d. Their heart will pump stronger

11. People with heart failure who are taking a diuretic ("water pill") need to: (medication)

○ a. Know if they need to take extra potassium with their water pill*

○ b. Take the diuretic after 3-4 pm in the day

○ c. Not worry about signs and symptoms of dehydration

○ d. Drink lots of water to replace lost fluid

12. If a person with heart failure gains 2-3 pounds in a few days, this usually means he/she: (symptoms)

○ a. Is eating too many calories and gaining weight

○ b. Has extra water in the body*

○ c. Needs to drink more fluid

○ d. Needs to be getting more exercise to burn calories

13. Beta blocker medications (ex. Coreg, metoprolol, atenolol) are medicines used to treat heart failure. These drugs help the heart pump stronger by: (medication)

○ a. Slowing down the heart rate*

○ b. Causing blood vessels to get smaller

○ c. Relaxing tight blood vessels and blocking salt retention

○ d. Improving blood counts (reducing anemia)

14. The best time of day for persons with heart failure to weigh themselves is: (behavior)

○ a. At bedtime

○ b. Upon awakening in the morning*

○ c. At or around lunchtime

○ d. When they remember to do it

15. Persons with heart failure should call their doctor if they have which of the following symptoms? (symptoms)

○ a. Weight gain of 2-5 pounds in 1-2 days

○ b. Increased swelling of the ankles and/or stomach

○ c. More shortness of breath

○ d. All of the above*

16. Persons with heart failure should exercise: (behavior)

○ a. To the point of breathlessness

○ b. Most days of the week*

○ c. Only at a slow pace that does not cause the heart rate to increase

○ d. 1-2 times per week

17. A person with heart failure should stop and rest when doing physical activity if: (symptoms)

○ a. They feel short of breath or winded

○ b. They have chest pain or discomfort

○ c. They feel dizzy or lightheaded

○ d. All of the above*

18. Which is a big source of sodium (salt) in the diet? (nutrition)

○ a. Processed foods (such as tv dinners)

○ b. Smoked or cured meats

○ c. Table salt

○ d. All of the above*

19. Which has the LOWEST amount of sodium (salt)? (nutrition)

○ a. Fresh fruits*

○ b. Canned vegetables

○ c. Reduced sodium soup

○ d. Frozen dinners

20. Which food has the MOST sodium (salt)? (nutrition)

○ a. Sliced tomato

○ b. Broiled fish

○ c. Baked ham*

○ d. Skim milk

21. Which dessert has the LOWEST amount of sodium? (nutrition)

    a. Hot fudge sundae

    b. Baked apple*

    c. Low fat instant pudding made with skim milk

    d. Chocolate cake made from a mix

22. Select the fast food with the LOWEST amount of sodium. (nutrition)

    a. Fried chicken

    b. Cheeseburger

    c. Baked potato with sour cream and chives*

    d. Taco salad

23. Some people with heart failure are told by their doctor to limit fluids. Which of the following count as fluids? (nutrition)

    a. Water and clear liquids

    b. Milk, ice cream, and yogurt

    c. Jello, pudding, and soups

    d. All of the above*

24. If a person with heart failure has a headache or pain, which would be the best medicine to take? (medication)

    a. Aspirin

    b. Tylenol (Acetaminophen)*

    c. Advil® or Motrin® (Ibuprofen)

    d. Anacin Regular Strength or Excedrin

25. The recommended total daily amount of sodium that persons with heart failure should eat is: (nutrition)

○   a. Less than 3,000 milligrams*

○   b. Greater than 4,000 milligrams

○   c. 1,500 milligrams

○   d. As close to 0 as possible

Use the picture of the soup label, to answer questions 26 and 27:

26. How many servings are in the can? (nutrition)

○   a. 1

○   b. 2 ½

○   c. 2*

○   d. 3

27. How much sodium is in one serving of soup? (nutrition)

○   a. 40mg

○   b. 950mg*

○   c. 475mg

○   d. 1900mg

Nutrition Facts
Serving Size 1 cup (237g)
Servings Per Container about 2

Amount Per Serving

Calories 100   Calories from Fat 20

% Daily Value*

Total Fat 2.5g   4%
  Saturated Fat 0.5g   3%
  Trans Fat 0g
  Polyunsaturated Fat 0.5g
  Monounsaturated Fat 1g
Cholesterol 25mg   8%
Sodium 950mg   40%
Total Carbohydrate 12g   4%
  Dietary Fiber 1g   4%
  Sugars 1g
Protein 7g

Vitamin A 20%   •   Vitamin C 0%
Calcium 2%   •   Iron 4%
*Percent Daily Values are based on a 2,000 calorie diet.

28. A person with heart failure who is trying to limit their fluids may reduce symptoms of thirst by: (symptoms)

○   a. Chewing gum or sucking hard candy*

○   b. Cutting back on their medications

○ c. Drinking small amounts every 30-60 minutes to prevent thirst

○ d. Warming fluids before drinking

29. If a person with heart failure forgets to take their medicine, they should: (medication)

○ a. Take their medicines as usual the next day

○ b. Take the medicines as soon as remembered*

○ c. Take double the dose the next day

○ d. Call their doctor immediately

30. It is important for a person with heart failure to: (behavior)

○ a. Make sure they get the flu shot every year

○ b. Receive the pneumovax vaccination to prevent pneumonia

○ c. See their heart failure doctor regularly

○ d. All of the above*

Appendix H. Heart Failure Video Survey

Today's Date: _____   Project I.D. Number: _____

Thank you for watching the videos. We would like to know your thoughts about the videos. Your

answers will tell us what works well in teaching people living with heart failure. Your answers

are private.

Instructions: Please circle whether you agree or disagree with each statement below. Then

please answer the questions. Your feedback is greatly appreciated.

1. It was easy to find the videos

   o Strongly agree

   o Agree

   o Disagree

   o Strongly disagree

2. I would recommend these videos to another patient with Heart Failure

   o Strongly agree

   o Agree

   o Disagree

   o Strongly disagree

3. The videos were meaningful to me

   o Strongly agree

   o Agree

   o Disagree

   o Strongly disagree

4. I learned something new about managing Heart failure

- o Strongly agree

- o Agree

- o Disagree

- o Strongly disagree

5. I am satisfied with the information in the videos.

- o Strongly agree

- o Agree

- o Disagree

- o Strongly disagree

Questions:

6. What were the most important things you learned from watching the videos?

7. After watching the videos, what changes will you make in taking care of yourself with

   Heart Failure?

8. Do you have any comments about using the videos as a part of your Heart failure

   education?

Thanks for completing this survey.

Appendix I. DNP Project Poster

Video Education to Improve Outcomes in Heart Failure (VETiO-HF): A DNP Quality Improvement Project

The VETiO-HF project will evaluate the outcomes of supplementing current Heart Failure patient education with videos on Heart Failure on 4 East and 4 Central.

Please notify Project contact below of patients that could participate in the project. These include:

- Patients diagnosed with Heart Failure
- Heart Failure Patients 18 years of age or older
- Heart Failure Patients admitted to 4 East or 4 Central

PROJECT LEAD CONTACT: KIMONE REID RN
UNIVERSITY OF VIRGINIA SCHOOL OF NURSING
Email: krr5nt@virginia.edu
Mobile: 956-467-6069

Appendix J. Inclusion/ Exclusion Criteria

Today's Date:

Name of Reviewer:

Hospital Unit: 4 East or 4 Central (Circle one)

Gender of possible participant:

Age of possible participant:

Inclusion Criteria

Yes	No	Inclusion Criteria
		Admitted with diagnosis with Heart Failure
		Age 18 years of age or older
		Admitted to 4 East or 4 Central

Exclusion Criteria: selecting any one of the items below exclude patient from the study

Yes	No	Exclusion Criteria
		Not admitted for heart failure
		Observation status
		Medically Certified as Blind
		Diagnosed with a cognitive impairment (e.g. Alzheimer's, Dementia)
		Unable to give voluntary consent
		Unable to read and write in English
		Being discharged to skilled nursing facility, rehabilitation facility, hospice care/ hospice facility, long term acute care facility or to a prison.

Included in project: Yes   No (Circle one)

Other comments (e.g. reason for refusing to participate):

Appendix K. Demographic Data Instrument: Chart Review

Answers will be kept confidential

Date: _____   Subject Project ID number: _____

1. Please indicate your gender

   o   Male

   o   Female

2. Please your state age

   _____

3. Please select the type of insurance used to pay for health care.

   o   No insurance

   o   Private insurance

   o   Medicare

   o   Medicaid

   o   Both Medicaid/ Medicare

4. Please list all comorbidities:

5. Please select medication class

   o   Beta Blockers

   o   Angiotensin Converting Enzyme (ACE) Inhibitors

   o   Diuretics

   o   Angiotensin Receptor Blockers (ARBs)

   o   Aldosterone Antagonist

   o   Anticoagulants

   o   Digitalis

6. Please record ejection fraction (EF) here: _____

    a. Was this ejection fraction within the last six months ?

