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## Evaluating Nurse Use and Satisfaction with Video-Based Discharge Education for Adults with Heart Failure

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University of Nebraska Medical Center  
College of Nursing

DOCTOR OF NURSING PRACTICE (DNP)  
FINAL DNP PROJECT

**Evaluating Nurse Use and Satisfaction with Video-Based Discharge Education for Adults  
with Heart Failure**

by

Molly Hendrickson, RN, BSN & Krystyna Simon, RN, BSN

The final DNP project presented to the  
Faculty of the University of Nebraska Medical Center College of Nursing  
In Partial Fulfillment of the Requirements for the Degree

DOCTOR OF NURSING PRACTICE

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DNP Program Faculty Academic Advisor  
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## **Abstract**

### **Background**

Heart failure (HF) readmission rates are high and influenced by self-care practices and self-efficacy for managing chronic disease. Using digital education via tablet can help improve the discharge education process and may increase self-care knowledge.

### **Objective**

The purpose of the study is to assess the current discharge processes implemented for HF patients in cardiovascular units at a Midwestern academic medical center.

### **Methods**

Participants for this two-phase study were recruited from two inpatient cardiovascular units within a 700-bed, Midwestern academic medical center. Phase one used a pre-post quasi-experimental design to evaluate a discharge educational intervention using the teach-back method in changing HF knowledge, measured with the Atlanta Heart Failure Knowledge Test (AHFKT), and self-efficacy, measured with the Self-Efficacy for Managing Chronic Diseases 6-item scale (SEMCD-6). Due to our limited sample size, a related-samples Wilcoxon signed rank test was used to analyze changes in scores from pre-test to post-test for HF knowledge and self-efficacy. Phase two used a descriptive survey to evaluate RN use and satisfaction with video-based HF education (HF Emmi™) and bedside tablets for discharge education. The 15-item survey included eight multiple choice questions, a 5-point Likert scale ranging from 0 to 4, and six open-ended questions. Descriptive statistics were reported for Emmi™ video satisfaction and responses to the open-ended questions were aggregated and analyzed for the presence of common threads.

## **Results**

Between September 2022 and November 2022, four participants enrolled and completed the initial intervention for phase one. Two were later lost to follow-up. Data analysis demonstrated that AHFKT scores and SEMCD-6 scores were not significantly different from pre-intervention to 30-days post discharge ( $p = 0.18$ ). From November 2022 and the end of December 2022, 24 nurses enrolled and completed phase two. Nurses reported mean satisfaction of the HF Emmi™ video and beside tables at 2.33 (SD = 0.92). Common threads in open-ended survey responses demonstrated difficulty accessing the HF Emmi™ video and lack of knowledge regarding the HF Emmi™ video.

## **Conclusions**

HF knowledge and self-efficacy for chronic disease management scores did not demonstrate statistical significance from pre-intervention to 30-days post discharge. Nurse surveys indicated a neutral response for use and satisfaction of the HF Emmi™ video. Findings from phase one indicate future studies are necessary to evaluate the impact of the teach-back method and digital discharge education in adults with HF. Findings from phase two indicate a need for further nurse training on the use of tablets for digital discharge education and methods for implementation to workflow.

*Keywords:* heart failure, teach-back, video education

## **Introduction and Problem Statement**

Heart failure (HF) is a chronic illness affecting 6.2 million adults in the United States, costing our country an estimated \$30.7 billion in 2012 (CDC, 2020). The American Heart Association (2021) estimates the prevalence of HF will increase by 46% between 2012 and 2030, with total direct medical costs projected to increase by about 127% by 2030. These astronomical medical costs are related to frequent hospitalizations experienced by adults with HF. In fact, Khan et al. (2021) found that one in four hospitalized adults with HF are readmitted within 30 days of discharge, and half are readmitted within six months.

HF-related readmissions are often associated with deficiencies in HF self-care practices. White et al. (2013) identifies noncompliance with medication therapies, lack of adherence to a low sodium diet, and delays in seeking medical treatment for worsening symptoms as primary reasons related to readmission. The ability for adults with HF to understand their disease and manage symptoms through self-care practices is vital to improving HF outcomes. Self-care practices for HF patients include adhering to diet, medication therapies, and daily weights (Boyde et al., 2018). Self-efficacy, which refers to the belief in one's ability to achieve a desired result, has been shown to positively influence self-care practices (Yehle & Plake, 2010). Educational intervention has been successful at increasing self-efficacy and self-care in adults with HF (Yehle & Plake, 2010).

Delivering education content to adults with HF can be challenging due to varying levels of health literacy in the United States. One method recommended by the Agency for Healthcare Research and Quality (AHRQ) and the Institute for Healthcare Improvement (IHI) as a means for taking a standardized approach to health literacy is the teach-back method (Yen & Leasure, 2019). This method involves patients explaining in their own words what they have learned

during educational sessions (Yen & Leasure, 2019). Yen and Leasure (2019) found statistically significant reductions in readmissions and improvements in health care knowledge after use of the teach-back method for adults with chronic illnesses like HF and diabetes mellitus.

As changes in methods of delivering patient education have evolved, the use of digitalized education through smart phone applications, videos, and tablets have become widely accepted. In contrast to traditional methods of patient education, digital methods offer more engaging and interactive patient education through the use of graphics and illustrations (Sawyer et al., 2016). Evidence has linked digital patient education to increases in self-care at 6 months follow-up and improvements in patient's ability to recall information compared to verbal or written education (Pool et al., 2021).

The use of digital education delivered through mobile technologies like smart phones or tablets before hospital discharge allows the bedside nurse to evaluate the learning that occurred during the patient's hospitalization. Although widely accepted and effective, tablet-based education has been underutilized in the inpatient setting due to various barriers to use by staff nurses. Sawyer et al. (2016) identified common nursing barriers to tablet adoption into clinical workflow for patient education like insufficient time, lack of administrative support, and lack of proper staff training on roles and responsibilities.

The problems addressed in this study are the HF related outcomes of self- efficacy for chronic disease management and self-care knowledge. Additionally, nursing barriers to the use of unit-based tablets for HF-related discharge education are examined. HF readmission rates are high and influenced by self-care practices and self-efficacy for managing chronic disease. Using digital education via tablet can help improve the discharge education process and may increase

self-care knowledge. To improve access to digital education via tablet, we sought to understand system-level and individual-level barriers to implementation.

### **Purpose and Aims**

**Purpose:** The purpose of this project is to assess the current discharge processes implemented for HF patients in cardiovascular units at a Midwestern academic medical center.

**Aims:**

1. Evaluate impact of the teach-back method with a video-based educational intervention on HF knowledge and self- efficacy in adults admitted for HF from pre-intervention to 30-days post discharge.
2. Evaluate RN use and satisfaction of the HF Emmi™ video and bedside tablets for discharge education.

