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A COMPARISON OF PEDAGOGICAL APPROACHES TO ERROR COMMUNICATION TRAINING

By

Marie Annette Gilbert

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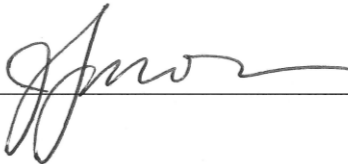
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A Comparison of Pedagogical Approaches to Error Communication Training

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May 1, 2015

ABSTRACT

Purpose: The purpose of this study was to compare the effectiveness of two different pedagogical approaches to error communication training.

Background: The literature advocates full, transparent communication following a medical error. However, many barriers to such disclosure exist. A significant barrier is healthcare providers do not feel prepared for these difficult conversations. This can be particularly challenging in a pediatric setting when the conversation with a parent may be more demanding than similar conversations in the non-pediatric settings.

Method: Individuals from three different professional groups were recruited; physicians, pharmacists, and nurses. A randomized controlled study was conducted to investigate whether the learning strategy used, interprofessional education (IPE) or self-study, influenced a team's performance in a simulated error communication scenario.

Results: The total mean score in a simulated error communication scenario was higher for the IPE group than the self-study group. This was not statistically significant; however, effect size would suggest a large estimation of magnitude between groups. Pre and post self-confidence scores identify that there was a significant difference in self-confidence following the education intervention for the IPE group but not for the self-study group. Overall satisfaction was higher in the IPE group

Conclusion: It would appear that the IPE approach to error communication is more effective in terms of performance, self-reported confidence level, and participants overall satisfaction. Larger research studies are recommended for further investigation. A power calculation suggests a sample size of 17 teams per group (IPE and Self-study) for 80% power in future studies.

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CHAPTER 1 - STATEMENT OF PROBLEM

The report "To Err is Human" (Institute of Medicine, 2000) increased awareness of patient injuries sustained and adverse outcomes occurring as a direct consequence of receiving healthcare. Healthcare organizations and leaders can either react in a defensive, reactive survival manner when errors occur, or chose to be proactive and learn from errors (Conway, Federico, & Stewart, 2011). Furthermore, it has been suggested that errors do not necessarily constitute improper, negligent, or unethical behavior, but failure to disclose them may (Porter-O'Grady & Malloch, 2011). Organizations are encouraged to develop comprehensive policies to address error disclosure in a prompt and consistent manner (ECRI Institute, 2008). These policies need to prioritize the medical and psychological needs of the patient over the protection of the organization (Amercan Society for Healthcare Risk Management, 2003).

The organizational structure relevant to this capstone was reflected in organizational policies. The study site, a pediatric tertiary hospital, had three specific error disclosure policies: a policy and procedure relating to medication error investigation, a policy and procedure concerned with communication following an adverse event, and a sentinel event policy. The policies were developed by the clinical risk manager, the pharmacy director, and the director of quality and medical affairs as the lead authors. Additional involvement was evident from the organizations general council.

Organizations have started to adopt the term "error communication" rather than error disclosure when communicating errors to patients and their families. The term "communication" is preferred to "disclosure" as it conveys a sense of openness and reciprocity and may assist in promoting an organizational culture of transparency (Consensus statement of the Harvard

Hospitals, 2006). Effective communication is essential for patient safety and patient centered care and is characterized by trust, respect, and empathy (Laidlaw & Hart, 2011). This can be particularly challenging when an error has occurred in a pediatric setting. The conversation with a parent may be more demanding than similar conversations in the non-pediatric settings (Loren, et al., 2008). In 2008, under the guidance of the medical director for patient safety and chair of the patient safety committee, the term error communication was introduced to the study site.

Error Communication Task Force

In 2008, an error communication task force was convened. Members of this task force included representatives from the patient safety committee, medical executive committee, ethics department, administration, nursing, information technology, outcomes, pharmacy, patient safety, and legal. A patient family member was also included on the task force. A plan identifying two phases was initiated.

Phase 1 involved a literature review and evaluation of best practice from other hospitals. In addition to this review a survey was developed and implemented to evaluate medical staff, staff, and patient/family's desires for communication. Based on their findings the task force developed some guiding principles and made the recommendation to communicate all errors associated with harm or the potential to cause harm (S Lehman, personal communication, October, 15, 2013).

