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Utilization of Clinical Practice Guidelines: Barriers and Facilitators

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Title: Utilization of Clinical Practice Guidelines: Barriers and Facilitators

Key Points:

1. Clinical practice guidelines are tools used to assist health care professionals in clinical decision making with the ultimate goal of improving patient care.
2. Promoting the implementation of CPGs at the point of care delivery is a hurdle to translating scientific findings into practice.
3. As access to electronic evidence sources increase, the amount of evidence available to clinicians for clinical decision support is overwhelming.

4. Increased adoption of electronic health records and clinical decision support tools will move clinical practice guidelines more rapidly to the patient encounter.

Abstract:

Clinical practice guidelines exist as tools to augment clinician decision making yet several barriers to implementation have been identified in the literature. Researchers cite a lack of knowledge of guideline existence, complexity of guidelines, staff attitude, and lack of training, time and resource constraints as reasons for non-adherence to clinical practice guidelines. This purpose of this project was to seek understanding of what factors promote or prevent the implementation of evidence based clinical practice guidelines at the point of care delivery using a population of neuroscience advanced practice providers. Understanding internal and external factors that impact the use of evidence based recommendations by advanced practice providers for this high acuity population was unknown. From the respondents' perspective, clinical practice guidelines were viewed as valid tools necessary to standardize patient care. Respondents exhibited proficiency in synthesis and integration of a complex set of guidelines to guide clinical decisions and treatment plans in challenging patient scenarios. Efficient and effective guidelines impact patient safety and quality by increasing the consistency of behavior and replacing idiosyncratic behaviors with best practices. Advanced practice providers possess the expertise required to bring clinical practice guidelines to the bedside more quickly to improve the health, quality and safety of neuroscience patients.

Utilization of Clinical Practice Guidelines: Barriers and Facilitators

Clinical practice guidelines are designed to improve quality of care, reduce variation in practice and ensure evidence-based care is delivered when appropriate. Despite the creation of guidelines at national and international levels, guidelines are underutilized by clinicians at the bedside to improve patient care. Clinical practice guidelines (CPGs) are defined as “systematically developed statements to assist practitioners and patients to make decisions about appropriate health care for specific circumstances” (Field & Lohr, 1990, p. 13). In the United States, the National Guideline Clearinghouse™ (NGC), a public database of evidence-based clinical practice guidelines provides clinicians with a method to advance excellence in care by decreasing the gap between evidence and practice. Although high quality, well developed clinical practice guidelines are available, these tools are only useful if implemented locally to improve patient care.

Translating evidence into practice while implementing, planning and caring for patients is a core competency of nurse practitioners (NPs) and physician assistants (PAs) in acute care settings. The term “advanced practice provider” has been used to describe nurse practitioners (NPs) and physician assistants (PAs) who provide care to acute and critically ill patients. These advanced practice providers (APPs) have the expertise to guide the process change necessary to bring clinical practice guidelines to the bedside to improve the health, quality and safety of patients. The perception and use of clinical practice guidelines with this health care provider population is poorly understood. The majority of research on the development, implementation and use of clinical practice guidelines is focused on physician behavior (Abrahamson, Fox & Doebbeling, 2012). Further research exploring the attitudes, knowledge and behaviors of nurse practitioners and physician assistants toward the use of clinical guidelines is needed to identify

what facilitators and barriers exist. Understanding these perceptions is a key to engaging advanced practice providers in the creation, implementation and ongoing surveillance of clinical practice guidelines pertinent to their patient population.

Statement of the Problem

Decisions about when, why and how to pursue certain diagnoses and treatments are complicated. Patient care interventions are based on scientific principles, theoretical knowledge and a clinician's expertise. Clinical practice guidelines exist as tools to augment clinician decision making yet several barriers to implementation have been identified in the literature. Researchers cite a lack of knowledge of guideline existence, complexity of guidelines, staff attitude, lack of training, time and resource constraints as reasons for non-adherence to clinical practice guidelines (Alanen, Välimäki, & Kaila, 2009; Ebben et al., 2012; Ebben et al, 2013). Clinicians are encouraged to use evidence based clinical practice guidelines in light of available resources and circumstances presented by individual patients to provide the current standard of care.

Traditionally "standard of care" has been defined as "the level at which the average, prudent provider in a given community would practice" (Legal dictionary, 2014).

Specialty societies, health plans, accrediting organizations, private organizations and federal agencies such as the Agency for Healthcare Research and Quality (AHRQ) are now setting, modifying, monitoring and publicizing standards of care for patients. Potential liability exists for the clinician who does not follow the minimal acceptable level of care determined by consensus of providers, consumers or these outside agencies. Buppert (2012) suggests the standard of care address the following questions:

- Did the clinician do the right thing at the right time?

- Was effective care provided to the patient?
- Was care provided safely and in an appropriate time frame?
- Was the outcome as good as expected, given the patient's condition, personal characteristics and the current state of medical science?

Clinicians may be more likely to adopt clinical practice guidelines if they believe guidelines offer malpractice litigation protection and support a standard of care. Utilization of clinical practice guidelines is one method to facilitate clinical decision making in providing safer, quality care to patients. Yet, some clinicians believe guidelines characterize a rigid or oversimplified practice of medicine and refer to guidelines as “cookbook medicine”. At the community hospital setting for this project, clinician utilization of clinical practice guidelines to guide complex clinical decision making was unknown.

Purpose

The purpose of this project was to seek understanding of what factors promote or prevent the implementation of evidence based clinical practice guidelines at the point of care delivery using a population of neuroscience advanced practice providers.