    (circle) Yes No

7. * In the past 12 months, how many TIMES were you hospitalized for one night or longer? _____ times

    a. Length of stay of index admission _____

Appendix L. Demographic Data Instrument: Patient Interviews

Answers will be kept confidential

Date: _____   Subject Project ID number:_____

Permission to call patient: Yes   No   Best Time to Call:

Telephone: home/ mobile ( ) __- _____

Is it okay to leave a voice message if the call is unanswered?   Yes   No

Email address: _____

1. Please select your living arrangements

   o   Living alone

   o   Living with spouse/ partner

   o   Living with friends

   o   Other _____

2. How much education did you complete?

   o   Did not complete high school

   o   High school graduate/ GED

   o   College graduate

3. Please indicate annual income:

   o   Prefer not to state

   o   Less than $24,999

   o $25,000 – $49,999

   o $50,000 – $74,999

   o   More than $75,000

4. Employment status

- o Unemployed
- o Full-time
- o Part-time
- o Retired
- o Disabled

5. Please select travel time to the hospital
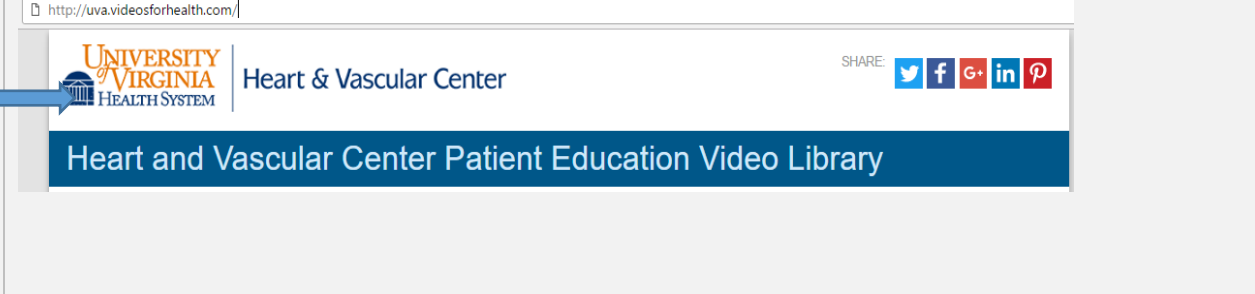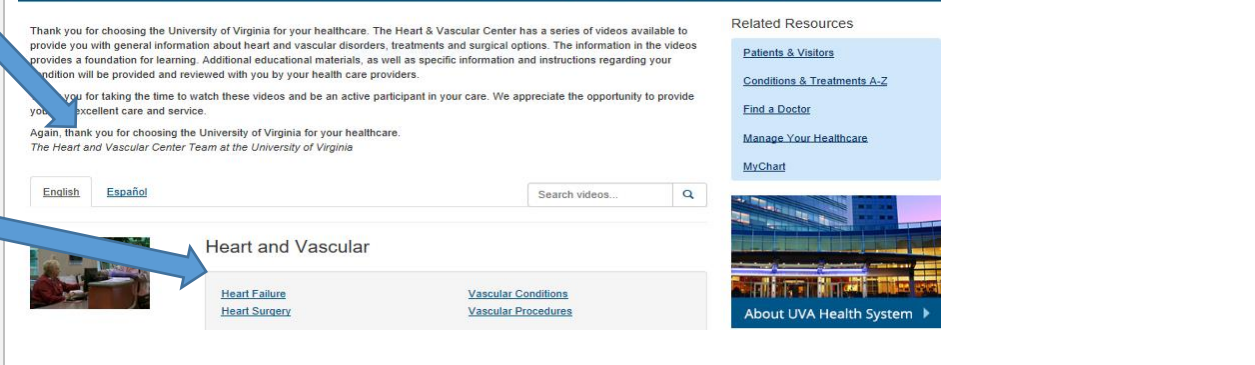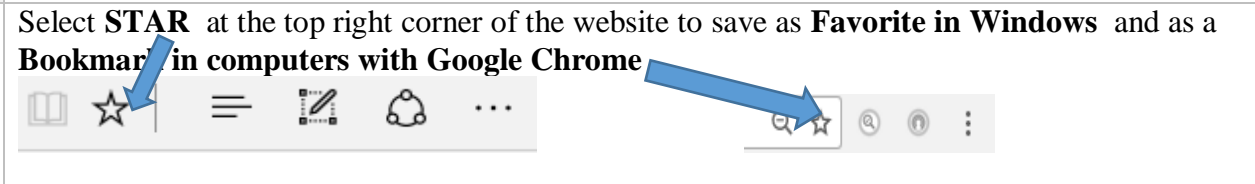
   - o Less than 1 hour

   - o 1 – 2 hours

   - o 3 – 4 hours

   - o 4 hours and more

6. How many miles did you travel to arrive at University of Virginia Medical Center?

   _____

7. Please select time since HF diagnosis.
   - o Less than 12 months
   - o 1 – 5 years
   - o 5- 10 years
   - o > 10 years

Appendix M. Video Guide

1. **Turn on your device. Then open your internet/ web browser.**	
2. **Enter the website address: http://uva.videosforhealth.com/** - **You will see the main heading University of Virginia Health System Heart and Vascular Center.**	http://uva.videosforhealth.com/ **UNIVERSITY of VIRGINIA HEALTH SYSTEM** | Heart & Vascular Center SHARE: **Heart and Vascular Center Patient Education Video Library**
3. **Select your preferred language to watch your videos.** 4. **Under the heading Heart and Vascular, select Heart Failure.** - **All the videos for Heart Failure are listed here.**	**UNIVERSITY of VIRGINIA HEALTH SYSTEM** | Heart & Vascular Center SHARE: **Heart and Vascular Center Patient Education Video Library** Thank you for choosing the University of Virginia for your healthcare. The Heart & Vascular Center has a series of videos available to provide you with general information about heart and vascular disorders, treatments and surgical options. The information in the videos provides a foundation for learning. Additional educational materials, as well as specific information and instructions regarding your condition will be provided and reviewed with you by your health care providers. ... you for taking the time to watch these videos and be an active participant in your care. We appreciate the opportunity to provide you... excellent care and service. Again, thank you for choosing the University of Virginia for your healthcare. *The Heart and Vascular Center Team at the University of Virginia* Related Resources Patients & Visitors Conditions & Treatments A-Z Find a Doctor Manage Your Healthcare MyChart English Español Search videos... Heart and Vascular Heart Failure Vascular Conditions Heart Surgery Vascular Procedures About UVA Health System ▶
5. **You may save the Heart Failure video webpage as a favorite or a shortcut for easy access for future use.**	Select **STAR** at the top right corner of the website to save as **Favorite in Windows** and as a **Bookmark in computers with Google Chrome**
Watch the videos at your own pace. You may watch them more than once and with friends and family.	

Appendix N. Video Usage and Rating Log

Video Usage and Rating Log (Page 1 of 4)

Date: _____   **Project I. D. Number:** _____

The videos were created to provide health information to patients living with Heart Failure. Your answers below will provide us with useful feedback to help improve how we teach patients living with heart failure. Your answers are private.

Instruction: Below is a list of all the videos. Please check each box in the "Watched" column after completely watching a video. Then please rate each video watched by circling a number. Thanks for completing the log.

Ratings: 1 = Not Helpful   3 = Very Helpful
          2 = Somewhat Helpful   4 = Extremely Helpful

Watched		**Name of the Videos**	**Ratings**			
☐		What is Heart Failure?	1	2	3	4
☐		Your Heart Failure Management Plan	1	2	3	4
☐		Heart Failure: Making Lifestyle Changes	1	2	3	4
☐		Managing Heart Failure: Energy Conservation	1	2	3	4
☐		Managing Heart Failure: Handling Flare-ups	1	2	3	4
☐		Managing Heart Failure: Finding Support	1	2	3	4

Video Usage and Rating Log (Page 2 of 4)

Date: _____   **Project I. D. Number:** _____

Instructions: Below is a list of all the videos. Please check each box in the "Watched" column after completely watching a video. Then please rate each video watched by circling a number.

Ratings: 1 = Not helpful   3 = Very Helpful
               2 = Somewhat helpful   4 = Extremely Helpful

Watched		Name of Videos	Ratings			
☐		Common Tests for Heart Failure	1	2	3	4
☐		Heart Failure: Your Heart Failure Healthcare Team Visits	1	2	3	4
☐		Heart Failure: Monitoring for Signs and Symptoms	1	2	3	4
☐		Managing Heart Failure: Quit Smoking	1	2	3	4
☐		Emotions of Heart Failure	1	2	3	4
☐		Managing Heart Failure: At Hospital Discharge	1	2	3	4
☐		Understanding Heart Failure Medications	1	2	3	4
☐		Heart Failure Medications: Ace Inhibitors and ARBs	1	2	3	4

Video Usage and Rating Log (Page 3 of 4)

Date: _____   Project I. D. Number: _____

Instructions: Below is a list of all the videos. Please check each box in the "Watched" column after completely watching a video. Then please rate each video watched by circling a number.

Ratings: 1 = Not helpful   3 = Very Helpful
              2 = Somewhat helpful   4 = Extremely Helpful

Watched		Name of Videos		Ratings		
☐		Heart Failure Medications: Diuretics	1	2	3	4
☐		Heart Failure Medications: Digitalis	1	2	3	4
☐		Taking Your Heart Failure Medications	1	2	3	4
☐		Heart Failure Medications: Beta-Blockers	1	2	3	4
☐		Heart Failure Medications: Aldosterone Antagonists	1	2	3	4
☐		Managing Heart Failure: Limiting Sodium	1	2	3	4
☐		Using the Food Label When You Have Heart Failure	1	2	3	4
☐		Managing Heart Failure: Fluid Guidelines	1	2	3	4

Video Usage and Rating Log (Page 4 of 4)

Date: _____   **Project I. D. Number:** _____

Instructions: Below is a list of all the videos. Please check each box in the "Watched" column after completely watching a video. Then please rate each video watched by circling a number.

Ratings: 1 = Not helpful   3 = Very Helpful
2 = Somewhat helpful   4 = Extremely Helpful

Watched		**Name of Videos**		**Ratings**		
☐		Managing Heart Failure: Exercise Safety	1	2	3	4
☐		Managing Heart Failure: Beware of Fat and Cholesterol	1	2	3	4
☐		Managing Heart Failure: Dining Out	1	2	3	4
☐		Managing Heart Failure: Getting Active	1	2	3	4

Appendix O. Device Agreement Form

I _____, hereby acknowledge receipt of a tablet computer and

charger from the University of Virginia Medical Center Advanced Heart Failure Center with the

expectation to return these items. My signature below indicates that I will return the device in

working condition at my next Heart Failure clinic appointment.

Date: _____

Patient Signature: _____

Witness (researcher): _____

Appendix P. Patient Education Card With Video Website Address

Appendix Q. Managing Your Heart Failure With Video Education Book

Managing Your
Heart Failure With
Video Education

PROJECT LEAD: KIMONE REID RN
UNIVERSITY OF VIRGINIA SCHOOL OF NURSING
[Email: krr5nt@virginia.edu]
[Mobile: 956-467-6069]

2

Hello,

Thanks for joining this project. We hope to help you and others living with heart failure to improve in taking care of yourself. Your answers on the surveys will provide feedback on how to best teach you and others affected by heart failure. Kindly let us know if you have any questions or concerns.

In this book, you will find:

1. Turn on your device. Then open your internet/ web browser.	
2. Enter the website address: http://uva.videosforhealth.com/ - You will see the main heading University of Virginia Health System Heart and Vascular Center.	
3. Select your preferred language to watch your videos.	
4. Under the heading Heart and Vascular, select Heart Failure. - All the videos for Heart Failure are listed here.	
5. You may save the Heart Failure video webpage as a favorite or a shortcut for easy access for future use.	Select STAR at the top right corner of the website to save as Favorite in Windows and as a Bookmark in computers with Google Chrome
Watch the videos at your own pace. You may watch them more than once and with friends and family.	