### **Review of the Literature**

This project required two comprehensive reviews of the literature. The first evaluated discharge education using the teach-back method and the effect of teach-back on self-care knowledge and self-efficacy in chronic disease management, and readmission rates in patients with HF. The second review evaluated the use of technology-based patient education on disease knowledge, nursing satisfaction, and nursing barriers to implementation. For the first review, we searched CINAHL, Google Scholar, Medline, and Embase using the following search terms: teach-back, HF, discharge, and video-education. Search terms were identified through consultation with the medical librarian. For a concise breakdown of our literature review, see Appendix A. Two reviewers independently screened the titles and abstracts to identify studies meeting the inclusion criteria and exclusion criteria. The inclusion criteria are participants >18

years of age, a chronic medical condition, experimental study designs, cohort study designs, and articles published within the last 10 years. The exclusion criteria are qualitative studies, study protocols, and articles that did not involve the use of teach-back in discharge education and the role of teach-back in the improvement of self-care knowledge, self-efficacy and/or hospital readmission rates. Out of 167 articles, 52 were excluded as duplicates. The remaining 115 articles were screened for eligibility in respect to the type of participants, intervention, outcomes, and study design. Therefore, an additional 110 articles were excluded due to not meeting our inclusion and exclusion criteria. Five articles remained eligible and were included in this review. We identified four educational approaches used to deliver the teach-back method. The small number of studies available for review suggests that the teach-back method has not been broadly investigated in the HF population.

Overall, studies reported positive outcomes on knowledge of self-care when using the teach-back method. Eighty percent (4 out of 5) reported statistically significant improvements in self-care knowledge after using the teach-back method. (Dinh et al., 2019; Mesbahi et al., 2020; Rahmani et al., 2020; White et al., 2013). Knowledge of simple self-care tasks (i.e., daily weighing, salt restriction, medication adherence) was improved when teach-back was included in discharge education. However, a study by Dinh et al. (2019) did not observe differences in self-efficacy between the intervention and control groups over a three-month study period. Finally, there was a positive but inconsistent improvement seen in hospital readmission rates, where only three studies found a significant decrease (Boyde et al., 2018; Mesbahi et al., 2020; Rahmani et al., 2020). The lack of consistent and strong evidence in this review suggests a need for further research.



Despite inconsistent findings on the efficacy of teach-back in the HF population, teach-back has been shown to improve outcomes for adults with other chronic illnesses, including diabetes and cancer (Oshvandi et al, 2014; Hosaini et al, 2021; Yen & Leasure, 2019; Choi & Choi, 2021). Oshvandi et al. (2014) and successfully used teach-back to improve self-care behaviors among diabetic patients. Hosaini et al (2021) found the use of teach-back to improve self-care practices and self-efficacy in the diabetic population. Additionally, the teach-back method is linked to positive health outcomes among patients with diabetes and cancer, including improvement in self-care practices and reduced readmission rates (Yen & Leasure, 2019; Choi & Choi, 2021).

For the second review, we searched EMBASE, CINAHL, Medline and Google scholar for the search terms: discharge education, patient knowledge, i-pad, tablet, mobile device, nursing barriers, and workflow. Search terms were identified through consultation with the medical librarian. For a concise breakdown of our review see Appendix B. 56 records were identified through databases using our search terms. Two additional articles were retrieved from Google Scholar. Twenty of 58 articles were removed as duplicates. Two reviewers independently screened titles and abstracts of the 38 articles to identify studies meeting the inclusion and exclusion criteria. The inclusion criteria for this review included participants >18 years old, studies published in the last 10 years, English language, inpatient or outpatient settings. The exclusion criteria were participants < 18 years old studies not reporting data on nursing barriers. Studies were not excluded based on design. After screening, 31 articles were excluded due to not meeting our inclusion and exclusion criteria. Seven studies remained for synthesis. The final seven studies include a descriptive study, an observational study, a mixed methods study, two feasibility studies, a qualitative evaluation, and a Quasi experimental study.

Six studies included semi- structured interviews or focus groups to collect feedback from nurses regarding implementation of technology-based discharge education (Smith et al., 2019; Klingbeil et al., 2022; Sinha et al., 2019; Johnson et al., 2020; Krall et al., 2016; Schooley et al., 2020). The nurse feedback includes barriers, facilitators, benefits, or challenges of incorporating digital education into nursing workflow. Of the six studies using technology-based discharge education, five studies involved the use of an iPad for education delivery, and one involved the use of a laptop. One study focused on standard discharge education and used surveys to collect nursing feedback on barriers to discharge planning (Graham et al., 2013).

The most common barrier or challenge reported by nurses in implementing technology-based education and standard education was a lack of time (Smith et al., 2019; Johnson et al., 2020; Graham et al., 2013; Sinha et al., 2019). Smith et al. (2019) found that nursing concerns related to lack of time were due to issues with staffing, shortened length of stay, and availability of tablets. Sinha et al. (2019) reported some nurses were concerned over the amount of time spent on discharge education due to possible issues with technology. Johnson et al (2020) reported nurses felt the digital based education took longer than standard education.

Various benefits of implementing digital education were reported by nurses through structured interviews or focus groups. Schooley et al. (2020) found that digital education via laptop was easily integrated into workflow. Sinha et al. (2019) found 88% of nurses believed digital education improved discharge planning. Krall et al. (2016) and Klingbeil et al. (2022) found that nurses felt the videos were convenient or useful and allowed for a standardization of discharge education.

The evidence from the two literature reviews contributed to the development of this project by providing evidence on the use of the teach back method to improve outcomes for

adults with HF. The review also identified nursing perspectives on digital based discharge education and implementation to workflow to provided important contextual information that included the development of our nurse satisfaction survey.

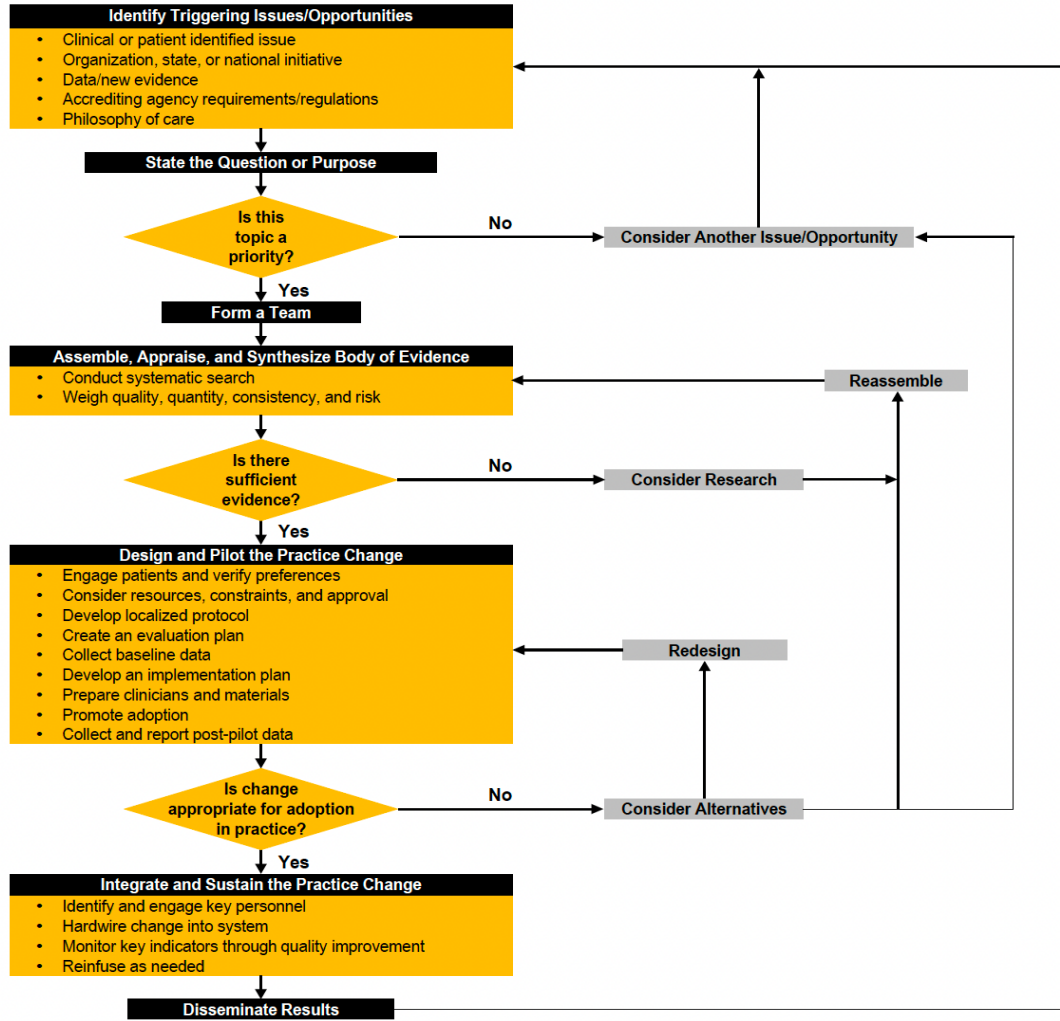
### **Conceptual and/or Theoretical Framework**

