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Improving Heart Failure Patient Referrals to the Center for Advanced Heart Failure & Pulmonary Vascular Disease at Hartford Hospital: A Quality Improvement Project

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Improving heart failure patient referrals to the Center for Advanced Heart Failure &

Pulmonary Vascular Disease at Hartford Hospital:

A Quality Improvement Project

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This is to certify that the DNP Project Final Report by

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has been approved by the DNP Project Team on

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for the Doctor of Nursing Practice degree

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Abstract

Significance and Background: According to the Health Resources & Services Administration (2021), health literacy is the degree to which individuals have the capacity to process and understand basic health information to make appropriate health decisions. Low health literacy is prevalent in populations such as older adults, minorities, and in individuals with lower socioeconomic status and living in medical underserved areas. Recommendations are to access health literacy in cardiac patients, especially in the acute care setting to improve health outcomes upon discharge.

Purpose: To determine whether a health literacy assessment in hospitalized congested heart failure patients, before discharge, will affect referral rates to the Center for Advanced Heart Failure and Pulmonary Vascular Disease (the Center) and decrease 30-day readmissions rates over a 60-day period.

Methods: Utilized the Plan-Do-Study-Act methodology. The primary investigator conducted chart reviews on 2 medical units at Hartford Hospital (Plan). Administered the Newest Vital Sign (NVS) to eligible heart failure patients before discharge. Patients who scored 0-3 had low health literacy and they were referred to the Center (Do). Tracked 30-day readmission rates for all patients completing the NVS (Study). Determine whether the NVS is useful in clinical practice (Act).

Outcome: Eighteen out of the 46 eligible heart failure patients completed the NVS. Eight patients had high health literacy. They scored between 4-6 on the NVS and were not referred to the Center. Ten scored a 3 or less and they were referred to the Center. Seven out of the 10 patients refused the referral, 2 patients expired before referral was given, and 1 patient accepted

and the completed referral with the Center. There was zero 30-day readmission in the 60-day study period.

Discussion: There is insufficient data to determine if the NVS assessment had an impact on referral rates to the Center. However, greater than 50% of patients had low health literacy in this study. In short, the findings of this study reinforce previous knowledge in that low health literacy level is prevalent heart failure patients.

Keywords: Health Literacy, Heart Failure, Health Literacy Level, Readmission Rates.

Improving Heart Failure Patient Referrals to the Center for Advanced Heart Failure &

Pulmonary Vascular Disease at Hartford Hospital:

A Quality improvement project

Chapter 1: Problem Identification, Development of Clinical Question, and Evidence

Review

Background and Significance of Problem

According to the Health Resources & Services Administration (2020), Health literacy is the degree to which individuals have the capacity to obtain, process, and understand basic health information needed to make appropriate health decisions. Low health literacy is prevalent in populations such as older adults, minorities, those with lower socioeconomic status, and those that are medically underserved. The American College of Cardiology (2020) states that it is of the utmost importance that a patient is able to understand and comprehend basic health information when they are making decisions related to their health or healthcare. The American College of Cardiology (2020) also states that while low health literacy has been associated with poorer health, higher healthcare costs and increased risk of death, experts note that health literacy is especially important when it comes to heart health. There is a move towards "patient-centered" healthcare, which includes assessing and improving patients' health literacy, in cardiac patient. In doing so, this will improve the quality of healthcare and reduce healthcare costs (NLM, 2021). As a result, it is important to incorporate health literacy assessment into the routine care of cardiac patients. In the subsequent paragraphs, a detailed description of a quality improvement (QI) study will be discussed. This QI study will examine the effects of a health literacy assessment in hospitalized congestive heart failure (CHF) patients and referral rates to an outpatient CHF clinic for specialized care.

Description of Local Problem/Organizational Priority

When a heart failure patient is admitted as an inpatient at Hartford Hospital they can be placed on any unit within the hospital, and not specifically on a cardiology unit. Referrals to the Cardiology Service for consults are not always placed promptly or placed at all. During their inpatient stay, the heart failure patient may not receive specific heart failure education or treatment as they would if they were on a cardiology unit. In addition, upon discharge they are only given general education and information. Many of these patients will not get the follow-up referral to the Center for Advanced Heart Failure & Pulmonary Vascular Disease (also known as the Center). Additionally, the general discharge instructions are basic with a medication chart, activity directions, and follow-up appointments that are not, necessarily, specific to their heart failure. The general education and information are tailored to the diagnosis at the time of admission and not to the individual patient. By not determining the health literacy level of the patients, it can lead to decreased medication adherence and a lack of understanding regarding their diagnosis and follow-up care needed. If patients had been referred sooner, the former situation could have been avoided.

Healthy People 2020 (2020) states that together, heart disease and stroke, along with other cardiovascular disease, are among the most widespread and costly health problems facing the nation today. These diseases account for approximately $320 billion in healthcare expenditures and related expenses annually. Given that they are also among the most preventable diseases, knowing the health literacy level of patients and increasing referral rates to the Center allows for specific and comprehensive education and information planning. Specific and comprehensive education and information should improve patients' adherence to the treatment plans.

Focused Search Question

       In hospitalized heart failure patients (P) does a health literacy assessment before discharge (I) compared to no health literacy assessment (C) affect referral rates to the Center and rates of 30-day readmission (O) over a 60-day period (T)?

Evidence Search

       External Evidence. Based on the literature search (see Appendix B for complete evidence table and Appendix C for complete evidence synthesis table), 9 articles met the inclusion criteria, with four articles identified as Level I, 2 Level II, and 1 Level VI. Five of the nine articles specifically measured the impact of general health literacy levels on 30-day readmission rates in heart failure patients. Seven of the nine articles provided specific evidence on the impact of low health literacy levels and 30-day readmission rates in heart failure patients. Three articles of the nine closely linked self-management interventions with the level of the patient's health literacy. Eight of the nine articles highlighted the fact that health literacy plays a vital role in the management of heart failure patients. A review of these outcomes will be addressed in the evidence appraisal, summary, and recommendations section.

       Internal Evidence. Two sources of evidence from industry organizations (see Appendix B and C) were found through the Mayo Clinic (2018) and the American Heart Association (2020). Both entities provided evidence and recommendations regarding the use of an instrument, such as a questionnaire, to determine the health literacy level of heart failure patients. Incorporating a health literacy assessment in clinical practice can have a profound effect on patients' health and healthcare decisions. To illustrate this point, an evidence review will follow in the next section on evidence appraisal, summary, and recommendations.

Evidence Appraisal, Summary, and Recommendations

Health literacy is a relevant topic for inpatient and outpatient heart failure patients within the Hartford Hospital healthcare network. Utilizing an assessment questionnaire to determine the patient's health literacy level is a quick and easy assessment that can be completed when a heart failure patient is admitted to a medical unit at the hospital. Most assessment questionnaires take less than 5-10 min to complete; they are available in multiple languages and at no cost. Many national healthcare agencies such as the Agency for Healthcare Research and Quality (2021) and the Centers for Disease Control (2021) offer these instruments which can be found online and incorporated into the Epic system for electronic charting. Health literacy instruments can be used with any patient population as part of the intake/admission process in all disciplines and is not specific to one clinical area. Training and education on health literacy and assessment instruments are minimal and can be incorporated into existing educational platforms for new and existing staff.

An evidence review (see Appendix A for the evidence search plan/results, Appendix B for the evidence table, and Appendix C for the evidence synthesis table) found 9 articles supported the practice change of identifying the health literacy level of heart failure patients to improve health outcomes and reduce readmission rates. Five out of the 9 articles were studies that specifically measured health literacy with the use of a 3-question Brief Health literacy tool (Cox, 2017), Short Test of Functional Health Literacy (DeWalt, 2012; Moser, 2015), Brief Screener (Fabbri, 2018), or Demographic questionnaire (Razazi, 2020). The 5 studies collectively found that patients with low health literacy had higher rates of 30-day readmissions, and that low health literacy was associated with an increase in 30-day unplanned healthcare use after discharge in the heart failure population. Patients with inadequate health literacy had almost

a 50% increased risk of hospitalizations compared to with those with adequate health literacy. Inadequate or marginal health literacy was a risk factor for heart failure rehospitalization or all-cause mortality among rural patients with heart failure.

Three studies (DeWalt, 2006; Krumholz, 2002; McCoy, 2007) showed heart failure patients with low health literacy had poor self-management skills and that interventions that improved health literacy improved patients' self-management of their disease. These three studies closely linked self-management interventions with the level of the patient's health literacy. In one study (DeWalt, 2006), intervention patients received education on self-care emphasizing daily weight measurement, diuretic dose self-adjustment, and symptom recognition and response. Picture-based educational materials, a digital scale, and scheduled telephone follow-up were provided to reinforce adherence. Control patients received a generic heart failure brochure and usual care. Primary outcomes were combined hospitalization or death and heart failure-related quality of life. 123 patients (64 control, 59 intervention) participated in the study and 41% had inadequate literacy. Patients in the intervention group had a lower rate of hospitalization or death (crude incidence rate ratio (IRR) = 0.69; 95% confidence interval [CI] = [0.4, 1.2]; adjusted IRR = 0.53; 95% CI= [0.32, 0.89]). This difference was larger for patients with low literacy (IRR = 0.39; 95% CI= [0.16, 0.91]) than for higher literacy (IRR = 0.56; 95%CI = [0.3, 1.04]), but the interaction was not statistically significant. At 12 months, more patients in the intervention group reported monitoring weights daily (79% vs. 29%, p < 0.0001). After adjusting for baseline demographic and treatment differences, there was no difference found in heart failure-related quality of life at 12 months (95% CI= [-5.0, 9.0]).

Another study (Krumholz, 2002) found that formal education and support interventions impacted one-year readmission rate, one-year mortality rate, and costs of care for patients

hospitalized with heart failure. A formal education and support intervention substantially reduced adverse clinical outcomes and costs for patients with HF. Among the 88 patients (44 intervention and 44 control) in the study, 25 patients (56.8%) in the intervention group and 36 patients (81.8%) in the control group had at least one readmission or died during one-year follow-up (relative risk = 0.69, 95% CI = [0.52, 0.92]; p = 0.01). The intervention was associated with a 39% decrease in the total number of readmissions but was not found to be statistically significant (p = 0.06).