Background

Even with the exponential growth of publicly available clinical practice guidelines, ease of access to high quality evidence is out of reach for many clinicians. As access to electronic evidence sources increase, the amount of evidence available to clinicians for clinical decision support is overwhelming. It is often difficult for providers to stay current with the evidence necessary to provide the standard of care. In practice, clinicians use experience, education, literature, a patient's preference and clinical data to make clinical decisions. Patient interventions may be widely adopted but not necessarily based on evidence. CPGs are useful mechanisms to

break down complex data sets into more manageable pieces, promoting the effective use of evidence for busy clinicians to individualize patient care.

Despite immediate CPG availability in this technological era, use of practice guidelines varies widely. Dissemination of new information is haphazard and inconsistent and the impact on treatment decisions for care is unknown. Previously, a seventeen year time-frame was estimated to incorporate evidence into clinical practice (Balas & Boren, 2000). Despite the availability of evidence at the point of care and clinical practice guidelines embedded in the EHR, the dynamic workflow of a clinician's use of guidelines in practice is poorly understood (Laing, 2007). At the clinical site, one process amenable to the use of guidelines was analyzed in an attempt to understand the impact of CPGs in clinician decision making Figure 1.

<insert Figure 1.>

In the community hospital where this project was undertaken, the patient with intracranial hemorrhage due to anticoagulation is one of the highest acuity patients on the neuroscience service. As clinicians caring for patients with this devastating complication, use of evidence based treatment recommendations to guide treatment is crucial to patient safety. The decision to reverse anticoagulants is made by the clinician after consideration of intended benefit and potential risks to the patient. This diagnosis was purposefully selected for evaluation at the clinical site as anti-coagulated patients have a greater risk of hematoma expansion, and subsequent clinical deterioration and death, necessitating vigorous reversal of coagulopathy (Flaherty, 2010). Since management of anticoagulation associated intracranial hemorrhage prompts urgent reversal of anticoagulants with variable treatment options, an evidence-based anticoagulation reversal guideline is available at the clinical site. The locally developed guidelines serve as a guide to select initial doses and agents once appropriate patients are

selected. As one of the most difficult patients for the clinician to treat, understanding of barrier and facilitators to use of the guideline is helpful.

The advanced practice provider (APP) is one of the first to arrive at the bedside of the intracranial hemorrhage patient as the neurosurgeon or neurointensivist may not be immediately available. The APP initiates the care management of this patient by assessing, diagnosing and writing anticoagulation reversal orders. Although intracerebral hemorrhage represents only 10-15% of all cerebrovascular events, it is associated with substantial morbidity and mortality for patients (Moussouttas, 2012). The incidence of oral anticoagulation-associated intracerebral hemorrhage is growing due to the increasing use of warfarin, the emergence of multiple new blood thinners and the older age of treated patients (Cervera, Amaro, & Chamorro, 2012). Optimal treatment is yet to be defined making this a complex patient to manage. In the absence of well-designed randomized controlled trials, the treatment of this patient varies widely (Flaherty, 2010 & Moussouttas, 2012). Experts agree reversal of anticoagulation without delay is necessary to prevent hematoma expansion during the initial 24-48 hours (Aguilar et al, 2007).

An evaluation tool recommended to identify and prevent process problems is failure mode and effects analysis (FMEA). This prospective risk assessment process is designed to identify and prevent process problems before they occur (McDermott, Mikulik, & Beauregard, 1996). To assess risk in relation to adherence to the anticoagulation guideline, the American Hospital Association (AHA) and Institute for Safe Medication Practices (ISMP) recommend analysis of the prescribing phase, order processing phase and medication dispensing phase (AHA, 2002). Since non-adherence to practice guidelines may jeopardize patient safety or result in medication errors, risk assessment is a one method used to evaluate error prone processes.

FMEA reveals multiple potential failure modes due to a lack of APP utilization of the anticoagulation reversal guidelines, *Table 1*.

< insert Table 1 >

Significance of the Problem

Healthcare

The Institute of Medicine's *Promoting Adoption of Clinical Practice Guidelines* report challenges the healthcare community to create systems from within that promote the uptake and use of clinical practice guidelines at the point of care (National Research Council, 2011). The IOM recognizes this as one of the main steps in translating research findings into the mainstream of practice. A growing body of evidence shows that the rate of clinical practice guideline adoption is affected by the interaction of the guideline users (physicians, nurses, pharmacists), the characteristics of the guideline (e.g. ease of use, strength of the evidence) and the context of practice (e.g. inpatient, ambulatory) (Greenhalgh et al., 2005). Efficient and effective guidelines impact patient safety and quality by increasing the consistency of behavior and replacing idiosyncratic behaviors with best practices. Increased adoption of electronic health records and clinical decision support tools will move clinical practice guidelines more rapidly to the patient encounter. These practices standardize and improve the quality of care by reducing errors (Brokel, 2009). Use of electronic health record clinical decision support tools is shown to improve patient safety (Jao & Hier, 2010).

Advanced Practice Nursing

Translating evidence into practice while implementing, planning and caring for patients is one of the core competencies of nurse practitioners and physician assistants (NONPF, 2012 & NCCPA, 2012). The role of the nurse practitioner is to generate knowledge from clinical

practice to improve practice and patient outcomes by analyzing clinical guidelines for individualized application into practice (NONPF, 2012). Advanced practice nurses have the ability to translate scientific knowledge quickly and effectively to benefit patients in the daily demands of practice environments. Practice guidelines enhance clinician decision making by clearly describing and appraising the scientific evidence and reasoning behind clinical recommendations. Critically appraised and synthesized evidence is fundamental to quality practice. Understanding the barriers and facilitators to use of clinical practice guidelines by this population is a precursor to understanding use of CPGs and ultimately improving patient care.

