Southern California CSU DNP Consortium

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A FEASIBILITY STUDY: IMPLEMENTATION OF A SAFETY ASSESSMENT TOOL TO ASSIST CLINICIANS IN COMMUNICATING PATIENT SAFETY RISKS

A DOCTORAL PROJECT

Submitted in Partial Fulfillment of the Requirements

For the degree of

DOCTOR OF NURSING PRACTICE

By

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ABSTRACT

Patients with neurological disorders often have safety risks, which may make it difficult to function safely at home. Currently, there are limited standardized, person-centered, multi-risk assessment tools used to help identify safety risks among patients with neurological disorders.

The purpose of this feasibility study was to identify safety risks in patients with various neurological disorders through the implementation of a 9-question safety assessment tool created by the author of this study and a team of neurologists. Tool usage should facilitate communication among patients, nurses, and providers, enabling engagement of appropriate resources to mitigate risks.

The sample consisted of patients with various neurologic disorders seen in a general hospital's neurology clinic in the San Fernando Valley. Following IRB approval from the medical institution, patients completed the safety assessment questionnaire in clinic prior to being seen by their provider. Neurologists, residents, and a nurse practitioner reviewed the form prior to meeting with the patient. Identified risks were discussed privately with the patient during the clinic visit and noted as discussed on the safety assessment questionnaire.

Complete data were collected during 86% (670) of 779 patient encounters (M = 85%, SD = 15%). At least one risk factor was documented in almost half (49%) of patient encounters. When a risk factor was identified, this was almost always addressed by clinicians (93% of the time).

An evidence-based checklist identifying common risk factors directs both clinicians and patients to focus on reducing and mitigating risk factors and promotes patient safety by centering discussion on modifiable risks and direct treatment. Implementation of a safety assessment tool opens patient-centered discussions and modifies patients' and clinicians' behavior, which may positively impact patient outcomes.

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INTRODUCTION

Effective communication is imperative for the delivery of safe and reliable patient care. It is considered one of the leading priorities in health care today. Teamwork and communication are integral components in creating a culture of good communication and accordingly, are important precursors of patient safety (Makary et al., 2006).

Suboptimal communication between health professionals has been recognized as a significant causative factor in incidents compromising patient safety (Marshall, Harrison, & Flanagan, 2009). Marshall et al. (2009) found that communication failures have been estimated to be a major factor in 60-70% of serious incidents. Faulty communication has been implicated both in exhaustively studied and well-known catastrophes such as the explosion of the space shuttle Challenger, the release of methocyanate in Bhopal, India, and the incidence of adverse events in other high-risk settings (Sutcliffe, Lewton, & Rosenthal, 2004). Pfrimmer (2009) mentioned that communication breakdowns account for an overwhelming majority of sentinel events. Rabinovitch, Hamill, Zanchetta, and Bernstein (2009), similarly support this by stating that communication errors were the leading underlying cause of adverse events, associated with twice as many deaths due to clinical inadequacy.

Although the provisions of healthcare usually involves a multidisciplinary team of physicians, nurses, and allied health professionals caring for patients, many of them work independently of each other in time and space. Failure to communicate important patient information by healthcare providers and by patients themselves can result in medical errors, adverse patient events, injuries, and even death (Farra, Nicley, & Hodgson, 2014). A retrospective Australian survey of hospital admissions showed that communication

problems were the most common cause of preventable disability or death (Sutcliffe et al., 2004).

Collaboration between nurses and physicians is essential in communication, facilitating improved patient outcome and overall, patient care satisfaction. The benefits of effective nurse and physician communication include decreased cost, better patient care, and decreased patient morbidity and mortality (Johnson & Kring, 2012). However, the many conflicting daily demands of practicing in a large teaching facility such as providing clinical care and mentoring fellows, residents, and nurse practitioners, often limits the available time for physicians to communicate with their patients and staff.

The Influence of Electronic Health Records on Communication

In 1991, the Institute of Medicine (IOM) released *The Computer-based Patient Record: An Essential Technology for Health Care*, which nationally triggered a new way of thinking regarding communication in a health care setting (Sensmeier, 2009). According to Sensmeier (2009), the implementation of electronic health records (EHRs) increased efficiency in communication and patient safety by more timely documentation, increased access to patient information, provided automated notifications, provided access to safety alert screens, and provided up to the minute medication documentation.

In a study by King, Patel, Jamoom, and Furukawa (2014), researchers found the majority of clinicians who adopted the use of EHRs reported EHRs led to a variety of clinical benefits such as remote accessibility of the patients' chart, alerts of potential medication errors and critical lab values, availability of formulary medications and electronic prompts designed to remind clinicians to order preventive care services. However, the utilization of an EHR does not come without risks. As stated in Sensmeier

(2009), nurses found that EHRs hindered their work by decreasing time spent with the patient, creating frustration over slow system speed or downtime and unavailability of computers, and the distraction of looking at a computer screen instead of their patients resulting in a potential decline in quality care. In a study by El-Kareh et al. (2009), the authors noted that many clinicians felt that the electronic health record had an initial negative effect on their patient's interactions and resulted in worsening efficiencies related to medical documentation and length of patient visits. The lack of access to information whether due to system failures or lack of efficient documentation often resulted in redundant test ordering with resultant substantial cost implication. Other barriers noted by the authors included the need to significantly redesign workflows, extensive training and education, and the potential loss of clinical efficiency. Sutcliffe et al. (2004) found that although charts are the primary means of communication among many different health care providers, this is sometimes not the best way of communicating clinical issues. Often notes cannot be found electronically, are entered late, or due to time constraints, fail to mention pertinent information. In some circumstances, at many healthcare facilities, electronic health records consumed a vast amount of time, further compromising provider time spent with the patient and effective communication between the patient and providers.

Examples of the quandaries encountered with EHRs have been well documented in the literature and in many health care institutions. For example, in my work site, prior to the implementation of the EHR, health care clinicians received a hard copy of their patient's medical information. This information was organized in different sections in the patients' chart and was easily accessible. When the EHR was adopted, the dilemma

of retrieving multiple data materialized for the clinical staff. Health care providers also became easily frustrated due to the complexities of having to navigate through multiple screens to view patient data and became disappointed due to slow computer speed and disproportionate clinician-computer ratios. These difficulties led to decreased patient-provider time, as more time was now focused on retrieving patient information and completing charting and less time communicating with patients. Subsequently, patients called more frequently following their appointments, requesting to speak to their neurologist to discussed pertinent safety risks, which were not discussed during their last appointment. Some of the safety risks necessitated an immediate evaluation by a health care provider, which led to patient inconvenience and frustration of having to be rescheduled in an already busy clinic.

It is realistic to presume that no large hospital or health care organization is immune to individual errors; that the causes that increase the likelihood of individuals making errors can never be entirely eliminated. However, human performance can be improved by recognizing that communication and teamwork failures are common and lie at the root of many preventable adverse outcomes in the health care delivery system (Chassin & Becher, 2002). Remedying these failures is one of the many challenges and hope for improvement in health care.

Purpose of the Project

Effective communication and teamwork are instrumental in addressing healthcare's increasing staff shortages, the growing need for cost reduction and perhaps, more importantly, reducing safety risks in patients (Thomas, Sexton, & Helmreich, 2003). Each year, healthcare providers are expected to do more with fewer resources and

to maintain safety as a prime focus. The flow of information between healthcare providers (e.g., between physicians and nurses) is of particular relevance to effective teamwork (Thomas et al., 2003). Good attitudes about teamwork are important, as they are highly associated with better patient outcomes due to error avoidance and safety risk reduction.

A subset of patients who have increased safety risks are patients with neurologic disorders. For example, epilepsy-related death, particularly sudden unexpected death in epilepsy, is still underestimated by health care professionals and may reflect the mistaken belief that epilepsy is a benign condition (Shankar et al., 2013). Although a small number of people have a risk of sudden death due to their epilepsy, it is important for people with epilepsy and their families to be aware of this risk and other risks associated with epilepsy such as drowning, motor vehicle accidents, falls, and memory impairment.

Other patients with various neurological disorders are at risk for falls, accidents, and cognitive impairments. Patients who suffered a cerebral vascular accident, have a neuromuscular condition, are demented, or have an autoimmune disease such as MS are a few examples. According to Matsuda et al. (2011), several studies have investigated fall rates among persons with MS. The findings are consistent with retrospective studies in which authors reported a 50% fall rate in persons with MS (Matsuda et al., 2011). Precipitating factors for falls vary across patients, but they include weakness, decreased balance and gait, visual problems, use of gait devices, and impaired cognition.

Awareness of the ability to balance is also important in patients with dementia or Alzheimer's disease due to its relationship with fall risks. In a study by O'Connell, Dal Bello-Haas, Crossley, and Morgan (2014), the authors found that awareness of balance

was associated with fall history, balance, confidence, and instrumental activities of daily living. In addition to falls, other inherent safety risks of patients with dementia and their families include the use of fire while cooking; financial matters where poor decisions can result in loss of assets; and perhaps more saliently, driving, which presents a risk not only to the patient but to the public as well.

Another important safety risk is patient abuse. Abuse may occur in different forms such as physical, sexual, emotional, and financial. Patients with chronic neurological conditions often have severe cognitive or physical impairments, which make them dependent on their caregivers for the majority of their care and activities of daily living. This burden of care may be too great for a single caregiver to provide, leading to "caregiver burnout" (Roque, Weinberg, & Hohler, 2013). This increases the risk that the caregiver will become a perpetrator of abuse. Moreover, patients with a chronic neurological disease may be unable to defend themselves or report abuse to authorities.

The relationship between patients with neurological conditions and safety risks are important topics to communicate between patients, nurses and their neurologist. A teamwork paradigm is an appropriate approach in identifying such risk factors. One way of achieving this goal is through the implementation of a safety risk questionnaire, which would assist in identifying major safety risk factors in patients with neurological conditions as well as promote communication among nurses, clinicians, and patients. The anticipation is that the questionnaire will assist in communicating and minimizing modifiable safety risks, promote patient safety, and guide treatment.

The purpose of this feasibility study was to implement a safety assessment tool to assist clinicians in identifying and communicating potential safety risks in patients with

neurological disorders in a large general hospital, resulting in, appropriate identification and assessment in addressing the risks with definitive actions. The implementation of this tool may result in supplementary benefits as well, such as encouraging clinicians to perform routine safety assessments with their patients, since it is not consistently practiced, and potentially establish a conventional safety assessment protocol for patients with neurological disorders. A major goal in the utilization of this tool is not only to identify safety risks and promote communication among clinicians and nurses, but also to open a patient centered discussion with patients and outline individual risk factors, which could impact the patient's health.