The third study (McCoy, 2007) aimed to determine the impact of transitional care interventions on acute health service used by patients with congestive heart failure in primary care and to identify the most effective interventions and their optimal duration. Results showed that the different intensity and duration combinations do in fact have significantly different mean effects on the relative risk of readmission (p = .003). High-intensity interventions continued to be associated with a reduced risk of readmission regardless of their duration, and interventions of moderate intensity seemed to decrease the risk if they lasted longer than 6 months. Neither moderate-intensity, short-duration interventions, nor any of the low-intensity interventions significantly reduced the risk of readmission.

Based on the evidence reviewed, the recommendation is to use a health literacy assessment tool in an inpatient heart failure population to increase referrals to the Center. For this QI study, the *Newest Vital Sign* (NVS) by Pfizer will be the health literacy assessment tool used. The use of the NVS can identify patients that need to receive specific care that the Center can provide. Successful implementation of the NVS can increase the quality of life for heart failure patients that were identified as having low health literacy, and thus decrease the chances for re-hospitalization. Overall, the use of the NVS and referrals to the Center, may reduce morality

rates in HF patients with low health literacy levels. A detail description of the NVS and the implementation plan will be addressed in the Project Planning section.

Chapter 2: Project Plan

Project Goals

1. Increase healthcare staff's awareness of patient's health literacy level (patients with low health literacy are at high-risk for rehospitalization and mortality)

2. Improve referral rates of high-risk heart failure patients (patients with low health literacy levels, scores 0-3) to the Center for Advanced Heart Failure & Pulmonary Vascular Disease for disease management based on their health knowledge needs

3. Compare 30-day readmission rates in high-risk patient (patients with low health literacy) who were referred to the Center versus low-risk patient (patients with high health literacy) who were not referred.

4. Establish a protocol where all heart failure patients are screened for health literacy level and patients with low health literacy scores (0-3) are referred to the Center for Advanced Heart Failure & Pulmonary Vascular Disease

Context

Within the Heart & Vascular Institute, which is part of the Hartford Hospital healthcare network, there are 6-Acute Care locations and 37-Medical Group Locations across the State of Connecticut. This project will take place at Hartford Hospital (the main acute care campus) on CB4 and CB5 (Conklin Building Floors 4 and 5) and one of the outpatient medical groups, called the Center. The Center treats patients with advanced heart failure in the inpatient and outpatient setting. The Center offers a multidisciplinary approach to patient care, to include nursing staff

and physicians, working together as an integrated team to focus on disease management of the heart failure patient.

Project Team Members and Roles

Dawn Surprenant, MSN, RN, DNP Student role is lead PI for the span of the project. Christine Cosgrove, APRN, for the Center role is to serve as Practice Mentor and offer guidance throughout the span of the project. Amy Majewski, RN, Heart Failure Nurse Navigator for the Center role is to assist in identification of potential heart failure patients. Colleen Drake, Data Analyst for the Center role is to provide hospital data.

Key stakeholders and Buy-in

Key stakeholders are the individuals involved in the healthcare system and who are substantially affected by any reforms or changes to the system. The key stakeholders in this project are the patients and the multidisciplinary team at the Center. This multidisciplinary team includes the healthcare providers, the case coordinator, nursing staff, and the Center for Medicare & Medicaid Services (CMS) coordinator. An additional stakeholder also includes the Quality Improvement Team and the Quality Assurance Team at Hartford Hospital.

The multidisciplinary team plays a key role in ensuring that the patients receive adequate healthcare and while managing rising costs of healthcare. The patients also have an ethical responsibility to their own health and controlling healthcare costs as well. In order for the patients to meet their responsibility, they need the tools to do so. Healthcare providers, nursing staff, and the case coordinator all need to work together to provide patients with the tools, such as education about health and disease management, that will allow them to play an active role in their care. The education needs to be at a level that patients can comprehend, or else

communication of the disease management and care will fail. This inevitably will lead to low compliance and disease exacerbation.

If nursing staff use the health literacy assessment tool before patients are discharged from the hospital, they will know patients' health literacy level. The case coordinator, medical, and nursing providers can then use this information to increase referrals to the Center. The referrals will identify high-risk patients that need to be scheduled for appointments at the Center, and then targeted treatment plans for specialized care can be incorporated into their care. Ultimately this could decrease the number of exacerbations patients with heart failure experiences, thus reducing 30-day readmission rates, morbidity, and even death.

The Quality Improvement Team, CMS portion of the Financial Department, and the Quality Assurance Team at Hartford Hospital also have the responsibility to ensure that quality healthcare is provided to all who receive care at the institution, as well as work towards controlling the rising costs of healthcare. These three teams collect data on areas such as readmission rates in order to improve policies and processes within the healthcare institution. The data on readmission rates shows where changes and improvements in the system need to occur, especially when rates are above the national average for rate of readmission. According to Hospital Care Data (2021), the national average for rate of readmission within 30-days is 22%, with Hartford Hospital's rate identified at 23.3%. The ultimate goal is for all of the key stakeholders to work together in this healthcare system.

Chapter 3: Project Design and Methodology

Framework

The model used to guide this project was the Model for Improvement (MFI) as it is the most common model used for Quality Improvement in healthcare. The MFI consists of a rapid cycle process called Plan-Do-Study-Act (PDSA) (Institute for Healthcare Improvement, 2021). The MFI allowed for the construction of the DNP project in relation to the health literacy of heart failure patients. The PDSA framework is what is utilized to guide the goals of the project.

Plan Phase. During the planning phase this DNP student met with the Practice Mentor to discuss the use of the NVS, how it could be implemented in practice, and the value of the project for the Center. Getting started, assembling the team, examining the current approach, identifying potential solutions, and developing an improvement plan were completed.

Do Phase. The Do Phase is where the plan will be tested for improvement through the implementation of the project as outlined during the Plan Phase. The NVS is the health literacy screening tool used during the implementation of the project in order to identify patients with a low health literacy score. If scoring 3 or less the patient will be given a referral to the Nurse Navigator and then offered an appointment at the Center for further evaluation and treatment. Data collected during this phase will be utilized during the Study Phase.

Study Phase. Data collected during the Do Phase will be used to study the results. 30-day readmission rates for patients participating during the Implementation Phase will be reviewed in order to determine the value of the use of the NVS in practice. A summary of key lessons learned will be developed by the DNP Student and used to make changes going forward.

Act Phase. The DNP student will standardize the improvement or develop a new plan as well as establish future plans based upon what is learned in the first PDSA cycle.

Possible Barriers to Implementation

Lack of time and resistance to change may be possible barriers for the clinic staff and providers. Therefore, a change champion and/or subject matter expert will need to continue to actively engage the staff by frequently highlighting the advantages of the quality improvement change, make updates as necessary, and then distribute key evidence. In doing so, the staff may become more motivated to utilize the assessment tool and increase referral rates to the Center for the heart failure patients.

Sustainment

Tracking and then sharing the data on the number of referrals to the Center use of the assessment questionnaire and the number of referrals placed to the Center will assist in showing the implications of the tool and its success in practice. Additionally, revisions to the project will be made as necessary, as well as based off of stakeholder feedback.

Dissemination

The primary goal of disseminating evidence is facilitate the use of evidence-based research into clinical practice or quality improvement projects. Creating and presenting a poster is one professional method of communicating an evidenced based project. The poster contains an abstract of the project, and project data displayed in charts, tables, and figures in order to provide a visual display of the essential components of the project. The poster presentation is an opportunity for the DNP student to present their project in an environment that allows for questions and answers regarding the project, as well as allows for the exchange of information with their peers. The DNP poster will be constructed of the title, authors, affiliation, purpose statement, model, synthesis of evidence, practice change, implementation strategies, evaluation, and conclusion. The poster will also display the NVS screening tool, internal evidence, project

details and findings, as well as implications for practice change. The DNP student will present

their poster to their Professors and Peers at a Poster Presentation scheduled for April 22, 2022.

The DNP student will also present their final project to the Nursing Research Council at Hartford

Healthcare via the monthly Nursing Research Council meeting schedule for July 2022. The final

approved DNP project paper will be submitted to the digital repository for Sacred Heart

University by May 2022 as well as the IRB at Hartford Healthcare by May 2022.

Estimated Timeline

The proposed practice change is to implement the use of a health literacy assessment

questionnaire to all heart failure patients admitted to two inpatient medical units at Hartford

Hospital between October and December 2021. The implementation plan for this practice change

includes the design, setting, and sample. The NVS (Pfizer, 2011) is the chosen questionnaire to

be used in this project, and the ideal sample or number of patients to be screened is 50 patients

over 2-months. Estimated number of patients is based on information obtained from the Case

Coordinator for CB4 and CB5, who stated that an average of 20 to 25 heart failure patients are

admitted to these two units per month.

Previously health literacy screening instruments for health care settings were either too

long for routine use or available only in English. The objective of Weiss, et al., (2005) was to

develop a quick and accurate screening test for limited literacy available in English and Spanish.

Weiss, et al., (2005) administered candidate items for the new instrument and also the Test of

Functional Health Literacy in Adults (TOFHLA) to English-speaking and Spanish-speaking

primary care patients. They measured internal consistency with Cronbach's alpha and assessed

criterion validity by measuring correlations with TOFHLA scores. Using TOFLHA, Weiss and

colleagues created the Newest Vital Sign (NVS). It was found to be reliable (Cronbach alpha

is >0.76 for English and 0.69 for Spanish versions) and correlates with the TOFHLA. The criterion validity is 0.88 for English and 0.72 for Spanish versions. Patients with more than 4 correct responses are unlikely to have low literacy, whereas fewer than 4 correct answers indicate the possibility of limited literacy. Based on the study by Weiss, et al., (2005) the NVS is a suitable instrument for use as a quick screening test for limited literacy in primary health care settings.

The NVS instrument (see Appendix D for complete information on the NVS) was selected for this project based on its creation by Weiss, et al., (2005) and found to be a reliable and valid measure of health literacy in the hospitalized heart failure patient population in a later study (Mock & Sethares, 2019). Mock & Sethares (2019) conducted a study to test-concurrent validity and reliability of the NVS in hospitalized adults with heart failure and found that the NVS was a reliable ($\alpha = 0.70$) and acceptable measure of health literacy in the hospitalized HF population.

