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Impact of Health Information Technology Patient Education with "Teach-Back" on Patient Satisfaction and Hospital Readmissions

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Final DNP Practice Inquiry Project

Impact of Health Information Technology Patient Education with "Teach-Back" on

Patient Satisfaction and Hospital Readmissions

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College of Nursing

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Dedication

This work is dedicated to my father, Donald Floyd Currier. His intelligence, love of education, kindness, and patience gave me a strong foundation for learning, steadfastness, understanding and caring for others.

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Manuscript 1

Theory of Organizational Change

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Theory of Organizational Change

Doctor of Nursing Practice-prepared nurse leaders are responsible for translating research and evidence into practice and creating and maintaining cultures of quality and safety. Understanding how to create change in organizations is critical in achieving these goals. Organizational change theories can provide a framework for how to facilitate the adoption of a particular evidence-based intervention within an organization (Glanz, Rimer, & Vinwanath, 2008, p. 336). The purpose of this manuscript is provide insight to new nurse leaders about how to use the OD model to create a culture that allows changes to be made effectively across systems. The key concepts of Organizational Development theory (OD) will be discussed along with the four steps needed to make a change, and how nurse leaders can apply OD to their practice.

What is Organizational Development Theory?

OD is a system-wide approach of implementing effective organizational change through a planned process. The system can consist of a team, department, or total organization and includes an ongoing cycle of problem identification, action planning, implementation, and evaluation. This theory places a strong value on human potential, participation in the workplace, interpersonal relationships based on openness and trust, and active involvement of staff in the change process. This leads to organizational effectiveness and success in reaching organizational goals.

The key concepts of OD are organizational climate, organizational culture, organizational capacity, action research, and organizational development interventions. Attitudes and beliefs about organizational practices create organizational climate, and this influences employees' collective behavior (Hoy & Miskel, 1987; Litwin & Stringer, 1968). When members' perceptions about the organization's leadership include open communication, participative management, role-clarity, and a strategic plan, employee satisfaction and engagement are high. Organizational culture is closely related to climate. Assumptions, values, behavioral norms, behavioral patterns, and artifacts - which are symbols such as the mission and vision - are how employees

subconsciously think about and interpret their organizations (Glanz et al., 2008).   Culture forms slowly over time and is resistant to change. Organizational climate and culture can impact an organization's ability to integrate evidence into practice and the adoption, implementation, and effectiveness of any change efforts.   The resistance to change hinders an organization's capacity to function efficiently and effectively.

Organizational capacity is the ability of an organization to function by obtaining resources from the environment that impact an organization's success. An example of this is when the nurse coordinates a patient's care by utilizing the pharmacy to obtain medications – the nurse needs the medication delivered in a timely manner to ensure that the patient's blood levels remain therapeutic. The nurse also needs equipment and supplies from materials management to carry out the patient's treatment plan in a safe manner; information technology must be available for interdisciplinary communication; and environmental services must constantly address cleanliness to ensure infection control. If an organization cannot obtain adequate resources, mobilize resources efficiently and effectively, conduct work, and accomplish goals, then it will eventually cease to operate (Glanz et al., 2008). In a hospital system this could translate into loss of accreditation from the Joint Commission, loss of payment reimbursement from Medicare and Medicaid, and loss of Magnet Status representing nursing excellence.

Action research is the process of making the change. It applies scientific methods to help organizations identify problems, discover their underlying causes, and implement appropriate changes. Action research involves four steps to help organizations change and improve effectiveness: diagnosis of the problem, action planning, intervention, and evaluation. Diagnosis identifies problems and assesses the underlying causes. Action planning follows diagnosis and involves front line staff in developing strategic interventions and their feasibility for implementation for the diagnosed problems. This leads to action where change steps are specified and sequenced, progress is monitored, and stakeholder commitment is cultivated (Cummings, 2004). Evaluation assesses the planned change by tracking progress in

implementing the change and by documenting its impact on the organization and whether or not additional modifications are needed.

History and Theorists of Organizational Development Theory

The history of OD theory began with the 1930s human relations studies by psychologists who recognized that bureaucratic organizations led by authoritarian leaders resulted in lower employee motivation, decreased ability to solve problems, and poor response to managerial directives (Cummings, 2004). The Hawthorne studies influenced OD theory by showing that increased attention to workers led to higher motivation and productivity (Cummings, 2004). The survey feedback research of Rensis Likert assessed member attitudes towards organizations. It provided evidence that participative leadership enhanced employee involvement and empowerment at the work place and is more effective than traditional authoritative leadership (Likert, 1967).

Today, the approach to organizational change, referred to as action research, derives from Lewin's work on how to overcome resistance to change and sustain it once change has occurred. Making a change requires the following steps: "unfreezing" the current practice by making a compelling vision of the desired change so that members "buy in" to why the change is needed, moving to the new change in behavior by developing political support, involving staff, and managing the transition with education and coaching. The final step is "refreezing" which is accomplished by reinforcing new behaviors through rewards contingent on practicing new changes (Cummings, 2004).

Terms and Assumptions of Organizational Development Theory

The terms and assumptions used to initiate and carry out organizational change with OD are embedded in values of openness, trust, and collaboration among employees and grounded in beliefs that members should be actively involved in change. If there is not a climate of openness and trust, stress among employees occurs resulting in negative behaviors that predict poor service, poor quality, and failure to launch and maintain new programs. The use of OD theory in

organizational change may help organizations achieve high performance, staff satisfaction, and the capacity for continuous problem-solving and improvement. Another likely benefit is the resultant high quality work life, which enables the organization to attract and retain talented employees.

How is Organizational Development Theory used?

OD theory provides insight and guidance into how systems can make changes, implement new programs, or integrate evidence-based interventions into practice within or across organizations. An example application of the OD theory making changes to an existing program across organizations is the five-year organizational development plan for promoting heart health in Nova Scotia, Canada. Before applying the OD theory, the public health systems provided fragmented health promotion programs and had limited resources. The leaders decided to join forces to use OD theory to improve program sustainability and reduce duplication of effort (Butterfoss, Kegler, & Francisco, 2008). Four OD strategies were used: Staff were educated how to plan health promotion programs and action teams were established for implementation of health promotion activities. Action research steps were used including assessment of problems and barriers, action plan development, implementation of the plan, monitoring of change, and evaluation which were followed by the development of new action plans. The Heart Health Nova Scotia employees played key roles in developing strategies for the organizations to implement and facilitate learning across organizations (Glanz et al., 2008).

OD theory contributed substantively to this organizational change. Process evaluation results through qualitative and quantitative methods showed that 41 workshops reached over 140 organizations and the community health action teams conducted 18 initiatives that involved 39 organizations (Glanz et al.,2008). Organizational representatives reported increased knowledge and skills related to heart health promotion as a result of the various OD strategies applied (Glanz et al., 2008).

Relevance of OD Theory to DNP Prepared Nurse Leaders

Organizational development is a systems approach that helps organizations become more flexible and performance driven so they can compete in today's complex, rapidly changing healthcare environments. Its use of psychological foundations depends on the input and buy-in of staff that result in change processes that help organizations continuously transform and renew themselves for the highest quality services. The American Nurses Association's *Scope and Standards for Nurse Administrators* standard number nine (professional knowledge) supports the competencies nurse leaders must demonstrate implementation of changes in healthcare systems (ANA, 2004). The nurse administrator has the responsibility to create a work environment where nursing staff practice evidence-based nursing, demonstrate accountability for their practice, participate in decision making, and develop and foster relationships that support the continuous enhancement of care delivery and patient and employee satisfaction. This supports the assumptions in the OD model that staff members are competent, engaged, and satisfied with their work environment.

Evidence Based Work of OD Theory

The key concepts of OD theory are supported by evidence in the literature describing successes in organizational change. It is important to note that the evidence is interdisciplinary.

Organizational Climate and Culture

Glisson and Schoenwald (2005) implemented EBP for pediatric mental health services in rural Appalachia under the framework of the OD model. The leaders involved the clinicians in policy decisions and design of the work process. Upon evaluation of the program, it was found that the intervention improved organizational climate and lowered case manager turnover rates. The supportive organizational climate and culture were positively related to the quality and outcomes of the children's services and positive worker attitudes.

The connection between organizational climate/culture and outcomes was supported by research that found poor organizational climate is a key factor that explains the inadequate care

provided by child welfare systems nationwide (Glisson & Schoenwald, 2005). In another research article, the Marin County Health and Human Service Department leaders recognized that new organizational practices and norms are required to maintain relevance and effectiveness. The health services leaders used the OD model as a framework to transform their organizational culture into one of learning. Their goal was to create a resilient, persistent, and capable staff ready to confront complicated sociopolitical problems and government regulations (Lindberg & Meredith, 2012). Likewise, the OD concept of organizational climate and culture is relevant to the DNP nurse leader in creating a positive work environment, influencing positive patient outcomes and nursing satisfaction.

Action Research Steps

A number of researchers have used OD action research steps for successful organizational changes (Lindberg and Meredith (2012), Yang and Kagawa-Singer (2007), Plastow (2006), and Brodsky and Baron (2000). For example, after determining a need for organizational adjustment informed by changes in workforce demographics and constraints on resources, the Marin County Health and Human Services Department sought to transform its organizational culture into one that was conducive to learning. The agency director's goal was to create a culture where communication is encouraged both vertically and horizontally, frontline staff are engaged and their voices heard, cross-departmental problem solving is practiced, innovative ideas are supported, and evidence-informed practice is regularly implemented. The process used in the development of a culture of learning followed the steps of action research: problem diagnosis with goal setting, assessment of barriers to change, development of education and communication plans, interventions with specific performance indicators identified, and evaluation, both formative and summative. Assessment included interviewing key stakeholders including frontline staff. The plan was developed in collaboration with the staff and leaders who would be carrying out the new practices. Goals, timelines, and roles were identified, staff were educated, and the plan implemented. Fine-tuning occurred throughout implementation.

Outcomes were measured and communication was provided to all stakeholders throughout implementation. Reports were sent to all levels of the organization. The results of the Marin County Department of Health and Human Services case study provides excellent support of how OD theory is relevant to supporting the roles, responsibilities, and competencies of a DNP nurse leader. The ANA (2004) states nurse leaders must include staff in identification and diagnosing problems, integrate organizational theories and related research findings in the planning process, foster participation, reward staff, and take the lead in creating and evaluating programs that support organizational and nursing core values and objectives.

OD Interventions

Experience has demonstrated that organizational transformations of patient-focused redesigns are best orchestrated in environments where the process is methodically facilitated by an internal project manager or external consultant. The executive director from the Marin County Health and Human Services Department, who identified the need to create a learning culture in that organization, utilized OD interventions by engaging a consultant. The OD consultant (ODC) helped leaders and staff to identify and address critical blockages to communication and understand what was limiting agency learning. This action gave the staff motivation to change and created "buy-in" for the new process (Lindberg & Meredith, 2012). The ODC directed an assessment with OD interventions such as surveys and focus groups, and then facilitated the staff in creating an action plan.

Application Exploration

The OD model provides an excellent framework for planning and successfully implementing evidence into practice throughout a system. An example of OD theory applied to advanced nursing practice is implementing health information technology, coupled with evidence-based practice teaching techniques on a 64-bed cardiology unit. Leveraging technology can automate prescriptive education that patients and families can understand, engage patients in their care, and provide self-management support throughout the hospital stay and at home. The

goal of this project is to decrease unnecessary readmissions and increase patient satisfaction scores. If the pilot succeeds, the program will be disseminated throughout the organization.

The first two components of OD, organizational climate and culture, must be explored to determine if the staff are satisfied and engaged. Organizations can build positive climate and culture through creating openness and trust, involving staff in changes, and investing in staff development. When staff develop positive working relationships and trust their leaders, they become engaged and committed to the organization and are willing to expend their energy in performance improvement and provision of high quality care. This leads to the ability of the organization to function efficiently and effectively and will more likely succeed in implementing changes and in reaching organizational goals.

Another piece of successful application is to meet with key stakeholders to develop "buy-in" and political support. Key stakeholder commitment must be cultivated because a positive climate and culture will more likely lead to a successful change in practice. In the cardiology unit study, the patient education manager will meet with the first group of stakeholder leaders - chief nursing officer, cardiology nurse director, cardiology nurse manager, director of nursing staff development, and chief informatics officer - to validate that the project is congruent with organization goals and resources are available to implement and sustain the changes proposed. The next group of key stakeholders that will meet with the patient education manager will include the cardiovascular nurse council and the bedside nurses in ICU and acute/progressive unit who will be implementing the change in practice. An internal OD facilitator, the information technology project manager, will guide the process by asking staff nurses to identify barriers to teaching and analyze the underlying causes of those barriers so problems can be identified and solved to prevent interference with the change in practice. The interdisciplinary team will be included in stakeholder discussions to foster commitment and interest for future roll out of EBP.

The OD facilitator will then lead key stakeholders through the action research process: diagnosis of the problem and development of a plan of action with nurses' input of how to

integrate the evidence into practice, and the establishment of a standard work flow process that include steps that are specified and sequenced. Interventions will be planned and modified as needed, and outcomes identified. In this program, the measurable outcomes will be decreased readmissions (< 21%) and increased patient satisfaction scores (>90%).