Phase 2 of this initiative involved the development of expertise, education, and support for error communication. Unfortunately, education and training was never developed and the project and task force appeared to disband. It was unclear why the task force dissipated. One possibility was integration of this initiative did not fully occur. It has been suggested that integration of a change requires breaking down the clinical silos of complex healthcare

organizations care (Mohler, 2013). This concept needs to apply within senior leadership, administration, and at the point of care. The initial taskforce, with the exception of a family representative, were all senior leaders within the organization.

The success of phase 1 and failure of phase 2 reflects current literature and the challenges associated with implementing transparent error communication within healthcare organizations. A comprehensive review identified that much work is still required around error communication and disclosure (O'Connor, Coates, Yardley, & Wu, 2010). The challenges of this type of research are partly due to the rarity of the events and the ethics of such studies. However, O'Connor et al., (2010) suggested that currently there is no empirical evidence that disclosure is harmful to organizations, and there is some evidence that it is beneficial for organizations.

Problem Statement

It has been suggested that medical errors are frequently not communicated due to lack of knowledge of what information should be disclosed, insufficient communication skills, and fear of litigation (Gallagher, Studdert, & Levinson, 2007). Historically, error disclosure has been the responsibility of the physician. However healthcare requires a team approach and therefore it is probable that other providers may have been involved with the error (Jeffs, et al., 2010). Consideration needs to be given to the role of the healthcare team as they communicate with the patient and family regarding the error.   It has been suggested that healthcare organizations that integrate a team approach to error disclosure improve the quality of the disclosure process (Shannon, Foglia, Hardy, & Gallagher, 2009). Future research has been recommended focusing on the effectiveness of training programs to improve error disclosure (O'Connor, et al., 2010).

The purpose of this study was to compare the effectiveness of two different pedagogical approaches to error communication training. The research question guiding this study was

"Which learning strategy, interprofessional education (IPE) or self-study, is most effective for promoting team error disclosure and communication skills?"

Theoretical framework

This study was the second phase of a quality improvement initiative with the long term vision of developing a culture where open and honest communication is the norm. A culture where error communication is not an issue on its own, but simply one aspect of effective family centered care that is centered on collaborative relationships between families and providers. There are few guiding frameworks that target team communication in error disclosure (Kim, et al., 2011). However, considering the association between quality and relationships it would appear appropriate to blend a quality improvement model with relationship-based care model to provide the theoretical framework for this study.

Providing quality healthcare has traditionally been defined in terms of the structure-process-outcome health model developed by Donabedian (Donabedian, 1992). The structure refers to the environment, and focuses on characteristics of patients and providers (Duffy, 2003). For error disclosure and communication this would relate to skills and abilities of the provider. The process relates to specific interventions and services provided (Anderson, 2011). For error communication this would be associated with how, when, and where errors are disclosed to families. The outcome denotes the endpoint, and should be measured by criteria specific to the area of improvement (Anderson, 2011; Duffy, 2003). For error disclosure this would include effective error communication between providers and families.

Nurses' work focuses on relationships with patients, families and other health care providers. Considering the evidence that these relationships are important in quality care (Duffy, 2003), approaching error communication from an interprofessional perspective would emphasize

these relationships and promote quality (Houser, Escamilla, Jungnitsch, Christensen, & Rohan, 2013). The relationship-based care model was an appropriate model to blend with a quality based model as it has three crucial elements. These include the provider's relationships with patients and families, with self, and with colleagues (Anderson, 2011).