Theoretical Framework

Relationships between physicians and nurses are a significant part of the activities that involve healthcare decisions. Although physicians and nurses have segmented serious roles in providing team-based collaborative care, the literature on current relationships between physicians and nurses in typical health care settings illustrate troublesome characteristics that affect the quality of patient care that they provide (Jain, Luo, Yang, Purkiss, & White, 2012). Literature has progressively demonstrated that physician-nurse relationships greatly affect the quality of patient care they jointly provide. The authors further stated that although physicians and nurses are central members of today's health care teams, discrepancy continues to exist on how physicians and nurses view these communication disparities. In a study by Thomas et al. (2003), the authors surveyed critical care physicians and nurses exploring their attitudes toward team work. They found that 73% of physicians and only 33% of nurses rated the quality of their collaboration and communication as high or very high. In another study by

Rothstein and Hannum (2007), the authors found that advance practice nurses rated less favorable the physician's recognition of their additional responsibilities such as administrative responsibilities, responsibilities to other patients and personal circumstances.

The professional model of nursing perceives the relationship between physicians and nurses as interactions between two professions, each with its own areas of expertise and responsibilities (Rothstein & Hannum, 2007). However, many factors aside of expertise, responsibilities, and profession can influence the relationship between nurses and other healthcare providers. Such variables may include type and size of the work organization, patient illnesses and social characteristics, nurse and physician specialties, and work philosophies. Other factors may consist of responsibilities, education, perceived professional hierarchy, and formal effective teamwork and communication training. Puntillo and McAdam (2006) noted that physician's time in the hospital units is more limited because he or she must attend to other patients and responsibilities. Nurses spend more direct time with the patients and family members and thus can offer more ongoing support. Thus on several levels, there are differences between physicians and nurses that can create obstacles to communication and collaborative care.

Another conceivable communication obstacle that has recently emerged in healthcare is the introduction and utilization of electronic health records (EHRs). The American Recovery and Reinvestment Act (2009) directed billions of federal dollars to accelerate the widespread adoption of electronic medical records (EMRs) and electronic health records (EHRs; Shank, Willborn, Pytlikzillig, & Noel, 2012). The Health Information Technology for Economic and Clinical Health (HITECH) Act of 2009 was

designed to support diffusion of health information technology to improve patient care (King et al., 2014). Furthermore, HITECH authorized the Medicare and Medicaid EHR Incentive Program, which began providing incentive payments to physicians and hospitals that demonstrated meaningful use of EHRs in 2011. The EHR is considered a newer and promising tool for enhancing communication and health care delivery, as such, the interest in EHRs both, nationally and internationally, has grown enormously (Denomme, Terry, Brown, Thind, & Stewart, 2011).

However, despite promising greater accessibility to patient information and charting, EHRs are not immune to barriers or problems. According to Shank et al. (2012), privacy and security concerns were identified by behavioral health providers as major barriers in confidently utilizing EHRs. They reported that confidentiality is always an important factor and the biggest drawback is that data are being compromised or shared inappropriately or may reach the wrong person. In view of this, some patients have become reluctant to communicate personal information for fear that their information may be viewed by external sources. To further support problems in EHR, Kralewski et al. (2008) cited that it often takes 5 years or greater to completely shift to EHRs. In the interim, many practices must maintain duplicate electronic and paper-based systems. This seriously limits the effectiveness of improving quality of care and in fact, may increase patient care hand-off error, create communication deficiencies, and make it difficult to access important medical information. Lastly, the authors noted a huge barrier to the efficiency and reliability of EHRs when they were completed at the end of clinic, and there was a rush to complete charting and "leave on time." This reduced the

chances that the clinicians would navigate through multiple screens and completely review or input pertinent patient data.

In brief, many time constraints to finish charting, the need to navigate through multiple screens to view patient information, the use of generic check-off templates, and oversights of crucial patient information, all contribute to increased patient safety risks and breakdown in communication among the patient, clinicians, and nurses.

Because physician-nurse relationships are a critical component of high-functioning patient teams, interventions are needed to facilitate communication between physicians and nurses and prevent potentially compromising quality patient care. According to Sutcliffe et al. (2004), the improvement in communication and safety awareness to affect system change and improve patient outcome should be a focus in all healthcare settings. Subsequently, these behavioral changes must be targeted toward multiple levels, rather than simply one individual level of a group or organization.

Theories pertaining to change and behavior were reviewed to assist in the selection of the theoretical framework for this feasibility study. During the past decade, there has been an increasing recognition of the application of different behavioral theories in the implementation of behavior-change interventions (Fishbein & Cappella, 2006). According to Fishbein and Cappella (2006), theories of behavioral predication and behavior change are significant because they contribute a framework to help identify the causes of any given behavior, which is an important initial step in the development of a successful intervention or change of behavior. Several theories have been used to explore change and behavior such as the shared decision-making model (SDM; Kasper, Légaré, Scheibler, & Geiger, 2012), the technology acceptance model (TAM; Gagnon et al.,

2010) and Prochaska's transtheoretical model of behavior change (Prochaska, 2008). For the purpose of this feasibility study, the theory of reasoned action (TRA) was utilized as the guiding framework. It helped guide the predictive behavioral outcomes in the application of a newly developed safety risk assessment tool which was utilized in attempt of identifying safety risks in patients with neurological disorders and facilitating communication in a busy neurology clinic.

Fishbein's Theory of Reasoned Action was developed in the field of social psychology and has been used by many researchers, particularly in regards to health communication and to predict behavioral intentions and behavior (Fishbein, 2000; Fishbein & Cappella, 2006; Gagnon et al., 2010). In a study by Natan, Beyil, and Neta (2009), TRA was applied for the purpose of evaluating the nurse's perceptions of the quality of care they provided hospitalized drug addicts. The researchers queried if nursing staff members' attitudes and subjective norms were related to their intended and actual quality care given to drug addicts. They found that nurses' stronger intention to provide quality care to drug users were associated with more positive attitudes. They learned that nursing staff had moderately negative attitudes towards drug users, held negative stereotypes of drug addict patients, and most considered the management of this group difficult. According to the authors, they concluded that positive attitudes towards drug users, perceived expectations of others and perceived correctness of the behavior are important in their effect on the intention of nurses to provide high quality care to hospitalized patients addicted to drugs (Natan et al., 2009).

Roberto, Krieger, Katz, Goei, and Jain (2011) examined the ability of the TRA and theory of planned behavior (TPB) to predict whether or not pediatricians encouraged

parents to get their adolescent daughters vaccinated against the human papillomavirus (HPV). Results indicated that pediatricians had positive attitudes, subjective norms, and perceived behavioral control toward encouraging parents to get their daughters vaccinated; that they intended to regularly encourage parents to get their daughters vaccinated against HPV in the following 30 days; and that they had regularly encouraged parents to get their daughters vaccinated against HPV in the past 30 days (behavior). Though data was consistent with both the TRA and TPB models, the results indicated that perceived behavioral control adds only slightly to the overall predicative power of the TRA, suggesting that attitudes and norms may be more important targets for interventions dealing with this topic and audience.

Lastly, Ortega, Huang, and Prado (2012) examined the HIV risk behaviors among Hispanic adolescents by integrating elements from two theories, the Eco-Developmental Theory and the TRA. This study suggests that family can play a central influence (as in subjective norms) in the conceptualization and theoretical foundation of community prevention efforts against communicable infections such as HIV.

The TRA includes the following concepts: behavioral attitudes, subjective norms, behavioral intention, and desired behavior. The desired behavior is the behavior or response a person is interested in predicting or changing. Behavioral attitudes branch from the individual's personal judgment whether performing the behavior would be good or not good for him/her. These attitudes influence the individual's beliefs concerning the personal results expected to occur from the realization of their behavior (Natan et al., 2009). The subjective norm is the individual's personal perception of the positive or negative social pressures applied on him or her to perform or avoid performing a certain

behavior. This social pressure leads to performance or avoidance of a desired behavior or change. According to the TRA, behavioral intention is defined as the individual's subjective probability of performing a specific behavior (Natan et al., 2009). The behavior intention is a combined meaning of the individual's behavioral attitude toward performing the behavior (i.e., the individual's favorable or unfavorable predisposition toward the behavior) and the subjective norm (i.e., the individual's perception of the behavior expected by relevant significant other.

According to TRA, the best predictor of desired behavior (the action one actually desires) is preceded by one's behavioral intention to perform or not perform the behavior (Fishbein & Cappella, 2006). A visual representation of these constructs is shown in Figure 1.

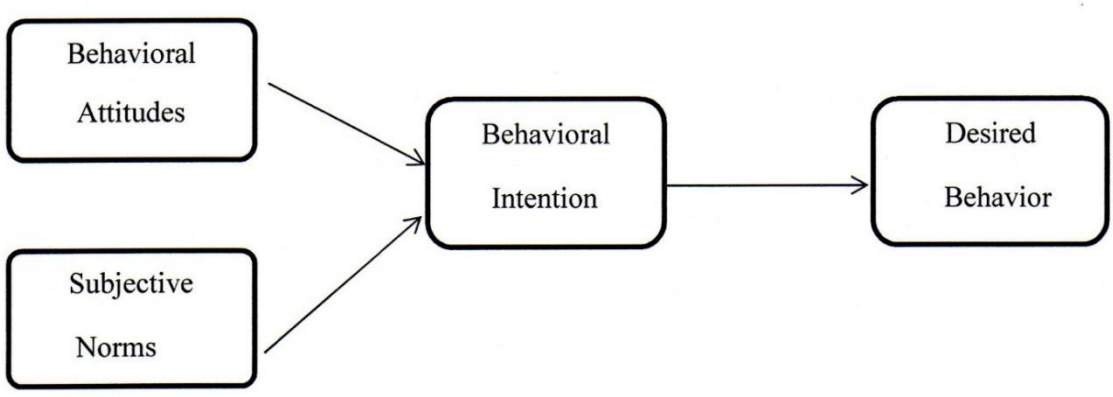

Figure 1. Fishbein TRA theoretical model. Adapted from "Nurses' perception of the quality of care they provide to hospitalized drug addicts: Testing the theory of reasoned action," by M. G. Natan, V. Beyil, & O. Neta, 2009, *International Journal of Nursing Practice*, *15*(6), pp. 533-573. Copyright 2009 by Blackwell Publishing. (See Appendix A for permission to use.)