The methodological framework for the study is the Iowa Model for Implementation of Evidence Based Practice (shown in Figure 1). This model is used to guide practitioners through the steps of implementing evidence-based research. The first step in the model is to identify a trigger or opportunity for change. This trigger is what will drive the change within the system and help the researcher develop the question or purpose, which is the next step in the model. Once the purpose is established, the researcher can evaluate whether this is a priority for the organization and then develop a team with stakeholders who have the skills needed to ensure the success of the project. The model emphasizes the importance of performing a literature review to demonstrate there is sufficient research to help lead change. If the review shows there is sufficient research, the practice may be implemented and evaluated. The Iowa model was ideal for this project because the model uses evidence-based research to help lead change and improve outcomes for patients. The model also involves the formation of a team of stakeholders to guide the process which was necessary for this study.

**Figure 1**

*The Iowa Model for Implementation of Evidence Based Practice*

**The Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Health Care**



◆ decision point  
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## **Methods**

### **Design**

This prospective quality improvement project is divided into two phases. Phase one involved a pre-post quasi-experimental design that aimed to evaluate a discharge educational intervention using the teach-back method in changing HF knowledge and self-efficacy. However, due to several process barriers, the investigators decided to conclude phase one and change their approach to a survey-based project in phase two. This phase involved a descriptive survey that aimed to evaluate RN use and satisfaction with video-based HF education (HF Emmi™) and bedside tablets for discharge education. Emmi™ videos are trusted, current, and easy-to-understand patient education programs that cover individualized health topics.

### **Setting**

Phases one and two took place in two inpatient cardiovascular units in a 700-bed, Midwestern academic medical center. The two units included an acute care telemetry unit and a progressive care telemetry unit. Of 770 HF-related discharges at the academic medical center in 2022, over 56% (435 discharges) were from these units.

## **Phase One**

### ***Subjects***

For phase one, potential participants were identified by the academic medical center's HF educators from September 2022 to November 2022. The educators notified the investigators of current potential inpatients, who were then screened by the investigators against inclusion and exclusion criteria. Inclusion and exclusion criteria for phase one are listed in Table 1. We excluded those with cognitive deficits that may have confounded our results. Adults with blindness and/or hearing loss were excluded since our educational intervention contained visual and auditory learning requirements. Adults with intra-ventricular devices, heart transplants, or

home inotropic therapy were excluded due to their advanced heart failure status, requiring additional education that is not included in the HF Emmi™ video. Finally, pregnant or breastfeeding adults were also excluded due to the complex physiologic changes that occur in this population.

**Table 1**

*Phase One Inclusion and Exclusion Criteria*

<b>Inclusion criteria (phase one)</b>	<b>Exclusion criteria (phase one)</b>
1. Primary admission diagnosis of acute HF exacerbation	1. Alzheimer's or other related dementia
2. Age greater than or equal to 19 years of age	2. Blindness
3. English-speaking	3. Hearing loss
	4. LVAD <sup>1</sup> , RVAD <sup>2</sup> , IABP <sup>3</sup> , or Heart transplant patient
	5. Pregnancy or breastfeeding
	6. Home inotropic therapy of the following medications: milrinone, dobutamine, dopamine.

<sup>1</sup> Left ventricular assist device

<sup>2</sup> Right ventricular assist device

<sup>3</sup> Intra-aortic balloon pump

The investigators approached the inpatients who met eligibility criteria in their private hospital room. Informed consent was then completed in-person using paper forms. Participants were given time to review the consent form and ask questions before obtaining consent. If participants met eligibility criteria and gave consent to participation, they were enrolled.

***Power Analysis***

A power analysis was conducted for differences in pre- and post-intervention HF knowledge based on a two-tailed t-test of the difference in means and an alpha level of .05. Accounting for a 10% rate of attrition, our recruitment target was 38 participants. This would grant us 80% power to detect an effect size of 0.5, which is a moderate effect size.

## ***Tools & Measures***

The investigators used three tools during phase one: a cognitive assessment pre-intervention, a CHF education pre/post-test, and a self-efficacy scale pre/post intervention (see Table 2 for descriptions of each tool). Cognition was assessed using the Montreal Cognitive Assessment (MoCA). The MoCA detects mild cognitive impairment (Hobson, 2015). The information was collected as a method to determine the influence of cognition on other project outcomes.

The CHF education pre/post-test consisted of the Atlanta Heart Failure Knowledge Test (AHFKT) version two (see Appendix C). This tool is used for HF patients and their family members to measure change in HF knowledge after exposure to a specific education and self-management intervention (Reilly et al., 2009). According to Reilly et al. (2009), content validity indexes (CVI) for clarity (0.81) and relevance (0.92) are acceptable, and the overall scale-level content validity index based on the average method (S-CVI/Ave, 0.96) is excellent. Additionally, factor analysis by Butts et al. (2019) confirmed its internal consistency, reliability, and validity (Cronbach's alpha, 0.87).

The third tool analyzed pre/post-intervention self-efficacy scores via the Self Efficacy for Managing Chronic Disease 6-item Scale (SEMCD-6) (see Appendix D). This tool is used to measure components of chronic disease self-management. Ritter and Lorig (2014) analyzed six independent studies to measure the tool's psychometric properties. Their study confirmed its internal consistency, reliability, and validity and showed that the SEMCD-6 was sensitive to change, correlated significantly with health outcomes, and resulted in minimal floor and ceiling effects (Cronbach's alpha, 0.88-0.95).