Therefore, the theoretical framework guiding this study combined a quality improvement model with a relationship-based care model; blending the structure, process, outcome health model by Donabedian (Donabedian, 1992) and the relationship-based care model by Koloroutis (Koloroutis, 2004) as shown in Figure 1.
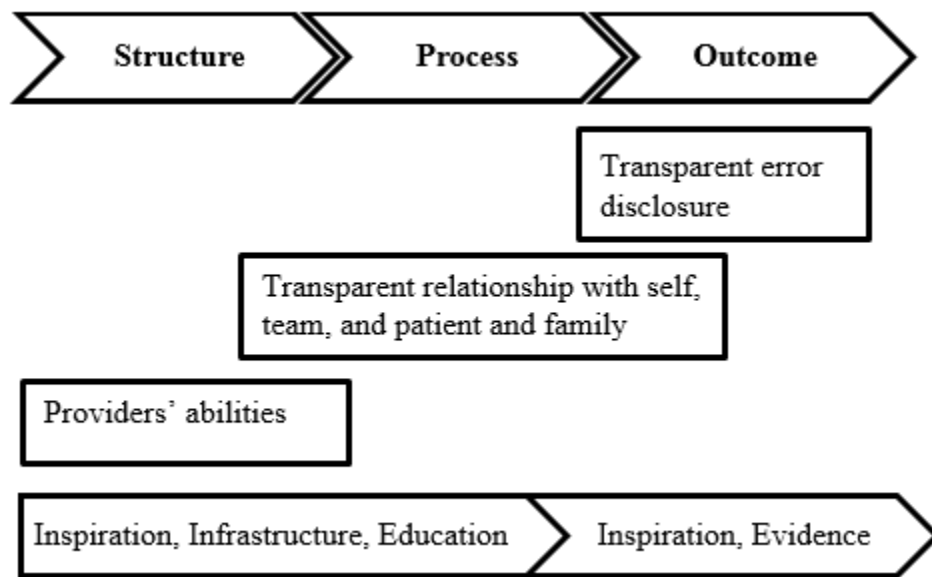
Figure 1. A proposed blended theoretical framework approach to effective error communication

Donabedian's Framework

Ernest Amory Codman and Mindel Sheps work provides the foundation of Donabedian's structure-process-outcome framework (Donabedian, 1989). Codman, who's work has been credited for initiating The Joint Commission, proposed that hospital systems were standardized,

and hospitals tracked patients to identify whether interventions were effective (The American Society for Healthcare Engineering of the American Hospital Association, 2004). Building on the work of Codman, Donabedian introduced the concepts of structure, process, and outcomes in 1966, and these concepts remain the foundation for healthcare quality evaluation today (Frenk, 2000).

The abstract concepts in this model, structure, process, and outcome, can be linked to empirical data to guide quality assessments and improvement initiatives. The framework can be used to improve quality only when the three concepts are causally related. Donabedian suggested that there must be a causal relationship between adjacent pairs and the degree of this relationship must be established prior to quality assessment (Donabedian, 1992).

An organizations physical space and culture can be defined within the concept of structure (Donabedian, 1992). Considerable work had been completed at senior leadership level to implement policies and procedures to promote a transparent error communication environment. This study addressed the concept of process as it relates to specific interventions and services provided (Anderson, 2011). For error communication this would be associated with how, when, and where errors are disclosed to families. Education was developed using evidence from best practice. This was delivered in two groups of interprofessional providers to identify the effectiveness of the delivery approaches, interprofessional education workshop or self-study. The education provided participants with details of how, when, and where errors are disclosed to families. The outcome denotes the endpoint, and should be measured by criteria specific to the area of improvement (Anderson, 2011; Duffy, 2003). For error dislcosure this was effective error communication between providers and families. Within the study the outcome was measured in a simulated error communication scenario.

Relationship-Based Care (RBC) Model

The three crucial relationships within RBC include the providers relationship with the patient and family, the providers relationship with self, and the providers relationship with colleagues (Koloroutis, 2004). The model supports the concepts that health care is provided through relationships and care should be organized around the needs and priorities of the patient and the families creating a caring and healing environment. The RBC model has evolved over 25 years and has it foundations in the beliefs of four theorists; Jean Watson, Kristen Swanson, Madeline Leininger, and Sharon Dingman (Felgan, 2004).

The providers relationship with the patient and family is essential for patient centered care. The ultimate purpose of the error communication initiative is to develop and maintain a culture in which concern moves away from discoverability and liability toward accountability and appropriate compensation prior to litigation; and from apprehension of whether to disclose to identifying how patients and families can best partner in their care by providing honest and transparent communication (Amercan Society for Healthcare Risk Management, 2003).

The providers relationship with self is also an important consideration when errors occur. Providers who are involved with an error can be considered the "second victim" (Nelson, 2013). It has been suggested that these second victims experience deep stress that manifests itself with physical symptoms such as sleep disturbances, crying and headaches, and emotional stress including fear, shame, sadness and decreased self-esteem (Nelson, 2013). These feelings are further compounded if there is lack of support from colleagues and adminstrative leadership, potentially leading to challenges for the provider to restore professional and personal integrity (Hall & Scott, 2012).