Evidence based nursing practice (EBNP) is being identified as a key to quality and excellence in nursing services. Incorporating evidence into practice is necessary to deliver scientifically sound and high quality patient care (Shirey, 2006). The OD theory is an excellent model for the DNP prepared nurse leader to follow when implementing evidence into practice because it helps overcome resistance to change and promotes success and sustainability of the new change (Shirey, 2006).

Manuscript 2

Use of Health Information Technology in Heart Failure Inpatient

Patient and Family Education: An Integrative Review

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Integrative Review Use of Health Information Technology and Teach-Back in Cardiology

Patient and Family Education

Abstract

Purpose: The purpose of this integrative review is to identify the most recent evidence for effective patient/family teaching for patients with heart failure (HF) in the current healthcare environment.

Method:

A review of MEDLINE, PubMed, Clinical Key, Clinical Key for Nursing, and CINAHL was completed to obtain evidence for this review. Key words used for the search were "heart failure," "cardiology," "patient education," "patient-centered care," "patient engagement," "teach-back," "readmission," "discharge," "inpatient," "clinician training," "video," "meaningful use," "information and communication technology," and "health information technology." Results were limited to articles studying human subjects, in English, and published in the last eight years. Articles were reviewed if they were (a) random controlled trials; (b) contained quantitative or qualitative studies; (c) specific to inpatients (d) inclusive for patient education and 30-day readmission rate for heart failure patients; and (e) inclusive for clinician use of effective health literate communication.

Findings: Eleven random controlled trials (RCT) publications and 1 systematic review of experimental studies publications met inclusion criteria, were reviewed, and categorized into four subgroups: (a) patient education interventions for the heart failure patient population; (b) use of health information technology as a tool to use to teach and engage patients and families; (c) clinician training for evidence-based practice of patient education communication techniques; and (d) patient perceived needs in self-care support.

Conclusions: Findings were conclusive that the use of individualized patient education combined with one or more of the following - health information technology; health literate multi-media; multiple interactions; inclusion of family members; nurse introduction upon

admission that self-management is a goal for discharge; clinician use of teach-back

communication technique - increased patient self-management behaviors, decreased symptoms,

decreased calls to the support nurse, and decreased hospital readmissions 30 – 44%.

Clinical Relevance: The evidence is clear that actively involving patients in their self-

management plan using health information technology with evidence-based teaching techniques

leads to changed behaviors, improved health outcomes, and decreased healthcare costs.

Healthcare organizations need to re-design their patient education programs and delivery care

systems, and train the interdisciplinary team in patient-centered communication techniques.

Inpatient Heart Failure and Patient/Family Education

Heart failure is a major public health problem in the United States and is the most common discharge diagnosis in people older than 65 years of age (Kutzleb & Reinter, 2006). Around 5.8 million people in the United States have heart failure, and approximately 800,000 people are diagnosed with it each year (Mozaffarin et al., 2015). As the number of individuals with heart failure continues to rise, there have been dramatic increases in associated health care costs (Fredricks 2010), and in 2012, heart failure cost the United States $30.7 billion (Mozaffarin et al., 2015). High rates of hospitalizations lead to high total costs that include health care services, medications, and lost productivity (Mozaffarin et al., 2015). In Kentucky there are 10,024 deaths from heart failure per year, ranking 6th in the nation, according to the 2012 Center for Disease Control Chronic Disease Indicators.

Despite advances in therapy, morbidity and mortality remain high in patients hospitalized from heart failure. Educating all cardiology patients about their disease and motivating and monitoring their adherence to a course of therapy are critical aspects in promoting positive outcomes. The current health care system is characterized by rapid pace of treatment delivery, high volume of patients, and high costs, and these interfere with providers' ability to educate their clients about self-management. In addition, time constraints prevent practitioners from providing interactive teaching to help patients understand how to care for themselves at home. According to estimates, 54% of readmissions may be preventable (Evangelista et al., 2003) and lack of compliance with medications, failure to follow a salt-restricted diet, and delays in seeking medical attention are among the primary reasons for the high rate of re-hospitalization among patients with heart failure (Evanelista et al., 2003). Effective patient education can play a role in addressing this significant health concern.

Purpose

The intent of this integrative review is to identify the most recent evidence for effective patient/family teaching techniques in the current healthcare environment for heart failure. Some

of the interventions that have been studied are the use of a patient-centered approach that activates the patients and families' involvement in their care, provision of multiple teaching sessions, use of teach-back technique, use of health information technology that engages patients through multi-media, as well as a combination of these interventions.

Methods

I completed a review of MEDLINE, CINAHL, Clinical Key, Clinical Key for Nursing, and PubMed databases for the years 2008 to 2016 to obtain evidence for this paper. The search terms used were "heart failure," "cardiology," "patient education," "patient-centered care," "patient engagement," "teach-back," "readmission," "discharge," "inpatient," "clinician training," "video," "meaningful use," "information and communication technology," and "health information technology." Inclusion criteria were limited to English speaking human subjects greater than 18 years old and studies published within the last eight years. Eighty-four abstracts were reviewed. Articles were chosen if they were (a) randomized controlled trials (RCTs); (b) quantitative or qualitative studies; (c) specific to inpatients with heart failure (d) specific to the use of health information technology in patient engagement, (e) inclusive for patient education and 30-day readmission rate; and (e) inclusive for clinician training on effective communication techniques.

The Hierarchy of Evidence Rating System used was Quality of Evidence SORT (Am Fam Physician 2004; 69: 548-56 Grading Evidence – FPIN 2008). This system rates the evidence from Level I to lll. Half of the studies in this review were Level I, systematic review/meta-analysis of RCTs with consistent outcomes, high-quality individual RCT and all-or none studies. Forty-two percent of the studies were Level 2 which consisted of limited quality patient oriented evidence from systematic reviews with inconsistent findings, and lastly, one study was Level 3, a quality evaluation of a training program. The articles were graded using Strength of Evidence SORT (Am Fam Physician 2004; 69: 548-56 Grading Evidence – FPIN 2008) rating scale to evaluate their strength. The system uses grades A to C, with A representing the strongest, good

quality, patient-oriented evidence that measures outcomes such as symptom improvement, cost reduction and quality of life.   Over one third of the articles were rated A and over half were rated B. While there are robust RCTs that show evidence of outcomes with patient education interventions, research in the use of health information technology and health outcomes is still in its infancy.

Findings

Eleven randomized controlled trials (RCT) and one systematic review of experimental studies met inclusion criteria and were reviewed.   Four major concepts that influence positive patient outcomes: (a) patient education interventions for the heart failure patient population; (b) use of health information technology as a tool to teach and engage patients and families; (c) clinician training for evidence-based practice of patient education communication techniques; and (d) patient perceived needs in self-care support.

The majority of the studies compared traditional patient education methods to individualized teaching based on patient/family needs and preferences, and every researcher in this review found that the latter was more effective (Boyde et al., 2011, Vreeland, Rea, & Montgomery, 2011, Dewalt et al., 2011, Jack et al. 2009, Powell et al., 2008, Prey et al. 2013, Fredricks, Beanlands, Spalding, & Da Silva, 2010, Kruse, Bolton, & Freriks, 2015, Dickson & Riegel, 2009, Harding et al., 2008, Leone, Walker, Curry, & Agee, 2012, Guilia & Furey, 2009). Leone, Walker, Curry and Agee (2012) discovered heart failure patients did not receive needed information when nurses used standardized one-size-fits-all scripts for patient education.

 Use of teach-back (Boyde et al., 2011; Dewalt et al., 2011; Jack et al. 2009; Dickson & Riegel, 2009; Guilia & Furey, 2009) along with a combination of health information technology (Jack et al., 2009; Prey et al., 2013; Kruse et al., 2015), health literate practices (Boyde et al., 2011; Dewalt et al., 2011; Jack et al., 2009; Kruse et al., 2015; Dickson & Riegel, 2009; Guilia & Furey, 2009), multi-media (Vreeland et al., 2011; Jack et al., 2009; Fredricks et. al., 2010; Prey et al., 2013), multiple face-to-face interactions (Vreeland et al., 2011; Dewalt et al., 2011; Jack et

al., 2009; Dickson & Riegel, 2009; Prey et al., 2013; Fredricks et al., 2010; Leone et al., 2012; Guilia & Furey, 2009), inclusion of family members (Vreeland et al., 2011), and nurse introduction upon admission that self-management is a goal for discharge (Vreeland et al., 2011), empowered patients to change behaviors, decreased readmissions, and improved patient satisfaction (Jack et al., 2009; Fredricks et al., 2010; Vreeland et al., 2011; Prey et al., 2013; Kruse et al., 2015). In addition, when health information technology was utilized to actively involve patients and families in the learning process, it enhanced real-time teaching (Prey et al., 2013 & Kruse et al., 2015).   Using HIT in the form of a patient portal – for online home access to education - showed success in self-management, increased medication adherence, and decreased cancelled follow-up clinic appointments (Prey et al., 2013; Kruse et al., 2015).

Nurses at the bedside have an opportunity to enhance meaningful communication interactions with patients and families by proactive use of evidence-based practice communication techniques, health literate teaching tools, and HIT to affect the quality of care and positive outcomes of patients with heart failure. Nurse leaders must ensure resources are available at the bedside and in training in order to adequately support this best practice.

Patient Education Interventions

Verbal instruction alone is the most frequent form of patient instruction and the least effective (Boyd et al., 2011). Increased knowledge does not mean changed behavior (Boyd et al., 2011). Nurses' close contact and development of rapport with patients and families creates a trust relationship, which allows open communication necessary to obtain a comprehensive learning needs assessment (Leone et al., 2012). When the nurse proactively discusses with the patient and family how to avoid a readmission, identifies obstacles to self-care (Leone et al., 2012), and provides teaching that is tailored to the needs and preferences of patients, it empowers patients to change behaviors. This is referred to as "patient-centered" care (Fredricks et al., 2010). Patient-centered care allows and encourages patients to become full partners with the medical team and therefore, take an active role in managing their health (Leone et al., 2012).

Patients with low health literacy are particularly vulnerable in their ability to understand the complicated self-care management of heart-failure (Baker et al., 2011, Fredricks et al., 2010, Leone et al., 2012). In order for patients to reach their behavioral goals, the following practices are essential: individualized teaching (patients choose topics and areas of concern) instead of standard teaching (RN chooses topics and uses for all patients); multi-media use (verbal along with written, video, interactive computer programs), and multiple sessions of education over a period of time. In several research studies (Fredricks et al. 2010; Leone et al., 2012; Baker et al., 2011) these practices increased patient knowledge of heart failure self-care, increased self-care behaviors such as daily weigh-in and monitoring of fluid, decreased symptoms of heart failure, and decreased end point hospitalizations and death by 44%.

When evidence-based interventions are bundled (Leone et al., 2012, Jack et al., 2009), patients experience a lower rate of hospitalization, improved self-perceived preparation for discharge, and increased primary care physician follow up. These are the desired outcomes for unnecessary hospital readmissions. An example of bundled interventions is utilizing a discharge nurse to work with patients and families to arrange follow-up appointments, confirm medication reconciliation with teach-back, conduct patient education with the use of an individualized booklet based on health literacy principles. To facilitate a successful transition of care, the booklet is also sent to patients' primary care provider and a pharmacist calls patients after discharge to review medications. This particular bundle of interventions decreased readmissions and associated costs by 33% compared to those patients who did not receive the bundled interventions (Jack et al., 2009).

Conversely, when nurses use scripted discharge teaching and no one engages the patient in designing a personalized discharge plan, nurses describe the patients as "non-compliant" when medical instructions aren't followed, and they view readmission as a weakness or deficiency of the patients, rather than a nurse to communicate clearly (Leone et al., 2012). Nurses also frequently cited the pressure of timely discharges as a barrier to providing effective patient

teaching. However, in reality, discharge teaching is rushed and ineffective because the nurse has not done any teaching until that point. Patient-centered care demands more than standardization; it requires patients to take an active role in managing their health. Nurses must involve patients as full partners in care that is customized to meet patient unique needs and concerns.

Health Information Technology and Patient Engagement

Health care organizations have an opportunity to decrease heart failure readmissions by improving care transitions from hospital to home to clinic. Communication of key information is imperative across the continuum of care for optimal patient outcomes (Murphy et al., 2013). Leveraging technology can engage patients in their care, provide self-management support, and improve communication throughout the hospital stay and transition to home. Giving patients access to their health information and electronic tools for using that information can better position them to participate more fully in their care (Ricaciardi et al., 2013). By increasing patient participation through HIT, patients can experience higher satisfaction and better health outcomes, and there is a correlation with reduction in overall expenditure (Prey et al., 2013). However, HIT does not take the place of face-to-face interaction with the clinician (Prey et al., 2013); it is a tool for the clinician to use to engage the patient and enhance self-management support.