4

Kindly note:

- You may watch the videos at your own pace while in hospital and after leaving.

- You may watch the videos with friends and/ or family.

- The videos may be watched more than once.

- You are not required to watch them all at once.

- Videos may be watched in any location of your choice.

- The videos may be watched on a computer, tablet computer or on a mobile phone with video

  and internet (such as smartphones).

Need to Know Heart Failure Topics

Topics	Name of the Videos
Overview of Heart Failure	• What is Heart Failure? • Common Tests for Heart Failure
Diet/Fluid Restrictions	• Heart Failure: Making Lifestyle Changes • Managing Heart Failure: Limiting Sodium • Using the Food Label When You Have Heart Failure • Managing Heart Failure: Fluid Guidelines • Managing Heart Failure: Beware of fat and Cholesterol • Managing Heart failure: Dining Out
Activity	• Managing Heart Failure: Exercise Safety • Managing Heart Failure: Get Active • Managing Heart Failure: Energy Expenditure
Signs and Symptoms	• Your Heart Failure Management Plan • Heart Failure: Monitoring for signs and symptoms • Managing Heart Failure: Handling Flare-Ups • Managing Heart Failure: At Hospital Discharge

6

Need to Know Heart Failure Topics

Topics	Name of the Videos
Weight Monitoring	• Heart Failure: Monitoring for signs and symptoms • Managing Heart Failure: Handling Flare-Ups
Medications	• Understanding Heart Failure Medications • Heart Failure Medications: ACE Inhibitors and ARBs • Heart failure Medications – Diuretics • Heart Failure Medications: Digitalis • Taking Your Heart Failure Medications • Heart Failure Medications: Beta-Blockers • Heart Failure Medications – Aldosterone Antagonists.
Self Care/Other	• Managing Heart Failure - Finding Support • Managing Heart Failure – Quit Smoking • Emotions of Heart failure • Your Heart Failure Healthcare Team Visits • Managing Heart Failure: At Hospital Discharge • Heart Failure: Making Lifestyle Changes

Appendix R. Checklist for the Protocol

Checklist for DNP Project – VETiO-HF

Today's Date: _____   Subject Project ID: _____

Hospital Unit: _____   Reviewer's Name:_____

Instructions: Check each item completed for every subject.

Start of study:

o   Inclusion/ Exclusion Form

o   Document patients who refused (yes or n/a – circle one)

o   Demographic questions using the 2 forms (Chart review, patient interviews)

o   Email and Phone contact

> o   Collect at least 2 phone numbers *(Do not document electronically emails or phone numbers; document on paper based interview form).*

o   Self-care of Heart Failure Index Pre-test

o   Atlanta Heart Failure Knowledge Pre-Test

o   Use video guide during demonstration

o   Play video No. 1 during demonstration.

o   Had to use strategy to encourage patient to watch videos (yes or n/a – circle one).

During Study:

o   Provide a copy of Managing Your Heart Failure Book with Disclaimer: Discuss contents

> o   Video Guide
> o   Video Usage and Rating Log
> o   HF Video Survey

o   Assist patient with creating shortcuts/ bookmarks for the videos

o   Device Agreement Form

o   Give patients Business Card with Website Address & Project I.D. Number

o   Place Post-it on White Board: Have You Watched a Heart Failure Video Today?

o   Document device patient will be using for video watching e.g. tablet, smartphone

o   Patient expressed concerns/ questions about the videos (yes or no – circle one). Document concerns.

Post Hospitalization

o Collect index admission – duration of patient's current hospitalization

o Send patient post0test survey links

o Telephone reminder

    o Surveys to be completed: Self-care (SCHFI), Knowledge (AHFKT), HF Video Survey, Video Usage Logs

    o Return Loaner Device/ Charger

    o Internet access

    o Watching the videos?

o Track 30 day readmissions

o Return Loaned Tablet/ Charger - Clinic Appointment

End of Study

o Self-care of Heart Failure Index Post-test

o Atlanta Heart Failure Knowledge Post-Test

o HF Video Survey

o Collect Video Usage and Rating Log

o Review chart for 30-day readmission

Appendix S. Telephone Reminder Script

Hello. May I speak to_____ (patient's name)? If patient answers proceed to say: I am _____ (your name), a registered nurse calling from the University of Virginia Health System. I am calling to follow-up on the videos presented to you while in hospital to continue watching at home.

Have you started watching the videos?

- If **no**, probe as to possible reasons why: Kindly tell me what has prevented you from watching the videos?

- If the patient shares a reason, first thank them for sharing: Mr./ Mrs./Miss____ Thank you for sharing this information with me.

- If the reason shared by the patient is a barrier to watching the video such as no internet access or a malfunctioning device that is needed to watch the video, say: Let me see how I may help and I will call you back with an update.

Document all barriers identified by the patient. Please select one or more barrier below that best applies.

_ Time

_ Loss of internet access

_ Device malfunction (tablet, computer etc.).

_ Difficulty getting to the video website.

_ Video glitches (video does not play, video stops playing, no sound)

_ Other barrier(s) not listed above: _____

If yes, move to thank them for starting to watch the videos:

- Thank you for taking the time to watch the videos.

Remind patient to track videos being watched and provide a rating for each as well:

- Kindly place a checkmark by each video you have finished watching on the video tracking sheet you received. Also, ensure to rate each video that you watched.

Then conclude by reminding the patient of these items:

1. The post-test questionnaires to be completed.

2. The upcoming Heart Failure Clinic appointment. If the patient has a loaned tablet, remind the patient to take the tablet to their HF clinic appointment:

    - Mr./ Mrs./Ms._____ Remember your Heart Failure Clinic Appointment is coming up.

    - Kindly take with you the device that was provided to you during your hospital stay to watch the videos.

Before ending the call, check if the patient has any questions:

- Are there any questions for me before I go?

- Thank the patient for their time and for participating in the project:

- First: Please call if you are having any difficulties or concerns with watching the videos. Please be sure to contact your healthcare provider with any change in your health status that is concerning. If having an emergency, please call 911.

- Then end by saying: Thank you Mr./Mrs./Miss___ for accepting my call, answering my questions and participating in the project.

Please document that patient received a telephone reminder to watch the videos and any concerns

/ difficulties identified/ addressed. If a post-call action is required, kindly do so and update the

patient accordingly. Document any action taken and return call completed.

Script for reaching patient's voicemail (only leave a message if patient gave permission for

voice messages):

Hello, this is _____ (your name), a registered nurse from the University of Virginia Health

System calling to speak to _____ (patient's name). I can be reached at telephone number

_____ (speak slowly and repeat the telephone number twice). Then say: Thank you.

Appendix T. CITI Training Certification

CITI PROGRAM

Completion Date 30-Jun-2017
Expiration Date 29-Jun-2020
Record ID 23701898

This is to certify that:

Kimone Reid

Has completed the following CITI Program course:

Human Research	(Curriculum Group)
IRB for Health Sciences Research (IRB-HSR): ALL RESEARCH	(Course Learner Group)
1 - Basic Course	(Stage)

Under requirements set by:

University of Virginia

Verify at www.citiprogram.org/verify/?w8fd00cbc-ff70-4b07-bac3-75c0a4dbc8c6-23701898

Appendix U. IRB Exemption Form

FOR IRB-HSR OFFICE USE ONLY
☒ **Project is determined to NOT meet the criteria of Research with Human Subjects or a Clinical Investigation** and therefore is not subject to IRB-HSR Review.   NOTE: *Project team is required to follow other requirements described in this form, and UVa policies to protect the data. See Appendix B: Privacy Plan.*   **UVa Study Tracking # 20080_**   ☒ Your project was determined to be QI-Improvement Project. Remember if you decide to publish that you must be careful to publish as QI and NOT as research.   ☐ Please provide this signed form to School of Medicine Office of Grants and Contracts and/or Medical Center Procurement if your project has external funding or plans to share identifiable health information outside of UVa.   See the following link for additional info: http://www.procurement.virginia.edu/pagebusinessadd
☐ **Project is determined to be Human Subjects Research or a Clinical Investigation** and must be submitted to the IRB-HSR for review and approval prior to implementation. Please go the Protocol Builder to create your submission. https://www.irb.virginia.edu/
Name of IRB Staff: *Joanna Faulconer*   **Date: August 23, 2017**

Appendix V. Study Protocol

- Determine patient eligibility for study using inclusion and exclusion criteria.

- Introduce self and state the category of healthcare professional – RN, CNS etc. Provide institutional affiliation (e.g. UVA Nursing School/ Medical Center).

- Asks permission to discuss the project: "May I talk to you about a new project involving patients with heart failure?"

- If patient says yes, say "thank you" and sit while maintaining satisfactory personal space for the patient. Ensure patient privacy. If patient says no, respect their wishes and thank them for allowing you to speak to them.

- Inform patients who responded "yes" about the study: HF patients currently receive teaching on HF while in hospital and written material to take home. The hospital will be making videos available to patients living with HF to help improve the care you currently receive. We would love to evaluate the effectiveness of the videos for teaching patients living with HF. We would also like to know your thoughts on using the videos as a part of your care.

- Provide a short description of the videos: The videos have been examined by nurses and physicians at UVA who are experts in caring for patients with HF and by persons involved in teaching patients. The videos are short, lasting on average 3 minutes. They contain real HF patients in real world environment e.g. exercising, at the doctor. They will show you information on HF such as tests for HF, eating healthily, how to monitor for signs and symptoms of HF, save your energy, how to handle flare-ups of HF, HF medications, and how to exercise safely etc.

- Discuss video accessibility with patients: You will have access to the videos while in hospital and at home. The videos may be viewed on a personal computer, tablet computer or on a cellular phone with video and internet capabilities (such as smartphones). If you do not have access to the internet or any of the devices mentioned, we can help you.

- Obtain informed consent if needed as per IRB. Ensure to inform patients of their right to refuse to participate and that refusing to participate will not affect the care they currently receive or will receive in the future. Inform patients of their right to withdraw from the project at any time without incurring any penalty. Share with patients that the study poses minimal risk to participants and unintended side effects are not anticipated because of the type of intervention. Inform patients that their data will be kept confidential and secure. Inform patients that their data will be reported at an aggregate level. Have patients sign consent form if required by IRB.

- Obtain permission for telephone reminders from patients. If permission received, collect email address, telephone number, and best time to call.
Collect demographic data using the **Data Collection Instrument for Patient Interviews.**

- Administer baseline questionnaires: The Self-care of Heart Failure Index and the Atlanta Heart Failure Knowledge Test.