**Table 2***Phase One Tools and Measures*

<b>Variable</b>	<b>Instrument</b>	<b>Description</b>	<b>Collection Time Point</b>
HF knowledge	Atlanta Heart Failure Knowledge Test (AHFKT)	30 multiple-choice questions that measure domains of patient education related to the HF disease process, diet, nutrition, medications, symptoms, and behaviors (Reilly et al., 2009). Scoring of the test attributes one point for each correct answer with no additional weighting of items, followed by summing the correct responses. A score less than 80% indicates inadequate HF knowledge (Butts et al., 2019).	Baseline, 30-days post hospital discharge
Self-efficacy	Self-Efficacy for Managing Chronic Disease 6-item Scale (SEMCD-6)	Six items on a visual analog scale, ranging from 1 (not at all confident) to 10 (totally confident). Domains include symptom control, role function, emotional function, and physician communication. Scoring involves computing the mean of the six items, unless two or more items are missing, in which case the tool is rendered incomplete (Ritter & Lorig, 2014).	Baseline, 30-days post hospital discharge
<b>Demographics and Clinical Factors</b>			
Demographics	Investigator-developed worksheet	Age, gender, race, ethnicity, education level, employment status, marital status	Baseline
Cognition	Montreal Cognitive Assessment	30-point test consisting of multiple cognitive domains including visuospatial, executive, naming, memory, attention, language, abstraction, delayed recall, and orientation. A score of 26 or above is considered normal with no detection of mild cognitive impairment (Hobson, 2015).	Baseline
Length of time with HF	Medical record & patient confirmation	Time (months) since HF diagnosis	Baseline
Comorbidities	Medical record & patient confirmation	Diabetes, chronic kidney disease, pulmonary dysfunction, hypertension	Baseline



### ***Data Analysis***

IBM SPSS software was utilized to conduct statistical analyses with the support of a professional statistician. Means, standard deviations, frequencies, and percentages are reported for descriptive data as appropriate. Due to our limited sample size, a related-samples Wilcoxon signed rank test was used to analyze changes in scores from pre-test to post-test for HF knowledge and self-efficacy. A two-sided p value of less than 0.05 was used to establish statistical significance.

Age, gender, race, ethnicity, education level, employment status, and marital status were measured with a sociodemographic questionnaire designed by the investigators specifically for this project. Age was collected as a continuous level variable. Gender, race, ethnicity, education level, employment status, and marital status were collected as categorical variables. Cognition was collected as a nominal variable via the MoCA. Two additional variables, length of time with HF and comorbidities, were individual characteristics collected from the medical record and confirmed with the patient for validity.

### ***Procedure***

Phase one involved the educational intervention. Initial contact for recruitment was completed by HF educators that were a part of the patient's care team and had ethical access to their medical information. The educators then notified the investigators of potential participants to allow the investigators to begin the screening process against inclusion/exclusion criteria. If the participant met criteria, permission for visitation was then obtained by hospital staff with ethical access. If the participant was agreeable, informed consent was obtained. The intervention then began by collecting demographics and clinical variables via an investigator-developed worksheet. Next, the AHFKT and SEMCD-6 were administered to assess baseline HF

knowledge and self-efficacy for chronic disease management. The investigators then utilized patient bedside tablets to access and play the HF Emmi™ education video. After the participant completed watching the video, the investigators initiated the teach-back process within 15 minutes. This process was standardized utilizing a teach-back protocol created by the investigators (described below). This protocol included three teach-back questions used to reinforce learning points based on participant responses (details on teach-back protocol below). Finally, the AHFKT and SEMCD-6 were readministered via telephone 30 days post hospital discharge.

### ***Teach Back Protocol***

The investigators used the Health Literacy Universal Precautions Toolkit by the AHRQ (2016) to assist in developing the teach-back protocol. The health literacy universal precautions aim to simplify communication, reduce risk of miscommunication, make the complexities of a healthcare system easier to understand, and aid patients in their efforts to improve their health (AHRQ, 2021). The purpose of this teach-back protocol is to ensure consistency between investigators. The teach-back portion of the intervention included three key questions that the participant was asked to answer and explain in their own words. If their response demonstrated misunderstanding of the educational video, the investigators then used plain language and rephrased the message until the participant demonstrated clear understanding. The three teach-back questions read:

1. Can you explain to me what HF is?
2. Can you give me one example of a HF symptom for which you should call your doctor?
3. Can you give me one example of a high salt food to avoid?

## **Phase Two**

### ***Subjects***

For phase two, RNs were considered eligible to participate if they were licensed and working in one of the two cardiovascular units. Recruitment occurred from the beginning of November 2022 to the end of December 2022. Potential participants for the survey were informed of the study via weekly emails sent by nursing unit managers, during change-of-shift huddles led by unit team leads, and during unit visits by the principal investigators.

### ***Tools & Measures***

Nurses were surveyed using an investigator-developed descriptive survey. Questions were formulated based on the investigator's knowledge and experience with cardiac care, discharge education, and use of the HF Emmi™ video. The nurse survey contained 15 questions, three involving demographics, four involving employment history, five involving use and understanding of the HF Emmi™ video and bedside tablets, and three involving satisfaction and experience using the HF Emmi™ video (See Appendix E). The response options varied, with multiple choice questions (Q 2, 3, 7, 8, 9, 10, 11, 12), a 5-point Likert scale (Q13), and open-ended questions (Q 1, 4, 5, 6, 14, 15). The survey could be completed online via Microsoft Forms or manually on paper surveys that were left in the units. Surveys could be left anonymous, although a raffle for a \$25.00 gift card was offered as incentive for study participation, which did require contact information (phone number or email address).

### ***Procedure***

Phase two involved the dispersal and collection of the RN survey tool. Unit managers relayed the online version to unit nurses via weekly email reminders. The investigators printed paper versions of the survey that were left in common areas of each unit. Unit team leads

reminded nurses of the paper surveys during change-of-shift huddles, and the investigators also conducted unit visits to hand out the paper surveys. Survey responses were collected at the end of December 2022 for final evaluation. Data from the paper surveys were entered into a spreadsheet manually. The second investigator then verified the information was entered accurately.

### ***Data Analysis***

Age, number of years worked as an RN, number of years worked on the unit, and number of years worked at the institution were collected as continuous level variables. Gender, race, travel nurse status, and Emmi™ video usage were collected as categorical variables. Descriptive statistics were reported for Emmi™ video satisfaction. Additionally, responses to the open-ended questions were aggregated and analyzed for the presence of common threads related to the experience of using the Emmi™ video. The common threads were derived from common words identified and confirmed using an iterative approach.

## **Findings**

### **Phase One**

#### ***Sample Characteristics***

Between September 2022 and November 2022, a total of six patients were considered eligible for the study. Four patients consented and completed the initial educational intervention, and two were later lost to follow-up. Descriptive statistics and individual characteristics for our sample are summarized in Table 3 and 4, respectively. Of note, mean score on the MoCA was 21 (SD 3.27).