The NVS is based on a nutrition label from an ice cream container. The patients will be given the label and then asked 6 questions about it (patients should refer to the label while answering the questions). The questions will be asked orally by the provider and then responses will be recorded by a healthcare provider or researcher on a special score sheet, that contains the correct answers. Based on the number of correct responses, the healthcare provider or researcher can assess the patient's health literacy level. Scoring is 1 point for each question with 6 questions total. A total score of 0-1 suggests high likelihood (50% or more) of limited literacy, a score of 2-3 indicates the possibility of limited literacy, and a score of 4-6 almost always indicates adequate literacy. Any patient who scores 3 or less will be referred to the Center for Advanced

Heart Failure & Pulmonary Disease, a consult will take place, and an appointment scheduled. Any patient who scores 4-6 will not be referred to the center.

If the NVS results do indicate that a patient has limited health literacy skills (scores 3 or less), then a referral to the Center is placed and an appointment is made for the patient to be seen at the Center. If the patient attends the scheduled appointment, then providers will use clear health communication techniques to help patients better understand their medical issues and to follow instructions. Those techniques include using plain language instead of medical terms, ask open-ended questions, use repetition and the "teach-back" method with demonstration, focus on key points, provide basic education, and instruction in the form of written material for reinforcement. The rates of 30-day readmission will be tracked for all of the low-risk and the high-risk patients in order to determine if the referral to the Center has an impact on the high-risk patients, and if the number of 30-day readmissions is the same or comparable to the low-risk patients.

Resources

1. People:
    a. Patients, preceptor, case coordinator, nursing staff, data assistant, and the providers in the clinic.

2. Capital:
    a. Use of the NVS tool is of no cost (Pfizer, 2005). Copies of the NVS tool are expected to be at about 10 cents per page. If 50 patients complete the NVS then overall cost would be about $5.00 with room for additional copies to made. Cost of the PI is $0 as time spent auditing charts and administering the NVS is not billable.

3. Material:

    a. Educational materials related to the project.

Review for Ethical Consideration

Table 3 displays the completed quality improvement tool. Answers to questions 1-11 and 14 are marked yes. For questions 12 and 13 the answers are marked no, indicating that this project meets criteria for a quality improvement project. Therefore, this project does not qualify as human subjects research and did not have to go through the Institutional Review Board at Sacred Heart University but may need to at Hartford Healthcare.

This project has been reviewed and approved to implement by the Nursing Research Council at Hartford Healthcare as well as the Institutional Review Board at Hartford healthcare.

Chapter 4: Implementation, Evaluation, ROI, Outcome, Results

Project Implementation

The DNP project implementation phase began in September 2021 (see Appendix E for complete process implementation). The PI worked with the Data Analyst at HHC within the Center and obtained the referral rate data for September 2021 before the implementation of the Newest Vital Sign (see Appendix D for approval of NVS in the NVS packet) in October 2021. The PI reviewed medical charts (Hartford Healthcare's Epic platform) for patients admitted to CB4 and CB5 for possible heart failure two days per week for nine weeks total. There were 358 patients admitted to CB4 and CB5 between October 1, 2021, and December 3, 2021, that had at least one cardiac diagnosis such as Hypertension, ECG changes, or other cardiac related issues in their chart. After further review of the charts, which included heart failure diagnosis and/or echocardiogram results, it was found that 46 out of the 358 patients ruled in for heart failure or possible heart failure.

Barriers to Implementation

During the nine-week implementation phase there were several barriers encountered that limited the number of patients who could potentially participate in the project. COVID-19 percentage rates at the hospital remained higher than expected, thus all COVID patients were ruled out of the project implementation due to hospital policy. Any patient that was experiencing acute delirium or had a diagnosis of Dementia and/or Alzheimer's were excluded from the study due to concerns with consent to participate. The PI also did not anticipate a high rate of patient declination to participate which reduced the number potential participants for the study. The high number of refusals to participate by patients that were ruled in initially was not expected. This led to a limited number of patients who completed the NVS. It was not immediately understood why the patients were refusing. After discussion with the case coordinator, it was thought that the patients may not have understood what they were being asked to complete. It was also believed the patients were too sick and did not wish to participate in a study while they were in the acute care setting. Lastly, 2 patient deaths reduced the number of potential participants as well.

Data Collection

Throughout the QI study, the PI communicated with Amy Majewski, Nurse Navigator for the Center. Nurse Majewski identified patients who were diagnosed or potentially diagnosed with heart failure daily during the 2-month study period (e.g., October-December 2021). There were 358 total patients admitted to CB4 and CB5 from October thru December 2021 that had a cardiac diagnosis. After reviewing the daily list of potential participants, the PI would conduct a chart review to determine which patients had an actual diagnosis of heart failure or an echocardiogram identifying the patient with heart failure. Forty-six of the 358 patients had a diagnosis of heart failure. The 46 patients or potential study participants were approached and asked to complete the NVS. Twenty-eight patients refused to complete the NVS while 18 patients agreed to. Of the 18, who agreed to participate in the study, 8 patients scored 4-6 on the NVS. They were not referred to the Center because they had a high health literacy level. Ten patients scored 3 or less on the NVS which reflects a low health literacy level, and these patients were referred to the Center. Of the 10 patients who had low health literacy level and a referral to the Center, 7 refused the referral and 2 patients expired before they were given the option. This left only 1 patient who accepted the referral and given an appointment at the Center. The PI also communicated with Colleen Drake, Data Analyst for the Center, during the study to obtain referral rates to the Center one month (September 2021) prior to implementation of study and 30-day readmission rates for all study participants (n=18).

Evaluation

Process Measurement

Study data was recorded and analyzed using Microsoft Excel. There was a total of 18 participants. The rates of low and high health literacy levels are reported in frequency and percentage, refer to Table 8 in the appendices. The rate of referrals to the Center, rates of no-show for appointments, and 30-day readmission are also reported in frequency and percentage, refer to Table 8 in the appendices. Lastly, a visual depiction of all study outcome measures (the sum of 18 who completed the NVS plus the 10 who were eligible for referral to the Center) is presented in a pie chart, refer to Figure 2, Appendix H. Due to lack of participation, there is limited data to assert the effectiveness of the NVS assessment in improving health outcomes in heart failure patients. As a result, it is difficult to determine if the NVS is suitable in practice without further investigation with a continued study.

Outcome Measurements

Eighteen patients out of the 46 heart failure patients agreed to complete the NVS. The NVS was administered, by the PI, to each patient. There were 8 patients that scored between 4-6 and were not referred to the Center. A total of 10 patients scored a 3 or less; they were referred to the Center. The case coordinator was given the names of the patients for referral. The case coordinator contacted each patient to make an appointment with the Center. Seven out of the 10 patients declined to make an appointment, two of the patients expired before an appointment was made. In the end, one patient made an appointment and was seen at the Center. The 30-day readmission rates for all 18 patients that completed the NVS is discussed in the results section. The 30-day readmission rates were reviewed from December 2021 to January 2022

<center>**Results**</center>

One patient out of 10 eligible patients accepted a referral to the Center. This patient was seen at the Center in December 2021 for an evaluation by the Heart Failure Team. This patient became an established patient with the Center and will continue to receive care at the Center. Upon review of readmission rates with Collen Drake, this patient did not have a readmission within 30 days of discharge from the hospital or 30 days after the appointment at the Center.

Seven out of the 10 eligible patients declined a referral to the Center and were not scheduled for appointments. Review of this groups 30-day readmission rates showed none of them were re-hospitalized 30 days after discharge from the inpatient setting. Two of the 10 eligible patients did expire before they were referred.

Eight patients were not eligible for a referral as they scored 4-6 on the NVS. Review of hospital data showed none of these patients had 30-day readmission after hospital discharge.

Return on Investment

It was thought that the use of the questionnaire in practice could potentially increase the identification of patients that may exhibit a low level of health literacy. It was further hypothesized that once the high-risk patients were identified (scores of 0-3) the rates of referrals to the Center would increase. The overall goal of the project was to increase the referrals to the Center to provide higher quality of care and increase patient adherence to treatment plans. Increased adherence would lead to reduced rates of hospital readmissions and, possibly, diminish the number of exacerbations patients might experience. Higher quality of care and patient adherence can lead to a reduction in the overall cost of healthcare for the patient and the healthcare system (ACC, 2020). While there was insufficient data to determine the impact of

using the NVS on referral rates to the Center, there were 10 patients who scored three or less and

had low health literacy. Being able to identify patients who have low health literacy is the first

step in initiating a referral and this step alone was beneficial. There have been studies done by

the American College of Cardiology (2020), American Heart Association (2018), and the

Centers for Disease Control and Prevention (2021) that have shown the effectiveness of

evaluating health literacy of heart failure patients to lead to better health outcomes in this patient

population. Overall, there were zero 30-day readmissions to the hospital among the 18 patients

who completed the NVS, which make it unknown if the use of the NVS and/or referral to the

center had an impact on this variable.

Chapter 5: Dissemination Plan

Implications of Project Results to Organization and Practice and Community

Conducting the chart reviews on CB4 and CB5, to extract patients with a heart failure

diagnosis or a potential heart failure diagnosis, showed there is a need to determine what patients

need further cardiac consultations to include a health literacy assessment. The Center had been

previously working with a Nurse Navigator to increase the referral rates of heart failure patients

admitted to CB4 and CB5. Conducting chart reviews and administering a tool like the NVS truly

highlighted the increased number of heart failure patients admitted to these Units. Heart failure

patients need increased education and care such as daily weights and diet education to include

fluid limitations and sodium reduction. When these heart failure patients are admitted to the

hospital for a diagnosis other than heart failure, they may not get the additional care they require.

If CB4 and CB5 can implement a health literacy assessment upon admission to be conducted by

the admitting nurse on these units, then there is a higher chance that a health assessment score

can be used for referrals sooner. Use of the NVS in practice could then potentially lead to faster

referrals to the Clinic for more specific and targeted heart failure treatment after the patient is discharged. This in turn could lead to reduced rates of exacerbations and readmissions.