- Use demo device to show patient how to access the videos using the patient guide.

- Play video number one under heading, **Heart Failure Basics** entitled **What is heart Failure?** for approximately 60 seconds to give the patient sufficient time to see a sample of the videos.

- Inform patients that they may watch the videos at their own pace, alone or with company while in hospital as well as post hospitalization and that videos may be watched repeatedly.

- Inform patients that they are not required to watch them all at once and that videos may be watched in the setting of their choice.

- Strategy to encourage patients who may have a challenge with the number of videos: Encourage patient to try to spend approximately 20 minutes each day for five days watching the videos to complete all the videos.

- Ask patients if they have any concerns or questions regarding the videos.

- Ask patient if they have access to a personal computer, tablet computer or a cellular phone with video and internet capabilities (such as smartphones). If patient states no, inform them of the loaner tablet computer from UVA's Advanced Heart Failure Center.

- If patient is receiving a loaned device, inform them of the limitations on these tablet computers for web browsing.

- Remind patients to return the device and any equipment provided with the device at their upcoming HF clinic appointment. Have patients sign the device agreement form.

- Inform patients that they will be asked to complete questionnaires (SCHFI, AHFKT, Heart Failure Video Survey) prior to or at their follow-up clinic appointment.

- Provide patient with a **business card with the website's location** and the **Managing Your Heart Failure With Video Education Book** which includes a copy of the **patient guide to accessing the videos**. Show patients the **video usage and rating log** in the book to document all the videos they watch as well as to rate the helpfulness of the videos that were completely watched.

- Assist patients with **creating shortcuts or bookmarks** on their devices for easy access.

- Ask patients if they have any concerns and questions again before closing.

- Thank patients for their time and for agreeing to participate in the project.

- Note: Patients will continue to receive usual HF patient education in addition to video education.

  Post Hospitalization:

- Patients will receive a scripted telephone call and/ or email reminder to watch the videos within 48 to 72 hours post hospital discharge. Also, to identify any challenges with watching the videos such as a loss of internet or a malfunctioning device. Notify project lead (DNP student) immediately of any concerns. Remind patients to complete the electronic post-intervention questionnaires. Finally, remind patients with loaned tablets to return the device along with charger at their first HF clinic appointment post hospitalization.

- Post intervention evaluation of primary measures and satisfaction with VE will be conducted via electronic or paper-based questionnaires.

- Use a secured link to email patients the post-test questionnaire on sixth to seventh day post hospital discharge.

- For patients who are not able to complete the electronic format, provide paper-based questionnaire along with pre-paid postage envelope with return address.

- Review medical records and hospital database for patients in the sample returning within 30 days for an unplanned admission; these patients will count as a readmission to be tabulated for the 30-day readmission rate.

Appendix W. Journal Guidelines

Journal of Cardiovascular Nursing Author Guide

Purpose of the Journal

The primary objective of *The Journal of Cardiovascular Nursing* (JCN) is to foster expert, evidence-based clinical practice of cardiovascular nurses by publishing outstanding clinically relevant cardiovascular research, and state-of-the art, systematic reviews of the cardiovascular research literature. Issues address the physiological, psychological, and social responses of cardiovascular patients and families in a variety of environments.

Publication Policy

JCN publishes unsolicited articles (research reports, brief reports, systematic reviews of the literature, instrument development papers, and articles on innovations in practice) on any cardiovascular topic. We also publish Brief Reports, which are shorter versions of research articles and which can include pilot or preliminary results, negative findings, descriptions of study designs (and which can include baseline participant characteristics), validation of an existing instrument, and descriptions of unique clinical trial or intervention study methods. We do not publish quality improvement projects because the knowledge gained is not generalizable beyond the local setting.

Authors are encouraged to submit (1) original research articles and brief reports; (2) analytical, systematic reviews that codify existing knowledge; (3) instrument development papers and testing of the psychometric properties of new instruments; (4) clinical articles that synthesize information in a specific area or guide the practice of specialists in the field; and (5) articles describing innovations in practice that are evidence-based. The decision to accept or reject an article will be based on the judgment of the editors and of peer reviewers.

Manuscript Submission

Online manuscript submission: All manuscripts must be submitted online through the Web site at http://jcn.edmgr.com/. First-time users: Please click the Register button from the menu on the Web site and enter the requested information. After successful registration, you will be sent an e-mail indicating your user name and password. *Note:* If you have received an e-mail from us with an assigned user ID and password, or if you are a repeat user, do not register again, just log in. Once you have an assigned ID and password, you do not have to reregister, even if your status changes (i.e., author or reviewer). Authors: If you are submitting a manuscript for the first time please review the Author Tutorial. Please click the *Log-In* button from the menu at the top of the page and log in to the system as an author. Submit your manuscript online according to the author instructions. You will be able to track the progress of your manuscript through the system. If you experience any problems, please contact the *JCN* Editorial Manager, Jeanine Vezie at jdvezie@outlook.com.

No Special Formatting Required for Manuscripts Prior to Acceptance. In order to increase ease of submission, JCN has moved to allowing authors to submit manuscripts without following many of our reference and other format guidelines until the manuscript is accepted for publication. We all have experienced the frustration of formatting a manuscript according to specific journal guidelines, only to have to reformat it if it is not accepted for publication in that journal. Thus, when submitting a manuscript for review, you need not follow many of the specific guidelines. However, please review the Manuscript Contents section below for a few formatting guidelines as we do require double spacing of manuscripts at all stages of review.

Manuscript Contents

Each manuscript must include the following upon submission:

- EACH AUTHOR listed on the paper must have answered all the authorship verifications/copyright transfer questions upon submitting. The corresponding author completes this when submitting during the "additional information step." This is where coauthor information is provided including legitimate coauthor emails to ensure each coauthor receives the email asking them to verify authorship. Each coauthor is emailed a hyperlink to verify their co-authorship and complete the questionnaire transferring copyright. The questions all must be answered before the manuscript will be processed.

- We no longer use the pdf copyright transfer forms.

- Title page including (1) title of the article, (2) author names (with highest academic degrees) and affiliations (including titles, departments, and name and location of institutions of primary employment), (3) corresponding author's name and complete address including email, phone and FAX numbers, (4) any acknowledgments, credits, or disclaimers, including funding sources and conflicts of interest, and (5) number of words in the text; number of tables and figures. PLEASE NOTE: #4 of the title page regarding any acknowledgments, credits, or disclaimers, including funding sources and conflicts of interest MUST ONLY BE LOCATED on the title page. Please do not put any of this information on your "Blinded Manuscript."

- Please do not use abbreviations in the title or any headers on your manuscript.

- Abstract of 250 words (150 words for brief reports) or fewer describing the main points of the article. If it is a research article (including psychometric studies) or brief report, prepare a structured abstract with the following headings: (1) background; (2) objective; (3) methods; (4) results; and (5) conclusions. If the article is not a research article, please

prepare a structured abstract with the following headings: (1) background; (2) purpose;
(3) conclusions; and (4) clinical implications.

- Keywords: Include 3 to 5 key words that describe the contents of the article. <u>To identify key words that help readers find your article, look in the</u> *National Library of Medicine's Medical Subject Headings* (MeSH). Using keywords that are compatible with MeSH will help people find your article, identify it as relevant, and increase your citations.

- Each *research article* or *review of the literature* must include a table entitled, "What's New?" that includes in bullet point form (2-3 short bullets only) a summary of the findings with implications for practice. Place this section on a separate page after the references. Use this section to address the "so what?" of your findings. All *other types of articles* must include a table entitled "Clinical Pearls" that that includes in bullet point form (2-3 short bullets only) a summary of the important clinical points of the article.

- Each person listed as an author should be thoroughly familiar with the substance of the final manuscript and be able to defend its conclusions.

- Again, Please note: ACKNOWLEDGEMENTS, DISCLOSURES, and CONFLICTS OF INTEREST or Persons who make subsidiary contributions may be listed on the Title Page only. If you wish to make a statement regarding disclosures or conflicts of interest, you must also put these only on the Title Page.

- Word limit: There is a word limit of 2800 words (text only) for all manuscripts except Brief Reports, which must be 1800 words (text only) or less.

- Written permission, including complete source, for any borrowed text, tables, or figures submitted by mail or fax (form attached to the end of this file).

- The entire manuscript should be double spaced for ease of reading/review.

- Cover letter: We do not require a cover letter.

- When attaching manuscript items, you must be sure to load manuscript items (i.e., title page, manuscript without author information, etc.) into the correct folder using the drop down list. Failure to attach the correct file to the corresponding folder will result in having your manuscript returned to you to make changes and resubmit. Please note that specific folders are only available to specific persons, i.e., the blinded manuscript is available to reviewers. The Title Page is not available to reviewers. Use the drop down list when attaching items to ensure you are attaching/loading the correct item into the correct folder.

AUTHOR'S MANUSCRIPT CHECKLIST FOR SUBMISSION TO JCN *ONCE THE MANUSCRIPT IS ACCEPTED FOR PUBLICATION*

The manuscript preparation guidelines below must be followed carefully once the manuscript is accepted for publication. We are sorry, but your manuscript will be returned to you if instructions are not followed, thus, delaying the process.

- The word limit for full manuscripts (other than brief reports) submitted to JCN is 2800 words for the text only. The word limit does not include the title page, abstract, references, tables, or figures.

- Although no particular style is required on a first submission, prior to final acceptance, the manuscripts must be prepared in accordance with the style guidelines of the 10th edition of the AMA Manual of Style.

- Avoid the use of excessive abbreviations, particularly non-standard abbreviations.

- Please take care to prepare your references in the correct format (examples shown below). Use no more than 45 references and be sure to include up to date references as well as important earlier work.

- Please be sure to number each page of the manuscript.

- Manuscripts must be created on IBM-compatible (PC) equipment using Windows 95 or higher operating system. Our preferred software is Microsoft Word.

- Manuscripts should be entirely double spaced (including quotations, abstract, lists, and references, footnotes, figure captions, and all parts of tables). Leave 1" margins throughout. Minimize creative formatting and avoid varying spacing between headings and paragraphs.

- Manuscripts should be ordered as follows: title page, abstract, text, references, summary and implications (see below for description of this element), tables, figure legends and any figures.

- If English is not your first language, has this manuscript been reviewed by a native English speaker? If not, you may want to use Chapter Editing at www.chapterediting.org, Scientific-Editor at www.scientific-editor.com or Journal Consortium at articles@journalsconsortium.org.