In this feasibility study, the application of the TRA was the guiding framework used to predict the success or failure of this project. First, the behavior that needed to

change or improve was examined. The desired behavior in this feasibility study was to identify safety risks in patients with neurological disorders. To achieve this, behavior needed to change. The behavior intended to change was the utilization of a questionnaire to help identify patients with a safety risk. The success (or failure) of this project rested on the physicians' and nurses' attitude toward performing this behavior. Would they feel the implementation of this questionnaire was an added burden that created unnecessary work? Would they lose enthusiasm as the project unfolded? This was also influenced by the subjective norms the nursing staff and clinician group perceived about the utilization of this tool. If the majority of members in each team perceived this tool as significant in identifying safety risks and enhancing communication and collaborated with the implementation of this tool, it was more likely that any outliers in the group would also cooperate, as they may feel cooperation was expected of them by significant relative others (i.e., supervisors, team leaders, colleagues). This in turn, would predict the success of the behavioral intention: completion of the patient safety risk questionnaire with each patient's appointments. Inversely, if the attitude was oppositional by the team members involved and subjective norms, most likely the team would all respond unfavorably to the intended behavioral change (implementation of this tool) and the desired behavior would not be achieved: identifying safety risks while enhancing communication. In this situation, the tool would be abandoned and safety communication could suffer.

With the application of the TRA, behavioral predictions and behavioral changes allow us to identify critical beliefs underlying a person's intention to perform (or not

perform) a given behavior (Fishbein & Cappella, 2006). These beliefs can serve as indicators for convincing communication and identifying safety risks.

REVIEW OF THE LITERATURE

A systematic review of literature was undertaken using the databases of MEDLINE, Web of Science, PubMed, Pub Med, Cochrane Central Register, CINAHL/EBSCO, and Google Scholar. Topics that were germane to this project were safety in healthcare, communication, and electronic health records. Key terms used to research safety risks were safety risks in hospitals, risk assessment, evaluation in hospitals, safety in neurologic patients, and patient safety risks. Safety risks in epilepsy and MS were reviewed with key terms: safety in epilepsy/MS, safety risks with epilepsy/MS, seizure precautions/safety, and safety education in MS/seizures/epilepsy.

In searching communication, key terms used were nurse/physician communication, communication barriers in healthcare providers, effective communication with doctors and nurses, communication improvements in healthcare providers, and healthcare communication. Electronic health records were researched with key terms: EHR, medical records, electronic medical records, electronic charting, and medical charting. Limitations were set for English language scholarly journals from the years 2000 to 2014. Review of literature was ongoing throughout the implementation of this project.

In the following paragraphs, a discussion of specific findings related to each of the major themes identified will be presented.

Interdisciplinary Communication

Communication in health care is one of the most important factors associated with quality of care and patient safety. Successful communication can be defined as the ability to translate information openly, accurately, and in a timely manner (Hoonakker,

Carayon, Walker, Brown, & Cartmill, 2013). Development of strong communication paths that support effective and seamless coordination between teams has proven to be an antecedent to positive patient outcomes (Farra et al., 2014). Inversely, poor communication has been identified as the root cause of the majority of negative sentinel events occurring in hospitals. In 2008, the Joint Commission highlighted improving effective interprofessional communication as one of its National Patient Safety Goals (Farra et al., 2014).

Kishimoto and Noda (2014) studied the difficulties of interprofessional teamwork in diabetic care. They found that insufficient interprofessional communication and inconsistency in motivation levels among staff were frequently citied as causes of insufficient teamwork and poor interdisciplinary communication. Both physicians and nurses considered that insufficient interprofessional communication was the main problem: physicians were not likely to realize that relationships between physicians and non-physicians staff were key, while nurses specifically considered that physicians should be more cooperative with them. Successful interprofessional teamwork-in other words, when multiple health workers from different professional backgrounds work together and are able to provide comprehensive services effectively by working with patients, their families, caregivers, and communities-lead to better patient care and safety and improved health outcomes for patients.

Saddik and Al-Mansour (2014) studied if computerized order entry system (CPOE) supported nurse-physician communication in the medication order process. They found that although CPOE characteristics supported medication order processes and nurse physician communication, a high percentage perceived that after CPOE

implementation, frequent physician contact was required creating additional work to follow up with physicians. Nurses in the study that had been working for 15 years or longer and worked in the surgery department reported negative perceptions of CPOE supporting the need for additional nurse-physician communication.

Lastly, Whitlow, Drake, Tullmann, Hoke, and Barth (2014) evaluated the impact of using Smartphones at the bedside on the quality of interprofessional communication between nurses and physicians. Although the results demonstrate improvement in quality of communication, and significant workflow efficiency, the authors noted that further research on the impact on patient safety and satisfaction is still needed in this mode of communication.

Interdisciplinary communication continues to be a topic of interest to many in healthcare. Due to many factors including the interruptive nature of many hospital units or healthcare settings, direct communication breakdown can lead to many errors and potential safety risks (Hoonakker et al., 2013). Because of this breakdown, several studies have implemented tools to assist in improving communication and safety. Missing in the literature review however, are robust and reputable safety assessment tools in patients with neurological disorders, which will help identify and address safety in patients with neurological disorders. It was the intent of this feasibility study to implement such a tool.

Electronic Health Records (EHRs)

The development of the electronic health record (EHRs) has been greeted as a critical step in improving medical care efficiency, medical quality, patient safety, and cost reduction. An EHRs system is defined as digitally stored healthcare information

throughout an individual's lifetime with the purpose of supporting continuity of care, education, and research (Ajami & Arab-Chadegani, 2013). The implementation of a national program of EHRs was an important section of the Patient Protection and Affordable Care Act of 2010 that provides bonuses to incentivize their widespread implementation in hospitals and physician's office (Bernat, 2013). Urged on by Medicare and Medicaid financial incentives, the prospect of increased efficiency, and the expectation of improved outcomes, the rate of adoption of EHRs by health care providers has accelerated since 2009 (Rothstein, 2012). According to Rothstein (2012), a study by the Center for Disease Control and Prevention published in 2011, reported that 57% of office-based physicians had adopted some type of EHRs.

As with most advances in technological advances, every benefit carries potential risks and the EHRs is no exception. Today, patient information is widely spread throughout healthcare systems due to the vast amount of healthcare providers and staff. The accessibility and lack of privacy controls of health information can lead to a variety of individual and societal harms such as embarrassment, stigma, discrimination, hesitancy to disclose information by patient and possible health consequences related to lack of or withheld sensitive information (Rothstein, 2010). As patients become more aware of the widespread use of EHRs and their information accessibility, they may become more reluctant or skeptical in providing sensitive information such as depression or substance abuse, which can consequently compromise patient safety.

Privacy concerns are only one barrier among the various communicating obstacles in EHRs. In a study by Ajami and Arab-Chadegani (2013), other struggles in EHRs

included reduction in practice productivity, disturbance in workflow, and more difficulty in obtaining medical information than paper base records.

Paré et al. (2014) researched barriers to organizational adoption of EHRs and found major barriers in their use included lack of computer skills of physicians and staff and lack of technical training and support. Having to navigate through multiple screens to view pertinent information and the complexity of many different EHRs in the market often disrupted useful communication among staff. These barriers underscore the well-known complexity, which exist in many EHRs which make information retrieval challenging.

To further support this, Khullar, Peitzmeier, Koffman, and Potter (2014) studied the impact of EHRs documentation on Pap Screening rates in an urban health center. The research revealed a large discrepancy between electronically derived measures of cervical cancer screening rates and rates validated by manual extraction, underestimating the clinical screening rate by 17.1%. Approximately 75% of inaccurately categorized patients were misclassified due to ineffective use of the EHR. These findings have significant implications, not only on provider-to-provider communication, but also on clinic funding and patient quality care.

Lastly, to additionally demonstrate the barriers in communication and safety in the utilization of EHRs, Abramson, McGinnis, Moore, and Kaushal (2014) studied EHRs adoption and health information exchange in nursing homes. They determined that among the most reported barriers in communication and safety in the use of EHRs was the lack of interoperability with other current systems.

Although no data exist to document how wide spread communication failures are, they are probably endemic in large, complex academic centers (Chassin & Becher, 2002). What is missing from current research is a rich description of the way clinicians in complex organizations such as hospitals experience error in the context of daily clinical practice (Sutcliffe et al., 2004). The proposed solution is often to promote better information transfer. However, communication failures entail more than the faulty communication transfer. They are the consequence of individual, relational and systemic factors, which suggest that more effective communication is more difficult than it looks (Sutcliffe et al., 2004).

Safety in the Healthcare Setting

Patients, clinicians, and managers all want to be reassured that their healthcare institution is safe. Many internal and external risk factors in health care organizations make safety an important issue and this has caused management to consider safety in their mission and incorporate it into their organization's culture (Vincent, Burnett, & Carthey, 2014). When all members of an organization understand why patient safety is important and incorporate it, then safety becomes a priority in the organization.

Medicine's hierarchical authority structure can create a challenging obstacle to developing effective teamwork. Research demonstrates that 70 to 80% of medical errors are related to deleterious interactions within the health care team (Daly & Mort, 2014). Some of these failures may be familiar, even predictable, but the system may also malfunction in unpredictable ways. Safety is partly achieved by being alert to these trepidations and responding rapidly to keep things on tract (Vincent et al., 2014).

Tools of Safety Measurements

Patients represent an important and yet an untapped source of information about the factors that contribute to the safety of their care. Despite the use in tools, such as the National Health Service (NHS) impatient health survey, used to assess patients' experience of care, there are no such routinely implemented surveys, which give patients the opportunity to provide feedback about the safety of their care (McEachan et al., 2014). Thus a tool to allow patients to directly report on their safety is timely and important in the motivation for healthcare to manage patient safety proactively. Berger, Flickinger, Pfoh, Martinez, and Dy (2014), examined how interventions encouraging patient's engagement in healthcare were implemented in control studies. They found while patient engagement in safety is appealing, there was insufficient high quality evidence enlightening real-world implementation of such methods.

Based on the literature reviewed, further work is encouraged to evaluate the effectiveness of interventions on patient and family engagement to elucidate the added benefit of incorporating engagement in multifaceted approaches to improve patient safety (Berger et al., 2014).