Key Lessons Learned

There were several key lessons learned throughout this project. The first key lesson was that there were many patients who were diagnosed with heart failure but did not know or understand they had this diagnosis. While conducting chart reviews, it was determined that many patients had echocardiograms with the diagnosis of heart failure from past medical visits or from a current visit. However, the diagnosis of heart failure was not in the chart or told to the patient. This made it difficult for the PI to approach the patient and ask the patient to participate in a study regarding heart failure. Approaching a patient to participate in a study regarding a known diagnosis can be a sensitive ask but approaching a patient to participate in a study about a diagnosis the patient did not know the patient had is controversial.

The second key lesson was that the PI did not anticipate the large number of refusals to complete the NVS. The act of completing the NVS was optional for all potential participants, and at any time they could opt out of participating or simply chose not to. The limited number of patients that were selected as potential participants were based on the criteria of having heart failure and being admitted to CB4 and CB5.

The third key lesson learned was that this project should have been implemented with the help of the nursing staff and not just the PI. There may be more potential overall for patient participation if the assigned nurse at admission completes the one-time screening tool at the beginning of the admission rather than when the patient has on the unit for an extended period of time, and/or acutely ill. Each staff nurse on CB4 and CB5 could have been given education on the use of the NVS, and then taught how to utilize the NVS during the admission process for the

patient. This in turn may have increased participation of potential patients and referrals to the Center. If the NVS assessment and brief discussion about the study was given during their admission, the process may be less burdensome to the patient. The lack of participation may have been due to the current COVID pandemic and/or patient's not wishing to receive additional care at the Center. Patients may have many reasons to refuse participation, and this may include but are not limited to financial concerns, fear, misinformation, and personal values and beliefs regarding healthcare (CDC, 2021). Patient participation could lead to overall improved health outcomes, and delivery of more appropriate and cost-effective care, but engaging the patient is the first obstacle to overcome (Friel, 2016).

The fourth key lesson learned was that it is often in how one approaches the patient and also how you explain the reasoning behind the importance of the study being conducted. The PI is a novice at implementing a QI study. As a result, the PI may not have approached the patients or explained the study details effectively to increase participation. There is a possibility that more patients may have been inclined to participate if the PI had a staff member to assist. Another possibility is that the PI was not able to be on the units daily to assist the staff during the admission process, at which time the NVS could have been administered concurrently when the patient was being admitted to the unit. This approach could have possibly allowed the patient to participate without feeling burdened by another healthcare member while in the acute setting.

After several discussions with the Project Preceptor and Case Coordinator, it was determined that the use of the NVS in the inpatient setting on CB4 and CB5 maybe more beneficial if the admitting nurse is the one to administer the NVS at the time of the patient's admission to CB4 and CB5. This change could possibly reduce the number of refusals from patients and therefore increase the number of patients referred to the Center.

Sustainability Plan

Lack of time and resistance to change will be the largest barriers for utilizing the Staff Nurses to implement the NVS on the inpatient units CB4 and CB5 in the future. A change champion and/or subject matter expert will be necessary to educate the staff on the use of the NVS and how to implement it when a patient is admitted. According to Toney-Butler & Unison-Pace (2021), the initial nursing assessment, the first step in the five steps of the nursing process, involves the systematic and continuous collection of data; sorting, analyzing, and organizing that data; and the documentation and communication of the data collected. Critical thinking skills applied during the nursing process provide a decision-making framework to develop and guide a plan of care for the patient incorporating evidence-based practice concepts. This concept of precision education to tailor care based on an individual's unique cultural, spiritual, and physical needs, rather than a trial by error, one size fits all approach results in a more favorable outcome (Toney-Butler & Unison-Pace, 2021).

In conclusion, actively engaging the staff by frequently highlighting the advantages of the quality improvement change, making updates based on input from the staff nurses, and then distributing key evidence will be necessary. In doing so, the staff may become more motivated to utilize the assessment tool during the admission process, thus increasing referral rates of heart failure patients to the Center. Tracking and then sharing the data on the number of referrals to the Center through the use of the assessment questionnaire will assist in showing the implications of the tool and its success in practice.

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Appendix A

Evidence Search Plan/Results

1. In newly diagnosed Heart Failure Patients (P) how effective is the use of a comprehensive discharge plan to include medication education based on health literacy level (I) compared to a general discharge plan (C) in reducing readmissions for exacerbation of symptoms (O) within 6 months of diagnosis (T)?

2. The levels of evidence that best answers this PICOT question is Level 1 to include Systematic Reviews & Meta-analysis of RCT's and Evidence-based Clinical Practice Guidelines; Level 4 to include Case-control or Cohort Studies; and Level 5 to include Systematic Review of Descriptive and Qualitative studies.

3. Relevant databases to search: Cochrane Database of Systematic Reviews, CINAHL, and Medline.

4. Keywords from PICO question to search the databases: Heart Failure; Comprehensive Discharge Plan; Medication Education; Health Literacy; Health Literacy Level; General Discharge Plan; Readmission rates; Exacerbation of symptoms; and adherence.

5. Defining parameters: English; Adults (ages 18+); published between 2015 – 2020; outpatient; and located in the United States.

6. Inclusion Criteria for article selection: heart failure; discharge plans; medication education; and health literacy level.

Table 1. Search Terms and Search Results by CINAHL.

Search Terms	Number of hits	Number of title & abstract reviewed	Number of full-text articles reviewed	Number of articles selected for this review without duplicates
Heart Failure	82	82	4	0
Heart Failure and Discharge Plans	30	30	2	0
Heart Failure and Medication Education	27	27	3	0
Heart Failure and Health Literacy	48	48	5	5
Heart Failure and Health Literacy Level	1	1	1	1
Heart Failure and Readmission rates	30	30	5	3
Heart Failure and Exacerbation	7	7	3	2
Heart Failure and Adherence	26	26	3	2

Table 2. Search Terms and Search Results by Cochrane

Search Terms	Number of hits	Number of title & abstract reviewed	Number of full-text articles reviewed	Number of articles selected for this review without duplicates
Heart Failure	42	42	4	1
Heart Failure and Discharge Plans	0	0	0	0
Heart Failure and Medication Education	0	0	0	0
Heart Failure and Health Literacy	0	0	0	0
Heart Failure and Health Literacy Level	0	0	0	0
Heart Failure and Readmission rates	2	2	0	0
Heart Failure and Exacerbation	1	1	0	0
Heart Failure and adherence	1	1	0	0

Table 3. Search Terms and Search Results by Medline

Search Terms	Number of hits	Number of title & abstract reviewed	Number of full-text articles reviewed	Number of articles selected for this review without duplicates
Heart Failure	24,747	0	0	0
Heart Failure and Discharge Plans	230	230	8	8
Heart Failure and Medication Education	25	25	25	6
Heart Failure and Health Literacy	56	56	12	6
Heart Failure and Health Literacy Level	6	6	4	4
Heart Failure and Readmission rates	589	589	112	22
Heart Failure and Exacerbation	351	351	84	16
Heart Failure and adherence	665	665	116	16

Table 4. Evidence Table

Article number	First author year	Purpose	Evidence type, level of evidence	Sample, setting	Major Variables Study and their Definitions	How major variables were measured	Findings that help answer question	Worth to practice/project, quality of evidence
1.	Cox (2017)	To assess 30-day readmissions and emergency department visits based on health literacy.	Prospective observational cohort study. Level VI.	264 patients in a large quaternary health system.	Health Literacy: the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions.	3-question Brief Health Literacy Screen to assess HL: 5-point Likert scale for each of the three questions. Total score between 3 and 15.	Low health literacy was associated with increased 30-day unplanned healthcare use after discharge in the heart failure population. Of the 264 patients 175 were considered of adequate HL and 89 were low HL.	Using a short, 3-question validated survey instrument, it was demonstrated that low health literacy was associated with increased 30-day unplanned healthcare use after discharge in this heart failure population. These results provide a clinically useful, easily

Article number	First author year	Purpose	Evidence type, level of evidence	Sample, setting	Major Variables Study and their Definitions	How major variables were measured	Findings that help answer question	Worth to practice/project, quality of evidence
						Adequate health literacy was a score of greater than 9.		incorporated tool that could identify high-risk patients at need for clinical interventions.
2.	DeWalt (2006)	Compared the efficacy of a heart failure self-management program designed for patients with low literacy versus usual care.	Randomized Control Trial. Level II.	123 outpatient heart failure patients (64 control, 59 intervention) over a 2-year period.	Death: the end of life of a person or organism.

All-cause Readmission: total number of admissions due to heart failure during a specific time period.

Heart failure-related quality of life: physical and emotional symptoms and the limitation on the patients daily physical and social activities. | Intervention patients received education on self-care emphasizing daily weight measurement, diuretic dose self-adjustment, and | 123 patients (64 control, 59 intervention) participated; 41% had inadequate literacy. Patients in the intervention group had a lower rate of hospitalization or death (crude incidence rate ratio (IRR) = 0.69; CI 0.4, 1.2; adjusted IRR = 0.53; CI 0.32, 0.89). | A primary care-based heart failure self-management program designed for patients with low literacy reduces the risk of hospitalizations or death. |

Article number	First author year	Purpose	Evidence type, level of evidence	Sample, setting	Major Variables Study and their Definitions	How major variables were measured	Findings that help answer question	Worth to practice/project, quality of evidence
						symptom recognition and response. Picture-based educational materials, a digital scale, and scheduled telephone follow-up were provided to reinforce adherence. Control	This difference was larger for patients with low literacy (IRR = 0.39; CI 0.16, 0.91) than for higher literacy (IRR = 0.56; CI 0.3, 1.04), but the interaction was not statistically significant. At 12 months, more patients in the intervention group reported monitoring weights daily (79% vs. 29%, p < 0.0001). After adjusting for baseline demographic and treatment	

Article number	First author year	Purpose	Evidence type, level of evidence	Sample, setting	Major Variables Study and their Definitions	How major variables were measured	Findings that help answer question	Worth to practice/project, quality of evidence
						patients received a generic heart failure brochure and usual care. Primary outcomes were combined hospitalization or death, and heart failure-related quality of life.	differences, we found no difference in heart failure-related quality of life at 12 months (difference = -2; CI -5, +9).	
3.	DeWalt (2012)	Self-care training can	Randomized, controlled	605 patients with HF over	Health Literacy: the degree to which individuals have the	Literacy was	Of the 605 patients	The design of self-care interventio

Article number	First author year	Purpose	Evidence type, level of evidence	Sample, setting	Major Variables Study and their Definitions	How major variables were measured	Findings that help answer question	Worth to practice/pr oject, quality of evidence
		reduce hospitalizatio n for heart failure (HF), and more intensive intervention may benefit more vulnerable patients, including those with low literacy.	comparative effectivenes s trial. Level II.	a 2-year period.	capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions. HF Knowledge: knowledge of the disease.	measur ed with the reading compre hension passage s of the Short test of Functio nal Health Literac y in Adults (S-TOFHL A) in either English or Spanish . The S-TOFHL A is a 36-item, 7-minute	studied: 225 had inadequate literacy and 380 had adequate literacy.	ns should take into account the needs of the patient in regard to prior knowledge and skills, the design of the educational materials, and the delivery and reinforcem ent of information provided.