  JCN or WK/LWW does not have an affiliation with these companies. These resources are offered only as a suggestion.

- Brief Reports guidelines:

o Brief reports are shorter versions of regular articles and are dedicated to research reports.

o The brief report can be used to report one of the following types of research manuscripts: 1) pilot studies or preliminary results; 2) negative research reports; 3) descriptions of

study designs or unique methods used in clinical trials, large observational or

epidemiological studies, or intervention studies (can include baseline sample

characteristics); and 4) translation and validation of existing instruments.

o Brief reports can be no more than 1800 words, excluding title page, table, figure and

references.

o Brief reports must include a structured abstract of 150 words or less. Only 1 table, 1

figure and 18 or fewer references can be included in a brief report.

Conflicts of Interest

Authors must state all possible conflicts of interest only on the title page, including financial,

consultant, institutional and other relationships that might lead to bias or a conflict of interest. If

there is no conflict of interest, this should also be explicitly stated as none declared. All sources

of funding should be acknowledged on the title page. All relevant conflicts of interest and

sources of funding should be included on the title page of the manuscript with the heading

"Conflicts of Interest and Source of Funding:" For example:

Conflicts of Interest and Source of Funding: A has received honoraria from Company Z.

B is currently receiving a grant (#12345) from Organization Y, and is on the speaker's bureau for

Organization X – the CME organizers for Company A. For the remaining authors none were

declared.

In addition, each author must complete and submit the journal's copyright transfer

agreement, which includes a section on the disclosure of potential conflicts of interest based on

the recommendations of the International Committee of Medical Journal Editors, "Uniform

Requirements for Manuscripts Submitted to Biomedical Journals" (www.icmje.org/update.html).

A copy of the form is made available to the submitting author within the Editorial Manager submission process. Co-authors will automatically receive an Email with instructions on completing the form upon submission.

<u>References</u>

- References must be cited in text and styled in the reference list according to the *American Medical Association Manual of Style*, Ed. 10.

- References should be included on a separate page at the end of the article and should be completely double-spaced.

- References should be numbered consecutively in the order they are cited; if a reference is cited more than once, use the original reference number. Cite personal communications in text only and give source, date, and type of communication. Do not use footnotes, except in tables.

- There is no limit to the number of references for regular articles. Only 20 references are allowed in brief reports.

- Page numbers should appear with the text citation following a specific quote.

- Examples of correctly styled reference entries:

<u>Journals:</u> Using the punctuation indicated below, include the following items: author, article title, journal, year, volume, issue number in parentheses following the volume number (this element is new with the 10th edition of the AMA guidelines), and inclusive pages. Always give the volume number and the issue number. Abbreviate journal titles per the List of Journals Indexed for Medline, which can be found on the National Library of Medicine website or here:

ftp://nlmpubs.nlm.nih.gov/online/journals/ljiweb.pdf

For six or fewer authors, list all authors.

Doe JS, Lister FG, Lise JK, Kellert JL. Allied medical education. *JAMA*. 1975; 23(3):170–184.

For more than six authors, list the first three followed by et al.

Doe JS, Justin MN, Gum KL, et al. Drug use during high school. *Am J Public Health*. 1976;64(1):12–22.

Reference to an Entire Book: Author, book title, place of publication, publisher, year.

Farber SD, Ball WD. *Neurorehabilitation: A Multisensory Approach.* Philadelphia, Pa: Saunders; 1982.

Chapter in an Edited Book:

Winawar S, Lipkin M. Proliferative abnormalities in the gastrointestinal tract. In: Card WI, Creamer B, eds. *Modern Trends in Gastroenterology*. 4th ed. London, England: Butterworth & Co; 1970.

Figures:

A) Creating Digital Artwork

1. Learn about the publication requirements for Digital Artwork:

   http://links.lww.com/ES/A42

2. Create, Scan and Save your artwork and compare your final figure to the Digital Artwork Guideline Checklist (below).

3. Upload each figure to Editorial Manager in conjunction with your manuscript text and tables.

   B) Digital Artwork Guideline Checklist

Here are the basics to have in place before submitting your digital artwork:

- Artwork should be saved as TIFF, EPS, or MS Office (DOC, PPT, XLS) files. High resolution PDF files are also acceptable.

- Crop out any white or black space surrounding the image.

- Diagrams, drawings, graphs, and other line art must be vector or saved at a resolution of at least 1200 dpi. If created in an MS Office program, send the native (DOC, PPT, XLS) file.

- Photographs, radiographs and other halftone images must be saved at a resolution of at least 300 dpi.

- Photographs and radiographs with text must be saved as postscript or at a resolution of at least 600 dpi.

- Each figure must be saved and submitted as a separate file. Figures should not be embedded in the manuscript text file.

    Remember:

- Cite figures consecutively in your manuscript.

- Number figures in the figure legend in the order in which they are discussed.

- Upload figures consecutively to the Editorial Manager web site and enter figure numbers consecutively in the Description field when uploading the files.

    Supplemental Digital Content

Authors may submit Supplemental Digital Content (SDC) via Editorial Manager to LWW journals that enhance their article's text to be considered for online posting. SDC may include standard media such as text documents, graphs, audio, video, and the like. On the *Attach Files* page of the submission process, please select *Supplemental Audio, Video, or Data* for your uploaded file as the *Submission Item*. If an article with SDC is accepted, our production staff will

create a URL with the SDC file. The URL will be placed in the call-out within the article. SDC files are not copy-edited by LWW staff, they will be presented digitally as submitted. For a list of all available file types and detailed instructions, please visit http://links.lww.com/A142.

SDC Call-Outs

Supplemental Digital Content must be cited consecutively in the text of the submitted manuscript. Citations should include the type of material submitted (Audio, Figure, Table, etc.), be clearly labeled as "Supplemental Digital Content," include the sequential list number, and provide a description of the supplemental content. All descriptive text should be included in the call-out as it will not appear elsewhere in the article.

Example:

We performed many tests on the degrees of flexibility in the elbow (see Video, Supplemental Digital Content 1, which demonstrates elbow flexibility) and found our results inconclusive.

List of SDC

A listing of SDC must be submitted at the end of the manuscript file. Include the SDC number and file type of the SDC. This text will be removed by our production staff and not be published.

Example:

Supplemental Digital Content 1.wmv

SDC File Requirements

All acceptable file types are permissible up to 10 MBs. For audio or video files greater than 10 MBs, authors should first query the journal office for approval. For a list of all available file types and detailed instructions, please visit http://links.lww.com/A142.

Tables

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Appendix. Draft Manuscript for Submission to the Journal of Cardiovascular

Nursing

Using Video Education to Improve Outcomes in Heart Failure (VETiO-HF)

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Tables and Figures:

Abstract

Background: Heart Failure (HF) education is a national quality measure of HF care. A standard method for educating HF patients does not currently exist. The Heart Failure Society of America 2010 guidelines have recommended using video in HF patient education.

Purpose: The aim of the study was to evaluate the effectiveness of supplementing usual HF patient education with video education (VE) in improving knowledge of HF, self-efficacy, self-care and reducing 30-day readmissions as well as assess patients' satisfaction with VE.

Conclusions: Supplementing usual HF education with VE significantly improved patients' knowledge of HF and self-maintenance, but did not significantly improve self-management and self-confidence. All-cause 30-day readmission rate was not significantly reduced. Patients were highly satisfied with VE.

Clinical Implications: Evaluating the impact of using VE in HF education provides useful information that may influence future patient education efforts and improve HF outcomes. Future research is needed to investigate whether self-efficacy and self-management improves with continued follow-up.

Keywords: heart failure, patient education, self-care, self-efficacy, readmissions.

Using Video Education to Improve Outcomes in Heart Failure

In the United States (U. S.), an estimated 6.5 million individuals 20 years of age and older have HF (Benjamin et al., 2017). This number is projected to increase to over eight million by 2030 (Heidenriech et al., 2013). In patients 65 years and older in high-income countries, HF is the most common diagnosis for hospital admission (Braunwald, 2014). Patients who have had prior HF hospitalization have greater rates of cardiovascular death and rehospitalization (Benjamin et al., 2017). Hence, to improve HF outcomes and reduce hospitalizations, educating patients about HF and self-care behaviors is an integral component of HF management.

Self-care is a process in which the patient is an active participant in their HF management (Lindenfeld et al., 2010). Through self-care, the patient performs behaviors that will facilitate optimal health and risk reduction of rehospitalization. The 2013 ACCF/ AHA Guidelines for the Management of Heart Failure recommend, "patients with HF should receive specific education that facilitates self-care" (Yancey et al., 2013, p. e171).

A concept pertinent to HF patients in making the best decisions regarding self-care is self-efficacy, from Bandura's social cognitive theory (Yehle & Plake, 2010). Perceived self-efficacy is the confidence in one's ability to perform a behavior and to have control of health practices. How much self-efficacy one has affects their level of commitment to performing desired behaviors and having control over their health. Studies have shown that when self-efficacy increases, self-care improves (Yehle & Plake, 2010). A vital component of HF education is empowering patients to perform healthy behaviors such as daily weight monitoring and medication adherence. However, there are no gold standard approaches to educating HF patients (Boyde & Peters, 2014). This education may be presented through various media, written, face-to-face, videos and web-based programs (Albert, Buchsbaum, & Li, 2007).

Furthermore, the HFSA 2010 Comprehensive HF Practice Guideline recommends that patients

should be offered a variety of learning options including video (Lindenfeld et al., 2010).

Utilizing video education (VE) may offer potential benefits such as being less resource

intensive, more cost effective and provide a consistent messaging to patients thus resulting in a

more standardized health information (Tuong, Larsen, & Armstrong, 2014). VE may enhance

retention of information. Additionally, 75% of information is absorbed visually and the rest via

the other senses (Albert et al., 2007), thus making VE a practical option for sharing health

information. VE may increase patients' confidence by including actual persons living with HF

role modeling the desired behaviors, thus patients see that the requisite behaviors are achievable

(Albert et al., 2007). Additionally, patients may replay the videos at their own time and pace in

their desired setting until understood, thus VE is a patient centered learning method. However,

the use of VE in HF is not well studied (Albert et al., 2007; Veroff et al., 2012).

The purpose of this project was to evaluate the effectiveness of supplementing usual

standard of HF patient education with VE in improving knowledge of HF, self-efficacy, self-care

and reducing 30-day readmissions as well as assess patient satisfaction with VE

Research Question

In adult patients with HF, does supplementing usual HF patient education with VE

increase knowledge of HF, self-efficacy, self-care and reduce 30-day readmissions?