Impact of project on population

Adherence to well-designed clinical practice guidelines is recognized as a strategy to reduce error and improve outcomes for neuroscience patients. Neurosurgical and cerebrovascular adverse events such as thromboembolic events, infection, wrong level surgery, management of vasospasm and salt wasting syndromes are complications likely be reduced by use to evidence based guidelines and protocols (Wong et al., 2012). In recent years, professional medical and nursing organizations attempted to monitor effects on practice by endorsing clinical practice guidelines on association websites. Successful efforts to evaluate clinical practice guidelines by the American Association of Neurological Surgeons and the Congress of Neurological Surgeons resulted in systematic approaches to cervical spine injury, concussion and severe traumatic brain injury (Council of State Neurologic Societies, 2013). The American Association of Neuroscience Nurses grants free access to electronic clinical practice guidelines to assist nurses in delivering optimum quality-focused patient care to specific neuroscience patient populations (AANN, 2013). Using expert consensus guidelines to develop protocols, order sets, clinical algorithms

and clinical decision support tools is recommended to shorten the time frame to translate evidence into practice (Gaddis, Greenwald, & Huckson, 2007).

Despite the availability of electronic access to evidence based resources at the clinical site, it was unknown to what extent clinicians in this project setting use them to deliver care. The clinical site for this scholarly project was a 200 bed community hospital in an academic health system with electronic access to clinical practice guidelines to enhance clinician decision making. Data were gathered on the use of clinical practice guidelines to support the anecdotal notion that the neuroscience APPs were unfamiliar with guidelines specific to the patient population. The survey assessed the extent to which clinicians agree with and trust clinical practice guidelines, the clarity and ease of use and the extent of use with a specific patient population. Results from the survey provided valuable insight to develop education and process improvement and to expand access and use of evidence based guidelines at the clinical site.

Application of Theoretical Framework

Although *clinical practice guidelines* encourage the consistent, efficient application of evidence when used by clinicians at the bedside of patients, a knowledge translation gap exists (Gaddis et al., 2007). Social, cognitive and motivational factors enable efficient knowledge translation in an organization (Gaddis et al., 2007). The inter-relationship between several concepts impacts the utilization of clinical practice guidelines in clinical practice, *Figure 2*.

<insert Figure 2>

The literature reveals many barriers and facilitators that impede the successful implementation of clinical practice guidelines. Understanding of individual predisposition to change and the optimal approaches to change clinician's behavior is incomplete. More theory based study is needed to better inform the design of interventions to successfully implement

evidenced-based findings in complex organizations. Individual professional decisions are central to the execution of clinical practice guidelines. It is useful to observe stimuli and responses in real world situations to understanding the human mechanisms necessary to improve behavior change strategies (Godin, Bélanger-Gravel, Eccles, & Grimshaw, 2008). In social cognitive theory, Bandura (1999) proposes that people regulate their own motivation within a network of interacting influences. Social cognitive theory describes a dynamic, ongoing process in which personal, environmental and human behavior factors exert influence upon each other, *Figure 3*. The survey assesses impact of the hospital environment, peers and self-motivation in the use of clinical practice guidelines in the population of neuroscience advanced practice providers.

Nevid (2009) explains that social cognitive theory illustrates individuals do not simply respond to environmental influences but actively seek and interpret information. Since people not guidelines are the agents of change, social cognitive theory provides understanding to the motivation of advanced practice providers in using clinical practice guidelines, *Figure 4*. Social cognitive theory provides the feedback necessary for the implementation of best practice change process to occur. This theory was central to understanding and predicting clinicians' intentions and behaviors in the use to clinical practice guidelines. Assessing the core elements of the theory, implications for advanced practice that encourage rapid translation of evidence into practice are developed.

<insert Figure 3 & 4>

Methodology

Project Design

The purpose of this project was to assess factors that negatively or positively influenced advanced practice provider utilization of clinical practice guidelines in a community hospital.

The method in this project was described in both a broad and narrow context relevant to neuroscience APP clinical practice. A non-experimental cross sectional descriptive design was used to gather qualitative and quantitative data via survey. The project was approved by the Institutional Review Boards at project setting and home university prior to survey distribution.

The survey was distributed to a convenience sample of all nurse practitioners and physician assistants working on a neuroscience specialty service at a community hospital. As clinicians responsible for health care delivery at the bedside, these APPs were chosen as they have the potential to narrow the gap that exists between standard of care and that which is actually delivered to patients at this community hospital. Twenty three credentialed nurse practitioner and physician assistant staff working full-time, part-time or contingent on the neuroscience service were included in the survey population. Advanced practice providers currently in orientation, as well as APP students and contingent employees who work less than 36 hours per month on the service were excluded. Recruitment of potential subjects was aided by the Neuroscience APP Team Leader and the health system Clinical Coordinator.

The setting for the scholarly project was the neuroscience service of a 200 bed suburban community hospital which is part of a seven hospital urban health system. The primary condition reviewed was the acute management of patients with anti-coagulation related intracranial hemorrhage in a community hospital. Understanding internal and external factors that impact the use of evidence based recommendations by advanced practice providers for this high acuity population was unknown. The rationale for surveying this group of advanced practice providers was to better understand what education and strategies might be employed to facilitate use of CPGs in the practice environment.

Data Collection Tool: Technology

The survey tool was designed with statements and open ended questions to assess mechanisms that influence utilization of clinical practice guidelines. The tool was developed using a framework originally designed to assess a variety of barriers related to knowledge, attitudes and behaviors of practitioners toward clinical practice guidelines (Cabana et al., 1999). A second instrument describing attitudinal statements about a Center for Disease Control (CDC) hand hygiene guideline was modified to fit the scholarly project setting (Larson, 2004). A four-point Likert-type scale ranging from strongly agree to strongly disagree was used to extract a positive or negative response. Eliminating the neutral response elicited a more discriminating and thoughtful response. The scale was 1=strongly disagree, 2=disagree, 3=agree and 4=strongly agree. The survey was purposefully designed with both positive and negative wording to encourage respondents to carefully read questions. Part one was developed with 17 statements used as a general tool to assess attitudes toward any clinical practice guideline. Part two used 13 statements to assess health system specific anticoagulation reversal guidelines. In addition, the tool asked six open-ended questions to obtain qualitative data about guideline knowledge and barriers and facilitators to using the specific guideline. Face validity was sought through doctorally prepared faculty evaluation and pilot survey. A pilot survey was completed by two acute care nurse practitioners who addressed ease of use, clarity and the amount of time needed for completion.