The providers relationship with self is cultivated by self-knowing and self-care, without which a providers ability to manage their own stress and balance physical and emotional demands of their work will be compromised (Koloroutis, 2004). Support for the provider will also be influenced by relationships with colleagues and healthcare leaders. Comprehensive caring can make the difference between a provider leaving the profession or becoming involved with practice change to improve care and prevent similar errors from reoccuring (Nelson, 2013).

The providers relationship with colleagues is also an important concept for effective error communication and occurs when providers respect each others scope and unique contribution to patient care (Koloroutis, 2004). Historically, error communication has been the responsibility of the physician, however healthcare requires a team approach (Jeffs, et al., 2010). It has been suggested that health care organizations that integrate a team approach to error communication improve the quality of the disclosure process (Shannon, et al., 2009).

Healthy teams are based on four basic characteristics trust, mutual respect, consistent and viable support, and open and honest communication (Creative Health Care Management, 2003). It has been identified that for many providers, developing health interprofessional relationships involves unlearning unhealthy interaction behaviors, and may be challenging (Wright, 2004). It can be assumed that healthy team relationships and behaviors should be strongly established for team based error communication to be effective.

Koloroutis (2004) simplified the process of transforming care through a relationship-based care approach by defining four key elements: inspiration, infrastructure, education, and evidence. Inspiration promotes progress and encourages providers to fully participate in achieving the vision (Koloroutis, 2004). The care environment will continue to grow when people feel valued and consequently inspired (Koloroutis, 2004). Infrastructure, comparable to

structure and process in Donabedian's model, refers to the environment of systems, practices, and processes, and is the foundation for change (Anderson, 2011). Education promotes personal growth and professional development and can be associated with providers characteristics within the structure element of Donabedian's model. Evidence is used to reflect a change has occurred and mirrors the concept of outcomes in Donabedian's model.

A significant barrier to effective communication is that healthcare professionals do not feel prepared or comfortable having these important conversations. The purpose of this research was to establish the most effective and feasible method of education for promoting effective team error disclosure and communication in a pediatric healthcare environment. This pilot study also provided data allowing power calculations for larger studies. The outcomes of this project was beneficial for the patients, families, providers and the organization. This was the next phase in an organizational initiative that began in 2008 with the goal of improving transparency and effective error communication.

CHAPTER 2 - LITERATURE REVIEW

The aim of this literature review was to critically analyze the published data on medical error disclosure and communication. A literature search was performed utilizing electronic databases and a manual search. The research studies retrieved were critically evaluated and the value of the evidence and its implication to practice were critiqued.

Keywords: Medical errors, error disclosure, error communication, open disclosure, error disclosure education, error disclosure training.

Literature Search Strategy

Utilising electronic databases and a manual search identified the research studies included in this review. The following electronic databases were used:

Cumulative Index to Nursing and Allied Health Literature (CINAHL), MedLine, PubMed, and EBSCOhost Research Databases.

The inclusion criteria were; English language journal articles only, peer reviewed journals, sample populations – All healthcare providers, nurses, residents, pharmacists, physicians, adult.

Emerging Topics

Regulations

It has been suggested that errors do not necessarily constitute improper, negligent, or unethical behavior, but failure to disclose them may (Porter-O'Grady & Malloch, 2011). In 2000 The Institute of Medicine (IOM) recommended establishing mandatory and voluntary reporting systems for healthcare institutions such as hospitals and nursing homes (Institute of Medicine, 2000). In 2001 the US Joint Commission on Accreditation of Healthcare Organizations

announced an 'unanticipated outcome' policy that demanded disclosure of a critical event by the provider or the institution (Joint Commission on Accreditation of Healthcare Organizations, 2004).

Despite the ethical and regulatory emphasis in this area, it has been suggested many errors are not disclosed (Wu, Boyle, Wallace, & Mazor, 2013). One possible contributing factor for the poor compliance with the Joint Commissions policy is the lack of specific direction for providers regarding the process of error disclosure. The 2010 National Quality Forum (NQF) Safe Practices Consensus Report provides guidance for the provider and may play an important role in improving the practice of error disclosure (National Quality Forum, 2010).

Safe practice 7 focuses on disclosure. It recommends that open and clear communication with patients and their families about serious unanticipated outcomes is provided, and that this is supported by systems that foster transparency and performance improvement to reduce preventable harm (National Quality Forum, 2010). The recommendations for this safe practice include Children's Healthcare Settings, which was the practice area for this study. In this environment the recipient of disclosure would be the patient's family rather than the patient.