Article number	First author year	Purpose	Evidence type, level of evidence	Sample, setting	Major Variables Study and their Definitions	How major variables were measured	Findings that help answer question	Worth to practice/project, quality of evidence
						timed test of reading comprehension and is a reliable, validated measure of literacy in the healthcare context. Each participant's literacy level was categorized as either inadequate/marginal		

Article number	First author year	Purpose	Evidence type, level of evidence	Sample, setting	Major Variables Study and their Definitions	How major variables were measured	Findings that help answer question	Worth to practice/project, quality of evidence
						(0–22 correct answers), which we refer to as "low literacy," or adequate literacy (23–36 correct). HFQOL was assessed at baseline with the validated Improving Chronic Illness		

Article number	First author year	Purpose	Evidence type, level of evidence	Sample, setting	Major Variables Study and their Definitions	How major variables were measured	Findings that help answer question	Worth to practice/project, quality of evidence
						Care Evaluation Heart Failure Symptom Scale. The Heart Failure Symptom Scale consists of 7 questions about health during the previous 4 weeks with a 5-point response scale; scores		

Article number	First author year	Purpose	Evidence type, level of evidence	Sample, setting	Major Variables Study and their Definitions	How major variables were measured	Findings that help answer question	Worth to practice/project, quality of evidence
						were transformed to a 100-point scale, with 100 representing the least possible symptoms/best health. In our analyses, a difference of 14 points on the 0 to 100 scale is roughly equivalent to a		

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Article number	First author year	Purpose	Evidence type, level of evidence	Sample, setting	Major Variables Study and their Definitions	How major variables were measured	Findings that help answer question	Worth to practice/project, quality of evidence
						difference in 1 level of New York Heart Association classification.		
4.	Fabbri (2018)	Examine the impact of health literacy on hospitalizations and death in a population of patients with heart failure.	Level I.	2487 Heart Failure Patients over about a 2-year period.	Health Literacy: degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions.	HL was measured as a composite score on three 5-point scales. Adequate was greater than or equal to 8 and low	Data showed that of the 2487 patients 261 had low health literacy. Patients with inadequate health literacy had almost a 50% increased risk of	The brief screener is a simple, efficient, and reliable tool to evaluate health literacy. May possibly identify patients at higher risk for poor outcomes.

Article number	First author year	Purpose	Evidence type, level of evidence	Sample, setting	Major Variables Study and their Definitions	How major variables were measured	Findings that help answer question	Worth to practice/project, quality of evidence
						was less than 8. Death rates and hospitalization rates were 250 deaths and 1584 hospitalizations.	hospitalizations compared to with those with adequate health literacy.	
5.	Friel (2016)	Low health literacy has a significant impact on the ability of HF patients and their caregivers to successfully manage chronic	Systematic Review. Level I	Eight studies published between 2002 and 2012.	Health literacy: the degree to which individuals can obtain, process and understand the basic health information and services they need to make appropriate health decisions. Intervention: action taken to improve a situation. Can be simple or complex.	Critical appraisal of the evidence.	4 of the 8 articles resulted in evidence regarding reduced hospitalization and readmission rates.	Provided more evidence from the literature.

Article number	First author year	Purpose	Evidence type, level of evidence	Sample, setting	Major Variables Study and their Definitions	How major variables were measured	Findings that help answer question	Worth to practice/project, quality of evidence
		disease via self-care behaviors.			Health Improved Outcome: changes in health that result from measures or specific health care investments or interventions.			
6.	Krumholz (2002)	Determine the effect of a targeted education and support intervention on the rate of readmission or death and hospital costs in patients with heart failure.	RCT Level II.	88 outpatient heart failure patients.	Intervention: action taken to improve a situation. Can be simple or complex.	Formal education and support intervention on one-year readmission or mortality and costs of care for patients hospitalized with HF.	Among the 88 patients (44 intervention and 44 control) in the study, 25 patients (56.8%) in the intervention group and 36 patients (81.8%) in the control group had at least one readmission or died during one-year follow-up (relative risk = 0.69, 95% confidence	A formal education and support intervention substantially reduced adverse clinical outcomes and costs for patients with HF.

Article number	First author year	Purpose	Evidence type, level of evidence	Sample, setting	Major Variables Study and their Definitions	How major variables were measured	Findings that help answer question	Worth to practice/project, quality of evidence
							interval [CI]: 0.52, 0.92; p = 0.01). The intervention was associated with a 39% decrease in the total number of readmissions (intervention group: 49 readmissions; control group: 80 readmissions, p = 0.06).	
7.	McCoy (2007)	Aimed to determine the impact of transitional care interventions (TCIs) on acute health service use by patients with congestive	Systematic review and meta-analysis of randomized controlled trials. Descriptive Level VI.	Searching the Medline, PsycInfo, EMBASE, and Cochrane Library databases. Performed a meta-analysis to assess the	Classification System for Intensity of Transitional Care Interventions: Low Structured telephone follow-up without home visits or Periodic follow-up in an outpatient clinic	The meta-analysis showed a significant 29% reduction in the risk of ED	We identified 41 randomized controlled trials. TCIs significantly reduced risks of readmission and ED visits by 8% and 29%, respectively (relative risk	

Article number	First author year	Purpose	Evidence type, level of evidence	Sample, setting	Major Variables Study and their Definitions		How major variables were measured	Findings that help answer question	Worth to practice/project, quality of evidence
		heart failure in primary care and to identify the most effective TCIs and their optimal duration.		impact of TCI on all–cause hospital readmissions and emergency department (ED) visits.	Moderate	without home visits	visits for TCI as compared with usual care (RR = 0.71; 95% CI, 0.52–0.98). The number needed to treat was 9, meaning that 9 patients had to receive the TCI for 1 patient to benefit (1 less	= 0.92; 95% CI, 0.87–0.98; *P* = .006 and relative risk = 0.71; 95% CI, 0.51–0.98; *P* = .04). High-intensity TCIs (combining home visits with telephone follow-up, clinic visits, or both) reduced readmission risk regardless of the duration of follow-up. Moderate-intensity TCIs were efficacious if implemented for a longer duration (at least 6 months). In contrast, low-intensity TCIs,	
						Home visits only or A combination of telephone follow-up with periodic follow-up in a clinic without home visits or Telecare (a specific type of intervention involving the transfer of patient vital signs, such as electrocardiogram, blood pressure, weight, via digital cable) without prearranged direct contact with patients			

Article number	First author year	Purpose	Evidence type, level of evidence	Sample, setting	Major Variables Study and their Definitions		How major variables were measured	Findings that help answer question	Worth to practice/project, quality of evidence
					High	A combination of home visits with other types of follow-up (telephone and/or clinic follow-up) or Telecare combined with prearranged direct contact with patients (eg, home visits, telephone follow-up, video visits)	ED visit to occur). Results showed that the different intensity and duration combinations do in fact have significantly different mean effects on the relative risk of readmission ($P = .003$).	entailing only follow-up in outpatient clinics or telephone follow-up, were not efficacious.	

Article number	First author year	Purpose	Evidence type, level of evidence	Sample, setting	Major Variables Study and their Definitions	How major variables were measured	Findings that help answer question	Worth to practice/project, quality of evidence
						High-intensity interventions continued to be associated with a reduced risk of readmission regardless of their duration, and interventions of moderate intensity seemed to decreas		

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Article number	First author year	Purpose	Evidence type, level of evidence	Sample, setting	Major Variables Study and their Definitions	How major variables were measured	Findings that help answer question	Worth to practice/project, quality of evidence
						e the risk if they lasted longer than 6 months. Neither moderate-intensity, short-duration interventions, nor any of the low-intensity interventions significantly reduced the risk of		

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Article number	First author year	Purpose	Evidence type, level of evidence	Sample, setting	Major Variables Study and their Definitions	How major variables were measured	Findings that help answer question	Worth to practice/pr oject, quality of evidence
						readmis sion.		
8.	Moser (2015)	Examine the association of health literacy with the composite end point of heart failure readmission rates and all-cause mortality in patients with heart failure living in rural areas.	RCT Level I.	575 rural adults hospitalized for heart failure within past 6 months. Followed for greater than or equal to 2 years to determine the number of re-hospitalizatio ns or all-cause death.	Health Literacy: degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions. Comorbidity Burden: number of additional diseases or illnesses on top of heart failure diagnosis. Depression: mood disorder that can cause persistent feeling of sadness and loss of interest.	Short Test of Functio nal Health Literac y in Adults Patients : 36 item tests in which patients are scored on number of correct items in 7 minutes . Total scores are 0-36 with	Inadequate or marginal health literacy is a risk factor for heart failure rehospitaliz ation or all-cause mortality among rural patients with heart failure. Of the 575 patients with Inadequate Health Literacy (score 0-16) 44 were rehospitalia zed for heat	A brief standardize d reliable and valid instrument to assess health literacy can measure marginal or inadequate health literacy levels.

Article number	First author year	Purpose	Evidence type, level of evidence	Sample, setting	Major Variables Study and their Definitions	How major variables were measured	Findings that help answer question	Worth to practice/project, quality of evidence
						adequate health literacy scored 23 to 36. Charlson Comorbidity Index to assess comorbidity burden: weighted for severity of comorbidity and then computed as a total score.	failure, 17 suffered all-cause deaths, and 49 did not experience the endpoint (HF rehospitalization or death).	