The technology used in this project included an online survey system and the hospital email system. The survey was created using Qualtrics © survey system and distributed via the project site employee e-mail system. Qualtrics©, a secure, web-based software tool provided

online reporting and data manipulation, functionality and data export to Excel ©. Anonymity was insured through the Qualtrics© secure database by de-identification of respondents.

Data Analysis

Data gathered included demographic data of survey participants *Table 3, Demographics*, use of clinical practice guidelines in general and use of a hospital specific anticoagulation reversal guideline. Of the 23 potential subjects, 17 (**74%**) **completed the survey**. The survey assessed the core concepts of knowledge, behaviors and environmental factors impacting whether or not clinical practice guidelines were used. Attributes of the guidelines and knowledge of evidence based recommendations for acute management of patients with anti-coagulation related intracranial hemorrhage were assessed. Data were analyzed using the descriptive statistics procedure in Excel © to determine and measure frequencies and central tendencies.

Qualitative data analysis was performed on open-ended questions by review of written narrative to identify themes and patterns in the data. The data was interpreted and applied in the context of the clinical question and concepts as outcomes. The meaning in the data was interpreted to ascertain what changes are necessary to improve practice.

<insert Table 2. Demographics>

Results

In assessing advanced practice provider use of clinical practice guidelines, statements and open ended questions related to knowledge, attitude and behaviors were evaluated via survey. Frequency distribution tables of results were constructed for both clinical practice guidelines in general and the hospital specific anti-coagulation reversal guidelines *Table 3 & Table 4*. An overall response rate to determine the score and mean related to all the statements was calculated. Prior to computing the mean of the series of questions, negatively worded questions

were assigned an opposite number of points than the positively worded questions. A higher score indicated fewer perceived barriers. A subscale mean response was calculated for statements relating to general clinical practice guideline adherence versus hospital specific guideline adherence. Overall 81% of the advanced practice providers surveyed perceived facilitators of clinical practice guidelines in general. *Figure 5* and 89% of APPs perceived facilitators of hospital specific anticoagulation reversal guidelines, *Figure 6*.

<insert Tables 3 & 4>

<insert Figures 5 & 6>

The primary facilitators influencing the respondents to use clinical practice guidelines included:

- patient care is standardized
 - patient outcomes are optimized
 - guidelines are practical to use
 - clinicians are familiar with guidelines in the neuroscience field
 - guidelines are readily accessible.
- Five primary facilitators for using the hospital specific anticoagulation guidelines were similar:
 - patient care is standardized
 - patient outcomes are improved
 - guidelines are practical to use
 - relevant to the neuroscience patient population
 - management expectation the use of guidelines

The only barrier that elicited a strong response (> 50% agree/strongly agree) was the statement: it is impossible to keep up with clinical practice guidelines in my field.

Discussion

Relationship of Results to Framework

Individual professional decisions were central to the execution of clinical practice guidelines, understanding perceptions to similar clinical scenarios of patients encountered on a daily basis were integral to recommending approaches to improve adherence. Responses to open-ended questions regarding these high acuity scenarios were evaluated to attain insight into factors that promote or prevent adherence to the use of clinical practice guidelines. Striking similarities in correct responses of complex treatment plans were noted in all three scenarios, demonstrating widespread use of the hospital specific anticoagulation reversal protocol.

From the respondents' perspective, standardizing patient care and improving patient outcomes were the leading reasons to use clinical practice guidelines. Results revealed numerous facilitators promoting successful implementation of clinical practice guidelines and few barriers. Using direct quotes, the core elements of the social cognitive theory were examined to develop implications for advanced practice that encourage rapid translation of evidence into practice.

Behavioral Factors

Self-reported behavioral factors such as thoughts, actions, and attitudes were examined for perceptions that influence participants use of guidelines. Respondents cited the need for patient safety and acuity as factors that influenced the use of the guideline, "...patient safety, I want to double check that I am doing the reversal correctly as we do not use these medications on a frequent basis, it is a safe way to provide care and maintain standards". Attributes of the guidelines also influenced use, "ease of use, consistency" and "I know the guideline is evidence

based”. Patient acuity status was addressed, “the seriousness of the diagnosis impacts my use” and “I want to be able to assess risk versus benefit of my plan”. A strong sense of self efficacy was present as some clinicians initiated behaviors necessary to attain the competency required to manage prospective situations, “I use the guideline all the time” and “I pull up the guidelines, print, read and implement”.

Barriers identified were evident in participant responses, “this policy is relevant to my patient population, more clinicians should be educated”, “make them more readily accessible, and have a website that lists all the hospital specific protocols” and “I wish the guidelines were all readily available in a binder or a paper folder”. Since electronic resources are the “source of truth” for policy or guidelines at this health system, suggestions to provide paper binders and folders may undermine the availability of electronic sources.

Environmental Factors

Environmental factors such as organizational culture, infrastructure, social norms, and resources had significant influence on use of guidelines. Several APPs suggested the most important factor influencing the use of the local guideline was the recommendation by opinion leaders. Respected peers were trusted to judge the evidence, “the neurointensivist helped create the guideline”, “endorsement by the physician”, “senior staff/attending physicians recommend”, “I was informed by a colleague” or “learned from the pharmacist”. Proactive leadership had an impact on guideline use “my manager expects me to use the guideline”, “its hospital policy” and “much importance is placed on practice guidelines in this organization” were more frequently cited as reasons to use guidelines than not. Use of embedded links in the electronic health record to clinical decision support tools such as Up to Date, Clinical Pharmacology, Epocrates, Access Medicine, Micromedex, Clinical Doc, PubMed, American Heart Association guidelines, hospital

specific guidelines and standard order sets confirmed infrastructure support providing easy access to evidence.