**Table 3***Phase One Sociodemographic Characteristics (n=4)*

<b>Variable</b>	<b>Mean (SD) or Number (%)</b>
Age, mean (SD)	64 (24.26)
Male gender, n (%)	3 (75)
Race, n (%)	
White	3 (75)
Black	1 (25)
Education level, n (%)	
7th grade	1 (25)
High school graduate	1 (25)
Some college	1 (25)
Graduate degree	1 (25)
Employment Status, n (%)	
Working	1 (25)
Retired	3 (75)
Marital status, n (%)	
Never married	2 (50)
Married	1 (25)
Divorced	1 (25)

**Table 4***Phase One Individual Characteristics (n=4)*

<b>Variable</b>	<b>Mean (SD) or Number (%)</b>
MoCA, mean (SD)	21 (3.27)
Months since HF diagnosis, mean (SD)	51.25 (65.96)
Diabetes, n (%)	2 (50)
Chronic Kidney Disease, n (%)	1 (25)
Pulmonary dysfunction, n (%)	3 (75)
Hypertension, n (%)	3 (75)

***Outcomes***

We evaluated the impact of the teach-back method with a video-based educational intervention on HF knowledge and self- efficacy in adults admitted for HF from pre-intervention to 30-days post discharge. The AHFKT scores and SEMCD-6 scores were not significantly

different from pre-intervention to 30-days post discharge ( $p = 0.18$ ). There were no significant differences between the completers and non-completers at baseline (a sensitivity analysis was conducted with an Independent Samples Mann-Whitney U Test).

**Table 5**

*Phase One Outcomes*

	<b>N</b>	<b>Mean</b>	<b>Median</b>	<b>SD</b>
<b>Total AHFKT Score Pre-intervention</b>	4	22.75	23.5	4.19
<b>Total AHFKT Score Post-intervention</b>	2	26.5	26.5	0
<b>AHFKT Score Difference (Post-intervention – Pre-intervention)</b>	2	+3.75 <sup>1</sup>	+3	-4.19
<b>Mean SEMCD-6 Score Pre-intervention</b>	4	7.8	7.25	1.5
<b>Mean SEMCD-6 Score Post-intervention</b>	2	7.65	7.65	0.49
<b>Mean SEMCD-6 Score Difference (Post-intervention – Pre-intervention)</b>	2	-0.15 <sup>2</sup>	+0.4	-1.01

<sup>1</sup>Asymptomatic significance = 0.18, retain the null hypothesis

<sup>2</sup>Asymptomatic significance = 0.18, retain the null hypothesis

**Phase Two**

*Sample Characteristics*

Between the beginning of November 2022 to the end of December 2022, a total of 90 nurses were eligible for the study. Twenty-four nurses (27%) enrolled and completed the survey.

Descriptive statistics for our sample are summarized in Table 6.

**Table 6**

*Phase Two Sample Characteristics (n=24)*

<b>Variable</b>	<b>Mean (SD) or Number (%)</b>
Age, mean (SD)	30.125 (7.75)
Male gender, n (%)	6 (25)
Race, n (%)	
White	21 (87.5)
Asian	1 (4.2)
Unknown	1 (4.2)

Missing	1 (4.2)
Travel Nurse, n (%)	4 (16.7)
Years employed as an RN, mean (SD)	5.23 (5.82)
Years employed on current unit, mean (SD)	2.49 (2.27)
Years employed at organization, mean (SD)	3.62 (4.61)

### **Outcomes**

We evaluated RN use and satisfaction of the HF Emmi™ video and bedside tablets for discharge education. On a scale of 0-4, 2.33 (SD = 0.92) was the average response for nurse satisfaction, partway between very dissatisfied (0) and very satisfied (4). Satisfaction was not different by age, gender ( $p = 0.28$ ), years employed as an RN, years employed on current unit, or years employed at the organization. However, there was a significant correlation between years employed as an RN, years employed on current unit, and years employed at the organization.

**Table 7**

#### *Phase Two Outcomes: Correlations*

		<b>Satisfied</b>	<b>Age</b>	<b>Number of years as RN</b>	<b>Number of years on unit</b>	<b>Number of years at organization</b>
<b>Satisfied</b>	Pearson Correlation	1	-0.299	-0.158	0.135	0.31
	Sig. (2-tailed)		0.155	0.46	0.53	0.15
	N	24	24	24	24	0.23
<b>Age</b>	Pearson Correlation	-0.299	1	0.336	-0.23	-0.155
	Sig. (2-tailed)	0.155		0.109	0.913	0.479
	N	24	24	24	24	23
<b>Number of years as RN</b>	Pearson Correlation	-0.158	0.336	1	0.237	0.648**
	Sig. (2-tailed)	0.46	0.109		0.264	<0.001
	N	24	24	24	24	23
<b>Number of years on unit</b>	Pearson Correlation	0.135	-0.23	0.237	1	0.671**
	Sig. (2-tailed)	0.53	0.913	0.264		<0.001
	N	24	24	24	24	23
<b>Number of years at organization</b>	Pearson Correlation	0.31	-0.155	0.648**	0.671**	1

	Sig. (2-tailed)	0.15	0.479	<0.001	<0.001	
	N	0.23	23	23	23	23

\*\*correlation is significant at the 0.01 level (2-tailed).

Further results involving use and understanding of the HF Emmi™ video and bedside tablets are shown in Table 8.

**Table 8**

*Phase Two Outcomes: Quantitative Findings*

Question	Response	Frequency	Percent
What device do you use to play the Emmi™ video for your HF patients?			
	Tablet	4	16.7
	WOW <sup>1</sup>	6	25
	Doesn't play video	13	54.2
	Missing	1	4.2
	Total	24	100
I know how to check out bedside tablets for patients.			
	No	4	16.7
	Yes	19	79.2
	Missing	1	4.2
	Total	24	100
I know how to locate the Emmi™ video in the chart.			
	No	10	41.7
	Yes	13	54.2
	Missing	1	4.2
	Total	24	100
I know how to play the Emmi™ video on the bedside tablet			
	No	17	70.8
	Yes	6	25
	Missing	1	4.2
	Total	24	100
Do you see the HF Emmi™ video ordered for all of your heart failure patients?			
	No	15	62.5
	Yes	8	33.3
	Missing	1	4.2
	Total	24	100

<sup>1</sup>Workstation on wheels



As shown above, most nurses responded that they do not play the Emmi™ video for their HF patients (54.2%). However, 79.2% of the nurses acknowledged that they know how to check out bedside tablets for their patients, and 54.2% acknowledged that they know how to locate the Emmi™ video in the patient chart. Nevertheless, 70.8% of nurses responded that they do not know how to play the Emmi™ video on the bedside tablet, and 62.5% stated that they do not see the HF Emmi™ video ordered for all their patients with HF.

Finally, responses to the open-ended questions were aggregated and analyzed for the presence of common threads, as displayed in Table 9. When asked, “How satisfied are you with the process of showing the Emmi™ video to patients for bedside education? Please explain your response to the previous question,” three common threads were identified.

- (1) **Difficulty accessing HF Emmi™ video.** Sample responses include, “It is very difficult to access the videos and there isn't an easy process to locate them for patients,” and “I always had trouble finding the code.”
- (2) **Unsure how to play the video on bedside tablets.** Sample responses include, “No idea how to do it,” “Not clear how to do it,” and “I wouldn't know how to show them.”
- (3) **Work night shift where discharges rarely occur.** Sample responses include, “I work noc shift and don't play these for my patient,” “I work the night shift and don't often discharge patients or show them educational videos,” and “I do not show the video typically because I'm night lead nurse.”