Article number	First author year	Purpose	Evidence type, level of evidence	Sample, setting	Major Variables Study and their Definitions	How major variables were measured	Findings that help answer question	Worth to practice/project, quality of evidence
						Patient Health Questionnaire to screen for depression: 9 item screening for 9 symptoms of depression. 4-point Likert scale used with total scores 0-27. Higher scores reflect more severe		

Article number	First author year	Purpose	Evidence type, level of evidence	Sample, setting	Major Variables Study and their Definitions	How major variables were measured	Findings that help answer question	Worth to practice/project, quality of evidence
						depressive symptoms.		
9.	Razazi (2020)	To determine the relationship between health literacy and knowledge of HF	Cross-sectional study. Level VI	Convenient sampling: 238 patients studied.	Health Literacy: degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions. HF Knowledge: knowledge of the disease.	Demographic questionnaire: nine questions related to personal and social data and clinical information. Short-test of functional health literacy in adults:	165 of the 238 patients had appropriate health literacy. 126 of the 238 patients had adequate heart failure knowledge. Significant relationship between health literacy and age (p<0.001), education level (p<0.001),	The higher the health literacy of the people may lead to the higher their knowledge and awareness about HF and better understanding the recommendations regarding their illness.

Article number	First author year	Purpose	Evidence type, level of evidence	Sample, setting	Major Variables Study and their Definitions	How major variables were measured	Findings that help answer question	Worth to practice/project, quality of evidence
						16 questions that measures HL through a 4-point Likert scale. Scores are 0-64 in total and score of 48 to 64 is sufficient health literacy, 32 to 48 is borderline, and 0 to 32 is	and marital status (p<0.016). Significant relationship between level of knowledge about HF and age (p<0.001) and education level (p<0.001). No significant relationship was found between the level of health literacy and knowledge with other demographic data and clinical variable	

Article number	First author year	Purpose	Evidence type, level of evidence	Sample, setting	Major Variables Study and their Definitions	How major variables were measured	Findings that help answer question	Worth to practice/project, quality of evidence
						inadequate. Knowledge about HF questionnaire: 15 questions with a score of 0 to 15, with 0 to 7 indicates lack of awareness and 8 to 15 is complete knowledge.	(p>0.05).	

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Evidence Synthesis

Table 5. Outcomes Synthesis Table: Impact of health literacy on 30-day readmission rates in

heart failure patients.

Article Number	1 N=264	2 N=123	3 N=605	4 N=2487	5 N=0	6 N= 88	7 N=0	8 N=575	9 N=238
Adequate Health Literacy	↓	↓	↓	↓	↓	NE	NE	↓	↓
Low Health Literacy	↑	↑	↑	↑	↑	NE	NE	↑	↑
Adequate Heart Failure Knowledge	NE	NE	↓	NE	NE	NE	NE	NE	↓
Low Heart Failure Knowledge	NE	NE	↑	NE	NE	NE	NE	NE	↑
Adequate Self-Care	NE	NE	↓	NE	NE	NE	NE	NE	NE
Low Self-Care	NE	NE	↑	NE	NE	NE	NE	NE	NE
Interventions	NE	NE	NE	NE	↓	↓	↓	NE	NE

N = Sample Size
NE = Not Examined

↑	= Increased impact on readmission rates (higher rate of readmissions)
↓	= Decreased impact on readmission rates (lower rate of readmissions)

Table 6. Level of Evidence Synthesis Table

Article Number	1	2	3	4	5	6	7	8	9
Level I: Systematic review or meta-analysis	X			X	X			X	
Level II: Randomized controlled trial		X	X			X			
Level III: Controlled trial without randomization									
Level IV: Case-control or cohort study									
Level V: Systematic review of qualitative or descriptive studies									
Level VI: Qualitative or descriptive study, CPG, Lit Review, QI or EBP project							X		X
Level VII: Expert opinion									

Appendix D

Dear Healthcare Professional:

Thank you for your interest in the Newest Vital Sign (NVS), the first tool available to assess health literacy in English and Spanish.

Research shows that patients with low health literacy are less likely to comply with prescribed treatment and medical instructions from their physician. Identifying patients who are at risk for low health literacy allows physicians to apply specific clear health communication techniques that may enhance understanding. The Newest Vital Sign is a simple and fast way to identify those patients. The tool, which tests literacy skills for both numbers and words*, has been validated against a previously validated measure of health literacy (the TOFHLA), and has been shown to take approximately three minutes to administer.

In addition to the NVS tool, we are also including information to help enhance patient-provider communication. In this folder you will find the following materials:

- NVS Tool (nutrition label and scoring sheet tear-off pad, both two-sided in English/Spanish)
- NVS Implemenation Guide
- *Ask Me 3* (fact sheet on free educational materials from the non-profit Partnership for Clear Health Communication)
- *Help Your Patients Succeed* (tips for improving communication with your patients)
- *Why Does An Ice Cream Label Work* . . . (fact sheet explaining the design of the NVS)

The Newest Vital Sign is Pfizer Inc's most recent contribution to the health literacy movement. For more than nine years, Pfizer has been committed to raising awareness of developing solutions for low health literacy. The overall goal of our Clear Health Communication Initiative is to positively impact the health care system by enhancing patient-provider communication to increase compliance and improve patient health outcomes.

The Newest Vital Sign and companion materials are available to medical and public health providers at no cost. To learn more about our efforts to improve health literacy, please visit www.pfizerhealthliteracy.com.

Sincerely,

Richard C. Hubbard, M.D.
Senior Director, External Medical Affairs
Pfizer Inc

*Literacy is defined as the understanding and application of words (prose), numbers (numeracy), and forms, etc. (document).

Implementation Guide for the Newest Vital Sign

Health literacy— the ability to read, understand and act upon health information — is now known to be vital to good patient care and positive health outcomes. According to the Institute of Medicine's groundbreaking report on health literacy, nearly half of all American adults — 90 million people — have difficulty understanding and using health information. When patients lack the ability to understand and act upon medical information, it can put their health at risk.

The Newest Vital Sign is a new tool designed to quickly and simply assess a patient's health literacy skills. It can be administered in only 3 minutes and is available in English and Spanish. The patient is given a specially designed ice cream nutrition label to review and is asked a series of questions about it. Based on the number of correct answers, health care providers can assess the patient's health literacy level and adjust the way they communicate to ensure patient understanding.

There are many ways to integrate the Newest Vital Sign (NVS) into a private practice or clinic setting to improve communication with patients. Improved communication can help increase your patients' ability to understand and act upon the information you provide; ultimately improving patient satisfaction and health outcomes.

How To Use the Newest Vital Sign

1. **Who and when to administer the Newest Vital Sign.**
   - **A nurse (or other trained clinic staff)** is the preferred administrator of the Newest Vital Sign.
   - Administer at the same time that other vital signs are being taken.
2. **Ask the patient to participate.**
   A useful way to ask the patient is an explanation similar to this:
   > *"We are asking our patients to help us learn how well patients can understand the medical information that doctors give them. Would you be willing to help us by looking at some health information and then answering a few questions about that information? Your answers will help our doctors learn how to provide medical information in ways that patients will understand. It will only take about 3 minutes."*
3. **Hand the nutrition label to the patient.**
   The patient can and should retain the nutrition label throughout administration of the Newest Vital Sign. The patient can refer to the label as often as desired.

More...

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4. **Start Asking the 6 questions, one by one, giving the patient as much time as needed to refer to the nutrition label to answer the questions.**
   - There is no maximum time allowed to answer the questions. The average time needed to complete all 6 questions is about 3 minutes. However, if a patient is still struggling with the first or second question after 2 or 3 minutes, the likelihood is that the patient has limited literacy and you can stop the assessment.
   - **Ask the questions in sequence.** Continue even if the patient gets the first few questions wrong. However, **if question 5 is answered incorrectly, do not ask question 6.**
   - **You can stop asking questions if a patient gets the first four correct.** With four correct responses, the patient almost certainly has adequate literacy.
   - **Do not prompt patients who are unable to answer a question.** Prompting may jeopardize the accuracy of the test. Just say, "Well, then let's go on to the next question."
   - **Do not show the score sheet to patients.** If they ask to see it, tell them that "I can't show it to you because it contains the answers, and showing you the answers spoils the whole point of asking you the questions."
   - **Do not tell patients if they have answered correctly or incorrectly.** If patients ask, say something like: "I can't show you the answers till you are finished, but for now you are doing fine. Now let's go on to the next question."
5. **Score by giving 1 point for each correct answer (maximum 6 points).**
   - **Score of 0-1** suggests high likelihood (50% or more) of limited literacy.
   - **Score of 2-3** indicates the possibility of limited literacy.
   - **Score of 4-6** almost always indicates adequate literacy.

Record the NVS score in the patient's medical record, preferably near other vital sign measures.

Best Practices for Implementation: Summary
- A nurse (or other trained clinic staff) is the preferred administrator of the Newest Vital Sign.
- Administer the NVS at the same time that the patient's other vital signs are being taken.
- Record the NVS score in the patient's chart, preferably near other vital sign measures.
- Tailor communication to ensure patient understanding.

**Why Does an Ice Cream Label Work as a Predictor
of the Ability To Understand Medical Instructions?**

A patient's ability to read and analyze any kind of nutrition label requires the same analytical and conceptual skills that are needed to understand and follow a provider's medical instructions. The skills, which are known as *health literacy,* are defined as the understanding and application of words (prose), numbers (numeracy), and forms (documents).

The use of an ice cream label is especially relevant as recent research in the *American Journal of Preventive Medicine* (November 2006) has shown that poor comprehension of food labels correlated highly with low-level literacy and numeracy skills. However, the study found that even patients with better reading skills could have difficulties interpreting the labels.

Whether reading a food label or following medical instructions, patients need to:

- remember numbers and make mathematical calculations.
- identify and be mindful of different ingredients that could be potentially harmful to them.
- make decisions about their actions based on the given information.

PROSE LITERACY:
Clinical example: The patient has scheduled some blood tests and is instructed in writing to fast the night before the tests. The skill needed to follow this instruction is **Prose Literacy.**

Ice cream label example: The patient needs this skill to read the label and determine if he can eat the ice cream if he is allergic to peanuts.