However, consideration should be given to involving pediatric patients in disclosure according to existing standards for pediatric assent. The report provides significant detail to guide organizations and providers in the process of error disclosure. It does however, identify that research is needed to establish the most effective methods for delivering education and training in error disclosure.

Definitions

Medical errors can be defined as the failure of a planned action to be completed as intended or the use of a wrong plan to achieve an aim (Kohn, Corrigan, & Donaldson, 1999). It

has been suggested that they should be expressed in terms of failed processes that are clearly

linked to adverse outcomes (Hofer, Kerr, & Hayward, 2000). Consideration to failed processes

rather than an individual's failure has been a paradigm shift within healthcare, but one that holds

significant potential to reduce additional errors occurring due to ineffective processes. However,

it is also important to note that in addition to system issues, medical errors can also result from

individual error (ECRI Institute, 2008)

The American Society of Healthcare Risk Management (ASHRM) defines disclosure as

providing information to a patient and/or family about an incident (Consensus statement of the

Harvard Hospitals, 2006). The purpose of disclosure is to foster open communication about all

aspects of care with patients and families. An effective disclosure process can be described as

one that allows the patient and family to understand what happened and the ramifications of the

event as well as have sufficient information to make future decisions (Amercan Society for

Healthcare Risk Management, 2003)

Several goals of disclosure have been identified by Oregon patient safety commission and

include; Increased trust between patients and healthcare providers both directly (those impacted)

and indirectly (the overall patient population), provide an opportunity for patients and families to

understand what occurred and begin healing, enhance accountability and promotes transparency,

demonstrate to employees an organization's commitment to safety and quality, contribute to

learning and quality improvement after the event, facilitate compliance with disclosure laws,

possibly reduce undesirable media attention (Oregon Patient Safety Commission, 2012). It has

been suggested that effective disclosure may reduce litigation or create a positive overall effect

on litigation outcomes, which may be considered a goal of disclosure for some organizations

(Kachalia, et al., 2010).

The term disclosure is no longer being used in some organizations, who have started to adopt the term "error communication" rather than error disclosure when communicating errors to patients and their families. The term "communication" is preferred to "disclosure" as it conveys a sense of openness and reciprocity and may assist in promoting an organizational culture of transparency (Consensus statement of the Harvard Hospitals, 2006). The principles of disclosure discussed are still pertinent to the term communication when referring to an error.

Patient and Family Perspective

It has been proposed that the suffering experienced by patients and families following an error extends to physical, emotional and financial trauma, leading to feelings of sadness, anxiety, depression, anger and frustration that the incident could have been preventable (O'Connor, et al., 2010). Patients want information, emotional support, and evidence that the healthcare team will learn from the error (Levinson, 2009). It is challenging in all environments for clinicians to provide full disclosure, particularly when an error occurs in the pediatric patient population, and the error needs to be communicated with the family.

Nevertheless, it has been suggested that parents want to be told about errors that occur during the care of their child (Loren, et al., 2008). Additionally, it has been identified that most parents want the medical error disclosed to their child, particularly if there was any potential or real harm (Matlow, Moody, Laxer, Stevens, Goia, & Friedman, 2010). Families and patients want providers to take responsibilities for any errors that have occurred and offer an apology (Consensus statement of the Harvard Hospitals, 2006). It has been recommended that sensitivity and expressions of empathy can help convey caring, maintain trust and maintain a strong provider-patient relationship (Wu et al., 2013). Finally, families want the initial communication to occur in a timely manner by, or at least in the presence of, a provider with a prior relationship

of trust with the patient (Consensus statement of the Harvard Hospitals, 2006). A synopsis of the research suggests that the majority of patients and families who experience a medical error desire three principal outcomes which include an apology, an explanation, and a commitment to future error prevention (Mazor, Goff, Doss, Velten, & Walsh, 2010)

Providers' Perspective

Providers want to be truthful to their patients (Etchegaray, Gallagher, Bell, Dunlap, & Thomas, 2012). However, the desire to disclose is complicated by the conflict of self as imperfect and cultural expectations of perfection as the standard for medical practice (Hannawa, Beckman, Mazor, Paul, & Ramsey, 2013). Additional barriers are consistently reported which include concern over increased litigation cost, fear of loss of relationship with the patients, fear of loss of reputation or damage to career progression, lack of institutional support, absence of training in how to disclose an error, and the emotional impact of adverse events on clinicians (Wu et al., 2013).