Barriers in the learning culture at the clinical site were noted. When asked how participants were educated on the hospital specific guidelines, replies included, "...no education, I read the policy myself", "on the job education", "a memo", "I found them by overhearing a conversation". Other participants were "given a paper copy to read" or identified an inability to find guidelines on the health system website. Answers revealed a perception of inadequate orientation and ongoing education for the neuroscience advanced practice providers in relation to the hospital specific clinical practice guideline.

Cognitive Factors

Cognitive factors including experience, competency, conceptual understanding and self-efficacy swayed participants to use guidelines. Responses to specific knowledge questions about anticoagulation reversal in intracranial hemorrhage patients revealed expertise, knowledge and strict adherence to protocol recommendations, "I refer to the health system website, follow the anticoagulation guideline protocol, discuss recommendations with attending staff and confer with pharmacy team" or "I stop aspirin and Plavix, assess PT/PTT/INR, CBC and administer platelet transfusions per protocol". Most responses to the clinical case studies revealed high level critical thinking with verbatim referral to the hospital guidelines. Specific recommendations for holding anticoagulant medications, reversal agent medication names and dosage recommendations, diagnostic lab tests with time frames and blood pressure parameters were outlined in patient treatment plans. Many responses revealed an expert level of understanding. When a lack of knowledge was present, participants used guidelines to supplement their

knowledge “there are many new anticoagulant reversal agents, I know how to reverse antiplatelet agents, and it’s the others that are more complex necessitating use of the guidelines”.

Survey participants identified a lack of awareness as a barrier, “...some emergency room physicians and advanced practice providers are not aware of the guidelines. They continue to give fresh frozen plasma (FFP) instead of prothrombin complex concentrates (PCC); they don’t know or follow the guideline”. Despite half of respondents (53%) identifying the top barrier as “impossible to keep up with all clinical practice guidelines in the field” , “...lack of knowledge or failure to have the guideline memorized” and “I did not know the guideline exists”, most clinicians felt they were “familiar with guidelines in their field” ,“guidelines were readily accessible”(88%) and “practical to use” (88%).

Relationship of Results to Aims/Objectives

This purpose of this project was to seek understanding of what factors promote or prevent the implementation of evidence based clinical practice guidelines at the point of care delivery. Perceptions of external and internal factors that influence the use of clinical practice guidelines in a population of neuroscience advanced practice providers were evaluated. The results from the survey add to the understanding of how clinical practice guidelines were used in a community hospital setting by a group of neuroscience nurse practitioners and physician assistants. The survey demonstrated a consistent use of the hospital specific anticoagulation reversal protocol in the survey population. Minimal treatment variability was noted in qualitative responses to case scenarios. The use of evidence-based guidelines was an important step in translating knowledge into practice for this group of clinicians. Participants in the project were knowledgeable of, understood and used guidelines to assist in clinical decision making with the ultimate goal of keeping patients safe and improving patient outcomes.

Impact of Results on Practice

The survey discovered that most respondents perceived clinical practice guidelines as valid tools to improve patient outcomes. Few of the failure modes anticipated by the prospective risk assessment process were realized. Use of evidence was improved by easily accessible, high quality, well developed local guidelines pertinent to the patient population served.

Despite the lack of a standardized process for educating clinicians to the hospital specific guidelines, the majority of providers exhibited familiarity and a competent level of knowledge in the use of the hospital specific guidelines in the patient scenarios. Through narrative responses for challenging patient scenarios, respondents exhibited proficiency in synthesis and integration of a complex set of guidelines to guide clinical decisions and treatment plans. Participants demonstrated appropriate use of the local anticoagulation reversal guideline content and most provided correct answers for the clinical case scenarios. If unable to provide answers, respondents stated they would actively seek and consult a peer to obtain the correct information prior to proceeding with treatment. The survey highlighted the importance of using champions of change, such as respected colleagues, to engage clinicians in efforts to improve practice and adherence to standards. Findings from the survey were used to develop implications for practice.

Strengths/Limitations of Project

No studies have examined the perceptions of neuroscience advanced practice providers in the use of clinical practice guidelines. This project sheds new light on the dynamic workflow of a clinician's use of clinical practice guidelines embedded in an electronic health record. One of the strengths realized by the project was an increased awareness of the hospital specific anticoagulation reversal guideline. The survey served as an educational tool encouraging respondents to review the guideline and discuss with peers prior to responding to case studies.

The increased attention of the project and survey may have led to a temporarily inflated response to the use of local guidelines resulting in a Hawthorne effect. Clinicians may have studied the hospital specific guidelines to answer the survey to perform well and “pass the test”. The study is limited by a small sample size and the convenience sample of neuroscience advanced practice providers. Since the health system has multiple sites with multiple advanced practice providers, the sample may not be representative of advanced practice providers in the organization. Due to the small sample size, findings cannot be generalized to the advanced practice provider population at large.

Future Implications for Practice

A multifaceted approach is necessary to facilitate the use of clinical practice guidelines to improve patient care. Based on survey findings of barriers in the use of clinical practice guidelines, the following implications for practice are recommended:

- 1) improve recognition and awareness of the current state
- 2) address ongoing education and competency
- 3) attain endorsement from administration
- 4) use a team approach with strong clinical leadership to address deficiencies.

The first step in the process is to evaluate the use of local clinical practice guidelines and assess barriers to use. Distribution of a confidential self-assessment survey to the intended users to identify obstacles such as level of knowledge, attributes of the guidelines or the context of practice are a method to raise advanced practice provider awareness and identify areas for process improvement.