NUMERACY:
Clinical example: A patient is given a prescription for a new medication that needs to be taken at a certain dosage twice a day. The skill needed to take the medication properly is **Numeracy.**

Ice cream label example: The patient needs this same skill to calculate how many calories are in a serving of ice cream.

DOCUMENT LITERACY:
Clinical example: The patient is told to buy a glucose meter and use it 30 minutes before each meal and before going to bed. If the number is higher than 200, he should call the office. The skill needed to follow this instruction is **Document Literacy.**

Ice cream label example: The patient needs this skill to identify the amount of saturated fat in a serving of ice cream and how it will affect his daily diet if he doesn't eat it.

Nutrition Facts

Serving Size   ½ cup
Servings per container   4

Amount per serving

Calories   250   Fat Cal   120

	%DV
Total Fat 13g	20%
Sat Fat 9g	40%
Cholesterol 28mg	12%
Sodium 55mg	2%
Total Carbohydrate 30g	12%
Dietary Fiber 2g	
Sugars 23g	
Protein 4g	8%

*Percentage Daily Values (DV) are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.

Ingredients: Cream, Skim Milk, Liquid Sugar, Water, Egg Yolks, Brown Sugar, Milkfat, Peanut Oil, Sugar, Butter, Salt, Carrageenan, Vanilla Extract.

The Newest Vital Sign™

A Health Literacy Assessment Tool

Score Sheet for the Newest Vital Sign
Questions and Answers

READ TO SUBJECT:
This information is on the back of a container of a pint of ice cream.

	ANSWER CORRECT?	
	yes	**no**

1. If you eat the entire container, how many calories will you eat?
   Answer: 1,000 is the only correct answer

2. If you are allowed to eat 60 grams of carbohydrates as a snack, how much ice cream could you have?
   Answer: Any of the following is correct: 1 cup (or any amount up to 1 cup), half the container. Note: If patient answers "two servings," ask "How much ice cream would that be if you were to measure it into a bowl?"

3. Your doctor advises you to reduce the amount of saturated fat in your diet. You usually have 42 g of saturated fat each day, which includes one serving of ice cream. If you stop eating ice cream, how many grams of saturated fat would you be consuming each day?
   Answer: 33 is the only correct answer

4. If you usually eat 2,500 calories in a day, what percentage of your daily value of calories will you be eating if you eat one serving?
   Answer: 10% is the only correct answer

READ TO SUBJECT:
Pretend that you are allergic to the following substances: penicillin, peanuts, latex gloves, and bee stings.

5. Is it safe for you to eat this ice cream?
   Answer: No

6. (Ask only if the patient responds "no" to question 5): Why not?
   Answer: Because it has peanut oil.

Number of correct answers:

Interpretation
Score of 0-1 suggests high likelihood (50% or more) of limited literacy.
Score of 2-3 indicates the possibility of limited literacy.
Score of 4-6 almost always indicates adequate literacy.

Información Nutricional

Tamaño de la Porción		½ taza
Porciones por envase		4

Cantidad por porción

Calorías	250	Cal Grasa	120

	%DV
Grasa Total 13g	20%
Grasas Sat 9g	40%
Colesterol 28mg	12%
Sodio 55mg	2%
Total Carbohidratos 30g	12%
Fibras Dietéticas 2g	
Azúcares 23g	
Proteína 4g	8%

*Porcentaje de Valores Diarios (DV) se basan en una dieta de 2.000 calorías. Sus valores diarios pueden ser mayores o menores dependiendo de las calorías que usted necesite.

Ingredientes: Crema, Leche Descremada, Azúcar Líquida, Agua, Yemas de Huevo, Azúcar Morena, Aceite de Cacahuate (Maní), Azúcar, Mantequilla, Sal, Carragenina, Extracto de Vainilla.

Hoja de Resultados para el Nuevo Signo Vital
Preguntas y Respuestas

LEA AL PACIENTE:

Esta información aparece en el reverso de un envase de helado.

1. Si usted se come todo el helado en el envase,
    ¿cuántas calorías habrá consumido?
    Respuesta: 1,000

2. Si a usted le recomendaron consumir 60 gramos de carbohidratos en la merienda,
    ¿cuánto helado puede comer?
    Respuesta: Cualquiera de: Hasta un máximo de una taza, una taza, la mitad del envase." Nota: si el paciente responde "dos porciones," pregunte "¿Qué cantidad de helado seria si lo sirviera en un tazón?"

3. Su médico le aconseja reducir la cantidad de grasas saturadas en su dieta. Usted normalmente consume 42 gramos de grasa saturada al día, que incluye una porcíon de helado. Si deja de comer helado, ¿cuántos gramos de grasa saturada consumiría cada día?
    Respuesta: 33 gramos

4. Si usted normalmente come 2500 calorías habrá consumido si se come una porción?
    Respuesta: 10%

LEA AL PACIENTE:

Imagine que es alérgico/a a las siguientes sustancias: Penicillina, cachuate (maní), guantes de latex y picaduras de abeja.

5. ¿Puede comer este halado con seguridad?
    Respuesta: No

6. (Solamente si responde "no" a pregunta 5): ¿Por qué no?
    Respuesta: Porque tiene aceite de cacahuate (maní)

¿RESPUESTA CORRECTA?	
si	no

Número de respuestas correctas:

Interpretación

Resultado de 0-1 sugiere alta probabilidad (50% o más) de alfabetización limitada.
Resultado de 2-3 indica la posibilidad de alfabetización limitada.Resultado de 4-6 casi siempre indica alfabetización adecuada.

February 2011
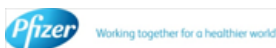
Appendix E

Form 1. Ethical Merit

Differentiating Quality Improvement and Research Activities Tool

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Questions

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1. Is the project designed to bring about immediate improvement in

   patient care? **Yes**

2. Is the purpose of the project to bring new knowledge to daily practice?

   Yes

3. Is the project designed to sustain the improvement? **Yes**

4. Is the purpose to measure the effect of a process change on delivery of

   care? **Yes**

5. Are findings specific to this hospital/setting? **Yes**

6. Are all patients who participate in the project expected to benefit? **Yes**

7. Is the intervention at least as safe as routine care? **Yes**

8. Will all participants receive at least usual care? **Yes**

9. Do you intend to gather just enough data to learn and complete the

   cycle? **Yes**

10. Do you intend to limit the time for data collection in order to

    accelerate the rate of improvement? **Yes**

11. Is the project intended to test a novel hypothesis or replicate one? **Yes**

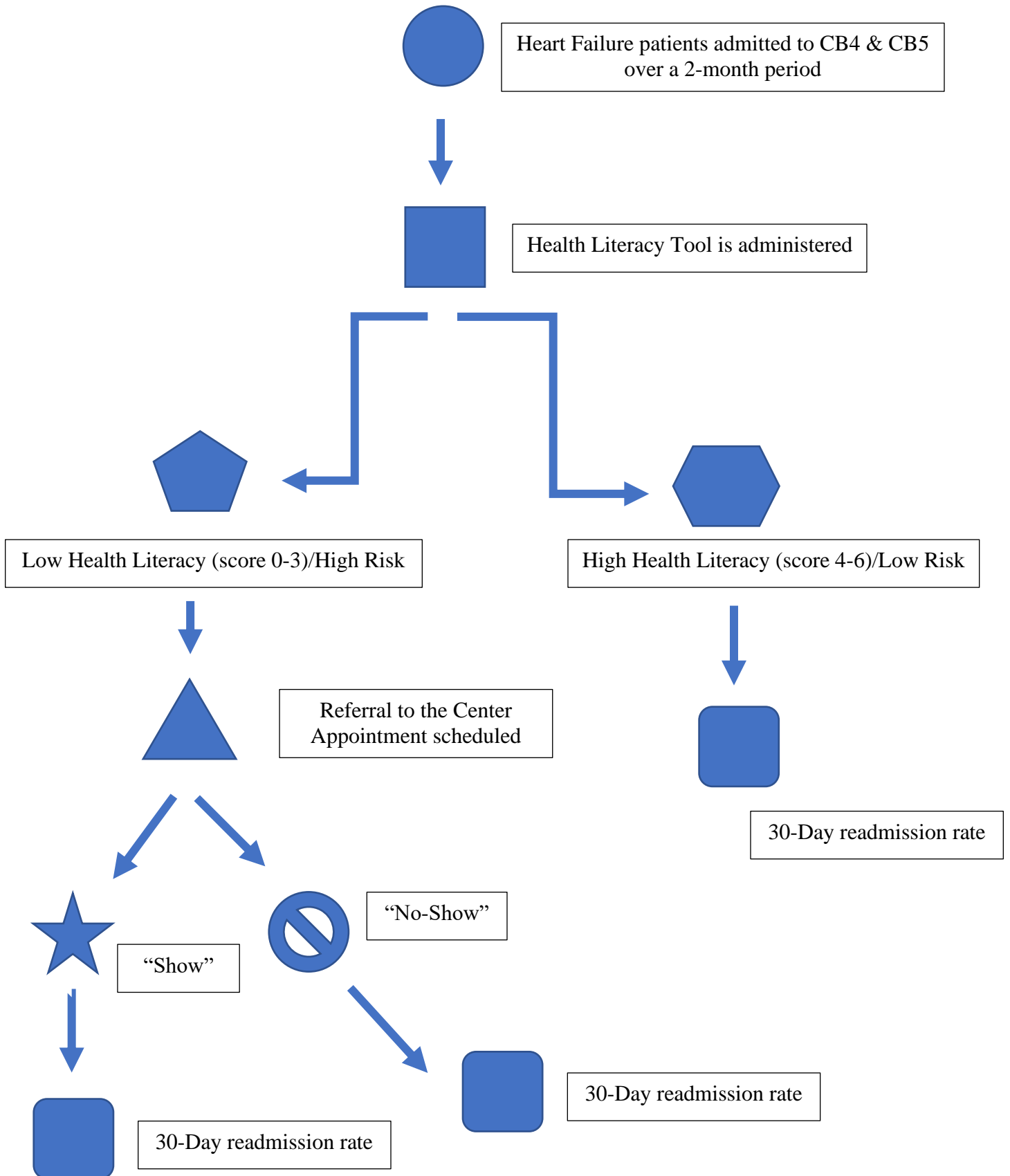12. Does the project involve withholding any usual care? **No**

13. Does the project involve testing interventions/practices that are not

    usual or standard of care? **No**

14. Will any of the 18 identifiers according to the HIPAA Privacy Rule be

    included? **Yes**

Note. Adapted from *Clinical Nurse Specialist,* by J. Foster, 2013, p. 10-3.