Fall prediction instruments. The risk of falling in adults with neurological conditions has been clearly recognized and has been associated with physical, cognitive, emotional, and behavioral impairments (Saverino, Moriarty, & Playford, 2014). A fall event may result in serious injury, fear of falling or limitations in activities: subsequently, characteristics of these events merit additional research.

In a study by Hirase, Inokuchi, Matsusaka, Nakahara, and Okita (2014), the authors utilized a modified fall risk factors screening tool to predict falls. The

investigators discussed that currently researchers use many performance tests to predict falls. However, due to the length of time and the need for specialists such as physical therapists to conduct these tests, their use is limited in primary care settings. The number of falls, risk factors for falls (15 risk factors on a standard questionnaire), physical function (chair standing test; CST), and Time Up and Go Test (TUGT)) were compared. The values for the CST and TUGT corresponding to the modified seven risk factors tool used in the study were similar to the CST and TUGT in previous studies for fall prediction. The authors confirmed that this abbreviated screening tool, comprising seven fall risk factors versus 15, was just as effective as longer tools in predicting falls. Furthermore, it did not require a specialist to complete it and could be used in clinical settings due to its faster completion.

In a cross-sectional retrospective study by Matsuda et al. (2011), the investigators used a survey questionnaire to examine the incidence, risk factors, and healthcare provider response to falls in persons with MS. In this study, a total of 58.2% of participants reported one or more falls in the previous 6 months, and 58.5 % were medically injurious. According to the authors of the study, factors associated with falls in persons with MS were similar to those in other populations with neurologic disorders. The authors noted that despite the increased incidence of falls, fewer than 50% of people with MS receive information about prevention of falls from a healthcare provider.

Safety prediction instruments. Schulz et al. (2012) further supported the utilization of tools in assessing safety in patients with neurological disorders. In their study, they utilized a home safety tool to assess stroke survivors' home environments, determine home safety problems and provided recommendations. With the use of a

safety risk assessment questionnaire, The Safety Assessment of Function and the Environment for Rehabilitation (SAFER) Tool, the investigators found that among 76 stroke survivors, the greatest problems were identified in the categories of bathroom, mobility, and communication. The authors concluded the safety tool was helpful not only in identifying occupational performance barriers in the home but also in determining the safety needs of stroke survivors and caretakers living at home.

Cramer, Perrine, Devinsky, and Meador (1996) used screening tools in patients with neurological disorders. The investigators in this study utilized a brief questionnaire, Quality of Life in Epilepsy (QOLIE-10), to assess function (driving, working, social limits), mental health (depression, energy and overall quality of life), and epilepsy effects (memory, physical and mental effects of medications). The authors reported the QOLIE-10 questionnaire could be completed by the patient in several minutes and reviewed rapidly by physicians. They added that the tool could provide potentially useful information for initial assessment or follow up of problem areas that are not commonly evaluated during routine clinical visits in patients with epilepsy.

Patients with seizures are not only at risk for injury while driving, but also at risk of sudden unexpected death in epilepsy (SUDEP). The incidence of sudden death appears to be 20 times higher in patients with epilepsy compared with the general population (Shankar et al., 2013). In a study by Shankar et al. (2013), the investigators conducted a detailed literature review to extract common risk factors. The research identified a number of risk factors for SUDEP, some of which were potentially modifiable. Based on the literature review, the authors believed that established risk factors could be employed in clinical practices as a checklist to reduce patients' risk for

SUDEP. The authors suggested the adoption of a SUDEP safety checklist would be resourceful in reducing safety risks in some individuals and would unquestionably help improve communication.

The utilization of brief assessment tools to assess safety risks in patients with neurological disorders is supported by several other studies as well. The Beck Depression Inventory (BDI-1A) is considered the gold standard screening tool for depression in Parkinson's disease. However, it is complex and has limited suitability as a quick and easy screening tool. Schneider et al. (2010) investigated the use of the WHO-5 Wellbeing Index Tool (WHO-5) as a screening tool. According to the authors, 215 patients with Parkinson's disease participated in the study, of which 213 (99.1%) completed the WHO-5 tool. WHO-5 showed high validity with adequate detection of depression without differences in validity indices compared to BDI-1A. The authors suggested the WHO-5 is a useful, brief, and easy instrument for identifying Parkinson's disease subjects with depression in daily practice.

Roque and colleagues (2013) screened for abuse and violence in a sample of 103 neurological disorder patients by utilizing a six-item questionnaire. Twenty-two of the 103 patients (21%) screened for abuse reported exposures to abuse or violence. Two patients with ongoing issues with abuse were identified. The most commonly reported abuse was being a witness to violence (65%), followed by physical abuse (41%), sexual and emotional abuse (36%), and financial abuse (23%). The neurological disorders most frequently diagnosed in these patients were chronic pain, neuropathy, autonomic dysfunction, headache, and Parkinson's disease. The authors concluded that a simple and

effective way to accomplish screening in the outpatient setting is through the use of an intake questionnaire combined with verbal clarification.

Lastly, medication used by patients with neurological conditions raise safety concerns as well. It is important to ascertain in every visit if a female who has a seizure disorder is pregnant or considering family planning. Aside from the potential teratogenicity of various antiepileptic drugs (e.g., valproate), risks of injury to the mother and fetus remain high if seizures are not well controlled. The general populations of patients with neurological disorders also have a safety risk related to medications such as medication discrepancies, side effects, and medication interactions. In a study by Heyworth et al. (2014), the investigators created a medication reconciliation tool (Secure Messaging for Medication Reconciliation Tool; SMMRT), which was e-mailed to patients after discharge through a secure web portal. The tool was piloted to 60 patients at a Veterans Affairs hospital so they could view their medications, verify their medications, and clarify any inaccuracies. A total of 108 medication discrepancies and 23 potential adverse drugs events (ADEs) were found. Nearly 50% of the potential ADEs were classified as serious. Overall, patients were enthusiastic about SMMRT and 90% indicated they would use it again.

The literature reviewed underscores that the utilization of succinct, patient-friendly safety risk assessment tools are instrumental in assisting clinicians in identifying and communicating potential patient safety risks. This literature review failed to identify a comprehensive general safety risk assessment tool used in patients with neurological disorders. Most questionnaires are specific to an individual disorder or specific medical problem. This feasibility study's intent was not to focus on one certain neurological

condition or safety risk, but rather a group of safety risks related to patients with a variety of neurological disorders.

PROJECT DESIGN

The primary method used to identify and communicate patients' safety risks between nurses and department staff physicians in this feasibility study was the implementation of a safety assessment questionnaire.

Project Setting and Sample

This project was completed in a general neurology clinic at a large county general hospital in the San Fernando Valley. The general neurology clinic was preferred over three other specialty neurology clinics in this medical facility due to the vast amount of different neurological disorders seen in this particular site. Patients who were examined in the neurological clinic at the institution were assessed with this newly constructed instrument to help identify safety risks. The number of questionnaires collected after 6 months determined the sample size.

Procedure

The author and the staff neurologists of the department in which the project was implemented created the tool. An extensive review of the literature and expert opinion was used to select items for the instrument. Ethical considerations were considered during the creation and no ethical implications were identified. The final draft of the tool was presented and approved by the Assistant Chief Medical Officer, Medical Records Committee, department staff neurologists and nurse practitioner, and the neurology clinic's nursing supervisor.

The instrument consisted of nine, yes-no questions, addressing the most pertinent safety risks found in patients with neurological disorders treated in the department's

weekly clinics. The tool was a double-sided, English-Spanish questionnaire with literacy level preserved at a fourth grade level (see Appendix B).

Data Collection

The intake nurse and the patient completed the questionnaire in the privacy of the patient's examination room during their appointment prior to seeing the neurologist or nurse practitioner. The completed safety risk questionnaire was given to the neurologist or nurse practitioner for review prior to seeing the patient. If no safety risks were identified, no further action was required. The box reading, "Were safety risks identified during this clinic visit?" was checked "No" and the questionnaire was filed in an expanding folder located in an easily accessible private physician charting room during clinic hours. After seeing the patient, if safety risks were checked and the physician or nurse practitioner recognized the checked items as true safety risks, they would check "Yes" to the question "Were safety risks identified during this clinic visit?" followed by "Yes" or "No" to the question, "If yes, were they addressed during this clinic visit?" Once again, the form was filed during clinic hours in an expanding folder located in a physician charting room.

Pilot Study

A training session was held one week prior to the implementation of the tool with the nurses who would be completing the questionnaire with the patients. Training focused on explaining the purpose of the project and the proper manner of asking the questions on the form.

A pilot test was performed during clinic with two nurses and patients prior to the tool's full implementation to test proper procedure, flow, usage, and the patients'

reactions to the questions. Random observations by the nurse practitioner of the nurses' questioning techniques were conducted on the first day of the tool's implementation to assure proper interviewing methods were utilized.

Full Implementation

Once the pilot was completed, full implementation commenced. The process of data collection proceeded as in the pilot study with modifications as identified during the trial. After completion of the questionnaire by the patient and nurse, the bright orange, clearly identifiable safety risk assessment tool was attached to the patient's intake medical record for the clinicians to evaluate prior to entering the patient's room. Upon completion of the patient's visit with the clinician, if safety risks were identified, clinicians checked a box indicating safety risks were identified and if the risks were addressed during the clinic visit. If no safety risks were identified, the clinicians checked a box indicating no safety risks were identified. The forms, as previously stated, were placed in an expanding folder located in a semi-private room easily accessible to all clinicians during clinic hours. At the conclusion of clinic, the forms were collected and given to the department's clerk to scan and upload into the department's shared hard drive. The original questionnaires were sent to medical records where they were scanned into each patient's permanent record. A copy of each form was made and stored in a locked office in the department of neurology. The nurse practitioner in the department recorded the data collected after each visit on a password protected word-excel spreadsheet. No linkage was given to the patient's name, medical record number, or diagnosis. The de-identified patient data included the following:

- Number of patients with no safety risks identified;
- Number of patients with safety risks identified;
- Number of patients with safety risks addressed during the clinic visit;
- Number of patient's safety risks not addressed during clinic visit; and
- Number of incomplete forms.

Project Analysis

The data collected were compiled and analyzed using Microsoft Excel. It was anticipated that with this feasibility study, patients and nursing staff would be able to communicate and identify safety risks easily and quickly. Once data were collected, the team of neurologists and nurse practitioner were able to determine the feasibility of this tool based on (a) completeness of the questionnaire and (b) if safety risks identified, and (c) if safety risks were addressed during the clinic visit. Based on these findings, the neurology team was able to qualitatively assess if the implementation of the safety questionnaire should continue or be abandoned.