Health information technology is being utilized for prescribed health education, generic health information, patient-specific information, communication between patients and health care providers, personalized decision support, and entertainment. Patients report that they valued access to health information and the improved communication with physicians through utilizing HIT (Prey et al. 2013, Kruse et al., 2015). Specifically, patients express high satisfaction with the provision of personal medication lists accompanied with verbal instruction, the ability to track pain and recovery progress through the nurse call button, and access to medical information about their condition and tips for living a healthy lifestyle (Prey et al., 2013). The hospital experience is improved when patients use HIT to access general activities such as music, movies, television,

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games, and video-conferencing. The impact of HIT decreases patient anxiety, increases patient

engagement, and shortens the hospital length of stay (Prey et al., 2013) and patients state they are

better prepared for recovery and have higher self-efficacy with the use of HIT. A study found

that an HIT tobacco cessation program significantly impacted patient outcomes by increasing the

number of ex-smokers by 50% (Kruse et al., 2015).

With access to a patient portal at home, health care organizations have noted many

benefits such as a higher rate of patient loyalty, increased shared decision making, and the lower

rate of no-show appointments (Kruse et al., 2015). A research study found that with the use of

education links in the portal, patients learned more about their diabetes and how to manage it,

which increased the likelihood of reaching their A1c blood level goal (Kruse et al., 2015).

There are, however, barriers for effective HIT use.   Disadvantaged groups, such as those

with low health literacy (Medicaid, uninsured, and African-American patients), were less likely to

recognize the self-management capabilities of the patient portal and did not have the ability to

navigate and use the technology effectively (Kruse et al., 2015). Medicare patients (65 years of

age and older) were less likely to use secure messaging due to difficulty using technology,

physical disabilities, and inability to access the internet (Kruse et al., 2015). Patient portals must

be user friendly and information must be health literate. Healthcare organizations must

incorporate proper training, assist patients in understanding the benefits of using the portal,

address attitudinal barriers and not focus solely on access.

Patient Perceptions of Education Received

Giving information does not support self-care skill development in patients with HF

(Dickson & Riegel, 2008), and many times, patients develop proficiency in self-care skills due to

the input from family and friends.   Health care professionals rarely make significant

contributions to the learning of essential skills. Patients have reported that they lacked

understanding of HF and its symptoms and there was no discussion by clinicians about disease

progression or advanced care planning (Harding, 2008). Patients often had specific questions, but

felt like they were not free to ask and thought that they were not being given full information (Harding et al., 2008). Clinicians reported they did not feel comfortable talking about poor prognoses and did not have the time needed for patient education; therefore, HF patients and their families had a high level of unmet informational needs that negatively impacted their quality of life (Harding et al, 2008).

Tactical and situational skills such as coaching patients through problem solving, role-playing specific situations, and speaking in plain language assist HF patients in developing skills needed to perform self-care (Dickson & Riegel, 2009). It is essential that anticipatory and timely communication from clinicians is provided to support patient self-management, compliance with medication, and informed decision making, ultimately helping to provide a good death (Harding et al., 2008).

Clinician knowledge and evaluation of training for evidence-based practice of patient education

Patient education is recognized as a core component of nursing; however, nurses often lack formal training in it. Patient education is often driven by the nurse's agenda, but in order to provide uality care, a patient-centered approach is needed. Assessing patient learning needs, individualizing teaching content, and evaluating patient understanding have been identified as areas in which nurses would benefit from additional training (Furey & Lamiani, 2009). Nursing staff education programs, built on evidence-based communication skills, improve nurses' ability to deliver the education effectively (Lamiani & Furey, 2008), a key component in improving patient understanding of self-care. This in turn, could influence patient health outcomes.

It is also important to consider what type of nurse provides the education. Vreeland et al. (2011) found that when staff nurses provide the teaching to heart failure patients instead of a specialized nurse (cardiac nurse specialist, nurse practitioner), patient satisfaction scores went down. Staff RN knowledge of heart failure self-care behaviors has been demonstrated to be low, but there is a gap in the research. It is not known if further educating staff RNs could make

discharge education as effective as specialized RN education (Vreeland et al., 2011).   Training

programs that focus on patient-centered communication skills and nurse preparedness to deliver

patient education increases the nurses' knowledge of the patient-centered model and the patient

education process (Furey & Lamiani, 2009). With training nurses allow patients to talk more

which is a patient-centered approach (Boyd et al., 2011), and this is associated with increased

patient satisfaction, improved compliance, and better health outcomes. This evidence supports the

importance of health care organization leadership to provide adequate resources to train nurses in

the delivery of patient-centered education and to integrate these practices into the health care

culture.

Conclusions

Results of this review guide best practice of patient and family education interventions

needed for heart failure patients' self-care.   This review of the literature supports the need for

hospitals to redesign the process by which patient and family education is provided, such as using

health information technology, to improve outcomes and decrease readmissions. In addition,

health care organizations must provide training for nurses to increase their patient education

knowledge and learn more effective communication skills. Health-care leaders need to commit

resources at the bedside to ensure there is time to customize teaching in multiple sessions and

support the patient during the transition to follow-up care.

It is important to address limitations that deter the patient use of HIT, including low

health literacy, lack of Internet access and IT support. Research on patient engagement with

technology is in its infancy.   There is a need for statistically powered RCTs for identification of

optimal methods that engage patients, change the care delivery process, obtain best outcomes, and

determine cost-effectiveness (Prey et al., 2013).

Nurses have the ability to positively impact the quality of care and health care costs by

providing evidence-based patient/family education that includes the use of health information

technology for engagement and self-management support. The findings of this review indicate

that nurses have an opportunity to become full partners in health care redesign and the

implementation of the Institute for Medicine's mandate for patient-centered care.

Evidence Chart: Use of Health Information Technology in Heart Failure Inpatient Patient and Family Education

Authors, year, Title, Journal, reference	Type of literature/ design	Sample	Purpose of Article	Findings	Implications	Evidence Level	Evidence Grade
Types of educational interventions for HF patients							
Fredericks, S., Beanlands, H., Spalding, K., & Da Silva, M. (2010). Effects of the characteristics of teaching on the outcomes of heart failure patient education interventions: a systematic review. [Review]. Eur J Cardiovasc Nurs, 9(1), 30-37.	Systematic Review RCTs, 32% studies quasi-experiment al, 62% studies experiment al design	69 publications, n=1865	Determine approach, mode of delivery, & dose used in providing heart failure patient education and what is most effective in producing best outcomes.	There were larger effect sizes for heart failure patient education when the content was individualized (vs. standardized), given using a combination of media and provided in more than one session. This enhanced the patient's overall knowledge, performance of specific behaviors, and reduce symptoms; leading to increased likelihood for retention, recall, and application. Group sessions were shown to be less effective than one-	Consider redesigning current patient education initiatives to include individualized content, combination of media, one to one, and in more than one session to enhance patient outcomes	Level 1 Randomized control studies	B Some limited quality studies

				one interaction.			
Boyde, M., Turner, C., Thompson, D. R., & Stewart, S. (2011). Educational interventions for patients with heart failure: a systematic review of randomized controlled trials. [Research Support, Non-U S Gov't Review]. J Cardiovasc Nurs, 26(4), E27-35.	RCTs from 1998-2008	19 publications n=2686	Systematically review patient education interventions for heart failure patients and assess their effectiveness.	The educational interventions resulted in improvement in patient knowledge, but there was no consistent improvement in other measures such as self-care abilities, quality of life, and mortality. It was difficult to make comparisons about effectiveness of the different strategies as each intervention used different outcomes measures. Each intervention demonstrated at least 1 positive outcome so each program did have some effectiveness	A patient-centered approach using an assessment of the learners' needs and preferences that is based on educational theory, and evaluated appropriately may assist to develop an evidence base for patient education. More research is needed to clearly identify the strategies that will achieve the best outcomes for these patients.	Level 1 Evidence obtained from RCTs	B Variety of outcomes measured so decreased consistency of measurements in review
Vreeland, D. G., Rea, R. E., & Montgomery, L. L. (2011). A review of the literature on heart failure and discharge education.	36 publications reviewed: Experimental studies, non-control group	Variety of studies reviewed, from n=12 to n=363	Review of the literature to summarize evidence for discharge education in general & the 6 major topics TJC has identified lead to decreased	Use of specialized RN educators vs staff RN, use of multimedia (dvd) with 1:1 teaching, caregivers present during teaching, Pt/family told	With anticipated reduced reimbursement for readmissions recommended by CMS, it is critical to further studies to provide evidence for the best practices associated	Level 2 Variety of studies reviewed	B Inconsistent in some areas

| [Review]. Crit Care Nurs Q, 34(3), 235-245. | descriptive study, 1 study terminated, randomized experimental design, qualitative study then conducted a quantitative study, quasiexperimental study, ethnographic study, pilot study | | readmissions. | education is part of the goal of hospitalization, & teaching provided throughout hospitalization, individualized education: improved knowledge, behavior, &outcomes, decreased the need for extra doses of diuretics, decreased the number of calls to the support RN, &decreased the number of HF symptoms, , use of Staff RN to teach lowered patient satisfaction – (staff RN had less knowledge of heart failure), Length of sessions needs to be 1 hour - the minimum time needed to teach 1:1 for decreased readmission rates & compliance with self-care. D/C education has more impact on knowledge than | with discharge education. | | |

				behavior.			
DeWalt, D. A., Broucksou, K. A., Hawk, V., Baker, D. W., Schillinger, D., Ruo, B., . . . Pignone, M. (2009). Comparison of a one-time educational intervention to a teach-to-goal educational intervention for self-management of heart failure: design of a randomized controlled trial. [Comparative Study Multicenter Study Randomized Controlled Trial Research Support, N I H, Extramural]. BMC Health Serv Res, 9, 99.	First a pilot study was done; single site trial Randomized controlled multi-site trial	N = 123 N = 660	Determine whether a literacy-sensitive, multi-session education intervention that teaches patients HF self- care skills until they reach behavioral goals (TTG –teach to goal is superior to a single session brief educational intervention.	Intervention increased HF knowledge, self-reported daily weights, HF related self-efficacy. Did not affect HF QOL. Decreased combined endpoint of hospitalization or death by 44%. Findings will be reported in 2011	HF self-management is a key element to optimal heart failure care and patients with low literacy are particularly vulnerable to poor uptake of complicated self-management training. Consider developing programs that allow for multiple TTG sessions with sensitivity to health literacy.	Level 1 Evidence from robust RCT with representative sample of population	A Consistent, good quality
Jack, B. W., Chetty, V. K., Anthony, D., Greenwald, J. L., Sanchez, G. M., Johnson, A. E., . . .	Randomized trial using block randomization of 6 &	N = 749 patients Single site hospital	To test effects of an intervention designed to minimize hospital utilization after	The RED intervention decreased hospital utilization within 30 days of discharge by	The data supports implementation of a comprehensive program for hospital discharge among	Level 1 RCT	B Single site

Culpepper, L. (2009). A Reengineered Hospital Discharge Program to Decrease Rehospitalization A Randomized Trial. Annals of Internal Medicine, 150(3), 178-187. doi: 10.7326/0003-4819-150-3-200902030-00007	8.		discharge. Intervention: patient-centered education, comprehensive d/c planning, and post discharge reinforcement by a discharge advocate, a health literacy friendly, plain language teaching sheet in color with written instructions focused on survival skills, and a follow up phone call	30%	similar hospitals		
Self-management skills training							
Powell, L. H., Calvin, J. E., Jr., Mendes de Leon, C. F., Richardson, D., Grady, K. L., Flynn, K. J., . . . Eaton, C. (2008). The Heart Failure Adherence and Retention Trial (HART): design and rationale. [Comparative	Single site, multi-hospital (9) behavioral randomized efficacy trial. Partially blinded trial	N=902, 47% women, 40% minorities representative of a cohort seen in routine practice	Evaluate the benefit of patient self-management skills training in combination with HF education, over HF education alone; evaluate if patient was activated to collaborate in their care and have self-efficacy determine if adherence to	Ongoing clinical trial	Encourage interdisciplinary teams to look at the patient side of HF and aim to activate the patient to more fully implement medical recommendations.	Level 1 RCT, population representative of cohort seen in clinical practice	A Consistent, good quality

Study Randomized Controlled Trial Research Support, N I H, Extramural]. Am Heart J, 156(3), 452-460.			treatment, QOL improve.				
Patient perceived needs							
Dickson, V. V., & Riegel, B. (2009). Are we teaching what patients need to know? Building skills in heart failure self-care. Heart Lung, 38(3), 253-261.	Qualitative descriptive meta-analysis	N=85 adults 3 prior studies were analyzed	Assess what self-care skills patients with HF perceive thy need and how they developed the skills needed to perform self-care.	Tactical & situational skills are needed to adhere to prescribed dietary, exercise, med, symptom monitoring, & management regimes. Self-care evolves over time & with practice as patients learn how to make self-care practices fit into the context of their daily lives. Skill proficiency acquired primarily through family and friends. Healthcare professionals rarely made significant contributions to the learning of essential skills	Results suggest providers are leaving patients to learn from their mistakes rather than teaching them the skills that they need to be adept in self-care. Assisting patients in skill development requires a shift in the patient education paradigm from a traditional model characterized by authoritarian, prescriptive and generalized information to a patient-centered, collaborative approach in which patients learn the tactical and situational skills necessary for true self-	Level 2 descriptive	B Some inconsistencies in previous researchers

| | | | | | care.