Additionally, when asked “Please take this space to tell us anything you want us to know about your experience using Emmi™ videos, especially as it relates to heart failure,” two common threads were identified.

(1) **Patients are instructed to watch the HF Emmi™ video at home.** Sample responses include, “Patients are instructed to do at home and in discharge paperwork,” and

“Patients usually are instructed to watch at home.”

(2) **Lack of knowledge regarding the HF Emmi™ video.** Sample responses

include, “Everything - I don't know what this is,” and “I have never seen this video.”

**Table 9**

*Phase Two Outcomes: Qualitative Findings*

Survey questions	Common threads identified
How satisfied are you with the process of showing the Emmi™ video to patients for bedside education? Please explain your response to the previous question.	<ul style="list-style-type: none"> <li>• Difficulty accessing HF Emmi™ video</li> <li>• Unsure how to play the video on bedside tablets</li> <li>• Work night shift where discharges rarely occur</li> </ul>
Please take this space to tell us anything you want us to know about your experience using Emmi™ videos, especially as it relates to heart failure.	<ul style="list-style-type: none"> <li>• Patients are instructed to watch the HF Emmi™ video at home</li> <li>• Lack of knowledge regarding the HF Emmi™ video</li> </ul>

## Discussion

### Phase One

Phase one of this prospective quality improvement project evaluated a discharge educational intervention using the teach-back method in changing HF knowledge and self-efficacy for chronic disease management. Due to process barriers, we had a small sample size of four participants. With these four participants we did not observe a statistically significant increase in HF knowledge from pre-intervention to 30-days post discharge. Several prior studies reported statistically significant improvements in HF self-care knowledge after using the teach-back method (Dinh et al., 2019; Mesbahi et al., 2020; Rahmani et al., 2020; White et al., 2013).

We attribute our non-significant findings to our underpowered sample. Additionally, we noted that our phase one participants scored within the range of mild cognitive impairment on the MoCA. Finally, we did not observe a statistically significant increase in self-efficacy for chronic disease management using the teach-back method, which is consistent with previous studies (Dinh et al., 2019).

### ***Phase One Limitations***

The following section will detail the limitations of phase one of this project including video education availability, training requirements, length of stay (LOS), slow recruitment, and a small sample size. The project had a slow start due to unforeseen issues with video education availability on the tablets. During the planning phase, we were informed that the videos were available on the bedside tablets but once ready to implement we found the videos were not available. At this point we had to work with the hospital's IT department to get the Emmi™ HF education video on the bedside tablets, which was a lengthy process. The investigators also ran into unforeseen training requirements in order to conduct research at the hospital. This was a new requirement and caused delays in beginning our recruitment process. We also found during the recruitment process that this population has a short LOS in the hospital. The average LOS for an adult admitted for an acute HF exacerbation is 1-2 days. Often, we were not notified of a potential participant until the day of their discharge. This contributed to slow recruitment, about one participant per week, and our small sample size of four participants.

### **Phase Two**

Phase two of our study employed both quantitative and qualitative data to evaluate RN use of and satisfaction with the HF Emmi™ video and bedside tablets for discharge education.

On average, nurse satisfaction scores regarding HF Emmi™ video utilization fell within the neutral category. One factor influencing this score was difficulty accessing and playing the HF Emmi™ video on the bedside tablets. This is consistent with Sinha et al.'s (2019) study, where nurses reported concern over the amount of time spent on discharge education due to issues with technology. Before our phase one intervention, we tested the HF Emmi™ video on the bedside tablets and ran into several technical issues. After further discussion with the hospital's information technology (IT) department, we discovered that the video was not available for viewing on the bedside tablets. We were able to work with IT to overcome this issue and were successful in incorporating the Emmi™ video into the bedside tablets.

Nonetheless, this technological setback could have affected the survey responses from nurses. Several nurses stated they had difficulty accessing the HF Emmi™ video on the bedside tablets, and it is possible that these nurses were not aware of the changes that were made to the tablets. Additionally, several nurses added that they had never been educated on these videos and were simply unaware of their purpose. This could have played a major role in satisfaction scores. Further investigation is recommended to determine the extent of nurse orientation to Emmi™ educational videos, and whether this is mandatory or optional.

Finally, 79.2% of the nurses acknowledged that they know how to check out bedside tablets for patient education. This indicates that operating tablet technology is not the issue nurses are facing. Instead, nurses are having technical issues accessing the educational video, as discussed above. Additionally, 62.5% stated that they do not see the HF Emmi™ video ordered for all their patients with HF. Without a provider's order in the EMR, the video is completely inaccessible to nurses. If these technical issues were to be solved, future findings may better correlate with current literature, which suggests that nurses find digitalized education to be

convenient, easy to use, and allow for a standardization of discharge education (Klingbeil et al., 2022; Krall et al.).

### ***Phase Two Limitations***

Phase two encountered several limitations which may have affected our outcomes. First is small sample size. A total of 90 nurses were eligible for participation in phase two, but only 27% of these completed the nurse satisfaction survey. The responses are not representative of all nursing staff.

As mentioned previously, the HF Emmi™ video was also not available for viewing on the bedside tablets. This is congruent with nurse responses, where 70.8% indicated that they did not know how to play the video on the bedside tablets. Since we did not inform the nurses of the prior issue, or the changes that were later made to overcome it, the questions pertaining to video access on the tablets are misleading.

Finally, we noted that 16.7% of the sampled nurses were travel nurses. In general, travel nurses undergo less orientation and unit-specific education due to their shorter travel assignments. It is possible that Emmi™ video education is not incorporated into travel nurse orientation, explaining the lack of Emmi™ video knowledge in some responses.

### **Conclusions**

The impact of digital discharge education and the use of the teach-back method for adults with HF requires further evaluation. While we aimed to recruit a sample of participants large enough for greater data analysis, we were unable due to lack of video availability on the tablets, short patient length of stay, and unforeseen training requirements. Of the two participants who completed phase one, the AHFKT scores and SEMCD-6 scores were not significantly different from pre-intervention to 30-days post discharge. Findings from phase one demonstrate the need

for further evaluation of the intervention with a larger sample size to determine the impact on outcomes for adults with HF. Of the nurses surveyed, data indicates that nurse satisfaction of the HF Emmi™ video utilization falls within the neutral range. While most nurses know how to check out bedside tablets for their patients, they do not know how to play the video education on the tablets. Findings from phase two indicate the need for nurse training on the use of bedside tablets for discharge education and methods to increase implementation to workflow.

### **Recommendations/Implications**

Our phase one literature review resulted in few studies regarding HF discharge education via the teach-back method, suggesting that this method has not been broadly investigated in the HF population. Therefore, we recommend that our phase one intervention is continued. This would allow for the recruitment of a larger sample and opportunity for greater data analysis. To ensure a smoother process, providers should ensure that the HF Emmi™ video is ordered on all patients admitted with a CHF exacerbation. A simple way to facilitate this would be to incorporate the HF Emmi™ video into the preexisting HF admission order set in the EMR.