Human Subjects Protection Approval from the Institutional Review Board (IRB) was obtained from the medical center and California State University Los Angeles for the implementation of this project to assure protection of human subjects (see Appendix C).

Data Analysis

The study utilized a post-only design to examine three measures relevant to assessing the utility of a new safety assessment tool for practitioners working with patients with neurological disorders in general hospital settings:

1. The feasibility of the tool was assessed by the percent of patient encounters at which complete data were collected by the nurses;

2. The prevalence of safety risks in this population of patients with neurological disorders was assessed with a 9-point scale which was later dichotomized (no risks vs. risks indicated); and
3. The percent of the time the safety risks were addressed during the patient's appointment was assessed by the percent of items checked "yes" on this safety assessment tool during patient encounters.

The three measures examined in this study were addressed through the summation of patient data during 779 patient encounters, which took place between April 1, 2014 to October 14, 2014. As only aggregate data were collected each day, data analyses were limited to examination of the summations of aggregate data and the calculation of percentages. Regarding the three measures of interest:

1. Regarding the feasibility of the tool, complete data on the 9-item safety assessment tool were collected at 86.01% (670) of the 779 patient encounters. It is worth noting that implementation of the tool was erratic from day-to-day, with collection of full data occurring at anywhere between 47.22%-100% of patient encounters ($Mean_{\text{full data collection}} = 84.85\%$, $SD = 14.77\%$).
2. Amongst patient encounters where complete data were available, at least one risk factor was documented for 48.81% (327) of the 670 patient encounters.
3. Amongst those patients who were found to have one or more risk factors, these risk factors were addressed by the physician at 92.97% (304) of patient encounters.

DISCUSSION

In clinical work, treating complex, fluctuating conditions requires thinking ahead and being prepared to adjust treatment as the patient's condition warrants. A patient may have been safe during previous clinical visits, but a health care provider cannot be assured the patient will remain safe from injury. As cited in Saverino et al. (2014), safety risks arise and are directly related to the number and severity of impairments of an individual resulting from aging or their neurological conditions. Questioning should be encouraged even when things are going well, to create opportunities for staff to envision scenarios.

The findings in this feasibility study indicated that of the 779 encounters collected, 86.01% (670) of them comprised complete data. Although the data collection was erratic, demonstrated by collection of full data occurring between 47.22%-100% of patient encounters ($Mean_{full\ data\ collection}$ = 84.85%, *SD* = 14.77%), 86.01% of completed forms demonstrated that for the most part, the nursing staff and patients were committed in completing this new tool. The data in this study elucidates various strengths. First, the sample size was a robust sample size (*n* = 779) with 670 completed forms received. Second, at least one risk factor was identified almost half of the time (48.81%) and third, of those risks identified, 304 (*n* = 327) were addressed at each clinic visit (see Figures 2 through 4). These results are important to recognize. Although most patients seen in clinic were established return patients, it is important to note that nearly half of them presented with safety risks. This demonstrates the importance of the safety assessment tools at this healthcare setting. This is further supported in literature. As sited in Lewis, Anderson, and Feuchtinger (2014), safety risk assessment tools of patients with

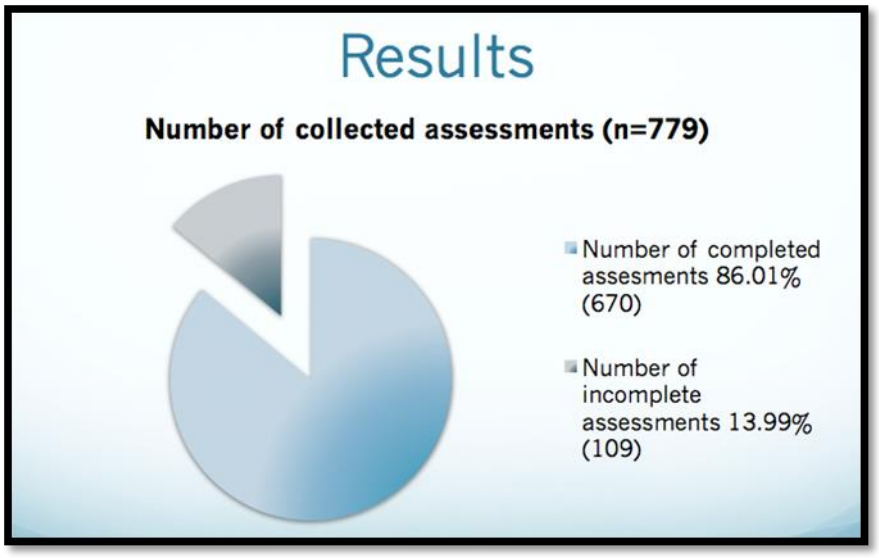

Figure 2. Results.

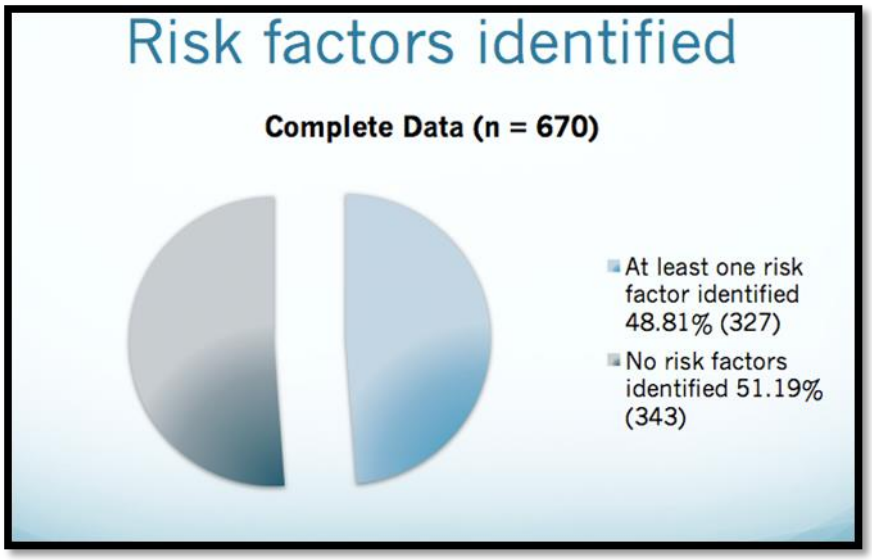

Figure 3. Risk factors identified.

Figure 4. Risk factors assessed.

neurological disorders play an important role in providing safe health care. This feasibility study is in congruence with this awareness.

Additional strengths in this study are attributed to its methodology. Before each clinic began, the nurse practitioner reviewed regularly with staff residents and medical students the purpose of the feasibility study, the safety assessment questionnaire, and directions for completion and filing. For rotating new staff, the same brief introduction was customarily provided by the nurse practitioner on a weekly basis. Secondly, the nurse practitioner had a good working relationship with the nursing supervisor and staff nurses. They were assured by the nurse practitioner that the study would be short term, the tool would be brief to complete, and that all the forms would be provided to them in advance.

The buy-in from the nursing staff supports the construct from the theoretical framework used to guide this study. In the Theory of Reasoned Action, the subjective

norm is the perception one has of what others would perceive of one if a certain action is taken or avoided. The nurses' involvement in the distribution and completion of the safety questionnaire may have been influenced by the good working relationship they had with the nurse practitioner and the desire to comply and not hinder the study. Having weekly interactions between the nurse practitioner and nursing staff, and seeking feedback were crucial in maintaining a good and productive working partnership. An additional strength in the methodology of this study was the availability of the safety assessment tool. It was always checked and made readily available by the nurse practitioner prior to the start of clinic. If forms were not available, forms were ordered in advance to avoid loss of time and data. This facilitated tool distribution, completion and procedure flow. A fourth strength was that the nurse practitioner's availability during clinic data collection hours. She was routinely present to answer questions or address issues pertaining to the tool or data collection. If any questions surfaced, the nurse practitioner was able to provide direction or mitigate problems. And lastly, the availability of the subjects made it easy for data collection. It was not necessary to search, recruit, enroll or stratify subjects, as they were all scheduled patients in the neurology clinic. Despite less study control, the convenience sampling made the data collection essentially seamless and effortless to obtain.

Although various methodological strengths aided in data collection for this study, there were various limitations. These limitations are important to consider, as they serve as spurs in improving future studies. The single greatest limitation of the study design is its use of a post-program only design in which an intervention was implemented without first collecting baseline data. A direct comparison of how many safety risks were

routinely identified in neurological appointments prior to the use of this tool would have served helpful to compare the tool's usefulness. As noted by Valente (2002), a causal relationship between interventions and subsequent behavior requires at minimum, changes in behavior utilizing pre- and post-program designs. If safety risks were identified routinely in neurological appointments prior to the use of this tool, this tool may actually be redundant. However, if this tool did indeed contribute in identifying safety risks, which were not commonly identified in clinic visit, it warrants further appraisal and possible implementation. The use of comparable data for better tool evaluation should be used in future studies.

Another limitation to this study is that it does not denote which risk factors were identified. The focused-target results rested on the principle "Were any safety risks identified during this visit?" and "If yes, were they addressed at this visit?" It is unclear with the data collected and without going beyond the scope of this study, which risk factors were mostly identified and posed the most risks. For instance, while at least one risk factor was documented in 327 of the 670 patient encounters examined in this study, it is not clear how often these particular risk factors were identified and addressed. This is important when considering future similar studies. If this data were measured, the safety risks most frequently identified could aim to improve patient care by offering prompt services to lessen those safety risks. For example, if falls or depression were identified more frequently than medication questions, it would be advantageous to have a close working partnership with physical therapy or psychiatry to be able to readily provide necessary services to patients during their clinical visit or very soon after. This could help strengthen the collaboration between specialties, expand patient clinic visits and

improve patient outcomes. Identifying the most common safety risks, as a guide to provide better patient services, should be a strong consideration in future studies.

Lastly, this study solely evaluated if safety risks were identified and if they were addressed during clinic visits. There was no data collected pertaining to how the safety risks were addressed. When the tool was created and reviewed with the group of neurologists contributing to the study, the consensus was not to include that information in the tool. It was felt that the purpose of the study was solely to aid communication and identify potential safety risks to the healthcare provider, and for the sake of simplicity and clinic flow, not to incorporate a plan of care or further references. It was collectively decided among the group of neurologists that if safety risks were identified, such as suicidal patients or patients whose seizures were not adequately controlled and were driving, that a note should address this in the patient's medical record, but not required in the safety risk assessment tool. Contrariwise, it was agreed that if certain risks were not felt to be life threating and part of usual clinic appointment discussion, such as medication questions or side effects, it would be up to the discretion of the clinician to reference the risk factor in the patient's clinic note, as this was considered "routine clinic visit discussion."