How satisfied are HF patients with VE?

Methods

A prospective one group pretest/ post-test design was used to examine the effectiveness

of adding VE to usual care. The 30-day readmission rate was compared to a randomly selected

historical group of HF patients (September 2016 – November, 2016 cohort) who did not receive VE.

Sample and Setting

HF patients meeting eligibility criteria were recruited within 48 hours of admission if medically stable. Eligible patients were: HF patients admitted to the designated acute cardiology units who were 18 years of age or older. Based on prior studies, patients were excluded if they were under observation, medically certified as blind, diagnosed with a cognitive, unable to give consent, unable to read and write in English, and/ or being discharged to a skilled nursing facility, rehabilitation facility, hospice care/ hospice facility, long term acute care facility or to a prison.

Measures

The Self-care of Heart Failure Index v.6 (SCHFI). The SCHFI, a 22-item instrument was used to measure self-care (Riegel, Lee, Dickson, & Carlson, 2009). The self-care confidence scale was used to measure self-efficacy as conceptualized by Bandura and has been utilized as a measure of self-efficacy in prior HF studies (Buck et al., 2015; Tovar et al., 2016). Each scale is "standardized to a 0- to 100-point range" and a score of 70 or greater can be used to indicate adequate self-care (Riegel et al., 2009, p. 493).

The Atlanta Heart Failure Knowledge Test (AHFKT). The AHFKT contains 30 multiple-choice items, with questions covering pathophysiology, nutrition, behaviors, symptom management, and medications (Reilly et al., 2009, p. 507). Permission was not required for use of the AHFKT nor the SCHFI (Butts et al., 2017; Riegel et al., 2009).

30-day readmission. All adult HF patients who received the intervention with an unplanned readmission to the AMC within 30 days of hospital discharge were counted as a 30-day readmission (IHI, 2013; Sylvia & Terhaar, 2014).

Patient satisfaction with VE. This was measured using an eight-item instrument developed by the project lead as a published validated instrument could not be found in the literature. Five statements are rated on a four point Likert scale and the remaining three items are open-ended questions. The questionnaire evaluated the patients' overall experience with VE, evaluating satisfaction with the videos and accessibility of the videos.

Additionally, a video usage and rating log was used to track the patients' video usage. This self-reported log provided information on the specific number of videos watched by each patient and the specific videos patients found helpful in managing HF.

Demographic and clinical data. Data collected included age, gender, race/ ethnicity, and marital status, patients' comorbidities to determine the Charlson Comorbidity Index which predicts risk of death from comorbid diseases (Charlson, Pompei, Ales & Mackenzie, 1987), the New York Heart Association (NYHA) functional classification, left ventricular ejection fraction (LVEF) score, and other data as noted on Table 1.

Procedures

Patients' data were collected through medical record reviews and patient interviews. NYHA class was assigned to patients not classified in the medical record, utilizing the patient presentation noted on admission. The NYHA classification designated was verified by a practicing board certified HF Nurse Practitioner. Participants were administered the SCHFI and AHFKT to collect baseline measures. Patients were introduced to the videos, created by Milner-Fenwick, Inc. The videos provide the basics of HF, HF medications and the lifestyle changes

needed for self-care. The videos displayed real world scenarios that HF patients may navigate, which require knowledge of HF and decision making regarding self-care. Patients were shown how to access the videos on the internet and the first video in the catalog played to show the actual content. Patients were provided with an overview of the contents of the videos.

Patients were encouraged to watch all the videos within seven days of hospital discharge. Patients were informed that they may watch the videos at their own pace, alone or with company while in hospital as well as post hospitalization and that videos may be watched repeatedly. In addition, patients were informed that they were not required to watch them all at once and that videos may be watched in the setting of their choice. The videos may be viewed on a personal computer, tablet computer or on a cellular phone with video and internet capabilities (such as smartphones). Patients were shown how to create internet shortcuts or bookmarks of the videos on their devices when permitted, to facilitate quick retrieval of the videos. A video usage and rating log was given to participants to document all videos watched and provide a rating.

Patients without access to the internet and/or a device to watch the videos were provided with a loaned tablet computer (iPads) with charging with internet access imbedded. The limitations of these loaned tablet computers for web browsing beyond the hospital's website were shared with patients. Teaching was provided on how to use the tablet computers which included the ability to power on/ off, access and play videos, and charge the devices. Teach-back used to verify understanding. Patients were informed to call for assistance if experiencing any challenges with the equipment or using the equipment. The tablet computers and charging equipment were returned to the HF clinic during the patients' follow-up appointment. A device agreement form was completed by patients receiving loaned devices.

At the end of the VE demonstration, patients were provided with a video guide for accessing the videos and were given a hospital card with the website address for the videos. This was to facilitate easy retrieval of the videos, offer a standardized way of accessing the videos and reduce the likelihood of future burden to nursing staff in providing guidance to locate the website. Patients were given a copy of the *Managing Your Heart Failure With Video Education* booklet developed by the project lead, which contained the video guide, video watching tips, and the need to know HF topics (recommended by the hospital in keeping with current HF guidelines) with corresponding videos. This booklet was reviewed by a HF expert for suitability for HF patients, the patient education librarian for assessing readability/ health literacy considerations and the second author for overall presentation. Patients were informed of the questionnaires to be completed post intervention. Patients were given time to express concerns or ask questions regarding the intervention. Contact for the project leader was provided to all participants for any questions or concerns identified. Patients were informed that they would continue to receive the usual standard of HF patient education in addition to VE.

Most patients received a scripted telephone call within 48 to 72 hours post hospital discharge, as a reminder to watch the videos and to identify any challenges with watching the videos such as a malfunctioning device. During the telephone call, patients who received loaned tablet computers were reminded to return the equipment at the next hospital visit. Post intervention evaluation of primary measures and satisfaction with VE was conducted via electronic or paper-based questionnaires. For the electronic method, patients were given a secure website link to complete the post-test questionnaires. Patients who did not complete the questionnaires electronically had the option to complete paper-based questionnaires and return them in the postage paid preaddressed envelope provided.

Medical records of participants were reviewed to identify patients returning to the AMC within 30 days. Patients with an unplanned readmission within 30 days from date of hospital discharge were counted towards 30-day readmission.

Protection of Human Subjects

The study was designated a Quality Improvement Project, and subject consent was thus not required. Assent was obtained from each participant by the project lead

Data Analysis

Data was collected from September 03, 2017 to November 21, 2017, and analyzed using SPSS Statistics for Windows, Version 24.0. (Armonk, NY: IBM Corp). A two-sided p value of < .05 was used to establish statistical significance. Standard deviations, frequencies and percentages are reported for descriptive data as appropriate. A paired samples t-test was used to analyze changes in scores from pre-test to post-test for the primary outcome measures – knowledge of HF, self-efficacy (self-confidence), and self-care (self-care maintenance, self-care management).

The Exact Mann-Whitney U Test was used to examine the relationship between most demographic variables and the pre and post-test changes due to the presence of small group sizes and the lack of normality of most distributions. The Spearman Rank Correlation was computed in order to investigate the relationship between the ordinal demographic variables – travel distance in miles and the Charlson Comorbidity Index, and the pre-post changes in self-management, self-maintenance, self-confidence and the Atlanta Heart Failure Knowledge Test. To determine the 30-day readmission rate, the number of all the 30-day readmissions by the patients who completed the study (numerator) was divided by the total number of patients who completed the study (denominator) (IHI, 2013; Sylvia & Terhaar, 2014). For comparison, a

randomly selected sample of 30 patients was drawn from HF patients admitted 12 months earlier

to the same hospital (September 2016 – November 2016). The 30-day readmission rates for this

sample and the study sample were compared using an exact two sided chi-square test.

Descriptive statistics was reported for video satisfaction and video usage as appropriate.

Using Qualtrics, patients' responses to the three open-ended questions on the Heart Failure

Video Survey were aggregated and analyzed to evaluate for the presence of themes related to the

experience of watching the videos. Themes were derived from common words identified (Miles

& Huberman, 1994).

<div align="center">

Results

</div>

Sample Characteristics

Two hundred and one patients were screened for the project from September 3, 2017 to

November 21, 2017. Sixty four patients (31.8%) did not meet eligibility criteria, 53 patients

(26.4%) refused; Fourteen patients (7%) were not able to participate - one patient had no

electricity at home and 13 patients did not have devices to play the videos. Seventy patients

(34.8%) who met eligibility criteria were enrolled in the project. Thirty patients (42.9%)

completed the study and 40 (57.1%) were lost to follow-up.

The differences between the loss to follow-up group and those completing the study were

evaluated using Pearson's Chi-Square Test. There were no statistically significant differences

between the people completing the study and those lost to follow-up when compared on most

demographic variables. However, when compared based on gender, a statistically significant

difference was observed ($p = .002$, two-tailed). A higher proportion of males were lost to follow-

up (75% of males versus 38% of females were lost to follow-up).

The mean age of those completing the study was 66.3 (SD 11.7) compared to the mean age of 65.0 (SD 12.9) for all participants; 21 (70%) were female, 20 (66.7%) were white. Table 1 displays the sociodemographic and clinical data for all participants and the patients who completed the project**.**

Knowledge of HF. Knowledge scores significantly increased from pre-test (mean score 22.67, SD 3.99) to post-test (mean score 24.37, SD3.61), $p = .008$ as shown in Table 2. The mean improvement in score was 1.7, 95% CI [.47, 2.93]. Participants' scores improved by at least 5% on 20 of the 30 questions on the knowledge test.

Examination of pre-test and post-test answers. On the pre-test, the percentage of persons answering individual knowledge questions correctly ranged from 24% to 100%. Sixteen of the 30 questions were answered correctly by more than 80% of participants. All 70 participants answered question seven correctly – this question assessed the domain of medication, specifically participants' knowledge of not skipping medications when feeling better.

On the post-test, eighteen of the 30 questions were answered correctly by more than 80% of participants. Altogether, participants consistently performed poorly on question 25 on both pre and post-tests. This question assessed the domain of nutrition (sodium). Fifteen questions had an increase of at least 10% in improvement of scores from pre to post tests.

Self-efficacy. Self-efficacy was evaluated by the self-confidence scale of the SCHFI. Participants started with a mean self-confidence score of 69.31 (SD 21.64) and improved to a mean post-test score of 70.98 (SD 18.6). The mean change in scores was 1.67, 95% CI [-8.29, 11.63]. However, this increase in self-confidence scores from pre to post-test was not statistically significant ($p = .735$).