Appendix F

Figure 1. Implementation Process

Heart Failure patients admitted to CB4 & CB5 over a 2-month period

Health Literacy Tool is administered

Low Health Literacy (score 0-3)/High Risk

High Health Literacy (score 4-6)/Low Risk

Referral to the Center Appointment scheduled

"Show"

"No-Show"

30-Day readmission rate

30-Day readmission rate

30-Day readmission rate

Appendix G

Table 7. QI Data Collection

	Number of referrals to the center pre-NVS	Number of patients given the NVS	Total number of patients with score 0-3	Total number of patients with score 4-6	Number of referrals to the Center (score 0-3)	Number of referrals that "Showed" to the Center	Number of referrals that "No-showed" to the Center	Number of 30-day readmissions of high-risk patients - "showed"	Number of 30-day readmissions of high-risk patients - "No-showed"	Number of 30-day readmission of low-risk patients
Week 1	X									
Week 2	X									
Week 3	X									
Week 4	0									
Week 5		X	X	X	X					
Week 6		X	X	X	X					
Week 7		X	X	X	X					
Week 8		X	X	X	X					
Week 9		X	X	X	X					
Week 10		X	X	X	X					
Week 11		X	X	X	X					
Week 12		18	10	8	1					
Week 13						X	X	X	X	X
Week 14						X	X	X	X	X
Week 15						X	X	X	X	X
Week 16						1	0	0	N/A	0

Table 8. Total number of patients who received NVS, frequency and percentages (total n=18).

	F	%
Low Health Literacy (n=18)*	*10*	*55.6*
High Health Literacy (n=18)**	*8*	*44.4*
Number of referrals to the Center*** (n=10)[+#]	*1*	*10.0*
Number of referrals that "showed" (n=1)****	*1*	*100.0*
Number of referrals that "no-showed"****	*0*	*0*
Number of 30-day readmissions for Low Health Literacy – "showed"	*0*	*0*
Number of 30-day readmissions for Low Health Literacy "no-showed"	*N/A*	*N/A*
Number of 30-day readmissions for High Health Literacy	*0*	*0*

*patients with scores 0-3
**patients with scores 4-6
***based on patient with low health literacy levels (scores 0-3)
****based on patient actually showing or not showing to the Center for appointment
[+]total of 7 patients with low health literacy declined referral to the Center
[#]total of 2 patients expired before referral to the Center

Figure 2. Outcome Measurement of NVS in Heart Failure Patients (n=28)

NVS in Heart Failure Patients

- Low Health Literacy (score 0-3)
- High Health Literacy (score 4-6)
- Number of Referrals to the Center (score 0-3)
- Number of Referrals that "showed" (score 0-3)
- Number of Refusals to Referral (score 0-3)
- Number of Deaths before Referral (score 0-3)
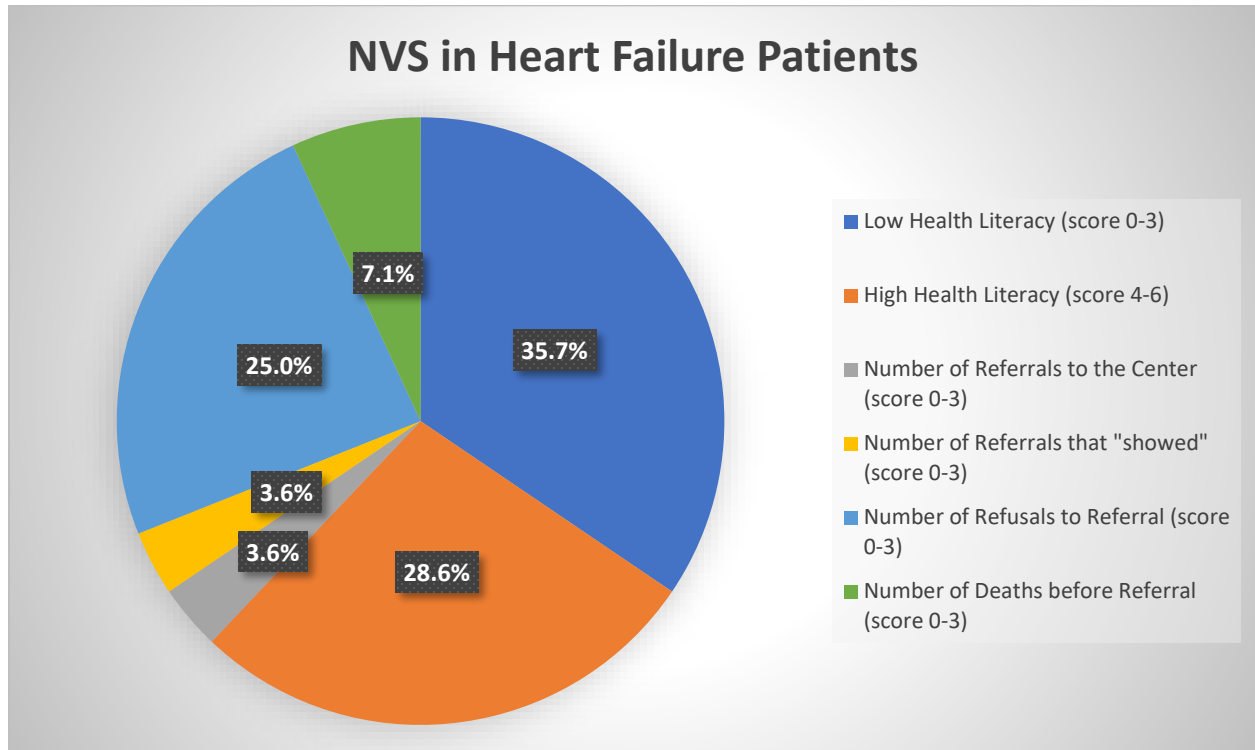
*n=the sum of the 18 patients who completed NVS plus the 10 eligible for referral to the Center.

Figure 3. Poster Presentation

DR. SUSAN L. DAVIS, R.N., & RICHARD J. HENLEY COLLEGE OF NURSING
Sacred Heart University

Improving heart failure patient referrals to the Center for Advanced Heart Failure & Pulmonary Vascular Disease at Hartford Hospital: A Quality Improvement Project

Dawn M. Surprenant, MSN, RN, Rosemary Johnson, DNP, APRN, ANP-BC, Christine Cosgrove, MSN, APRN, ANP-BC

Rationale

Low health literacy is prevalent in populations such as older adults, minorities, and in individuals with lower socioeconomic status and living in medical underserved areas. Recommendations are to access health literacy in cardiac patients, especially in the acute care setting to improve health outcomes upon discharge.

Background

Internal Data
- Two sources of evidence from industry organizations were found through the Mayo Clinic (2018) and the American Heart Association (2020).
- Both entities provided evidence and recommendations regarding the use of an instrument, such as a questionnaire, to determine the health literacy level of heart failure patients.
- Incorporating a health literacy assessment in clinical practice can have a profound effect on patients' health and healthcare decisions.

External Data
- 9 articles met the inclusion criteria, with four articles identified as Level I, 2 Level II, and 1 Level VI.
- 5 of the 9 articles specifically measured the impact of general health literacy levels on 30-day readmission rates in heart failure patients, while 7 of the 9 articles provided specific evidence on the impact of low health literacy levels and 30-day readmission rates in heart failure patients.
- 8 of the 9 articles highlighted the fact that health literacy plays a vital role in the management of heart failure patients.

PICO Question

In hospitalized heart failure patients (P) does a health literacy assessment before discharge (I) compared to no health literacy assessment (C) affect referral rates to the Center and rates of 30-day readmission (O) over a 60-day period (T)?

Methods

Utilized the Plan-Do-Study-Act methodology
- Conducted chart reviews on 2 medical units at Hartford Hospital (Plan).
- Administered the Newest Vital Sign (NVS) to eligible heart failure patients before discharge. Patients who scored 0-3 had low health literacy and they were referred to the Center (Do).
- Tracked 30-day readmission rates for all patients completing the NVS (Study).
- Determine whether the NVS is useful in clinical practice (Act).

Newest Vital Sign

Implementation Plan

1	2	3	4	5	6
Number of referrals to the Center 30 days before implementation of the NVS	Number of patients given the NVS • total number of patients scoring 0-3 • total number of patients scoring 4-6	Number of referrals to the Center (score 0-3) • number of referrals that "showed" • number of referrals that "no-showed"	Number of 30-day readmissions of high-risk patients "showed"	Number of 30-day readmissions of high-risk patients "no-showed"	Number of 30-day readmissions of low-risk patients (not referred to the center)

Outcomes

- 18 out of the 46 eligible heart failure patients completed the NVS.
- 8 had high health literacy, scored between 4-6 on the NVS, and they were not referred to the Center.
- 10 scored a 3 or less and they were referred to the Center.
- 7 out of the 10 patients (with low health literacy) refused the referral.
- 2 patients expired before referral was given.
- 1 patient accepted and completed referral with the Center.
- Zero 30-day readmission in the 60-day study period.
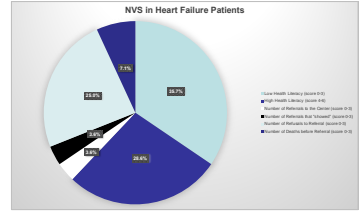
Sustainability Plan

- A change champion and/or subject matter expert will be necessary to educate the staff on the use of the NVS and how to implement it when a patient is admitted.
- Lack of time and resistance to change will be the largest barriers for utilizing the Staff Nurses to implement the NVS on the inpatient units CB4 and CB5 in the future.

Future Recommendations

- Provide education and training to staff on CB4 and CB5 – use of NVS in practice
- Administer NVS upon patient's admission to CB4 and CB5
- Refer patients who score 0-3 on the NVS to the Center for evaluation and treatment

References or information contact: dawn.surprenant1@gmail.com