Opportunity for home health RNs to contribute to skill development since many skills are learned at home. | | |
|---|---|---|---|---|---|---|---|
| Harding, R., Selman, L., Beynon, T., Hodson, F., Coady, E., Read, C., . . . Higginson, I. J. (2008). Meeting the communication and information needs of chronic heart failure patients. [Clinical Trial]. J Pain Symptom Manage, 36(2), 149-156. | Cross sectional qualitative methodology | N=20 CHF patients, 11 family caregivers | Generate guidance for appropriate information provision to CHF patients and their families | Lack of information has a negative impact on their quality of life. Patients & families have specific questions but feel unable to ask them & feel they are given full information when they are not. | Recommend skilled honest provision of information that maximizes comprehension. Adequate appropriate & timely communication is essential to enhance self-mgt and compliance with medication, reduce physical and psychological morbidity, prevent unplanned admission, inform decision making and ultimately provide a good death.

Provision of training and joint protocols between palliative care and cardiology to enhance cardiologists' skills in handling | Level 3

Case control study | A

Good quality patient oriented evidence |

					complex and end of life discussions, and develop and evaluate referral criteria and CHF care pathways to enable earlier palliative care interventions.		
Leone, R. P., Walker, C. A., Cox Curry, L., & Agee, E. J. (2012). Application of a Marketing Concept to Patient-Centered Care: Co-Producing Health With Heart Failure Patients. Online Journal of Issues in Nursing, 17(2), 1-1. doi: 10.3912/OJIN.Vol17No01PPT03	Double blind, peer reviewed Qualitative	N=10 RNs	Explore the nurse's use of co-producing (a marketing tool) to enhance patient education by involving patients as active partners in their care and its effect in decreasing readmissions	Nurses did not deviate from using scripts for patient teaching, called patients that were readmitted "non-compliant", didn't describe their teaching as failure, no time to teach, didn't have full knowledge of what to teach, family unavailable, & expressed individualizing teaching was not their responsibility.	A change from scripting to a co-production model of discharge teaching requires a redesign of the teaching process. Improvement of information sharing systems to communicate amongst nurses what they have taught and what discharge needs are, restructure rewards system from efficiency and standardization to customization and individualization of patient teaching, provide adequate staffing to enable nurses the time to provide patient centered care, and follow up with clinic education	Level 2 small sample size	B Limited quality

Giulia, L., Furey, A. (2009). Teaching nurses how to teach: An evaluation of a workshop on patient education. Patient Ed and Counseling, 75, 270-273.	Evaluation of a workshop on patient education	N=14 RNs	To evaluate the effect of a patient education workshop on RNs communication skills, knowledge of patient-centered model, patient education process, and sense of preparedness to provide effective patient education	Data suggest efficacy of the workshop in developing patient-centered communication skills and improving nurses' knowledge and preparedness to deliver patient education.	Trainings based on a patient-centered model and interactive learning methods should be implemented for nurses to improve their ability to deliver effective patient education.	Level 2 Small sample size	C Need further evaluation of patient outcomes
Health Information Technology							
Prey, J. E., Woollen, J., Wilcox, L., Sackeim, A. D., Hripcsak, G., akken, S., Feiner, S. (2013, November 5). Patient engagement in the inpatient setting: a	Systematic Review 3 RCTs with positive results 11 quasi-experimental designs using surveys and interviews to measure success of	17 publications N= 1,963	Summarize existing scientific literature regarding the use of health information technology to increase patient engagement in the inpatient setting	Patients often confused by frequent changes in medications and when using information technology, they desired a current med list, electronic information, but also wanted a verbal explanation included. Patient experience improved when patients were able to use the pillow	Technology does not take the place of face to face interaction with the clinician. It is key to engage patients & ensure satisfaction due to reimbursement rates based in part on HCAHPs scores. Research on patient engagement with technology is in its infancy and there is a	Level 1	A

systematic review. *Journal of American Medical Informatics Association*, 1-9. http://dx.doi.org/10.113 /amiajnl-2013-002141	intervention 3 qualitative analyses			speaker/remote control to track their progress with pain scale data, therapies, meds, billing, and be able to look up medical information about their condition & living a healthy lifestyle - plus music, movies, games, & videoconferencing. Patient engagement was increased, ICU & hospital LOS decreased, and patients had higher self-efficacy & were significantly better prepared for recovery in patients who viewed videos before surgery. RCT with 1,000 patients across 2 hospitals that stopped tobacco use while in hospital viewed video to encourage them to continue to do so at home. There was a 50% increase in	need for statistically powered RCTs for identification of optimal methods that engage patients, the delivery process, outcomes, and cost-effectiveness.	

				smokers who did not relapse into previous smoking behavior once at home.			
				Patients that used a mobile phone app that provided an interactive report during an emergency department stay reported decreased anxiety & increased awareness of their care team, promoted empowerment, and enhanced ownership of medical information.			
				The confidence patients had in managing their hospital stay improved the more engaged they were in walking through an interactive visual novel concerning helping a family member avoid a fatal heart attack.			
				Overall, studies found positive impact			

				through use of engagement technologies: lower average pain scores, increased self-efficacy, and engagement.			
Kruse, C. S., Bolton, K., & Freriks, G. (2015). The effect of patient portals on quality outcomes and its implications to meaningful use: A systematic review. *Journal of Medical Internet Research*, *17*. http://dx.doi.org/10.219 /jmir.3171	Systematic Review 19 non-experimental, but data driven studies, 7 quasi-experimental 1 experimental Based on AHRQ & US Health Resources and Services Administration (HRSA) quality indicators:	N = 27 publications	Summarize effect of patient portals on quality or chronic-condition outcomes	37% of papers reported improvements in medication adherence especially in chronic disease, disease awareness, self-management of disease, an increase in patient education, preventative medicine and increase in extended office visits at the patient's request for more information.

High level of patient engagement, sense of collaborative care, better patient-to-provider communication, patient satisfaction, perception of high quality care, customer retention, | Use of the patient portal can help health care organizations meet Meaningful Use Stage 2 & 3 and receive Medicare/Medicaid reimbursement from high patient satisfaction.

Patient portals help meet AHRQ/HRSA quality indicators by support of self-management and shared decision making. | Level 2 | B |

	-Management of chronic diseases -Patient Satisfaction - Including patients in medical decisions			and large reductions in no-show rates were seen among historically disadvantaged groups: Medicaid (*P*<.001), uninsured patients, *P*<.001), and black patients *P*<.001). Weak results on medical outcomes. Black less likely than white to recognize the self- management capabilities of the portal Portal users tend to be Caucasian educated females, <65 years old that prefer to communicate electronically Barriers: lack of internet access and IT support, and health literacy and	Healthcare organizations should focus heavily on the incorporation of proper training in proper portal use. Also need to assist patients to understand the benefits of using the portal, and provide interventions to reduce racial disparities. Must address attitudinal barriers and not focus solely on improving access. Patient portal must be user friendly and information is health literate. If patients don't understand the information, they aren't able to act on it.	

				numeracy skills affect full utility of the portal patients could not interpret diabetes associated lab results so saw an increase in phone calls to clinic			

TABLE 2
Assessing Quality of Evidence

Study quality	Diagnosis	Treatment/prevention/ screening	Prognosis
Level 1: good-quality, patient-oriented evidence	Validated clinical decision rule SR/meta-analysis of high-quality studies High-quality diagnostic cohort study*	SR/meta-analysis or RCTs with consistent findings High-quality individual RCT† All-or-none study‡	SR/meta-analysis of good-quality cohort studies Prospective cohort study with good follow-up
Level 2: limited-quality patient-oriented evidence	Unvalidated clinical decision rule SR/meta-analysis of lower quality studies or studies with inconsistent findings Lower quality diagnostic cohort study or diagnostic case-control study	SR/meta-analysis of lower quality clinical trials or of studies with inconsistent findings Lower quality clinical trial Cohort study Case-control study	SR/meta-analysis of lower quality cohort studies or with inconsistent results Retrospective cohort study or prospective cohort study with poor follow-up Case-control study Case series
Level 3: other evidence	Consensus guidelines, extrapolations from bench research, usual practice, opinion, disease-oriented evidence (intermediate or physiologic outcomes only), or case series for studies of diagnosis, treatment, prevention, or screening		

*—High-quality diagnostic cohort study: cohort design, adequate size, adequate spectrum of patients, blinding, and a consistent, well-defined reference standard.
†—High-quality RCT: allocation concealed, blinding if possible, intention-to-treat analysis, adequate statistical power, adequate follow-up (greater than 80 percent).
‡—In an all-or-none study, the treatment causes a dramatic change in outcomes, such as antibiotics for meningitis or surgery for appendicitis, which precludes study in a controlled trial.
(SR = systematic review; RCT = randomized controlled trial)

Am Fam Physician 2004;69:548-56. Grading Evidence – FPIN 2008
Key: Strength of Evidence: SORT

TABLE 1
Strength-of-Recommendation Grades

Strength of recommendation	Basis for recommendation
A	Consistent, good-quality patient-oriented evidence*
B	Inconsistent or limited-quality patient-oriented evidence*
C	Consensus, disease-oriented evidence,* usual practice, expert opinion, or case series for studies of diagnosis, treatment, prevention, or screening

*—Patient-oriented evidence measures outcomes that matter to patients: morbidity, mortality, symptom improvement, cost reduction, and quality of life. Disease-oriented evidence measures intermediate, physiologic, or surrogate end points that may or may not reflect improvements in patient outcomes (e.g., blood pressure, blood chemistry, physiologic function, pathologic findings).

Am Fam Physician 2004;69:548-56. Grading Evidence – FPIN 2008

Figure 1. Key: Quality of Evidence SORT

Manuscript 3

Impact of Health Information Technology Patient Education with "Teach-Back" on Patient

Satisfaction and Hospital Readmissions

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Abstract

Background: With the advances in medical care, patients are being asked to manage more complicated self-care regimens, and there is often a gap between what the nurse teaches and what the patient understands. This can lead to re-hospitalizations that are burdensome for patients and are costly to the American healthcare system. The Department of Health and Human Services (DHHS) challenged healthcare organizations to leverage technology that engages patients in self-management support and encourages clinician use of patient-centered communication techniques, such as teach-back.

Purpose: The purpose of this project is to evaluate the use of health information technology along with an evidence-based practice communication technique, teach-back, to improve patient satisfaction, and decrease hospital readmissions.

Methods: A descriptive, quasi-experimental study design using pre and post-test comparisons was used to make comparisons between thirty-day readmission rates, Consumer Assessment of Healthcare Providers and Systems (*CAHPS*) with transition of care, and a nurse satisfaction survey.

Results: There was no evidence of statistical significance in the comparison of outcomes before and after the intervention. The nurses provided teach-back following the video clips with 16% of the patients so the intervention was not implemented by the staff as planned. However, 90% of the patients that answered the Interactive Patient Care System (IPC) satisfaction survey before discharge responded that they were able to easily use the system, it helped them understand more about their health condition and how to care for themselves, and it positively impacted their hospital stay. While the results are not statistically significant, they are still sufficiently conclusive to support further study to analyze the effectiveness of using an IPC system with evidence based practice teaching techniques.

Introduction

Preventing 30-day hospital readmissions is an important national safety standard at the forefront of transforming healthcare. Re-hospitalizations are burdensome for patients and families, can be a poor reflection on quality of care, and are costly to the American healthcare system (Nelson, Batalden, Godfrey, & Lazar, 2011). In 2011, 30-day hospital readmissions for Medicare patients resulted in more than $4.3 billion in hospital costs (Hines, Barrett, Jiang, & Steiner, 2014).

With the advances in medical care, patients are being treated with an increasing number of medications and are being asked to manage more complicated self-care regimens, and there is often a gap between what the nurse teaches and what the patient understands. If a patient or caregiver does not understand the implications of a diagnosis and the importance of prevention and treatment plans, or cannot access health care services because of communication problems, an adverse event may occur (Kornburger, Gibson, Sadowski, Maletta, & Klingbeil, 2013). The most common reasons for readmissions are: patients not understanding medication instructions, patients or family members not recognizing signs of worsening condition and when to call the doctor, and patients missing follow-up clinic appointments (Koh, Brach, Harris, & Parchman, 2013). The incidence of 30-day readmissions may be decreased by improving communication and equipping patients and families to manage medications properly, recognize symptoms, and make lifestyle changes.