Increased use of clinical decision support tools moves clinical practice guidelines more rapidly to the patient encounter. Education and training during orientation must include

available electronic resources, access to and expectations of use of local guidelines appropriate to the service line. Survey results should serve as a needs assessment to identify high risk, low incidence guidelines that require reinforcement during yearly ongoing competency assessment. Discussion forums during rounds or formal health system conferences should be encouraged to improve compliance to clinical practice guideline expectations.

Organizations must adopt a vision that embraces evidence based practice, leadership support and a focus on teamwork and collaboration. Identification of clinical champions from all members of the health care team to develop and implement local guidelines may improve the consistency of behavior. The entire multi-professional team (physicians, advanced practice providers, nurses and pharmacists) have a responsibility to participate in the development of best practices and a local standard of care. Health system wide guideline development task forces may confer a “seal of approval” to promote trustworthy clinical practice guidelines. Commitment and endorsement need to come not only from clinical leadership, but administration as well. Since improving patient outcomes was a high correlate in the use of guidelines, development of a mechanism of audit and feedback specific to pertinent guidelines is necessary to encourage APPs to monitor neuroscience patient outcomes. Development of a quality scorecard based on performance would not only reinforce the learning culture but allow the neuroscience team to assess and adjust performance to improve care processes and ultimately neuroscience patient outcomes.

Translating evidence efficiently to benefit patients in the daily demands of practice environments is fundamental to quality practice. As members of the patient care delivery team, advanced practice providers possess the expertise required to bring clinical practice guidelines to the bedside more quickly to improve the health, quality and safety of neuroscience patients.

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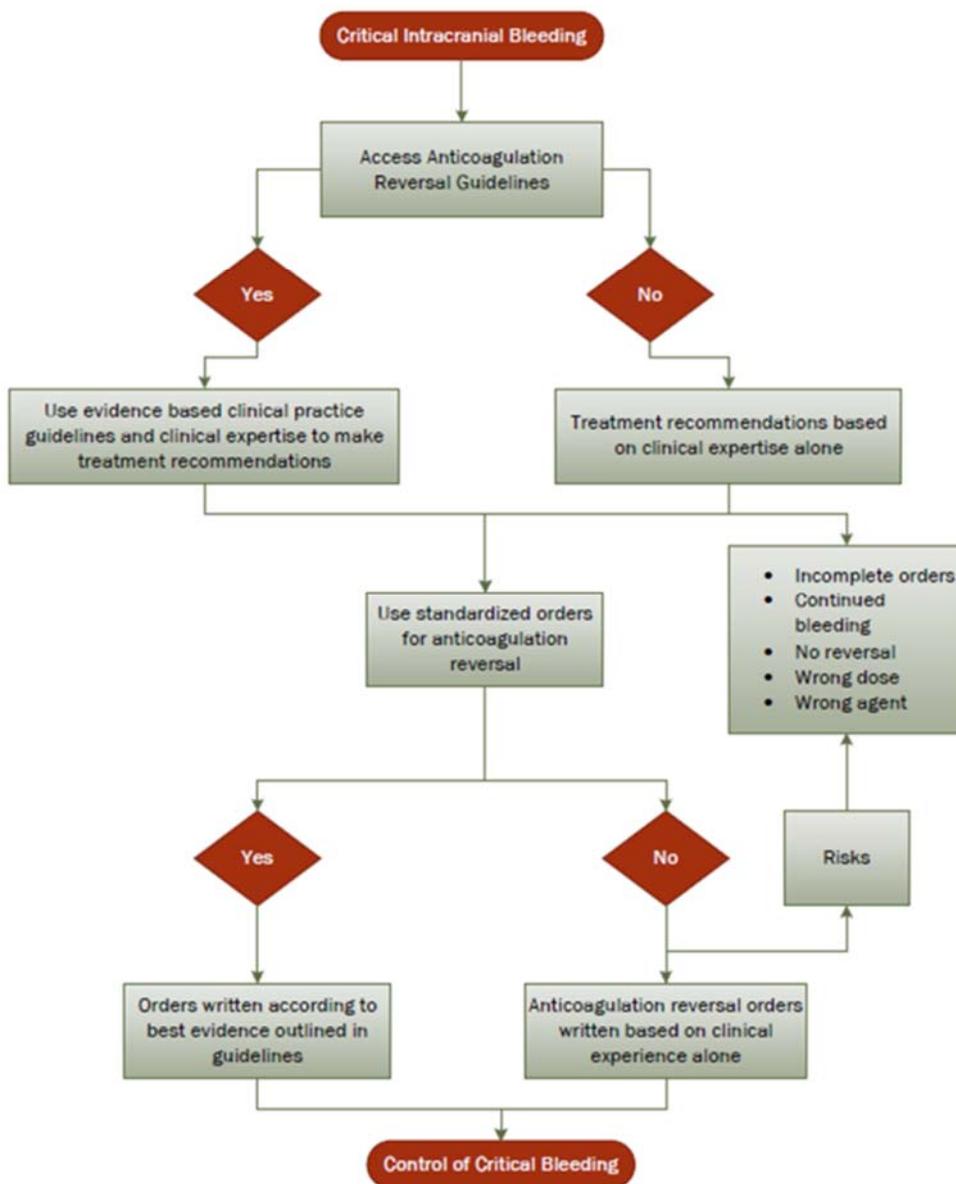


Figure 1. Failure Mode Effects Analysis (FMEA) of use of locally developed anticoagulation reversal guidelines for patients with anticoagulation related intracranial hemorrhage.