Self-care. The self-care maintenance scores had a statistically significant increase from pre to post test (p = .001). The mean scores at baseline was 67.22 (SD 18.65) and at post-test, the mean score was 81.18 (SD 14.17). The mean difference was 13.97, 95% CI [6.13, 21.81]. The scores for only 21 patients for the self-care management scale could be computed, as nine participants did not report symptoms of difficulty breathing and/ or ankle swelling in the last month. This scale requires participants to express having one or both symptoms to be computed, thus excluding asymptomatic patients (Riegel et al., 2004; Riegel et al., 2009). For the 21 participants who completed the self-care management scale, while there was improvement of self-care management among the sample from pre-test (mean 58.95, SD 23.98) to post-test (mean 68.38, SD 20.56) with mean difference of 9.43, 95 % CI [-.95, 19.81], these findings were not statistically significant (p = .073).

30-day readmissions. Seven of the 30 patients who completed the study were readmitted, an all cause readmission rate of 23.3%. Three (42.9%) of these readmissions were HF related and four (57.1%) were not HF related. In the comparison sample of 30 patients, nine were readmitted within 30 days, an all-cause readmission rate of 30%. Five of the nine (55.5%) admissions were HF related and four (44.4%) were not HF-related. An exact two sided chi-square test comparing the two rates was not significant (p= .276).

Since several significance tests were performed, it is possible one or more was significant due to chance alone.

How satisfied are HF patients with VE?

Video Usage. Seventy five percent (18/24) of those who provided feedback watched 20 or more of the 26 videos, 22 participants (91.7%) watched at least 16 (61.5%) of the videos. All

24 participants watched: *What is Heart Failure?, Managing Heart Failure: Energy Conservation* and *Managing Heart Failure: Handling Flare-ups*.

Heart Failure Video Survey. Seventeen patients (17/26, 65.4%) strongly agreed that the videos were easy to find and would recommend these videos to another patient with HF. The complete responses are shown in Table 3**.** The survey also contained three open-ended questions, noted below:

What were the most important things you learned from watching the videos? Twenty four participants provided responses to the open-ended questions. The three main themes identified were: gaining knowledge of and understanding of HF, personal role in symptom recognition and surveillance, and awareness of the need for self-care.

Gaining knowledge of and understanding what HF is. Participants were becoming aware of what heart failure is and understanding HF as the most important things learned.

> *"As a newly diagnosed heart failure patient, the videos provided me with basic*
>
> *information about heart failure and related topics that included diet and medications."*
>
> *"what heart failure is and understanding it."*

Personal role in symptom recognition and surveillance. The exemplar is a reflective statement of a patient relaying how the videos could have changed the trajectory of his HF, that he would have been able to recognize the symptoms earlier to avoid HF exacerbation and hospitalization. Additionally, the need for surveillance of self and paying attention to physiological changes arose in patients' comments.

> *"If I had seen the vidios after my initial cardiac hospitalization in February 2016 I would*
>
> *have recognized the symptoms I was having sooner and avoided the second*

hospitalization November 12, 2017 for pulmonary edema. Re: weight gain, shortness of

breath, fatigue, increased thirst"

After watching the videos, what changes will you make in taking care of yourself with

heart failure? Twenty five patients responded. The common theme throughout the responses

was the notable shift from being passive to an active HF self-care maintenance.

Shifting from passive to active self-care maintenance. Patients outlined concrete steps

they could take in their daily lives to manage living with HF including checking food-labels and

incorporating exercise. In addition, patients shared psychosocial self-care changes that they were

making for overall well-being as seen in the first exemplar.

> *"I never weigh myself, I just know about it during my appointments. Now I do it every*
>
> *day as well as taking my blood pressure wherein I list them and show these to my medical*
>
> *team. I now watch my medicine intake, take regular exercise much longer, involve family*
>
> *with my health problems, socialize more with friends."*

Do you have comments about using the videos as a part of your heart failure

education? Twenty three participants responded. The main themes arising from content analysis

using the primary words, were (1) length and quality of the videos ("…*They were short – didn't*

bombard you with too much information at one time…") and (2) the quality of the information

presented ("*The videos were short enough, but informative enough to keep ones attention*").

Video Rating Log. Twenty four of the thirty patients (80%) rated the videos watched.

The videos with the highest ratings were *Heart Failure Medications: Diuretics* (71.4%,

extremely helpful), *Managing Heart Failure: Limiting Sodium* (65%, extremely helpful), and

Taking Your Heart Failure Medications (61.9%, extremely helpful).

Discussion

This project evaluated the effect of VE on increasing HF knowledge, self-efficacy, self-care and reducing 30-day readmissions. Additionally, patients' satisfaction with using VE was evaluated. The findings support current literature that using videos is a patient centered evidence-based intervention. Findings from the project indicate that VE is beneficial to improving patients' knowledge of HF. This improvement in HF knowledge from pre to post test is in keeping with prior studies (Boyde et al., 2012; Liou et al., 2015). Of note, improvements were seen in 20 of the 30 questions across the multiple domains being evaluated by the AHFKT, indicating that VE can help in achieving adequacy in knowledge related to various components of HF self-care.

While statistical significance was not achieved for the changes in self-confidence and self-management, the changes in the pre-post test scores are of relevance clinically. The authors of SCHIFI posit a cut-point of 70 or greater to judge achievement of self-care adequacy (Riegel et al., 2009). However, the authors stipulated that evidence has indicated that "benefit occurs at even lower levels of self-care." (Riegel et al., 2009, p. 495). The changes in self-confidence also saw persons achieving the cut-point of 70, increasing from 69 to 70. Self-efficacy is not well studied in HF (Yehle & Plake, 2010), further studies with a more prolonged period of follow-up will be needed to determine if self-efficacy improves. Another possible contributor to the non-significant self-efficacy results found may be the high comorbidity burden within the final sample, a mean Charlson Comorbidity Index of 6.2. Prior studies have established the effect of comorbidity on self-efficacy, revealing that comorbity decreases self-efficacy. As the level of comorbity increases, a decline in the relationship between self-efficacy and self-maintenance occurs (Buck et al., 2015).

For self-management, mean score prior to exposure to the videos was 58.95 (SD 23.98), post exposure to the videos mean scores had increased by 9.43 points to 68.4 (SD 20.56). Participants may need more time than the study period to apply the knowledge being gained to improve self-management skills, and utilize problem solving and critical thinking to respond to changes in medical condition. Statistical significance for self-care management ($p<.0001$)was achieved in the study by Boyde et al (2012), which used SCHFI to assess self-care for patients who received VE and self-confidence trended towards significance ($p = .051$) (Boyde et al., 2012). Of note, the follow-up period for this study was 8 weeks (Boyde et al., 2012). Thus, continued delivery of VE and follow-up may be needed in this sample to adequately evaluate the possible effect on self-care management and self-confidence.

A reduction was observed in the 30-day all-cause readmission rate and HF related readmissions in the sample versus the historical group. This result is similar to the study by Liou et al. (2015), which reported no significant difference in 30-day readmissions in patients who received supplemental VE and those that did not. Although, this finding is not statistically significant, any reduction in 30-day readmissions for HF patients has clinical implications for a condition with high associated morbidity and mortality rate as well as high economic burden on health systems (Braunwald, 2014; Benjamin et al., 2017).

Patient satisfaction with VE was consistent with prior studies that used VE (Albert et al., 2007). Ninety two percent found the videos meaningful. This is the first evaluation of VE to assess HF patients' perceived meaningfulness and helpfulness of using videos to learn about HF and self-care management.

Strengths and limitations of the design

This project is the first to have evaluated the effects of VE delivered via mobile technology, tablet computer and patients' personal computer. Prior studies used videotape and DVD formats. This project contains an item analysis of HF knowledge unlike prior studies that evaluated the impact of using VE for improving HF knowledge. This aspect helps clinicians to better determine the focus of interventions at an individual, and/ or local unit/ hospital level by identifying the specific knowledge gaps that exists for patients.

The project overcame some of the challenges that often restrict eligibility of patient participation such as not having access to internet or the requisite technology. Furthermore, the project builds on the limited work done in this area of HF education. This project in addition to offering ratings of the videos, is the first to also provide narratives of the patients' experiences of using VE. In striving for patient-centered care, obtaining the subjective experiences of HF patients facilitates an increased understanding of what is meaningful to HF patients in optimizing their own self-care, and possible barriers from their perspective to achieving improved HF self-care.

The design of this project is limited by several factors. A pre-test/ post-test design was used to determine the effect of the intervention on the primary measures. The design lacks a control group and convenience sampling was utilized; hence, the risk for bias or confounding factors being introduced into the study. An inclusion and exclusion criteria along with a clearly outlined project protocol was used to introduce objectivity and reduce selection bias.

The attrition experienced may have affected the findings particularly with more men being loss to follow-up. The study only had a Time 1, and therefore unable to determine if improvements seen in HF knowledge and self-care maintenance would be sustained or whether self-management or self-confidence would improve. In addition to these factors, the study was

conducted at a single site facility thus generalizing to other settings/ populations may not be possible. For 30-day readmission, only data at the AMC was used, thus admissions to other acute care hospitals may have been missed.

Practice Implications

Nurses play an integral role in the education of HF patients, spending many hours delivering information on HF self-care (Dickson & Riegel, 2009). Adding VE to usual care is congruent with HF patients' preference for a multi-modal style of learning (Boyde et al., 2009). This method also supports nurses offering a patient-centered evidenced-based intervention that is in keeping with current HF guideline recommendations. The study showed that VE can help improve patients' knowledge of various components of HF self-care. For clinical practice, this helps advanced practice nurses and others delivering HF education understand how best to use VE in teaching patients and for tailoring of the intervention. This may help to improve adherence to required self-care maintenance and reduce risk of hospitalizations and other health risks.

Implications for Future Research

Future research may help us further determine the impact VE may have on outcomes that were not statistically significant (self-efficacy, self-management, 30-day readmission), to see if a longer duration of exposure to the intervention with repeated follow-up improves these outcomes.

Conclusion

The findings of the project indicate that VE significantly improved patients' knowledge of HF and self-maintenance. In addition, VE is a useful and convenient way to deliver HF education, which patients found to be meaningful and satisfactory.

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Table 1.