The complexity of error disclosure from the providers' perspective is further complicated by the suggestion that while most providers indicate that they would disclose an error to patients, the communication that occurs does not contain the elements desired by patients (Gallagher, Waterman, Ebers, Fraser, & Levinson, 2003). The discrepancy between what providers say and what patients expect might explain some of the differences between reported attitudes and actual error disclosure behavior (Fein, et al., 2007). This makes it particularly difficult to change practice if clinicians believe they are already providing full disclosure.

A comprehensive review was conducted by authors from multiple sites with a history of patient safety and quality initiatives (O'Connor et al., 2010). The review was conducted as a joint project between the Health Information and Quality Authority and the World Health

Organization alliance for patient safety, exploring the impact of patient safety incidents and adverse events. It included authors from Health Information and Quality Authority, Dublin, Ireland; Safety and Learning, Dublin, Ireland; WHO Patient Safety, London, UK; Johns Hopkins, Baltimore, USA.

The most commonly reported institutional barrier to disclosure identified by O'Connor et al. (2010) was fear of medical malpractice litigation. While there is currently no consensus on the relationship between disclosure and litigation costs it has been suggested that there is the potential that open disclosure will reduce litigation costs (Levinson & Gallagher, 2007). At worst it was suggested that disclosure would have a neutral effect by increasing the number of cases but reducing the value of each case.

O'Connor et al. (2010) also suggest that many healthcare professionals do not feel prepared or comfortable to have these important conversations. Efforts to improve education and training in the area of error communication have been reported in the United States and Canada. It was further suggested that training and education should be delivered utilizing a team based model which more accurately reflects the environment in which healthcare professionals work and care for patients.

O'Connor et al. (2010) conclude that much work is required around error communication and disclosure. The challenges of this type of research are partly due to the rarity of the events and the ethics of such studies. However, it was suggested that currently there is no empirical evidence that disclosure is harmful to organizations and there is some evidence that it is beneficial. It is recommended that future research should focus on the effectiveness of training programs to increase error disclosure.

The Second Victim

The concept of the second victim was introduced by Wu to describe a provider who has been involved with an error and has been traumatized by the event in a similar way to the patient (Wu, 2000). It has been suggested that fear, guilt, shame, self-doubt, anger and disappointment are frequently reported consequences among providers involved with an error (Seys, et al., 2013). These symptoms may last for a few days to weeks and in some cases providers may develop symptoms similar to post traumatic stress disorder. Providers can experience both short and long term symptoms (Wu et al., 2013). It has been identified that some providers leave the profession altogether and a few even commit suicide (Shanafelt, et al., 2011).

The initial research surrounding the concept of the second victim focused on physicians. However, subsequent studies suggest that this phenomenon is not unique to this group. Studies investigating the emotional trauma and pain experienced by nurses following a medication error are similar to those associated with the second victim concept. Rassin, Kanti and Silner (2005) suggest that the feelings associated with making a medication error often become worse over time and have been likened to posttraumatic stress disorder. It has also been proposed that following an error nurses commonly have a loss of personal and professional self-confidence and self-esteem (Mayo & Duncan, 2004). It is also reported that nurses have been found to experience nightmares, flashbacks, lingering feelings of depression, nervousness, anxiety, and an inability to forgive themselves (Rassin, Kanti, & Silner, 2005). These findings are strongly associated with the second victim concept.

The notion of the second victim is an important consideration for organizations. Promoting transparency requires the disclosing providers to confront and accept responsibility for errors. Supporting providers with appropriate education prior to disclosure, and providing the

emotional support following an error is a desirable component to an efficient and effective approach to managing adverse events and errors (Wu et al., 2013). Support can be provided at the individual and organizational level. Programs need to include support provided immediately post adverse event as well as on middle long and long term basis (Seys, et al., 2013).

Transparent Error Communication

In essence open disclosure is a fundamental part of an ongoing patient-centered informed consent process (Gunderson, Smith, Mayer, McDonald, & Centomani, 2009). It allows patients to make decisions about their care, which would not be possible with incomplete or deceptive information. Consequently, ethicists mandate full and truthful disclosure of medical errors to patients and families (Banja, 2005).