America addressed this quandary by developing new public policy for healthcare reform: the HITECH Act, incorporated by lawmakers in the 111th Congress as part of the national American Recovery and Reinvestment Act (ARRA; H.R.1) signed into law on February 17, 2009 (P.L. 111-5). The public policy principles are to improve the design for clinical decision making and improve health outcomes, promote information sharing with patient/client for engagement

and self-management support, share health information between health providers, serve as a trusted steward of tax payer dollars, and protect privacy and security. Three goals of ARRA are avoiding costly readmissions, keeping patients healthy, and rewarding quality rather than quantity. To motivate organizations to improve quality of health care and lower costs to taxpayers and patients, ARRA decreased Medicare reimbursements for readmissions and mandated public reporting (Department of Health and Human Services, 2010). Hospitals with excessive readmissions within 30 days of discharge from treatment for heart attack and heart failure incur up to 3% of Medicare payment penalties (Rice, 2014). In the United States, 39 hospitals received the maximum readmission penalties fine of 3% from the Center for Medicare and Medicaid Services (CMS), with nine of the 39 (about 23%) being in Kentucky. These consequences motivate University of Kentucky HealthCare to implement interventions that improve transitions of care and patient self-management in order to decrease the rate of readmissions.

The prevalence of patients with low health literacy also contributes to hospital readmissions and poor health outcomes, and costs millions of dollars every year (Weiss, 2007; Dickens & Piano, 2013). Health literacy is defined as the ability to understand, process, communicate, and act on basic health information needed to make appropriate health decisions (Department of Health and Human Services, 2010). Only twelve percent of American adults are proficient in health literacy skills and able to follow medical instructions and manage medical treatments (The Joint Commission, 2007). Anyone can have low health literacy, even highly educated people who are ill, anxious, or unfamiliar with medical terminology. However, the elderly and those with limited education, lower income, chronic disease, and English as a second language have been identified as those at greater risk for low health literacy (Institute of Medicine [IOM], 2004). For those with low health literacy skills, the hospital stay can be confusing and overwhelming which can result in misunderstood instructions and non-compliance with the self-management plan. People with low health literacy are hospitalized more often and for longer

periods of time; use emergency departments more frequently; make more medication errors; and for those with heart failure, asthma or diabetes, manage their diseases less proficiently (Berkman & Donahue, 2011).

Forty counties in Kentucky are considered to have "persistent poverty," meaning 20% or more of the residents have fallen below the poverty line over the past three decades, according to the U.S. Census Bureau's American Community Survey (Rice, 2014). This statistic reflects the vulnerability of Kentucky's patient population and the importance of the redesign of delivery care systems.

<div align="center">

A Call for Change

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The Institute of Medicine (IOM) 2006 report, Preventing Medication Errors, states that current methods for teaching patients about their medicines are inadequate and contribute to medication errors. At the federal level, the Department of Health and Human Services (DHHS), has urged all healthcare providers to be aware of health literacy and develop interventions addressing it in clinical practice (Department of Health and Human Services, 2010).

As a component of ARRA, the DHHS has challenged healthcare organizations to leverage technology that engages patients in self-management support and encourages clinician use of health literate communication techniques, such as teach-back (Koh et al., 2013). By increasing patient participation in care, patients can experience higher satisfaction and better health outcomes, and there is also a correlation with reduction in overall costs (Prey et al., 2013). Giving patients access to their health information and the electronic tools to use that information can better position them to self-manage their conditions, coordinate care across multiple providers, and improve communication with their care teams (Ricciardi, Mostashari, Murphy, Daniel, & Siminerio, 2013). People who use e-health resources feel better prepared for clinical

encounters, ask more relevant questions, know more about their healthcare, and are more likely to take steps to improve their health (Ricciardi et al., 2013).

Health information technology (HIT) interactive patient care (IPC) systems are being developed and integrated to support self-management through the use of inpatient bedside TVs, electronic health records (EHR), and patient portals in user-friendly interfaces. Utilizing this technology in the inpatient setting allows more face-to face time with the nurse who introduces how the information in the video will help the patient recover. Then, the nurse follows up with an individualized discussion and teach-back.

Evidence-based practice teaching techniques

Traditional models of care where patients are passive recipients of health care are no longer effective. Instead, patients must be partners and active in their care. Actively engaged patients have an enhanced ability to identify potential health risks early, enabling them to communicate with their physician in a timely manner (Nash, Reifsnyder, Fabious, & Pracilio, 2014). It is widely acknowledged in the education literature that effective patient education is based on a comprehensive learning needs assessment, and teaching is tailored to the needs and preferences of the patient. These practices empower patients to change behaviors and are referred to as "patient-centered" care (Boyde, Turner, Thompson, & Stewart, 2011). Other interventions that use a patient-centered approach and activate the patient and family's involvement in their care include the use of multi-media resources, multiple teaching sessions, teach-back technique, and a combination of these interventions (Fredricks, Beanlands, Spalding, & Da Silva, 2010). Compared to printed handouts, short videos demonstrating patients practicing self-management in the home setting have been found to significantly improve patient understanding, especially for people with low health literacy. One study found that using multi-media to increase patient awareness may decrease risk of complications. An example of this is when nurses used video clips to show patients that have had a percutaneous coronary intervention what a stent thrombosis

is, how the anti-platelet medicine prevents re-occlusion of the artery, and what happens if the patient does not take the medicine as instructed coupled with providing the patient with a weekly pill box and a simple medication calendar, there were decreased episodes of stent thrombosis (Steffenino, 2007).

Teach-Back

An effective and easy way to close the gap of communication between clinician and patient is to employ the "teach-back" method, also known as the "show-me" method or "closing the loop" (Schillinger et al., 2003). Forty to eighty percent of the medical information patients receive is forgotten immediately and nearly half of the information retained is incorrect (Kessels, 2003). Patient education is an important nursing role and core competency of fundamental nursing practice. Successful education can improve health outcomes, decrease readmissions, decrease health care costs and increase patient satisfaction. The use of teach-back method throughout hospitalization can improve the discharge process and home care for the patient. When patients repeat information and instructions back to the nurse in their own words their retention of vital at-home care information is increased (Kornburger, 2013). During the teach-back process patients transition from having their healthcare providers manage their condition to managing it themselves. Nurse use of teach-back reinforces what the patient already knows and teaches them what they don't know. Repeating this process increases patient self-care capacity, boosts their confidence in managing their condition, and allows them to self-manage it successfully. There are many components involved in obtaining positive health outcomes, but starting with teach-back involves the patients in their care and ensures that patients know how to take their medication, recognize symptoms, and attend follow-up clinic visits after they are discharged from the hospital.

Patient-centered education based on health literacy principles was identified by University of Kentucky HealthCare's (UKHC) Enterprise Interdisciplinary Patient Education

Team as a gap in clinical practice. In 2003, 2007, and 2010, the organization's stakeholders, along with the Patient Education Team, reviewed health information technology (HIT) interactive patient care (IPC) systems that included health literate video clips, personalized information, and a daily plan of care that nurses could use as a teaching tool to engage patients in their care and enhance learning self-management. The team enthusiastically embraced the idea of implementing a state-of-the-art patient education system that would integrate into the electronic medical record (EMR) and be accessible from home so that individualized self-management could be learned throughout the continuum of care. The barrier to purchasing this type of system was the high cost. The Chief Information Technology Officer and Chief Nursing Officer highly supported the program and recommended it as a donor opportunity.

To improve quality of care, pilot programs implementing teach-back and health literate care teaching tools were implemented from 2010 – 2014 on a cardiology unit, an orthopedic unit, and the cardiac catheterization recovery unit with the intent of decreasing 30-day readmissions. Nurses in each area were trained in teach-back and demonstrated competency. The first pilot utilized a heart failure tool-kit that contained a DVD, calendar, illustrated pamphlets, and pill box to support self-management of heart failure. Data were not collected during this pilot project due to lack of human resources for retrieval. A second pilot used a health literate patient teaching sheet coupled with nurse use of teach-back directed toward patient pain management after joint replacement. Data collection and analysis showed that pain-related readmissions decreased from 60% to 0%. The third pilot utilized iPads with software application (app) of short video clips that taught self-care for patients who received Percutaneous Coronary Intervention (PCI) coupled with the use of nurse teach-back. (The use of video combined with teach-back was included as a learning precursor for implementation of the HIT interactive patient care system.) In addition, a cardiac interventional nurse called the patient/families 24 – 48 hours after discharge to obtain teach back on PCI self-care skills to ensure understanding and provide clarification. A

statistician collected and analyzed data six months before and 6 months after the intervention.

The 30-day readmission rate decreased from 7.7% to 2.2%, and this was statistically significant,

p<.035. Upon seeing the successful results of these pilot programs, confidence was high that

nurses would be able to implement the use of video clips and evidence-based teaching techniques

into practice.

The University of Kentucky HealthCare received a generous donation to purchase a

health information technology interactive patient care system, GetWellNetwork, to pilot on a 64

inpatient cardiology unit. This pilot allowed an opportunity for the nursing staff to leverage health

information technology to enhance patient engagement and ensure that patients have the skills

and knowledge to manage their health at home in the hopes of improving satisfaction and

outcomes. This HIT interactive patient care program is also key in supporting the health care

organization meet Meaningful Use mandates.

Purpose

The purpose of this project is to evaluate the use of health information technology along

with teach-back to enhance patient self-management skills. The aim of this project is to address

the learning needs of patients and families with low health literacy, involve them in their care,

improve patient-clinician communication, and measure the impact on patient satisfaction and the

rate of 30-day hospital readmissions among heart failure and other cardiology patients. This

study was approved by the University of Kentucky Medical Institutional Review Board.

Theoretical Model

Doctorate of Nursing Practice nurse leaders are responsible for translating research and

evidence into practice to create and maintain cultures of quality and safety. Organizational

Development theory (OD) is a system-wide approach of implementing organizational change

through a planned process. This theory was used as the framework to facilitate the adoption of

this evidence-based intervention within the cardiology division. This philosophy places a strong value on human potential, participation in the workplace, interpersonal relationships based on openness and trust, and active involvement of staff in the change process. This leads to organizational effectiveness and success in reaching organizational goals.

The planning, implementation, and evaluation were based on the tenets of the logic model. The logic model visually depicts the relationship between the program's activities and its intended outcomes that aid nurses and the interdisciplinary team in program planning, design, implementation, analysis, and generating knowledge (Appendix A).   It also supports program management and provides project participants with a clear guide of pre-determined goals and desired outcomes, and it also helps them understand possible challenges. It informs leaders of resources needed and informs participants of resources available and a timeframe.

Methods

Design

This project employed a descriptive, quasi-experimental study design using pre and post-test comparisons. The comparisons include: thirty-day readmission rates, CAHPS patient satisfaction with transition of care scores, and Nurse Satisfaction Survey. These measures will be discussed in detail under the Methods/Procedure section.

Sample

Patients greater than 18 years old admitted to the cardiology division in Pavilion A received the patient education intervention, as did their families. The cardiology pavilion accepts any patient with a cardiac or cardio-thoracic diagnosis, and the division includes three levels of care: intensive, progressive and acute.   Inclusion criteria for the study were: 1) any adult admitted to the cardiology pavilion 2) English or Spanish speaking and 3) admission April – June, 2015, without the intervention and during the same time frame one year later, April – June, 2016.

Patients with heart transplants were excluded since there was no educational content available on the IPC system for this diagnosis. A frequency distribution of the patient demographics will be reported.

Procedures

The intervention included the nurse and patient/family use of HIT through an interactive patient care system on the inpatient TV and electronic medical record.

To evaluate the intervention, the following protocol was followed:

- All RNs attended training and demonstrated competency in the use of the HIT interactive patient care system (Appendix B) and teach-back technique (Appendix C).

  - Before training and two months' post-implementation, all nurses completed the Nurse Satisfaction Survey.

- Each patient/family was assessed by the nurse for learning needs and concerns upon admission as well as daily with plan of care interdisciplinary rounds. Individualized teaching was provided based on assessments.

- Upon admission, the nurse introduced the purpose of the IPC to the patient/family and explained that they will use it throughout their hospital stay to learn how to safely take their medicines, identify medicine side effects, learn home self-care, and recognize complications and the appropriate actions to take.

- Each patient/family is taught how to use the IPC system and/or staff will help the patient use the system.

- RNs actively involve the patient and family in the patient's care by asking:

  - What do you know?

- o What is your goal?

- o What are your concerns?

- The RN introduces the video clips and how the information may help them understand what they need to know or do.

- The patient/family views video clips prescribed according to diagnosis/need.

- The RN follows with teach-back to address patient/family concerns and understanding of home self-care.

  - o The RN teaches with potential home scenarios to practice how patients should respond.

  - o The patient and family "teach-back" key information to the nurse.

- The patient care manager includes a process evaluation report in the "end of week notes" each Friday to keep staff apprised of the fidelity of the intervention, patient/family feedback, CAHPs scores, and readmission data.

- The patient care manager and staff meet regularly for reflection, identification of barriers, and modification of the intervention as needed.

- Leaders recognize and reward the nursing staff to encourage the new practice interventions. The staff share scenarios showing successful use of the IPC and teach-back, and weekly "teach-back of the week" awards are given during huddles.