Sociodemographic and clinical characteristics

Variable	All enrolled participants	Participants completing study	Lost to follow-up	*p* value*	Test
	(n = 70)	(n = 30)	(n=40)		
Age (years), mean (SD)	65. 0 (12.9)	66.3 (11.7)	64.0 (13.8)	.448	1
Gender, n (%)				.002	2
Female	34 (48.6)	21 (70.0)	13 (32.5)		
Male	36 (51.4)	9 (30.0)	27 (67.5)		
Race, n (%)				.817	3
Black	21 (30.0)	9 (30.0)	12 (30.0)		
White	47 (67.1)	20 (66.7)	27 (67.5)		
Asian	1 (1.4)	1 (3.3)	0 (0.0)		
Hispanic	1 (1.4)	0 (0. 0)	1 (2.5)		
Marital status, n (%)				.511	3
Never married	7 (10.0)	2 (6.7)	5 (12.5)		
Married	35 (50.0)	15 (50.0)	20 (50.0)		
Divorced	14 (20.0)	5 (16.7)	9 (22.5)		
Separated	1 (1.4)	0 (0. 0)	1 (2.5)		
Widowed	13 (18.6)	8 (26.7	5 (12.5)		

Variable	All enrolled participants (n = 70)	Participants completing study (n = 30)	Lost to follow-up (n=40)	p value*	Test
Living Arrangement, n (%)				.326	3
Living with spouse/ partner	39 (55.7)	14 (46.7)	25 (62.5)		
Living with other family	18 (25.7)	10 (33.3)	8 (20.0)		
Living alone	12 (17.1)	5 (16.7)	7 (17.5)		
Living with friends	1 (1.4)	1 (3.3)	0 (0.0)		
Education level, n (%)				.658	2
Did not complete high school	16 (22.9)	7 (23.3)	9 (22.5)		
High School Graduate/ GED	32 (45.7)	12 (40.0)	20 (50.0)		
College Graduate	22 (31.4)	11 (36.7)	11 (27.5)		
Employment Status, n (%)				.491	3
Unemployed	5 (7.1)	2 (6.7)	3 (7.5)		
Full-time	8 (11.4)	1 (3.3)	7 (17.5)		
Part-time	4 (5.7)	2 (6.7)	2 (5.0)		
Retired	35 (50.0)	16 (53.3)	19 (47.5)		
Disabled	18 (25.7)	9 (30.0)	9 (22.5)		
Income, n (%)				.943	3
Less than $ 24, 999	30 (42.9)	13 (43.3)	17 (42.5)		

Variable	All enrolled participants	Participants completing study	Lost to follow-up	p value*	Test
	(n = 70)	(n = 30)	(n=40)		
$25, 000 – $49, 999	16 (22.9)	8 (26.7)	8 (20.0)		
$50, 000 - $74, 999	2 (2.9)	1 (3.3)	1 (2.5)		
More than $75, 000	5 (7.1)	2 (6.7)	3 (7.5)		
Prefer not to state	17 (24.3)	6 (20.0)	11 (27.5)		
Type of Insurance, n (%)					
No insurance	8 (11.4)	3 (10.0)	5 (12.5)	1.000	3
Private Insurance	28 (40.0)	11 (36.7)	17 (42.5)	.622	2
Medicare	51 (72.9)	22 (73.3)	29 (72.5)	.938	2
Medicaid	13 (18.6)	7 (23.3)	6 (15.0)	.375	2
Other Insurance	3 (4.3)	2 (6.7)	1 (2.5)	.573	3
Charlson Comorbidity, mean (SD)	5.8 (2.8)	6.2 (2.3)	5.5 (3.1)	.246	1
Comorbidities, n (%)					
Hypertension	55 (78.6)	25 (83.3)	30 (75.0)	.400	2
Diabetes Mellitus	38 (54.3)	19 (63.3)	19 (47.5)	.188	2
Hyperlipidemia	37 (52.9)	14 (46.7)	23 (57.5)	.369	2
Atrial Fibrillation	30 (42.9)	14 (46.7)	16 (40.0)	.577	2
Coronary Artery Disease	30 (42.9)	11 (36.7)	19 (47.5)	.365	2

Variable	All enrolled participants (n = 70)	Participants completing study (n = 30)	Lost to follow-up (n=40)	p value*	Test
Chronic Kidney Disease	27 (38.6)	11 (36.7)	16 (40.0)	.777	2
Obstructive Sleep Apnea	23 (32.9)	7 (23.3)	16 (40.0)	.142	2
Other cardiac arrhythmias	20 (28.6)	10 (33.3)	10 (25.0)	.445	2
Previous MI	17 (24.3)	6 (20.0)	11 (27.5)	.469	2
Depression	15 (21.4)	9 (30.0)	6 (15.0)	.130	2
Solid Tumor	14 (20.0)	8 (26.7)	6 (15.0)	.227	2
Valvular Heart Disease	12 (17.1)	3 (10.0)	9 (22.5)	.170	2
COPD	12 (17.1)	6 (20.0)	6 (15.0)	.583	2
Previous CVA/ TIA	10 (14.3)	3 (10.0)	7 (17.5)	.498	3
Peripheral Vascular disease	10 (14.3)	3 (10.0)	7 (17.5)	.498	3
Liver Disease	4 (5.7)	3 (10.0)	1 (2.5)	.307	3
Obesity	14 (20.0)	5 (16.7)	9 (22.5)	.546	2
Current history of substance use	4 (5.7)	1 (3.3)	3 (7.5)	.630	3
Malignant Lymphoma	2 (2.9)	0 (0.0)	2 (5.0)	.503	3
Peptic Ulcer Disease	1 (1.4)	1 (3.3)	0 (0.0)	.429	3

Variable	All enrolled participants	Participants completing study	Lost to follow-up	p value*	Test
	(n = 70)	(n = 30)	(n=40)		
Medication class, n (%)					
Diuretics	52 (74.3)	22 (73.3)	30 (75.0)	.875	2
Beta Blockers	51 (72.9)	21 (70.0)	30 (75.0)	.642	2
Statins	47 (67.1)	19 (63.3)	28 (70.0)	.557	2
Anticoagulants	24 (34.3)	11 (36.7)	13 (32.5)	.716	2
ACE Inhibitors	19 (27.1)	8 (26.7)	11 (27.5)	.938	2
Aldosterone Antagonist	13 (18.6)	6 (20.0)	7 (17.5)	.790	2
Angiotensin Receptor Blockers	10 (14.3)	5 (16.7)	5 (12.5)	.735	3
Digitalis	5 (7.1)	3(10.0)	2 (5.0)	.645	3
NYHA Classification, n (%)				.477	3
Class I	1 (1.4)	1 (3.3)	0 (0.0)		
Class II	14 (20.0)	7 (23.3)	7 (17.5)		
Class III	39 (55.7)	17 (56.7)	22 (55.0)		
Class IV	16 (22.9)	5 (16.7)	11 (27.5)		
Ejection Fraction, n (%)				.098	2
HFrEF (EF $\leq$ 40%)	45 (64.3)	15 (50.0)	30 (75.0)		

Variable	All enrolled participants	Participants completing study	Lost to follow-up	p value*	Test
	(n = 70)	(n = 30)	(n=40)		
HF*p*EF, borderline (EF 41% – 49%)	7 (10.0)	4 (13.3)	3 (7.5)		
HF*p*EF (EF ≥ 50%)	18 (25.7)	11 (36.7)	7 (17.5)		
Ejection Fraction within last six months 6 months, n (%)	65 (92.9)	28 (93.3)	37 (92.5)	1.000	3
Time since HF diagnosis, n (%)				.581	3
Less than 12 months	26 (37.1)	12 (40.0)	14 (35.0)		
1 - 5 years	26 (37.1)	9 (30.0)	17 (42.5)		
6 - 10 years	10 (14.3)	4 (13.3)	6 (15.0)		
Greater than 10 years	8 (11.4)	5 (16.7)	3 (7.5)		
Length of stay, median (IQR)	5.0 (6)	4.5 (6)	5.0 (8)	.541	4
Hospitalizations in the past 12 months	34 (48.6)	15 (50.0)	19 (47.5)	.836	2
Miles traveled to hospital, median (IQR)	40.0 (53.5)	40.0 (59.8)	40.0 (60.0)	.725	4
Travel time to the hospital				1.000	3
Less than 1 hour	37 (52.9)	16 (53.3)	21 (52.5)		
1-2 hours	22 (31.4)	9 (30.0)	13 (32.5)		
3 – 4 hours	6 (8.6)	3 (10.0)	3 (7.5)		

Variable	All enrolled participants	Participants completing study	Lost to follow-up	p value*	Test
	(n = 70)	(n = 30)	(n=40)		
5 hours and more	5 (7.1)	2 (6.7)	3 (7.5)		

Note. *p* values of tests comparing those who completed (n=30) with those lost to follow-up (n=40); 1 = computed using Two-sided Independent samples t-test; 2 = computed using Two-sided Chi-square test; 3 = Exact Two-sided Chi-square test; 4 = computed using Mann-Whitney U test. Some patients had multiple types of insurance payment; most patients had multiple conditions and were taking multiple medications; HFrEF = HF with reduced ejection fraction; HFpEF, borderline = HF with preserved ejection fraction, borderline; HFpEF= HF with preserved ejection fraction; EF = ejection fraction; IQR = Interquartile Range.

Table 2

Results of Primary Measures

Variables	Frequency	Pre-test Mean (SD)	Post-test Mean (SD)	*p* value
Knowledge of Heart Failure	30	22.67 (3.99)	24.36 (3.61)	**.008***
Self-care maintenance	30	67.22 (18.65)	81.18 (14.16)	**.001***
Self-care management	21	58.95 (23.98)	68.38 (20.56)	.073
Self-care confidence	30	69.31 (21.64)	70.98 (18.16)	.735

Note: p< .05

Table 3.

Patient Satisfaction with Video Education Survey Results (N=26)

Statements	Strongly agree n (%)	Agree n (%)	Disagree n (%)	Strongly disagree n (%)
It was easy to find the videos	17 (65.4)	8 (30.1)	1 (3.9)	0 (0.0)
I would recommend these videos to another patient with heart failure	17 (65.9)	9 (34.9)	0 (0.0)	0 (0.0)
The videos were meaningful to me	11 (42.3)	13(50.0)	2 (7.7)	0 (0.0)
I learned something new about managing heart failure	14 (53.9)	11(42.3)	1 (3.9)	0 (0.0)
I am satisfied with the information in the videos	14 (53.9)	11(42.3)	1 (3.9%)	0 (0.0)