This limitation again draws attention to the study's theoretical framework, The Theory of Reasoned Action. In the TRA, behavioral attitudes are the individual's personal judgment whether performing the behavior would be good or not good for him/her. These attitudes influence the individual's beliefs concerning the personal results expected to occur from the realization of their behavior (Natan et al., 2009). During the creation of this tool, the neurologists involved admitted they were participating in this

study not from an inspiring approach but rather as a manner of complying with mandated quality improvement goals of the department. Towards the third month of the tool implementation, the concept of having a new tool was viewed as time consuming and redundant by most of the neurologists, as they felt they already addressed safety risks during clinic visits. Additionally, several of the neurologists in the department shared their discomfort with the tool. They persuaded caution in its consistent use because some felt that if it were to be successful in identifying safety risks, it would lead into long-term or permanent implementation. The buy-in from the neurologists initially seemed existent when the tool was created, but as its use persisted, the support waned. This was noted by the inconsistent full data collection occurring between 47.22%-100% of encounters ($Mean_{full\ data\ collection}$ = 84.85%, *SD* = 14.77%), and the lack of consensus pertaining to documentation protocol. It appeared the nursing staff and the nurse practitioner leading this project were the main promoters to the successes in this study.

The disproportion in neurologist support is not uncommon when new procedures or protocols are a possibility. In a study by Rabinovitch et al. (2009), a nurse practitioner-based sign out system was introduced to help improve communication between day and night time physicians. The effectiveness for communication was evaluated with pre-intervention and post-intervention questionnaires and by recording daily logs. The study demonstrated a significant decrease in number of log-ins after 8 weeks of use and the tool was abandoned after 16 weeks. In this feasibility study, it is not clear at this time or in this department how the utilization of this tool could have been more seamless. Perhaps further studies where significant supportive physician buy-in is present would add clarity.

Lastly, post-program designs' inability to establish changes in behavior, remain susceptible to all of the major threats to internal validity (Valente, 2002). In this instance, this study design can neither protect against nor measure the impact played by history. Although the result demonstrated tool feasibility, its necessity was not established in this study due to lack of comparable data. Additionally, it remained unclear if the findings that safety risks identified 48.81% of the time, and addressed 92.97% of the time, reflected a true value. Given the inconsistency and hesitation regarding the usage of this tool by the staff neurologist, it is uncertain if unchecked boxes in the tool were due to the physicians not addressing the safety risks, forgetting to mark the form, or whether they simply chose not to complete the form. It was difficult to estimate if the results would have been greater in a different scenario, for example, more clinician support. It was also difficult to approximate if these findings could be generalized or expected to be similar in other studies or settings.

It is important to note however, that the use of the safety assessment tool led neither favorable nor unfavorable unintended consequences. Although the tool completion and collection was erratic at times, it was not abandoned prematurely or cause patient harm. What was unintended was the diminished physician motivation, but this was discussed previously.

Additional high quality research should continue to promote the usefulness of safety risk assessment tools. Particular areas of research deserving more attention include the role of safety risks assessment tools that address multiple neurological problems instead of tools designed to focus on solely one or a handful of risks, such as falls or cognitive impairment.

Implications for Nursing

Aside of promoting communication and identification of safety risks, a clear and concise communication tool such as the one created in this study has significance to the nursing profession. It bequeaths better teamwork to ensure patients have what is needed for his or her optimal health and safety. This screening tool can contribute to early identification of safety risks in patients with neurological disorders and encourage nursing interventions needed in an inpatient or outpatient setting. In identifying such risk factors, it partners in raising awareness of patient's unique needs with caretakers and other healthcare providers while facilitating communication and promoting patient safety.

Patients have individual needs that hospitals should address to improve safety and quality. These needs can be addressed more fully by encouraging patient and family engagement in safety assessment and intervention, while making use of patients' knowledge and concerns (Berger et al., 2014). For nurses, it would be a quick way of looking at risk factors in patients with various neurological disorders, while helping both patients and clinicians to focus on abating certain risk factors and promoting patient safety. The strategy of implementing a safety assessment tool is not only useful in identifying, addressing, and incorporating management plans, but serves as a potential reflector of change in the patient's risk status and assists to justify early intervention. This safety risk assessment tool serves as an instrument, which can be used to open discussions with nurses and patients who have risk factors and outline how individual behavior could impact their risks (for example, medication non-compliance, depression or driving). For patients, it opens a dialog pertaining to complex and sometimes sensitive topics such as depression or physical status.

Lastly, due to its simplicity, a questionnaire such as the one suggested in this study may provide additional health and safety education for patients, families, and healthcare providers. Thus, this study puts forth its findings as a springboard for additional studies as means of identifying and communicating patient safety.

Conclusion

It is well documented that teamwork and communication is an integral component of patient safety in patients with neurological disorders. As noted by Mosely et al., (2012), up to 91% of medical errors contain some element of communication breakdown. Providing patient safety assessment through ongoing screening, assessment and treatment is important in the care of the neurology patient (Lewis et al., 2014). This study did not identify an existing safety risk assessment tool in the literature which appraises multiple neurological safety risks affecting a variety of neurological disorders. This study is the first known to the author to address multiple risks in multiple neurological disorders. This is significant given that among older adults, multifactorial risk factor identification and management has been shown to be an effective strategy (Matsuda et al, 2011). Further studies with concrete support and implementation are needed to fully assess its effectiveness and desired gains.

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APPENDIX A

AUTHOR PERMISSION TO REPRODUCE CHART

On Sunday, March 22, 2015 3:33 PM, Shaby <shaby@XXXXX.XXX> wrote:

Toda Raba!
Thank you very much.
Betty B. Shaby, ANP, MSN soon to be doctorate...

Never, never, never give up!

Winston Churchill

On Sunday, March 22, 2015 1:25 AM, "ר"ד ברים ותנ וב" <meraav@hy.health.gov.il> wrote:

It is o.k

ד״ר בן נתן מירב

ב-22 במרץ 2015, בשעה 08:37, Shaby < XXXXX.XXX @shaby> כתב/ה:

Hi Dr Natan,
My name is Betty Shaby and I am a doctorate candidate. I am using the Theory of Reasoned Action as my supporting theoretical framework for my doctoral project. Throughout my literature review, I came across your paper "Nurse's perception of the quality of care they provided to hospitalized drug addicts: Testing the theory of reasoned action.".(2009, International Journal of Nursing Practice). I would like your permission to adapt your diagram or something very similar to represent the four constructs of the model, with of course crediting your paper.

Please advise if this ok.
Thank You and have a GREAT day!

Betty Shaby, MSN

Never, never, never give up!

Winston Churchill

APPENDIX B

QUESTIONNAIRE, ENGLISH AND SPANISH

COUNTY OF LOS ANGELES

OLIVE VIEW - UCLA MEDICAL CENTER

Neurology Clinic Safety Assessment

DEPARTMENT OF HEALTH SERVICES

1. What medications do you take? _____

   Do you have questions about your medications? ☐ Yes ☐ No

2. Are you experiencing side effects from your medications? ☐ Yes ☐ No
   If so, what are they _____

3. FEMALES: Are you pregnant or considering pregnancy in the near future? ☐ Yes ☐ No

4. Have you experienced any falls in the past month? ☐ Yes ☐ No

5. Do you have problems with balance or walking? ☐ Yes ☐ No

6. Do you use an assisted walking device to walk such as a walker, cane, or wheelchair? ☐ Yes ☐ No
   If yes, what do you use? _____

7. Do you drive? ☐ Yes ☐ No

8. Are you working with heavy machinery, sharp objects, climbing ladders, or working near pools/jacuzzis or other bodies of water unaccompanied? ☐ Yes ☐ No

9. Do you feel depressed? ☐ Yes ☐ No
   If so, how depressed are you? ☐ Mild ☐ Moderate ☐ Severe
   Do you think of hurting yourself, or others? ☐ Yes ☐ No
   If so, do you have a plan? ☐ Yes ☐ No

Name of person completing this form: _____ Date: _____

Name of physician or NP reviewing this form: _____ Date: _____

Clinician:
Were safety risk(s) identified? ☐ Yes ☐ No
If so, were these safety risks addressed during this visit? ☐ Yes ☐ No

PATIENT DATA - Imprint or Print Legibly
Name:
MRUN:
Date of Birth:
Ward or Clinic:
Req. Loc. Code:

T-OV2519

OVER FOR SPANISH

FILE IN MEDICAL RECORD

NEUROLOGY CLINIC SAFETY ASSESSMENT

PAGE 1 OF 1

OV2519 (2-14)

COUNTY OF LOS ANGELES

DEPARTMENT OF HEALTH SERVICES

OLIVE VIEW - UCLA MEDICAL CENTER

Evaluación de seguridad de la Clínica de neurología

1. ¿Cuales medicamentos toma? _____

   _____

   ¿Tiene preguntas acerca de su medicamentos? ☐ Sí ☐ No

2. ¿Tiene efectos secundarios con sus medicamentos? ☐ Sí ☐ No
   En ese caso, ¿cuáles son?: _____

3. MUJERES: ¿Está embarazada o considera quedar embarazada en el futuro cercano? ☐ Sí ☐ No

4. ¿Ha tenido alguna caída en el último mes? ☐ Sí ☐ No

5. ¿Tiene problemas de equilibrio o para caminar? ☐ Sí ☐ No

6. ¿Utiliza algún aparato que le ayuda a caminar, como un andador, bastón o silla de ruedas? ☐ Sí ☐ No
   Si la respuesta es sí, ¿qué usa? _____

7. ¿Usted maneja? ☐ Sí ☐ No

8. ¿Trabaja con maquinaria pesada, objetos filosos sube y baja escaleras, o trabaja cerca de piscinas/jacuzzis u otros lugares cercanos al agua? ☐ Sí ☐ No

9. ¿Se siente deprimido/a? ☐ Sí ☐ No
   Si la respuesta es sí, ¿cuánta depresión siente? ☐ Leve ☐ Moderada ☐ Grave
   ¿Piensa en hacerse daño o hacerles daño a otras personas? ☐ Sí ☐ No
   Si la respuesta es sí, ¿tiene un plan? ☐ Sí ☐ No