Measures

Patient Outcomes

The program effectiveness was measured with a pre versus post design examining the following:

- Thirty-day hospital readmission rates

  o Compare 30-day readmission rates of *heart failure* patients admitted to the 8th floor who use the IPC at least once during their hospital stay with patients who do not use the system.

  o Compare 30-day readmission rates of *all cardiology patients,* other than those with heart failure, admitted to the 8th floor who use the IPC at least once during their hospital stay with those who do not use the system

- Transition of Care Assessing Health Care Quality from the Patient's Perspective (CAHPS) patient satisfaction scores (Appendix D).

  o Compare CAHPS transition of care scores of *all cardiology patients* admitted to the 8th floor who use the IPC at least once during their hospital stay with those who do not use the system

Registered Nurse Outcomes

The program effectiveness was measured with a pre versus post design examining the results of the Nurse Satisfaction Survey (Nurse Survey) (Appendix E).

- Compare nurses' self-reported satisfaction with efficiency and effectiveness of patient education without the IPC system versus with use of the system.

- Compare nurses' self-reported confidence that they will integrate the use of the teach-back technique into their daily nursing practice and their belief in its importance before they implement the use of the IPC system versus three months after using the system.

Data Collection

The IPC system was put into place during April – June 2016, and April - June 2015 was used as a control period. Descriptive statistics were used to describe the patient population (Table 1) and nurse demographics. The patient population consisted of 93% Caucasian, 6.5% African American, and 3% Asian. Forty-five percent were 45-64 years old and 42% were > 65 years old. Sixty-three percent of the patients on the cardiology division were male and 37% were female. Seventeen percent of the patients lived in Fayette County, 5% were from Madison County, and the remainder were from counties throughout southeastern Kentucky. The top three diagnoses were acute myocardial infarction (AMI) and other ischemic heart disease (38%), heart failure (15%), and dysrhythmias (15%). The top volume procedures included percutaneous coronary intervention/cardiac catheterization at 18%, coronary artery bypass surgery at 8%, and aortic valve replacement at 3%.

The nursing demographics included 300 staff nurses. Seventy-six percent had Bachelor of Science in Nursing (BSN) degrees and 24% had Associate Degrees of Nursing (ADN). Years of experience included: 12% of the nursing staff had >10years, 18% had >5 -9 years, 30% had 2-4 years, and 40% were new graduates with one or less years. Nursing leadership consisted of the following: nurse director, clinical nurse specialist, ICU patient care manager (PCM), ICU assistant manager, and acute/progressive assistant manager. The Acute/progressive PCM position was vacant. A PCM from outside of the organization was hired during the three-month intervention period. Twelve super-users were trained and acted as nurse champions to mentor and coach use of the IPC system with patient/family education. The turnover rate of nurses for CVICU is 7.0% and 12.1% for acute/progressive. During the intervention period, 6 nurses left

the unit for other jobs and 23 new nurses were hired. Because there was no systematic orientation program for use of the IPC and teach-back, the newly hired nurses were not trained in including the intervention in their daily work flow.

To measure the 30-day readmissions, a three-month sample was collected before implementation of the intervention for April, May, and June 2015 the previous year and compared with a three-month post-intervention sample in April, May, and June 2016. Two data sets were collected: 1.) all readmissions on Pavilion A, 8th floor and 2.) only patients with a primary diagnosis of heart failure on Pavilion A, 8th floor. All data that were collected for this project were collected on a routine basis by the organization.   Similarly, with the CAHPS scores, a three-month pre-intervention sample was collected before the intervention for April, May, and June 2015 and compared to a three-month sample of patients that used the IPC system in April, May, and June 2016. A three question patient satisfaction survey was placed in the IPC system to obtain patient and family feedback on the following: 1) Was the system easy to use? 2) Did the videos help you understand your health problem and treatment? 3) Did the system make a positive impact on your hospital stay? Two hundred and nine patients answered these questions during the pilot project time, April – June, 2016.

The Nurse Survey was utilized to compare the confidence and conviction of the nurses using the teach-back method before training versus two months after training. In addition, nurses' satisfaction with the efficiency of the system and its ability to enhance effective patient education was measured during these same two time periods.

In order to measure fidelity of the intervention, an expert nurse trained as a Super-User used the Teach-Back Observation Tool to evaluate the nurses according to the eleven-point competency skills check list. Also, a HIT report was developed to audit documentation of videos

ordered by nurses, the number of videos viewed by patients/families, and the nurses use of teach-back.

Analysis and Results

Rate of Readmissions

A chi-square test of association was used to determine if there was a difference in readmission rate across the two 3-month periods. There was no difference (Chi-square=2.20; p=.14). The rates were 15.3% and 15.0% in 2015 and 2016, respectively. [Note, this analysis does not control for differences that may exist by floor and month, this is just the aggregate test of the pre/post differences on readmission totals.]

Patient Satisfaction

The patient satisfaction surveys were analyzed for differences in transition of care questions for April - June for years 2015 and 2016. A two sample t-test was used to compare the transition of care statements over time. No pre/post differences were found in the CAHPS patient satisfaction questions.

The CAHPS survey results were not statistically significant, however, ninety percent or greater of the 240 patients that answered the three question IPC patient satisfaction survey before discharge, responded that the system was easy to use, the videos helped them understand their health problem and treatment, and the IPC system made a positive impact on their hospital stay. Patient comments included, "I liked learning about new medicines when the doctor ordered one for me", "It was helpful learning more about my procedure and what I can do to stay healthy", and "The movies and internet were a nice way to pass the time while I was in the hospital."

Nurse Satisfaction

A two sample t-test was used to examine whether there were any differences in the mean survey score for pre (n=187) and post IPC intervention (n=154) for each question. The Nurse Survey results showed no differences and no statistical significance in any of the questions before and after the program implementation.

Fidelity of the Intervention

In order to observe if the intervention was carried out as planned, the project team developed a report with the University of Kentucky Information Technology Business Intelligence services to assess nurse documentation of teach-back April – June 2015, pre-intervention, and nurse documentation of the intervention April – June 2016, post-program implementation. The report included: percent of IPC videos ordered, videos viewed by patients/families, nurse use of teach-back after the video, and any other teach-back documented in the chart during this time period (Figure 3). The audit revealed that the clinical practice part of the intervention was never fully completed. Post-intervention, the nurses ordered videos for 49% of their patients, and 48% of those patients/families viewed the videos, but patients/families received teach-back only 16% of the time. Further investigation is needed to identify why the nurses did not provide teach-back following the patient/family viewing of the videos. It is possible that the lack of fidelity of the intervention could be one of the variables in this research evaluation that prevented the expected outcomes from being achieved.

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Limitations

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There were technical and human resource limitations that impacted the outcomes of this program evaluation. The nurses did not receive adequate training due to lack of available resources. Training was not provided as planned because the project was behind schedule due to the need for increased IT time to manage the unexpected complexity and lack of interoperability

of the integration with the EMR. Implementation of the IPC coincided with the same time period that Nurse Staff Development educators were committed to another mandated project. There were more initiatives than resources, therefore, competition was high for available resources.

A limitation that occurred before the implementation of the IPC system was the warning that nurses verbalized about the history of EMR technical problems. They stated that if the EMR did not operate smoothly and efficiently with the IPC system, they would not use the technology. Unfortunately, a significant technical problem was associated with documentation of information from the IPC system into the EMR, and as a result, too much time was required of nurses to work around this issue. The lack of efficiency of the documentation process caused nurse dissatisfaction and a lack of enthusiasm for using the system. Lastly, during the pilot time period, the patient care manager retired and another was hired after the project was started. The new manager was hired from outside of the system and was immersed in orientation so could not be directly involved in leading the culture change. Many of the original nurses chosen to be the IPC champions left the unit so the mentoring and coaching of the program declined. All of these factors are common in complex adaptive systems, such as this academic medical center, and influenced the ability of the nursing staff to adopt the use of the IPC system and EBP teaching techniques as planned.

Discussion

The purpose of this project was to evaluate the effects of evidence-based teaching techniques with use of health information technology. Other studies have demonstrated that leveraging technology increases patient engagement, activates patient participation in care, and enhances the support of self-management skills (Koh et al., 2013). In this project, it was found that there are both benefits and implications to consider in adopting and using HIT as a tool to engage and teach patients and families. The Health Information Technology and Patient Safety Report (Institute of Medicine, 2012), emphasizes that user-friendly HIT must be a high priority to allow clinical productivity and effective care. Despite progress in establishing standards and

services to support health information exchange and interoperability, electronic health information is not yet sufficiently standardized to allow seamless interoperability. Even with UKIT's efforts to mitigate problems during the integration of the IPC and EHR, technology malfunctions and lack of interoperability were barriers to using the IPC technology successfully and meaningfully.

In spite of the limitations, patient and family feedback was so overwhelmingly positive, the UKHC executive leadership decided to implement the IPC system on two additional patient care units. These two Medicine units are part of a national research project, Better Outcomes for Older Adult Safe Transitions (BOOST), a delivery care system that improves the transition of care in order to decrease readmissions. The BOOST initiative includes use of EBP teaching techniques such as patient engagement, teach-back, and daily interdisciplinary rounding and patient goal setting. The interdisciplinary team has already been trained to integrate these practices into daily care which could influence the success of obtaining positive outcomes with the use of the IPC system in these patient care areas. The same metrics will be used to measure effectiveness of the IPC with EBP teaching techniques.

Due to the efforts and feedback of the cardiology unit nursing staff to improve processes and create a comprehensive patient education program, the Medicine team will have the opportunity to implement an improved IPC system. Improvements include a technology patch for more effective and efficient integration with the EMR, patient access to the IPC system and its features through the patient portal, the addition of 125 video topics to fill patient education content gaps, a discharge pathway, a falls prevention pathway, an interactive plan of care feature, and the development of an ongoing systematic orientation and training program for staff. These enhancements should improve the likelihood of reaching desired outcomes of patient satisfaction, decreased readmissions, and nurse satisfaction. If integration and technology problems arise again, it may be time for the organization to replace the current EMR with one that is interoperable with other systems.

Implications for Practice

Utilization of health information technology coupled with teach-back to engage patients, enhance health literate care and improve self-management support is key to improving health outcomes and cost savings by preventing readmissions. In light of the findings, it is difficult to integrate evidence-based practice and change the culture of an organization. Clinical and administrative processes are more convoluted in today's healthcare organizations, and outcomes of patient care are often unpredictable in complex systems as demonstrated by this IPC pilot program (Clancy, Effken, & Pesut, 2008).   The Institute of Medicine identified complexity as the key reason for significant unpredictability and variation in clinical outcomes across healthcare organizations.

Because a complex adaptive system (CAS) is seen as a social entity and staff behavior occurs due to interactions with people in the system, nurse leaders must adopt complex thinking and focus on building and nurturing relationships. Nurse leaders must equip staff with tools to develop creative solutions and give them the authority to implement these solutions (Chaffee & McNeill, 2007). Effective organizational behavior is characterized by decentralized control that provides rapid decision making and effective execution. Traditional centralized decision-making such as an autocratic and hierarchical organization structure will lead to failure in a dynamically changing environment such as a nursing unit.

The results of this study reinforce the importance of the nurse leader providing staff with clear expectations for roles and responsibilities and ensuring adequate training and validation of staff competency in teach-back and technology use. The nurse manager must embrace the evidence-based practice so the staff nurses model his/her enthusiasm and commitment to using these new resources to improve patient care and outcomes. The nurse leader's modeling must include feedback and ongoing communication with the nursing staff. During rounds, for example, managers could ask patients open ended questions about their experience with the IPC

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system and how it is helping them. The patient responses provide the manager with insights on how well the staff are integrating IPC and teach-back into patient care. Nurses have the science background and the clinical and interpersonal skills needed to lead the way for the change of delivery care systems and transformation of health care and this effort is the perfect opportunity for nurses to affect patient outcomes.