Additionally, our descriptive survey in phase two revealed most nurses felt neutral (i.e., not satisfied nor dissatisfied) with the process of showing the HF Emmi™ video, which indicates an opportunity for improvement. Specifically, educating nursing staff on Emmi™ videos and how to access them on patient bedside tablets would improve access to these videos and increase the nurses' knowledge regarding this form of discharge education. This could be accomplished via online web modules, in-service training/lectures, or staff bulletin boards. Furthermore, incorporating HF education into daily nurse workflow could ensure that discharge education receives appropriate attention and is not accidentally overlooked.

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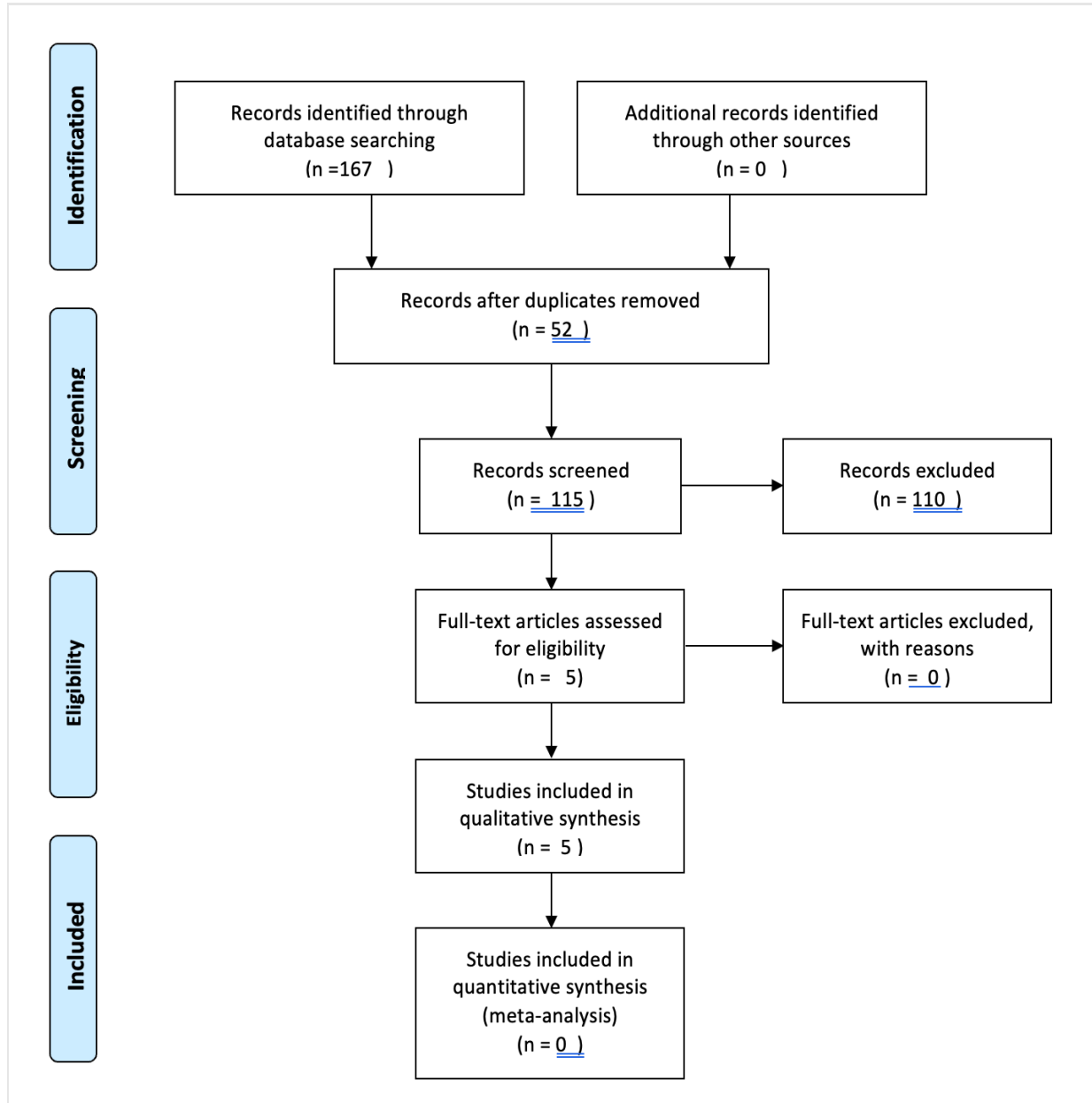
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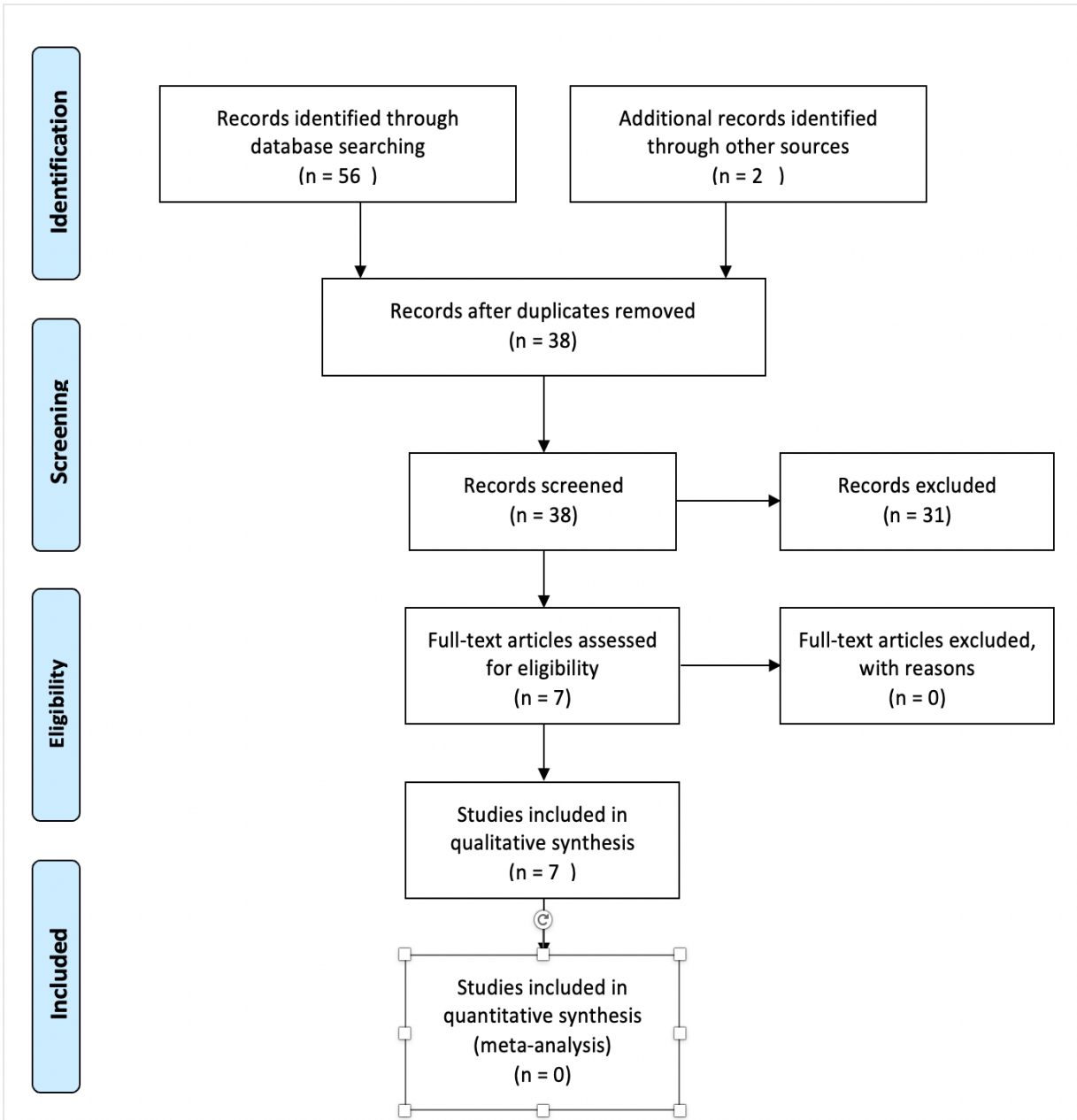
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## Appendix A