In general, disclosure should be made as promptly as possible, and as appropriate given the patient's medical and emotional condition (Kalra, Kalra, & Baniak, 2013). It has been identified that the most appropriate person to provide the initial communication is a provider with a relationship of trust with the patient (Consensus statement of the Harvard Hospitals, 2006). The communication between the providers and patient and family should occur somewhere that guarantees privacy and confidentiality. It should be a comfortable environment with adequate seating for all involved (ECRI Institute, 2008).

Four essential steps have been identified to ensure full, transparent communication occurs between the providers and family and patient; tell the patient and family what happened, take responsibility, apologize, and explain what will be done to prevent future events (Consensus statement of the Harvard Hospitals, 2006). Kim, et al., (2011) have converted these essential steps into seven behaviors with positive and negative performance anchors. The seven target behaviors are as follows (Kim, et al., 2011):

1. Conducts explicit disclosure of error to a patient/family

2. Responds forthrightly to a patient/family questions about event

3. Apologizes upfront and early in conversation

4. Exhibits general communication skill with the patient/family

5. Conducts blame-free disclosure, acknowledges personal role

6. Offers plans to prevent future errors

7. Plans follow up with the patient/family

In addition to the error disclosure behaviors, Kim, et al., (2011) presented the notion that prior to error communication with the family occurring the team needs to complete two key phases. Firstly the team needs to discuss the error. This involves the acknowledgement an error has occurred and discussing what happened without blame. The team then needs to plan for the disclosure which includes collaborating on the plan for the communication, identifying who will lead the communication and the role of other team members. It is also beneficial during the planning phase to anticipate likely questions and formulate reasonable responses (Kim, et al., 2011).

The continuum of communication includes transparency, open communication and disclosure. Error communication should not be considered a unique, discrete form of communication, but rather an ongoing component of communication with patients, families, and healthcare staff. Error communication and disclosure should be considered no different from any other type of difficult conversation held within the healthcare environment (Amori, 2013).

Education and Training

A common theme to emerge from the literature is that the teaching of transparent medical error disclosure and communication is negligible and inadequate in the vast majority of

undergraduate medical curricula (Stroud, Wong, Hollenberg, & Levinson, 2013). The majority of studies focus on physicians' experiences. This is not unexpected as historically physicians have been the primary providers communicating with the patient or family regarding an error.

The studies that included providers other than physicians report similar gaps in education. Nurse Managers, who can be significantly involved with the coordination of the organization's response to an error, have limited access to error disclosure training (Shannon, et al., 2009). Furthermore, a comprehensive review on disclosure of patient safety incidents reported that insufficient knowledge or skill in disclosure was identified as a potential barrier by healthcare professionals regarding effective disclosure (O'Connor et al., 2010).

A variety of pedagogies have been adopted in error disclosure curricula. These include didactic sessions only (Posner & Nakajima, 2011), a didactic session combined with small group discussions (Paxton & Rubinfeld, 2010), didactic session combined with role play (Bonnema, Gosman, & Arnold, 2009), and didactic session combined with small group discussions, role play (Keller, Bell, & Dottl, 2009). Simulation has also been used for error communication and disclosure education (Barrios, et al., 2009; Overly, Sudikoff, Duffy, Anderson, & Kobayashi, 2009). While the majority of studies have identified that error communication and disclosure education occurred as a stand-alone curriculum, several studies identified error disclosure was included as part of a larger patient safety curriculum (Gillies, Speers, Young, & Fly, 2011; Gunderson et al., 2009), or as part of a wider communication skills curriculum (Hatem, Mazor, Fischer, Philbin, & Quirk, 2008; Watling & Brown, 2007). Studies of existing error disclosure curricula demonstrate improvements in learners' knowledge, skills and attitudes (Stroud et al., 2013). However, there is a paucity of research comparing different pedagogies to investigate which is most effective.

Implications for Practice

The literature, combined with ethical and regulatory emphasis in the area of error disclosure and communication provided a strong and rigorous foundation to conduct a study to compare the effectiveness of two different pedagogical approaches to error communication training.

CHAPTER 3 - METHODOLOGY

Project Design

This project was the next phase in an organizational initiative that began in 2008 with the goal of improving transparency and effective error communication. The purpose of this project was to establish the most effective and feasible method of education for promoting effective team error disclosure and communication in a pediatric healthcare environment. A randomized controlled pilot study was conducted to investigate whether the learning strategy used, interprofessional education (IPE) or self-study (independent predictor variable), influenced a team's performance in a simulated error disclosure (outcome variable).