Conclusion

This study showed evidence, although not statistically significant, of patients' satisfaction with real time availability of health literate resources to support their learning about health conditions and self-management skills. Nurses were satisfied with the effectiveness of the IPC system, and they reported that patients and families better understood self-care practices after using the system.   Readmission rates were not impacted during this pilot program, but the lack of teach-back could have influenced these results. The use of IPC systems may be more effective in improving outcomes when placed in patient care areas that have already changed their cultures by implementing the BOOST program. The BOOST program intentionally integrates EBP teaching techniques into daily care, thereby, offering a more promising environment for the successful use of the IPC system. Further research is needed to examine how cultures can be changed to include engagement of patients through leveraging technology and staff use of EBP teaching techniques. In turn, these practices may strengthen the impact of patient education on improved health outcomes and decreased healthcare costs
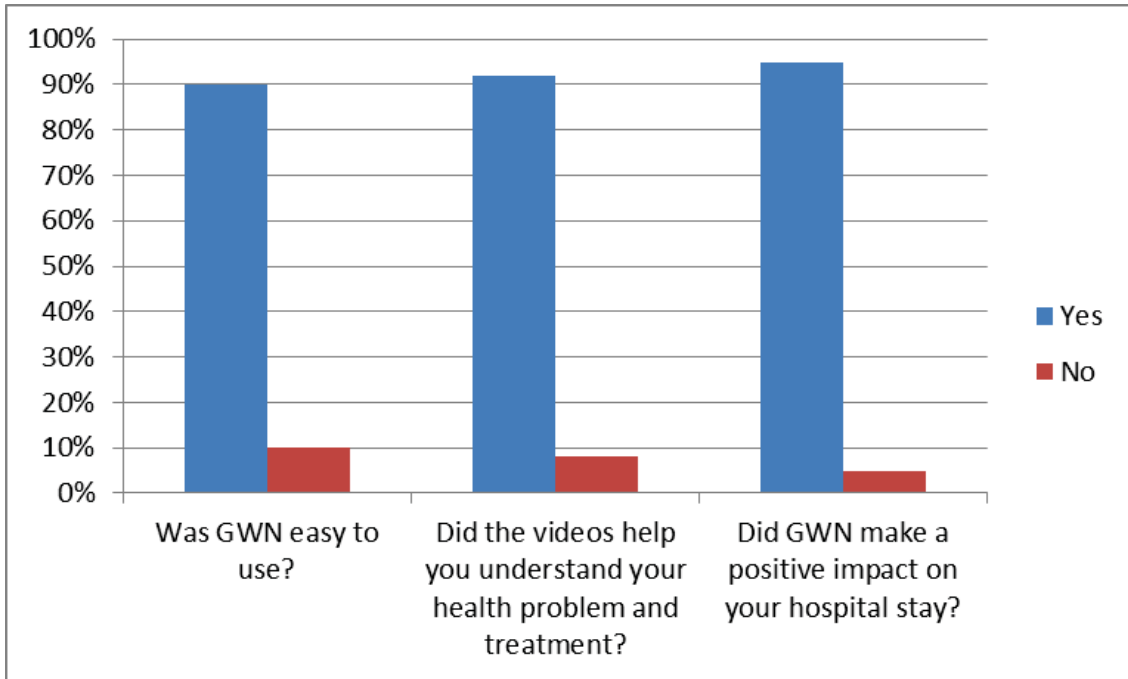
Figure 2. Patient responses n= 209

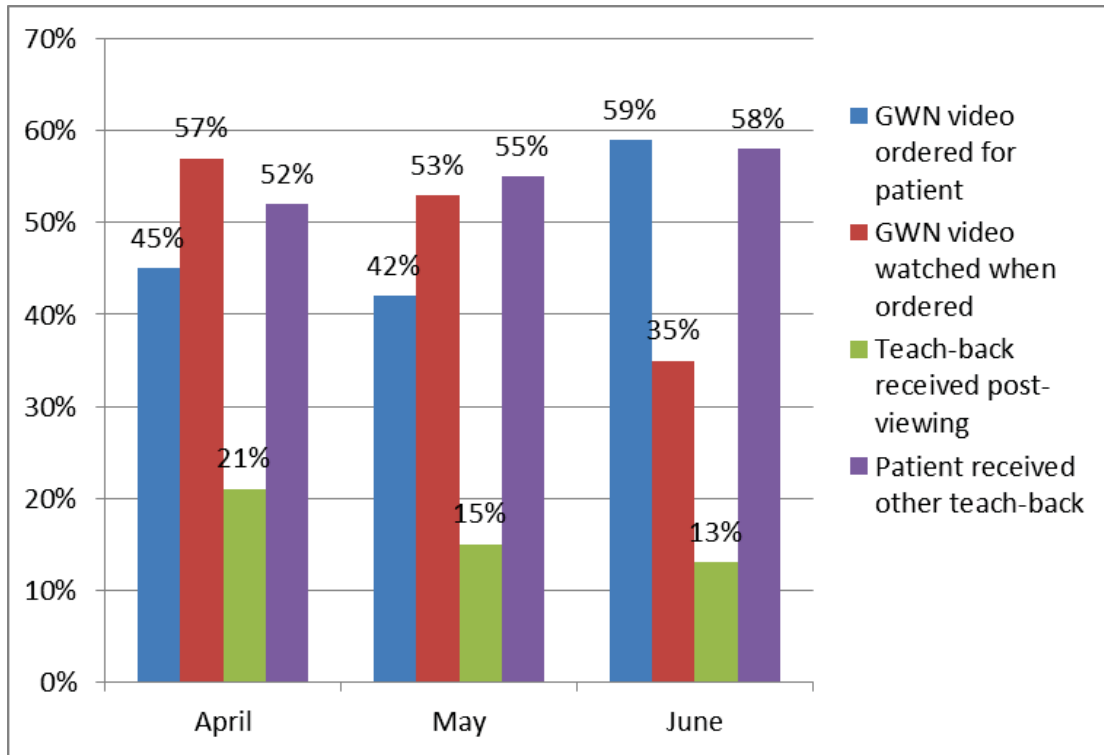Patient satisfaction related to the use of the IPC system, April – June 2016

Figure 3. Percent of IPC system use plus teach-back

Post IPC April – June 2016

Practice Inquiry Project Conclusion

In response to the Department of Health and Human Services (DHHS) call to the nation's healthcare organizations, this pilot program leveraged health information technology with the evidence-based practice communication technique, teach-back, in an attempt to improve patient satisfaction and decrease hospital readmissions. The findings from the review of the literature were conclusive that individualized patient education combined with one or more of the following - health information technology; health literate multi-media; multiple interactions; inclusion of family members; purposeful introduction upon admission that self-management is a goal for discharge; and clinician use of teach-back - increases patient engagement and enhances learning self-management skills which result in decreased readmissions.

Doctor of Nursing Practice nurse leaders are responsible for translating research and evidence into practice and creating and maintaining cultures of quality and safety. The Organizational Development theory places a strong value on human potential that staff should be actively involved in the change, and interpersonal relationships are based on openness and trust. This was used as the framework to implement the new practice into a complex healthcare environment.

It was found that there are both benefits and implications to consider in adopting and using HIT as a tool to engage and teach patients and families. Electronic health information is not yet sufficiently standardized to allow seamless interoperability, and technology malfunctions were barriers to staff in using the IPC technology successfully and meaningfully. Readmission rates were not impacted during this pilot program, but only 16% of the patients received teach-back, and this could have influenced the results. However, this study showed clinical evidence, although not statistically significant, of patients' satisfaction with real time availability of health literate resources to support their learning about health conditions and self-management skills. Ninety percent of 240 patients that answered the Interactive Patient Care System (IPC) satisfaction survey before discharge responded that they were able to easily use the technology, it

helped them understand more about their health condition and how to care for themselves, and it positively impacted their hospital stay.   These results are sufficiently conclusive to support further study to analyze the effectiveness of using an IPC system with evidence-based practice teaching techniques.

Research on the use of technology for self-management is in its infancy and there is a need for statistically powered RCTs for identification of optimal methods to change the care delivery process, obtain best outcomes, and determine cost-effectiveness.

Table 1.   **Inpatient Cardiac Patient Demographics Pavilion A, 8th floor FY 2015**
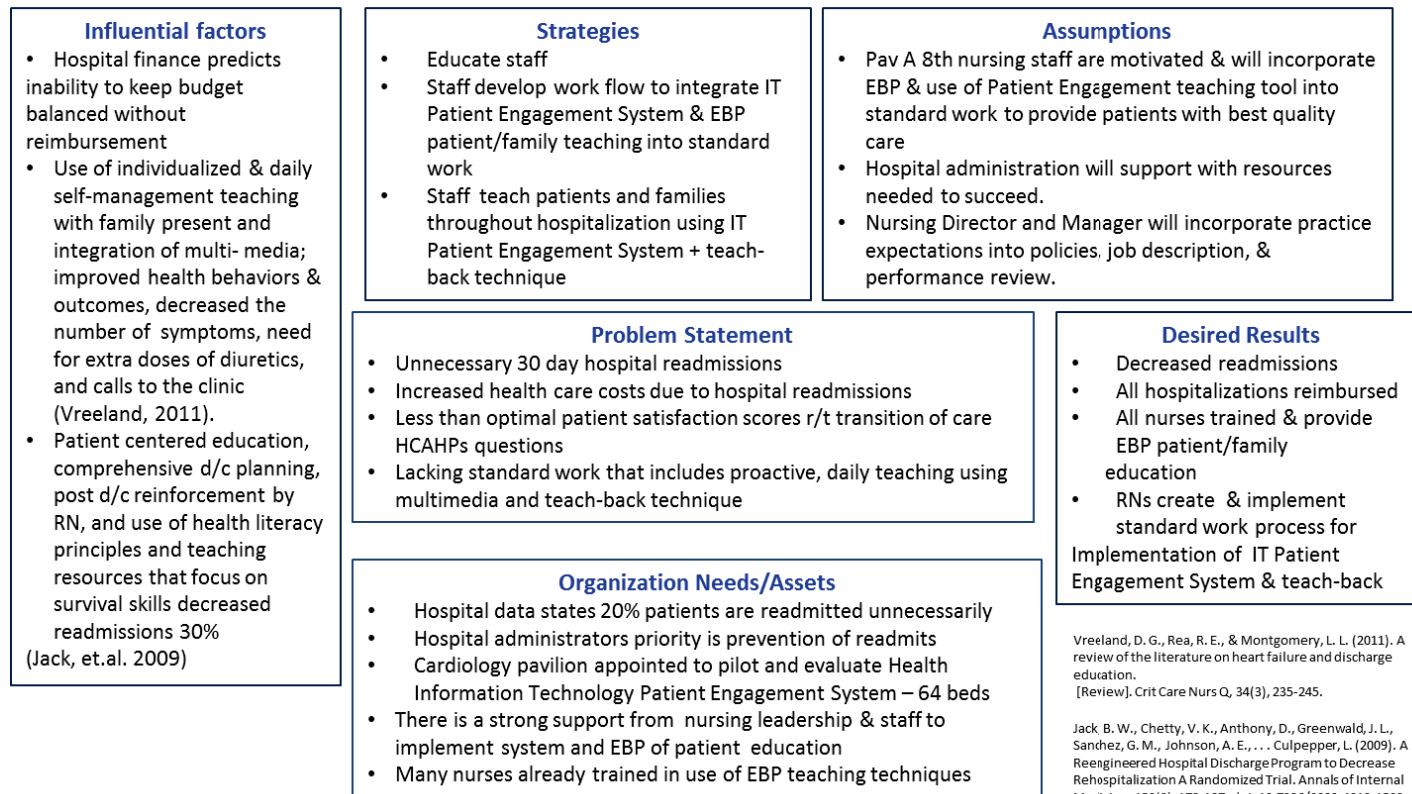
FY 2015 Race Class	Unique Patients	Racial %
WHITE/CAUCASIAN	634	93%
BLACK/AFRO AM	44	6.5%
ORIENTAL/ASIAN	2	0.3%
NATIVE HAWAIIAN	1	0.1%

Cardiac Discharge Demographics FY 2015

Unique Patients				Inpatient Discharges			
Payor Mix							
FY 2015				FY 2015			
Medicare	341	851	1,192	Medicare	371	1,182	1,553
Medicaid	138	436	574	Medicaid	151	620	771
Managed Care	124	328	452	Managed Care	136	411	547
Govt / Other	41	103	144	Govt / Other	42	138	180
Self-Pay / Charity	6	34	40	Self-Pay / Charity	6	37	43
2015 Total	**650**	**1,752**	**2,402**	**2015 Total**	**706**	**2,388**	**3,094**
Grand Total	**650**	**4,451**	**5,101**	**Grand Total**	**706**	**5,684**	**6,390**
Age / Gender Category							
	Pav A, 8th Fl	*Other*	*Total*		*Pav A, 8th Fl*	*Other*	*Total*
FY 2015				FY 2015			
Age 0 - 17		61	61	Age 0 - 17		71	71
Age 18 - 44	79	268	347	Age 18 - 44	88	360	448
Age 45 - 64	295	744	1,039	Age 45 - 64	319	1,061	1,380
Age 65 - 84	255	597	852	Age 65 - 84	275	799	1,074
Age 85 +	21	82	103	Age 85 +	24	97	121
2015 Total	**650**	**1,752**	**2,402**	**2015 Total**	**706**	**2,388**	**3,094**
Grand Total	**650**	**4,451**	**5,101**	**Grand Total**	**706**	**5,684**	**6,390**
	Pav A, 8th Fl	*Other*	*Total*		*Pav A, 8th Fl*	*Other*	*Total*
FY 2015				FY 2015			
FEMALE	239	742	981	FEMALE	257	977	1,234
MALE	411	1,010	1,421	MALE	449	1,411	1,860
2015 Total	**650**	**1,752**	**2,402**	**2015 Total**	**706**	**2,388**	**3,094**
Grand Total	**650**	**4,451**	**5,101**	**Grand Total**	**706**	**5,684**	**6,390**

Appendix A

Logic Model

Use of Health Information Technology plus Teach-Back to decrease Readmissions

Logic Model Plan

Influential factors
- Hospital finance predicts inability to keep budget balanced without reimbursement
- Use of individualized & daily self-management teaching with family present and integration of multi- media; improved health behaviors & outcomes, decreased the number of symptoms, need for extra doses of diuretics, and calls to the clinic (Vreeland, 2011).
- Patient centered education, comprehensive d/c planning, post d/c reinforcement by RN, and use of health literacy principles and teaching resources that focus on survival skills decreased readmissions 30% (Jack, et.al. 2009)

Strategies
- Educate staff
- Staff develop work flow to integrate IT Patient Engagement System & EBP patient/family teaching into standard work
- Staff teach patients and families throughout hospitalization using IT Patient Engagement System + teach-back technique

Assumptions
- Pav A 8th nursing staff are motivated & will incorporate EBP & use of Patient Engagement teaching tool into standard work to provide patients with best quality care
- Hospital administration will support with resources needed to succeed.
- Nursing Director and Manager will incorporate practice expectations into policies, job description, & performance review.