Nombre de la persona completando esta forma: _____ Date: _____

Nombre del doctor o de la enfermera revisando esta forma: _____ Date: _____

Clinician:

Were safety risk(s) identified? ☐ Yes ☐ No

If so, were these safety risks addressed during this visit? ☐ Yes ☐ No

PATIENT DATA - Imprint or Print Legibly

Name:

MRUN:

Date of Birth:

Ward or Clinic:

Req. Loc. Code:

T-OV2519

OVER FOR ENGLISH

FILE IN MEDICAL RECORD

NEUROLOGY CLINIC SAFETY ASSESSMENT

OV2519 (2-14)

APPENDIX C

HUMAN SUBJECTS PROCETION APPROVAL

E R I

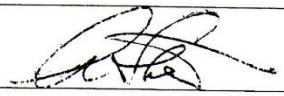
Olive View-UCLA Education & Research Institute
14445 Olive View Drive – Research Administration Office
Sylmar, CA 91342-1495
Telephone (818) 364-3434 Fax (818) 364-3465
Website www.ovuclaeri.com

APPROVAL NOTICE

DATE:	May 14, 2014
TO:	Betty Shaby, NP
FROM:	Anthony Shaw, M.D., Chair, IRB
SUBJECT:	#13E-BS1001 Quality Improvement Project: Improve Communication Between Clinicians and Nurses Regarding Safety Risks in Patients with Neurological Disease

	SUBMISSION AND REVIEW INFORMATION
☒	Initial Review: Approval period: **5/10/2014** through **12/31/9999**
☐	Continuing Review: Approval period:
☒	Exemption: Meets requirements for exemption per 45 CFR 46.101(b).
☐	Expedited: Meets the requirements for expedited review per 45 CFR 46.110.
☐	Waiver of Written Informed Consent: Requirement for informed consent waived under 45 CFR 46.116(d).
☒	Specific Conditions for Approval: See attached General Conditions of Approval
☐	Full Committee Review/IRB Meeting Date:

	DOCUMENTS REVIEWED	
☐	Protocol Version Date and/or Number	
☐	Informed Consent Form(s)	
☐	Investigator's Brochure	
☒	Other (Specify)	Application signed 04/30/2014
☒	Date Reviewed & Appvd	05/10/2014

IRB CHAIR SIGNATURE	
FWA #00000495	

HIPAA: FOR STUDIES REQUIRING WRITTEN CONSENT, A SEPARATE HIPAA CONSENT FORM IS ATTACHED TO THE REGULAR CONSENT FORM. BOTH FORMS MUST BE SIGNED BY SUBJECTS ENROLLED AFTER APRIL 14, 2003.

GENERAL CONDITIONS OF APPROVAL:

1. Notification of an **adverse reaction* or a serious adverse event** such as the death of a study patient at Olive View or other sites reviewed by the Olive View-UCLA IRB must be immediate. The principal investigator (PI) is also responsible for meeting all Medical Center requirements for reporting to Quality Assurance, Risk Management and safety programs. Notification of an event affecting a multi-site study patient when the site is not reviewed by Olive View IRB requires prompt reporting.
2. Application for review/renewal of the protocol is due two months prior to the end of the current approval period.
3. If modifications of this approved study are made, the IRB must review them prior to initiation. The data collected under the study can be used only for the purposes reported to the IRB and only for the sponsor indicated on the IRB application. Furthermore, it is the PI's responsibility to forward the revised material to the granting agency (sponsor).
4. All approved informed consent forms given to subjects must have the IRB number and expiration date on the first page of the form.
5. The PI is responsible for ensuring that the personnel performing the project are qualified, appropriately trained, and will adhere to the provisions of the approved protocol.
6. The PI is responsible for obtaining the legally effective informed consent from human subjects or their legally responsible representative, and using on the currently approved consent process and stamped consent documents as appropriate, with human subjects.
7. A copy of the informed consent form(s) must be placed in the medical record of all subjects; the Principal Investigator is responsible for retaining the original signed consent form for 5 years after the last IRB approval ends.
8. Any physician(s) caring for your research subjects must be fully aware of the protocol in which the subject is participating.
9. The PI is responsible for assuring that adequate resources to protect research subjects (i.e., personnel, funding, time, equipment and space) are in place before implementing the research project, and that the research will stop if adequate resources become unavailable.
10. For exemptions, if changes are made to the study and it no longer qualifies as an exemption, it is the investigator's responsibility to notify ERI to obtain full committee review and approval.

If you have any questions, please contact the ERI Office at extension 3434.

Version Date: 03/31/2011

Sample text for an Institution with a Federalwide Assurance (FWA) to rely on the IRB/IEC of another institution (institutions may use this sample as a guide to develop their own agreement).

Institutional Review Board (IRB) Authorization Agreement

Name of Institution or Organization Providing IRB Review (Institution/Organization A):
Olive View-UCLA Education & Research Institute

IRB Registration #: IORG#0000391 Federalwide Assurance (FWA) #, if any: FWA#00000495

Name of Institution Relying on the Designated IRB (Institution B):
California State University, Los Angeles (CSULA)

FWA #: 00001182

The Officials signing below agree that CSULA may rely on the designated IRB for review and continuing oversight of its human subjects research described below: (*check one*)

(___) This agreement applies to all human subjects research covered by Institution B's FWA.

(X) This agreement is limited to the following specific protocol(s):

Name of Research Project: Improve Communication Between Clinicians and Nurses Regarding Safety I
Name of Principal Investigator: Darlene Finocchiaro and Betty Shaby
Sponsor or Funding Agency: _____ Award Number, if any: _____

(___) Other (*describe*):_____

The review performed by the designated IRB will meet the human subject protection requirements of Institution B's OHRP-approved FWA. The IRB at Institution/Organization A will follow written procedures for reporting its findings and actions to appropriate officials at Institution B. Relevant minutes of IRB meetings will be made available to Institution B upon request. Institution B remains responsible for ensuring compliance with the IRB's determinations and with the Terms of its OHRP-approved FWA. This document must be kept on file by both parties and provided to OHRP upon request.

Signature of Signatory Official (Institution/Organization A): _____ Date: JUL 08 2014

Print Full Name: Anthony Shaw, M.D. Institutional Title: Chair, IRB

NOTE: The IRB of Institution A may need to be designated on the OHRP-approved FWA for Institution B.

Signature of Signatory Official (Institution B): _____ Date: 7/9/14

Print Full Name: Philip LaPolt, Ph.D. Institutional Title: Institutional Official

APPENDIX D

TABLES OF EVIDENCE

Table 1. *Improving Communication Between Clinicians and Nurses Pertaining to Safety Risk in Patients With Neurological Problems*

Purpose, Author(s), Year	Design/Key Variables	Sample/Setting	Measures	Results /Findings	Conclusion, Limitations and Notes
Explore perceived differences in nurses' perception of RN/MD collaboration among ICU and MSU nurses. (Johnson & Kring, 2012).	Descriptive Design Key Variables: Collaborative efforts between MD/RN, Professionalism, Disruptive Behavior, Managerial, and Administrative Support.	Convenience random sampling, Magnet Hospital in S. East U.S.A. Three ICUs and eight MSU. RN inclusion criteria: Employed in unit @ least 6 months, work min. one 8 hour day/wk. Recruited with use of fliers in unit. *N* = 89 MSU nurses *N* =77 ICU nurses. No stat. sig differences in demographics.	25-item Likert survey used to collect information regarding physician collaboration.	3/23 questions had stat. sig differences between the groups: Interdisciplinary rounding: *N* =71 ICU (75%) *N* = 80 MSU (33%) MDs treat RNs as maidens: *N* = ICU = 39% *N* = MSU 21% RNs reported MDs displayed unprofessional behavior sign. *N* = 41 ICU (80%) *N* = 50 MSU (58%) In general MD/RN relationship was satisfactory: *N* = 74 ICU (75%) *N* = 84 MSU (65%).	Perception of RN/MD collaboration: more similarities than differences. Limitations/Notes: Limits generalizability to non Magnet Hospitals and other units where RN functions independently (L&D and Dialysis).
Evaluate the implementation of a	Prospective, controlled group with pre/post test.	OR staff in two hospitals in The Netherlands.	LRF: measured using LOTICS scale. *Materials Resources:*	Intervention group: *Material Resources*, *Training* and *Staffing*	Changes of scores on two of the relevant LOTICS scores.

Purpose, Author(s), Year	Design/Key Variables	Sample/Setting	Measures	Results /Findings	Conclusion, Limitations and Notes
patient safety program in the operating room. (Van Beuzekom et al., 2012).	Multi factorial approach aimed at improving factors associated with latent risk factors.	Interventional group (I-OR) and Controlled group (C-OR).	variation in equipment use technique *Training:* amount of training and experience staff has. *Staffing:* Adequate staffing *Perceived incidents rates:* safety related events: accidents, near misses and errors. *Incident reporting*: actual incidents.	*Resources* sig. changes in two LOTICS scales. I-OR rated more favorably on Staffing Resources and Material management No difference in *Training* between groups *Perceived incident rates:* lower PRE-I than at baseline *Reported incidents* increased from 250 year PRI to 629 POI Controlled group: Staffing resources worsened. No sig. difference in other LRF.	Limitations: Limited to smaller group of disciplines and settings. Questionnaire was limited in scope and more directed to a limited set of factors connected to LRFs. LOTICS Scale was the researchers own tool no mention of pretesting. Study was from The Netherlands. Uncertain due to different Health Care Systems worldwide.
Evaluate the effectiveness of an NP-based sign out system in improving communicating patient information to the on-call residents. (Rabinovitch, Hamill, Zanchetta, & Bernstein, 2009).	Prospective Pre and Post intervention design IV: NP based sign-out system. DV: Communication among neuro-surgi-cal team.	Questionnaires *N* = 25 PRI respondents *N* = 13 NPs, *N* = 4, Residents *N* = 5, Staff attending *N* = 4 POI: *N* = 20 NP, *N* = 5 Resident, *N* = 5 Fellow, *N* = 5 Staff Attending *N* = 5 Setting: neurosurgical unit at Western	Effectiveness of methods evaluated by pre and post Likert scale and by recording of # times sign out system was accessed via the internet. Likert scale rated: system accessibility, effective tool for communication, comprehensive	20/25 of participants completed PRI questionnaire. 6 /20 reported entering medical info. (5 NPs and 1 fellow). 8 /10 staff and 100% NPs used sign-out tool as a reference. 1 staff MD used sign out system only used it as a reference. Those	PRI quest. demonstrated initial interest. Significant drop in utilization of system after 8 wks. May suggest problem/limitations with system implementation. Other respondents found the system not kept current. Overnight