Appendix A: Prisma Flow Diagram Phase 1

## Appendix B



Appendix B: Prisma Flow Diagram Phase 2

## Appendix C

### Atlanta Heart Failure Knowledge Test (AHFKT-V2)

(Correct answers are marked with an asterisk)

We have some questions about heart failure. Select one 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:
  - 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?
  - 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 helpful for someone with heart failure.**

	Yes	No
3. Avoid salty foods	*	
4. Drink lots of fluids		*
5. Stop smoking	*	
6. Drink alcoholic drinks each day to relax		*
7. Skip heart failure medicines when they feel better		*
8. Know when to call the doctor or nurse for symptoms of heart failure	*	

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

- a. Removing extra fluid and salt from the body
- b. Causing blood vessels to get smaller
- c. Blocking the harmful effects of stress hormones\*
- d. Improving blood counts (reducing anemia)

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

- 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:

- 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:

- 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. How often should a person with heart failure weigh themselves?

- a. Every day\*
- b. Every week
- c. Every month
- d. Once in a while

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

- 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?

- 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. How often should a person with heart failure exercise?

- a. Every week
- b. Every day\*
- c. Several times a day
- d. 2-3 times per week

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

- 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?

- 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)?

- a. Fresh fruits\*
- b. Canned vegetables
- c. Reduced sodium soup
- d. Frozen dinners

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

- a. Sliced tomato
- b. Broiled fish
- c. Baked ham\*
- d. Skim milk

21. Which dessert has the LOWEST amount of sodium?

- 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.

- 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?

- 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?

- 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:

- a. 3,000 milligrams
- b. 2,500 milligrams
- c. 1,500 milligrams\*
- d. 500 milligrams

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



**Nutrition Facts**  
Serv. Size 1/2 cup (120mL)  
condensed soup  
Servings about 2.5  
Calories 60  
Fat Cal. 15  
\*Percent Daily Values (DV) are based on a 2,000 calorie diet.

	Amount/serving	%DV*	Amount/serving	%DV*
<b>Total Fat</b>	1.5g	2%	<b>Total Carb.</b>	8g 3%
Sat. Fat	0.5g	3%	Fiber	Less than 1g 4%
Trans Fat	0g		Sugars	1g
<b>Cholest.</b>	15mg	5%	<b>Protein</b>	3g
<b>Sodium</b>	890mg	37%		
Vitamin A 4% • Vitamin C 0% • Calcium 0% • Iron 2%				

Satisfaction guaranteed... 857.8443

26. How many servings are in the can?

- a. 1
- b. 2
- c. 2 1/2\*
- d. 3

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

- a. 15mg
- b. 890mg\*
- c. 445mg
- d. 2225mg

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

- 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:

- 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:

- 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 D

### Self-Efficacy for Managing Chronic Disease 6-item Scale

We would like to know how confident you are in doing certain activities. For each of the following questions, please choose the number that corresponds to your confidence that you can do the tasks regularly at the present time.

1. How confident are you that you can keep the fatigue caused by your disease from interfering with the things you want to do?											
<b>Not at all confident</b>	1	2	3	4	5	6	7	8	9	10	<b>Totally confident</b>
2. How confident are you that you can keep the physical discomfort or pain of your disease from interfering with the things you want to do?											
<b>Not at all confident</b>	1	2	3	4	5	6	7	8	9	10	<b>Totally confident</b>
3. How confident are you that you can keep the emotional distress caused by your disease from interfering with the things you want to do?											
<b>Not at all confident</b>	1	2	3	4	5	6	7	8	9	10	<b>Totally confident</b>
4. How confident are you that you can keep any other symptoms or health problems you have from interfering with the things you want to do?											
<b>Not at all confident</b>	1	2	3	4	5	6	7	8	9	10	<b>Totally confident</b>
5. How confident are you that you can do the different tasks and activities needed to manage your health condition so as to reduce your need to see a doctor?											
<b>Not at all confident</b>	1	2	3	4	5	6	7	8	9	10	<b>Totally confident</b>
6. How confident are you that you can do things other than just taking medication to reduce how much your illness affects your everyday life?											
<b>Not at all confident</b>	1	2	3	4	5	6	7	8	9	10	<b>Totally confident</b>

## Appendix E

### RN Survey - Satisfaction of Emmi™ Video

We are a DNP group interested in gathering information on RN satisfaction and processes in relation to the Heart Failure Emmi™ video education. Your feedback is greatly appreciated and will help us impact your patients!

1. What is your age in years?

Enter your answer

2. How do you identify your race?

- a. American Indian/Alaska Native
- b. Black/African American
- c. White
- d. Asian
- e. Native Hawaiian/ pacific islander
- f. Prefer not to say

3. How do you identify your gender?

- a. Male
- b. Female
- c. Non-binary
- d. Prefer not to say

4. How many years have you been a registered nurse?

Enter your answer

5. How long have you worked on this unit?

Enter your answer

6. How long have you worked at Nebraska Med?

Enter your answer

7. Are you a travel nurse?

- a. Yes
- b. No

8. What device do you use to play the Emmi™ video for your heart failure patients?

- a. Tablet
- b. Wow computer
- c. I don't show the video to my patients

9. I know how to check out bedside tablets for patients.

- a. Yes
- b. No

10.I know how to locate the Emmi™ video in the chart.

- a. Yes
- b. No

11.I know how to play the Emmi™ video using a bedside tablet.

- a. Yes
- b. No

12.Do you see the heart failure Emmi™ video ordered for all of your heart failure patients?

- a. Yes
- b. No

13.How satisfied are you with the process of showing the Emmi™ video to patients for bedside education?

- a. Very satisfied
- b. Satisfied
- c. Neutral
- d. Dissatisfied
- e. Very dissatisfied

14.Please explain your response for the previous questions.

Enter your answer

15.Please take this space to tell us anything you want us to know about your experience using Emmi™ videos, especially as it relates to heart failure.

Enter your answer

16.Please leave a phone number or email for if you agree to be contacted regarding your responses.

Enter your answer

If you agree and provide feedback you will be entered to win a \$20 Starbucks gift card :)

Enter your answer