Problem Statement
- Unnecessary 30 day hospital readmissions
- Increased health care costs due to hospital readmissions
- Less than optimal patient satisfaction scores r/t transition of care HCAHPs questions
- Lacking standard work that includes proactive, daily teaching using multimedia and teach-back technique

Desired Results
- Decreased readmissions
- All hospitalizations reimbursed
- All nurses trained & provide EBP patient/family education
- RNs create & implement standard work process for Implementation of IT Patient Engagement System & teach-back

Organization Needs/Assets
- Hospital data states 20% patients are readmitted unnecessarily
- Hospital administrators priority is prevention of readmits
- Cardiology pavilion appointed to pilot and evaluate Health Information Technology Patient Engagement System – 64 beds
- There is a strong support from nursing leadership & staff to implement system and EBP of patient education
- Many nurses already trained in use of EBP teaching techniques

Vreeland, D. G., Rea, R. E., & Montgomery, L. L. (2011). A review of the literature on heart failure and discharge education.
[Review]. Crit Care Nurs Q, 34(3), 235-245.

Jack B. W., Chetty, V. K., Anthony, D., Greenwald, J. L., Sanchez, G. M., Johnson, A. E., . . . Culpepper, L. (2009). A Reengineered Hospital Discharge Program to Decrease Rehospitalization A Randomized Trial. Annals of Internal Medicine, 150(3), 178-187. doi: 10.7326/0003-4819-1503

Logic Model Indicator Development

Focus Area	Question	Indicators	Technical Assistance Needed
Teach-back and use of the Interactive TV as a teaching tool	Does the RN introduce the interactive TV upon admission and use daily to teach? Does the patient and family use the Interactive TV to learn self-management skills? Is EBP teach-back technique implemented?	Chart audits show compliance with teaching throughout hospital stay with use of teach-back/show-back by the end of 2 weeks and every week thereafter.	• Patient Education department and research literature • Staff Development provision of Nurse training program • Coaching & competency verification with expert patient education RN • Statistician for analysis & reporting for all sections
Decreased 30-day readmissions	Is the rate of 30-day readmissions rate < 21%, national average	Readmissions on the cardiology pavilion decrease by the end of 1 month and every thereafter for three months.	• Data collectors • Data reports from finance monthly • Costs of readmissions by Finance
Patient Satisfaction	Are patient HCAHPs scores > 90% related to patient education/Transition of Care?	HCAHPs questions related to patient education and discharge instructions fall in the >90% percentile as compared to nationwide statistics.	• Office of Service Excellence compiles and reports HCAHPs scores for cardiology pavilion weekly.
Increase use of Patient Portal	Do patient portal hits increase?	It provides number of patient portal hits 3 months pre-intervention and 3 months post-intervention for the cardiology pavilion.	• IT patient portal group will collect data and send report monthly

Logic Model: Evaluation Planning

Evaluation Focus Area	Audience	Question	Use
RNs use HIT as a teaching tool paired with teach-back to enhance patient/family self-management skills	Staff Nurse	• Was the teaching tool (Interactive TV) put into practice daily? • Did the intervention get to the cardiology patients? • Did patients teach-back survival skills to the RN?	• Evaluation report to stakeholders • Compliance assessment for TJC patient education standards • Magnet documentation
RNs implement ebp teach-back technique	Nurse Leaders	• Are nurses practicing best practice patient education for safe and high quality outcomes? Magnet designation? • (Outcomes) • Are nurses being trained on EBP patient education? • How are newly hired RNs being trained? • How much will it cost to train nurses?	• Nursing standards state best practice nursing results in safe and quality care for patients. • Report to Magnet repository and Magnet document for reinstatement of Magnet Status every 3 years. • High patient & nurse satisfaction scores meet Magnet Nursing Excellence award – report weekly to hospital staff. • Compliance report for TJC
Evaluation Focus Area	**Audience**	**Question**	**Use**
Decrease costs of healthcare by decreased non-reimbursable 30 day readmissions	Hospital Administrators Political leaders working on health care reform act	• Were 30-day readmits decreased < 21%? • Is the program working? • Is this program worth the cost? • Is this program decreasing healthcare costs?	• Hospital bills are not reimbursed by Medicare & Medicaid & the hospital loses money if patient is readmitted < 30 days. • CMS core measures reports • Budget implications: cost benefit analysis • Report monthly to hospital employees

| Patient Satisfaction: are patients and families satisfied with quality of teaching and preparing them for successful home care and recovery? | Patients and Families | • Are nurses providing education in multiple sessions (meds, signs & symptoms of worsening condition, f/u appointment) with plain language & teach-back?
 • Did the EBP patient education help the patient/family and quality of life? | • Positive health outcomes, quality of life.
 • Evaluation report to stakeholders, nursing staff, hospital employees, UHC, Magnet. |

Appendix B

GWN Competency Skills Checklist   UK HealthCare.

GetWellNetwork (GWN) Competency Checklist

Goal: RN Demonstrates use of GWN as a teaching tool along with teach-back, daily, to ensure patient/family understanding of what to expect in the hospital and how to care for self at home.

	Met	**Unmet**
Use of GetWellNetWork System functions		
1. Uses the pillow speaker to access the GWN menu		
2. Uses the keyboard to access the GWN menu		

3.   Navigates the GWN system and locates specific items under GWN icons:
  • Home screen
    o **Evidence based practice teaching techniques:** During admission orientation: Introduce the importance of the patient/family playing an active role in their health care utilizing the GWN and teach-back technique with the nurse
 	
    o   Admitting Nurse script:
"I want to take a few minutes to talk with you and your family about an essential part of your care here at the University of Kentucky Hospital. We will use the TV to keep you informed, communicate with us, and to provide you with education on your health condition. We will also use your TV together every day as we talk about your daily plans for your care. To get you started, I am going to start # videos for you that will tell you more about our hospital, how to use this system, as well as some tips on how you can be very safe while you are here.
 	
You will also have access to TV, the internet with Facebook and Pandora, and Hollywood movies and video games as well."
 	
  • "Hospital Info: Welcome to UK Healthcare", "Welcome to Get Well Network"
    o   Verbalize Patient Safety videos must be watched upon admission to ensure the safest hospital stay possible
  • Patient/family Education:
    o "Watch Videos Picked Just for Me"		

- o "See My Medicines" - o General health video library: "Browse Health Videos" - Patient Portal – "Get My Health Info at Home" - Language Preference – "Change My Language" - Access TV, movies, internet, games, music - Share a Comment - Nominate a nurse for the Daisy Award		
4. Identifies location in **SCM for documentation:** - Order videos - Patient/family completed videos in GWN: See Documents tabs "Nursing – GWN Patient Education - o Open GWN Document: List of videos viewed by patient/family & if they answered comprehensive question correctly (this is an enhancement of education and does not take the place of teach-back with the nurse) - o Save Document and it will populate Goals/Outcomes Education form - Nurse completes teach-back with patient/family and documents in Goals/Outcomes Education form: GWN teach-back - If patient/family are already knowledgeable and have demonstrated by teach-back/show back and don't need video clips or refuse teaching documents in Goals/Education form: GWN videos not viewed		

5. Evidence based practice nursing intervention:
Develops daily patient education goal with the patient/family (Uses the GWN to enhance learning). The nurse will introduce the prescribed video clip or new medication information and:
 	
   a. Explain how it will help them and why it is important for best recovery
   b. Allow pt./family time to view information;		

6. **Evidence based practice nursing intervention:**
Return for teach-back to assess accurate understanding (according to Teach-Back skills check list)
 	
   a. by asking the patient to explain in their own words key elements of self-care required for discharge
   b. RN will clarify/answer questions and help problem solve as needed
   c. Give patient/family scenarios they may face at home to work through		

Comments: Give completed Teach-Back skills check list and GWN skills checklist to manager for personnel file (TJC)

Validated by: _____ **(signature)**

Teach-Back skills check list

Teach-back Observation Tool

Care Team Member: _____ Date:_____

Observer: _____ Time:_____

Did the care team member...	Yes	No	N/A	Comments
Use a caring tone of voice and attitude?				
Display comfortable body language, make eye contact, and sit down?				
Use plain language?				
Ask the patient to explain in their own words what they were told to do about: • Signs and symptoms they should call the doctor for? • Key medicines? • Critical self-care activities? • Follow-up appointments?				
Use non-shaming, open-ended questions?				
Avoid asking questions that can be answered with a yes or no?				
Take responsibility for making sure they were clear?				
Explain and check again if the patient is unable to use teach-back?				
Use reader-friendly print materials to support learning?				
Document use of and patient's response to teach-back?				
Include family members/caregivers if they were present?				

Appendix D

Assessing Health Care Quality from the Patient's Perspective (CAHPS) patient satisfaction survey questions:

- o Did nurses listen carefully to you?

- o Did nurses explain things in a way you could understand?

- o Before giving you new medicine, did the staff tell you what the medicine was for?

- o Before giving you new medicine, did the staff describe possible side effects in a way you could understand?

- o Did you get information in writing about what symptoms of health problems to look out for after you left the hospital?

- o When you left the hospital, did you have a good understanding of the things you were responsible for in managing your health?

- o When you left the hospital, did you clearly understand the purpose for taking each of your medications?

- o Would you recommend this hospital to your friends and family?

- o Using any number from 0 to 10, where 0 is the worst hospital possible and 10 is the best hospital possible, what number would you use to rate this hospital during your stay?

Appendix E

Nurse Survey

UK HealthCare. **Nurse/Provider Survey** **getwell:)network**

This survey is designed to measure the confidence and conviction of using teach-back in our institution and the usability of the Get Well Network. Please complete the following evaluation to help identify any areas of opportunity. It should take no longer than 5 minutes to complete. If you submit this survey, you are giving your permission to use the results of unidentified survey data that will be analyzed and reported in aggregate. This is confidential and there will be no identification of any individual participant.

What is your current role at UK HealthCare?

☐ Physician/Provider   ☐ PCF   ☐ Nurse Manager
☐ Nursing   ☐ Dietician   ☐ Other care provider
☐ Pharmacy

What is your current GetWellNetwork training status?

☐ I have not yet received the UKHC GetWellNetwork or any type of workshop.
☐ I have received the UKHC GetWellNetwork Training

On a scale of 1 to 10, how convinced are you that it is important to use teach-back (ask patients to explain key information back in their own words)? Circle one.

Not at all convinced									Highly Convinced
1	2	3	4	5	6	7	8	9	10
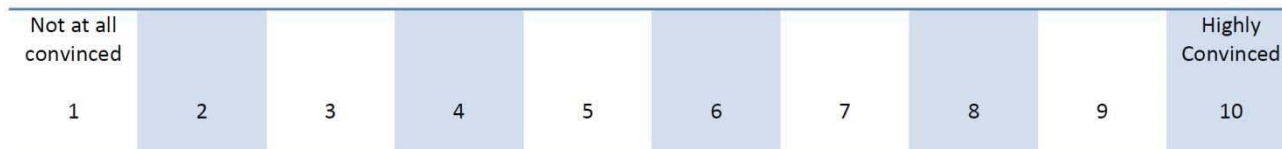
How often do you ask patients to explain back, in their own words, what they need to know or do to take care of themselves?

☐ Never.
☐ I have been doing this for less than 4 months.
☐ I do not do it now, but plan to do this in the next month.

☐ I do not do it now but plan to do this in the next 2-6 months.
☐ I do not do it now and also do not plan doing it in the future.

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Please rate the usability of the GetWellNetwork.

Try to respond to all the items. For items that are not applicable, use N/A

	Strongly Agree	Agree	Somewhat Agree	Neither Agree nor Disagree	Somewhat Disagree	Disagree	Strongly Disagree	N/A
Overall, I am satisfied with how easy it is to use this system.	○	○	○	○	○	○	○	○
It was simple to use this system	○	○	○	○	○	○	○	○
I am able to complete my work efficiently using this system.	○	○	○	○	○	○	○	○
The information (such as online help, on-screen messages, and other documentation) provided with the system is clear.	○	○	○	○	○	○	○	○
It is easy to find the information that I need.	○	○	○	○	○	○	○	○
The organization of information on the system screens is clear.	○	○	○	○	○	○	○	○
The system has all the functions and capabilities I expect it to have.	○	○	○	○	○	○	○	○
Overall, I am satisfied with this system.	○	○	○	○	○	○	○	○
I believe this system will make my job of educating the patient and family more efficient.	○	○	○	○	○	○	○	○
I believe this system will enhance my ability to teach patients and families more effectively.	○	○	○	○	○	○	○	○

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