Table 1. *Failure Mode and Effects Analysis Implementation of Anticoagulation Reversal**Guidelines.*

Process and Sub-processes	Potential Failure Modes	Effects
Prescribing		
Assess patient	PMH not readily available	Clinical situation not considered (renal, liver function, allergies, concomitant use of other drugs)
	Medication reconciliation incomplete	Risk for choice of wrong reversal agent
	Allergies not documented clearly or accurately	Allergic response
Monitoring effects of medication	Lab data results insufficient, insufficient monitoring, wrong labs ordered	Delay in treatment, wrong treatment, failure to recognize consequences before harm occur, no achievement of pharmacological reversal
Choice of correct agent	Wrong agent selected Provider unaware of availability of treatment guidelines for anticoagulation reversal	No reversal, continuation of major bleeding,
Order Processing		
Standard order sets	Providers unaware of standard order sets	Incomplete orders Delay in treatment Wrong treatment
Timely delivery and administration	Not ordering stat Inaccurate order entry	Delay in distribution of medication
Use of anticoagulation guidelines	Lack of advanced practice provider competency and education on anticoagulation guidelines, lack of familiarity with content, complexity in guidelines	Overdose, under dose, failure to recognize adverse effects
Medication Dispensing		
Use of guidelines by interdisciplinary team	Failure to communicate with interdisciplinary team, attending staff physicians, consultants, pharmacy, nursing Staff attitudes and belief in validity of guidelines	Delay in treatment, wrong treatment, failure to recognize consequences before harm occur, no achievement of pharmacological reversal

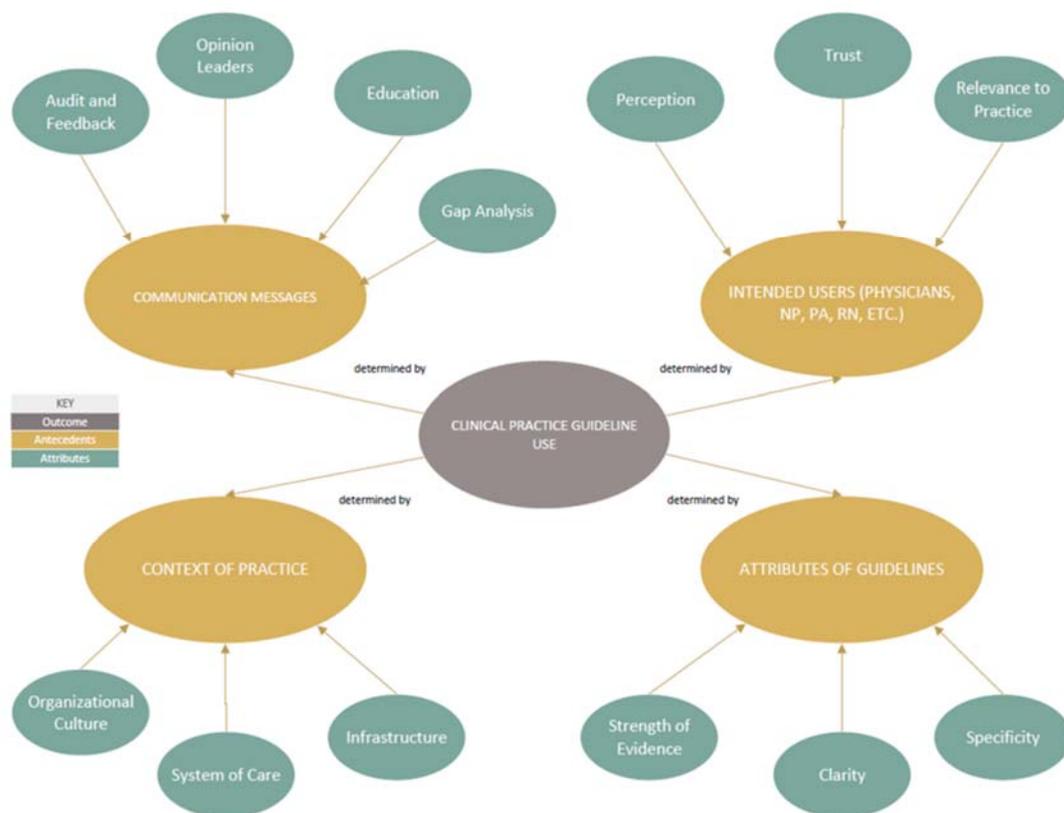


Figure 2. Clinical practice guideline use is determined by multiple factors: the intended users, communication messages, context of practice and attributes of the guidelines themselves.

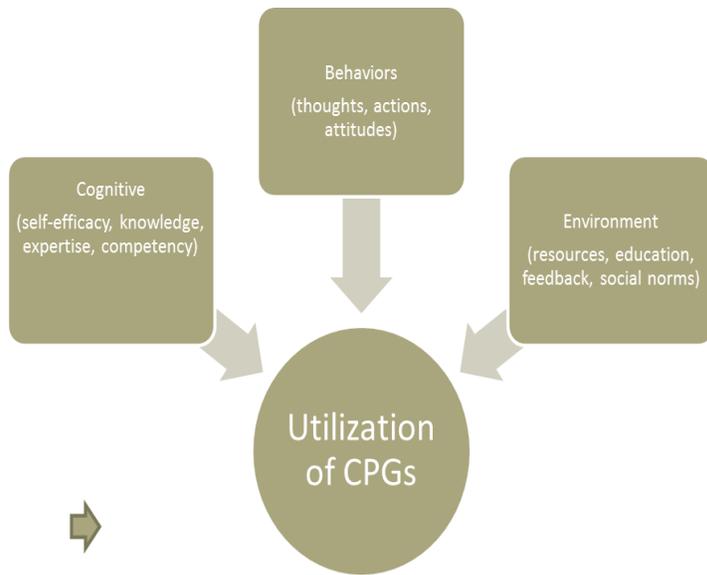


Figure 3. Social Cognitive Theory explains the interaction between cognitive factors, environmental factors and behaviors in relation to use of CPGs (Bandura, 1999).