Purpose, Author(s), Year	Design/Key Variables	Sample/Setting	Measures	Results /Findings	Conclusion, Limitations and Notes
		Hospital, Toronto, Canada.	summary, improves workflow, and improves pt. care. Daily log ins measured at first 2 weeks of study and 2 weeks after x8 weeks.	reported using the system, 87.5% stated the system was accessible. 50% reported it effective for communication, 25% thought it provided comprehensive medical info. Overall 6/15 reported the sign-out system improved ability to care for pts. The sign-out system was eventually abandoned after 16 weeks of use.	staff did not enter admission info into the system. Inefficiencies/inconvenience in reporting system. NPs overburdened. Duplicated work. This may have contributed to failure as well.
Evaluate if standardized check-out system improves completeness and perceived accuracy of inpatient neurology handoffs. (Mosely et al., 2012).	Pre and Post Test Pilot Study Key variables IV: sign-out process in inpatient neurology services. DV: Improvement in completeness and perceived accuracy of information being communicated	Piloted in general neurology, stroke, and neurologic intensive care units 23 residents completed pre-interventional survey 20 residents completed post implementation survey. Authors did not disclose the name or location of the institution.	Electronic predesign Likert type survey: yes/no answers and 1) always 2) sometimes and 3) never answers. A structured sign-out system based on SBAR, Post implementations survey.	Structured sign-out residents were significantly more likely to share test results with pt./ families prior to shift change. Electronic series list and important data were transmitted. Overall satisfaction increased.	Standardized sign-out improves completeness and perceived accuracy of handoffs. Limitations: Low POI response rate. Small sample size limits statistical strength. Different levels of participants' education, Hawthorn Affect may have produced biases.

Purpose, Author(s), Year	Design/Key Variables	Sample/Setting	Measures	Results /Findings	Conclusion, Limitations and Notes
Improving communication among nurses, patients, and physicians. (Chapman, 2009).	Descriptive Observational Self Report Pilot Study. Key Variables: Change of Shift Report. Nurse-Physician Intentional Rounding.	*N* = 20 (RNs, pharmacist, case managers, MDs, clinical coordinators, educators and supervisors). 28 bed medical-surgical telemetry unit at Wentworth-Douglass Hospital, Dover, New Hampshire.	One-on-one bedside report between incoming/ outgoing RN. Prerecorded audio report reduced to 30 seconds, Standardized templates reports using SBAR, Role-play, Safety Huddle: 10-min. teams huddle of in/out RN shifts.Tools: written guidelines using SBAR educational sessions, and one on one feedback. Pt. feedback: gathered from pre-existing patient satisfaction survey Intentional Rounding: Nurse rounded with MD Tools: observation, personal feedback. *N* = 20 (RNs, pharmacist, case managers, MDs, clinical coordinators, educators and supervisors).	Report time decreased from 40 min. to 25-30 min. RNs able to leave on time, Quality of pt. information improved due to personal information exchange. Intentional rounding goal was 50%. after > year, was 67%. RNs reported > feelings of collaboration and valued by MDs. Annual surveys of the RNs showed > satisfaction with MD working relationships from 78% in 2006 to 91% in 2008.	Personal bedside report, safety huddles, and nurse -physician intentional rounding improved RN/MD and patient satisfaction. Limitations/Notes: Pt. satisfaction and RN retention rate based on annual surveys and "recent staff satisfaction report" but not based on a study results. Difficult to generalize study.

Purpose, Author(s), Year	Design/Key Variables	Sample/Setting	Measures	Results /Findings	Conclusion, Limitations and Notes
Evaluate the outcome of a conflict resolution training program on nurses' perception of their collaboration with MD with whom they work. (Boone et al., 2008).	Quasi experimental design: DV: Conflict management training IV: Improvement of RN/MD collaboration in Cardio Vascular Lab	Convenience sampling from work roster. Intervention group: 9 RNs from CVL. Control group: TELE: 18 RNs. Study conducted in a private hospital in southern California.	Two hour mandatory training with lecture, group discussion and role-play. CBS = 4 point Likert type scale used to measure nurses' perception of collaboration responses. Control group surveyed at PRI and 3 months POI.	No significant differences were found between the groups at baseline on the CBS. Mean CBS score over time = no significant differences in mean scores between the two groups at baseline and at 3 months interval on the CBS.	Intervention was not effective in improving nurses' perception of collaboration with MDs after conflict resolution training. Limitations/Notes: Very small sample size. MANDATORY session may cause resentment with staff and skew results.

Note: ANOVA = Analysis of Variance, CBS: Collaborative Behavior Scale, Com. = communication, CVL = Cardio Vascular Lab, DELPHI = Deliver Primary Healthcare Information, DV = Dependent Variable, Dx = Diagnosis, ED = Emergency Department, HER = Electronic Health Records, GPs = General Practitioners, ENP = Emergency Nurse Practitioners, FSC = Family Support Coordinator, FSS = Family Satisfaction Survey, ICU = intensive care units, IN = Intervention, Info = information, Int.=intervention, IV = Independent Variable, LOTICS Scale = Leiden Operating Theatre and Intensive Care Safety Scale, MD = Medical Doctor, Min. = minutes, MSU = med-surgical units, *N* = Sample Size, Neuro = neurological, NP = Nurse Practitioner, NPPSS = Nurse and physician Perception and Satisfaction Survey, OR = operating room, Phy.= physician, POI = post intervention, PRI = pre-intervention, PRISMA = Prevention and Recovery Information System for Monitoring and Analysis, pts. = patients, Quest. = Questionnaire, Rec = recommendations, RIAS=Rotor Interaction Analysis System, RN = registered nurse SBAR= situation background-assessment-recommendations, SD. = standard deviation, SHO = senior house officer, SIMS = Shared Information Management Services, SPSS = Statistical Package for the Social Sciences, Stat.sig = Statistically significant, TELE = telemetry group, Tx. = Treatment

Table 2. *Role of Electronic Health Records in Patient Care*

Purpose, Author(S), Year	Design/Key Variables	Sample/Setting	Measures	Results /Findings	Conclusion, Limitations and Notes
Elicit community behavioral health providers' beliefs about the benefits and barriers of using EHR. (Shank, et. al., 2012).	Exploratory, qualitative Variables: quality care, privacy and security, and delivery of services.	Convenient, random sampling from a list of behavioral health providers practicing in 16 county urban and rural regions in Nebraska. *N* = 32 Phone interviews were conducted with middle aged, (41-30 years), highly educated (MD, Phd, or Masters) slightly more male (53%) sample of MDs, ANPs, PAs, psychiatrist, psychologist or RNs.	Semi-structured interview asking four focal questions: What are the Benefits, Barriers, Who do you rely on in your organization to be a part of decision making regarding adopting EHR? What is the likelihood you and others in your primary practice or organization would use EHRs? Interviews coded (using Atlas.ti software) and transcribed over a 10-week period.	Benefits of EHR mentioned by 100% of providers, Barriers = 59%. Barriers involving privacy and security concerns agreed by 100% of providers, while 22% perceived it beneficial. Barriers to delivery of service: 97% of providers agreed and 66% saw it beneficial.	Most providers (81%) expressed overall positive support for electronic behavioral health records. Limitations/notes: Some sample members may have already had experience with EHR in which they may have more positive views of EHR compared to clinicians with no previous EHR experience.
To measure changes in primary care clinician's attitudes towards an EHR during the first year of implementation. (El-Kareh et. al., 2009).	Longitudinal survey Variables: overall quality of care, Patient safety, Communication, and efficiency.	86 primary care clinicians surveyed between December 2006 and January 2008 at Atrius Health an integrated multispecialty group practice in eastern Massachusetts.	Perceived impact on overall quality of care, patient safety, communication, and efficiency at 1, 3, 6, and 12 months following implementation of EHR	Proportion of clinicians agreeing that EHR improved overall quality of care: 63-86%, Reduced medication-related errors: 72-81% , Improved follow up test results: 62-87%,	Overall improvement in perception related to test result follow up were first detected at 6 months while those related to overall quality, efficiency, and communication were first identified at 12 months.

Purpose, Author(S), Year	Design/Key Variables	Sample/Setting	Measures	Results /Findings	Conclusion, Limitations and Notes
		Sample size: 86 primary care clinicians, 73 physicians 10 NPs 3 PAs Surveys were sent via mail, and paper mail at one month, (baseline) 3, 6, and 12 months following the completion of all stages of EHR implementation at his/her health center.		Improved communication among clinicians: 72-93%, Rating increased from 1-12 months. During same period of time, decreasing proportion of clinicians agreed the EHR decreased quality of pt. interaction :49-33%, resulted in longer visits: 68-51%, increased time spent on documentation: 78-68%.	Primary Care clinicians report increasingly positive perceptions of a new EHR system within 1 year of implementation across a spectrum of domain of care. Limitations: only one year follow up.
Explore the views and perspectives of primary health care providers participating in DELPHI project regarding their experiences using EHR. (Denomme et al., 2011).	Descriptive qualitative study. Variables: Credibility and Trustworthiness of data.	Study participants were recruited from the original study participant pool of 30 EHR users across six family practice sites using EHR software. Final sample: 19 participants in both rural and urban practices. Sample: 7 MDs 7 interprofessional health providers (nurses, medical assistants) and	Semi structured interviews were conducted with each participant at their practice sites by two researchers. 14 interview questions, explored the adoption process and barrier and facilitators to ongoing HER. Both individual nd team analyses were performed	Consistent data entry was imperative to successful EHR utilization, EHR software was utilized differently depending on the role of the team member. Team members continued to seek out a team champion/problem solver to help overcome obstacles, Communication was enhanced by using the	Findings illuminate important elements of team behavior that promote EHR adoption and provide insight for primary health care providers moving through the continuum of initial to advanced EMR adoption.

Purpose, Author(S), Year	Design/Key Variables	Sample/Setting	Measures	Results /Findings	Conclusion, Limitations and Notes
		5 administrative staff (receptionists). Study was in southwestern Ontario between December 2008-March 2009.		common messaging system with n EHR. Success with certain EHR functions encouraged others to learn additional features in EHR.	

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