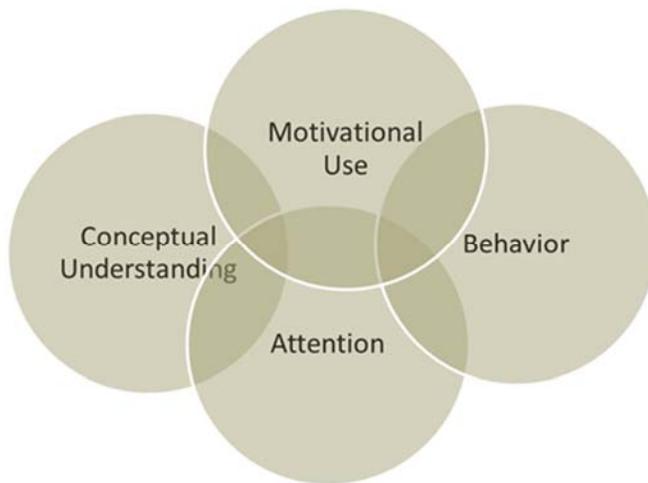


Figure 4. Social cognitive theory illustrates individuals do not simply respond to environmental influences but actively seek and interpret information. People not guidelines are the agents of change (Bandura, 1999).

Table 2. Demographics

Provider Role	Frequency	Percent
Nurse practitioner	11	65%
Physician assistant	6	35%
Experience in neuroscience field	Frequency	Percent
Less than five years	8	47%
Six to ten years	5	29%
Eleven to twenty years	4	24%
Level of education	Frequency	Percent
Master of science	7	41%
Master of science-nursing	9	53%
Doctor of nursing practice	1	6%
Current employment status	Frequency	Percent
Full-time	14	82%
Contingent	3	18%

Table 3. Survey responses to clinical practice guidelines in general.

Facilitators (descending score)	SA (4)	A (3)	D (2)	SD (1)
<i>n=17</i>				
Familiar with guidelines	18%	70%	12%	0%
Readily accessible	6%	65%	29%	0
Practical to use	6%	82%	12%	0
Facility places importance	12%	47%	35%	6%
Optimizes patient outcomes	12%	82%	12%	0
Standardizes Care	12%	88%	0	0
Sufficient Admin Support/Resources	0	59%	35%	6%
Patient awareness	0	6%	76%	18%
Protection from malpractice	0	65%	35%	0
Barriers (ascending score)	SA (1)	SD (2)	D (3)	SD (4)
Impossible to keep up guidelines	12%	41%	41%	6%
Too prescriptive	0	29%	65%	6%
Cumbersome & inconvenient	0	12%	82%	6%
Difficult to apply/adapt to practice	0	12%	82%	6%
Cost outweighs benefit	0	24%	76%	0
Interfere with professional autonomy	0	18%	76%	6%
Knowledge and creativity result in better patient outcomes	0	18%	70%	12%
Use of guidelines optional in current employment	0	24%	65%	12%

Note: SA=strongly agree, A= agree, D=disagree, SD= strongly disagree. Negatively worded questions assigned the opposite number of points than positively worded questions. Barriers scoring scale: strongly agree=1, agree=2, disagree=3, strongly disagree=4. Facilitators scoring scale: strongly agree=4, agree=3, disagree=2, strongly disagree=1. A higher score is associated with fewer perceived barriers in the use of clinical practice guidelines.

Table 4. Survey responses to health system specific anticoagulation reversal clinical practice guidelines.

Facilitators (descending score)	SA (4)	A (3)	D (2)	SD (1)
<i>n=17</i>				
Familiar w/AC reversal guidelines	18%	53%	29%	0
Knows how to access AC guidelines	18%	53%	29%	0
Familiar w/standard electronic order sets	12%	65%	23%	0
Agree with guideline content	23%	65%	12%	0
Anticoagulation guidelines improve patient outcomes	29%	65%	6%	0
Anticoagulation guideline standardize patient care	23%	76%	0	0
Practical to use	23%	71%	6%	0
Neurosurgeon/intensivist expectation	35%	53%	12%	0
Manager expectation	29%	65%	6%	0
Guideline relevant to patient population	41%	53%	6%	0
Confidence in guideline developers	35%	53%	6%	6%
Responsibility of NP/PA to order AC reversal and monitor	18%	82%	0	0
Barriers (ascending score)	SA (1)	A (2)	D (3)	SD (4)
Reversal Guideline is difficult to apply	0	18%	59%	23%

Note: SA=strongly agree, A= agree, D=disagree, SD= strongly disagree. Negatively worded questions are assigned the opposite number of points than positively worded questions. Barriers scoring scale: strongly agree=1, agree=2, disagree=3, strongly disagree=4. Facilitators scoring scale: strongly agree=4, agree=3, disagree=2, strongly disagree=1. A higher score is associated with fewer perceived barriers in the use of clinical practice guidelines.

Utilization of Clinical Practice Guidelines

■ Perceive Facilitators to Use ■ Perceive Barriers to Use

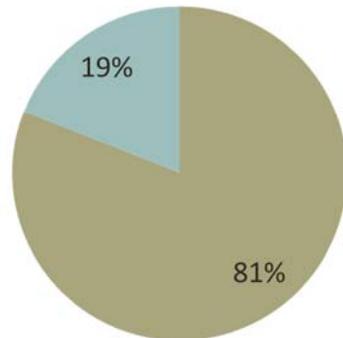


Figure 5. Calculated overall response rate to survey Part 1 (clinical practice guidelines in general) based on scores and means related to all statements. Negatively worded questions were assigned opposite number of points than the positively worded questions. Higher scores indicated fewer perceived barriers.



Figure 6. Calculated overall response rate to survey Part 2 (health system anticoagulation reversal guidelines based on scores and means related to all statements. Negatively worded questions were assigned opposite number of points than the positively worded questions. Higher scores indicated fewer perceived barriers.

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