Setting

The project was conducted at a stand-alone pediatric hospital.

Population and Sample.

Individuals from three different professional groups were recruited in to the study: physicians, pharmacists, and nurses.

Inclusion criteria. Participants must have belonged to one of the following categories, and worked, or are in a clinical practicum, at the study site: Pediatric residents, pharmacy residents, pharmacy students, pharmacists and nurses who had graduated within the past year.

Exclusion criteria. Providers who had been directly involved with an error disclosure

Sample size. Recruitment continued until 24 participants were identified, 8 subjects from each professional group.

Intervention

An invitation was sent to providers with details of the study. Coordination of the invitations occurred between the Principal Investigator and leadership at the study site. Participants who volunteer were sent a follow up email with additional information regarding informed consent (see Appendix A for initial and follow up emails and Appendix B for informed consent).

Subjects were randomized into two groups each containing 4 physicians, 4 pharmacists, and 4 nurses. One group was the experimental group and completed a 1 hour interprofessional error communication workshop, and the other group was the control group and reviewed the content of the workshop as an independent self-study in an online PowerPoint.

The content of the education was developed by the principal investigator. It was reviewed and approved by the research team. The content was based on current best practice and the error disclosure team training tool kit from the University of Washington (University of Washington, 2014). In addition to content a simple pre and post confidence assessment was developed. The key target behaviors required to disclose a medical error were used, and participants were asked to identify their level of confidence for each of the behavior. This reinforced the learning outcomes associated with the education activity. On the post assessment the participants were also given an opportunity to comment on the education activity they had just completed. This information was useful to evaluate the participant's reaction to the learning experience, level 1 of Kirkpatrick's four-level evaluation model (Kirkpatrick, 1998) (See Appendix C for the pre-assessment and Appendix D for the post-assessment and evaluation).

The material presented to both groups was the same, only the delivery differed. In the control group, participants reviewed the material individually from an online PowerPoint

presentation. The experimental group reviewed the material interprofessionally. Activities in the control group were performed individually, whereas the activities in the experimental group were performed in groups of 3, a nurse, a pharmacist, and a physicians.

Following the education, all participants completed an error communication assessment in a simulated error communication scenario. Each team was evaluated during the simulation by 2 Raters. The Raters each received training prior to the assessment. Neither Rater had any association with the study site and did not work with any of the study sample. The Raters were blinded to the educational intervention of each team. The Raters had attended a training session with the PI which included two videos demonstrating poor team performance and expected team performance, and an explanation of the assessment tool.

Assessment Plan

A discrepancy between what providers intend to do and actually do in practice relating to error disclosure has been observed (O'Connor et al., 2010). Additionally, it has been recognized that providers have a limited ability to accurately self-assess, and that the processes used to evaluate professional development and competence needs to focus more on external assessment (Davis, et al., 2006). Consequently a simulated error communication scenario was chosen as the method of evaluation in this study.

Instrument

The specific assessment items and performance anchors on the assessment instrument for this study were obtained from the web-based communication assessment tool developed by Kim et al. (2011). This assessment tool comprised of three sections which include team discussion of error, team planning of disclosure and team disclosing error to patient (Kim, et al., 2011). Testing has demonstrated acceptable reliability of this tool. Additionally, content validity has

been established based on empirical evidence from team communication and error disclosure

literature, from experts' understanding of the domain, and perspectives within the

multidisciplinary research team (Kim, et al., 2011).

For this study an adapted version of the web-based communication assessment tool was

used. Only items from the section relating to the phase of disclosing the error to the patient was

used. A Likert scale of 0-10 was used where 0 is very poor performance and 10 is excellent

performance. To assist the evaluators, the descriptors for excellent and very poor performance

were identified on the assessment tool (See Appendix E for a copy of the assessment tool).

Permission was obtained from the primary author of the web-based communication assessment

tool (S Kim, personal communication, April, 24, 2014).

Data Collection

The education interventions included pre- and post-assessment of participants' self-

confidence. This was captured using the seven key behaviors and a Likert scale of 0-10 where 0

= No confidence and 10 = complete confidence. The post assessment also included an evaluation

of the learning activity and participants were asked to comment on the length of the education

session, their overall satisfaction and any additional comments (See Appendix C for the pre-

assessment and Appendix D for the post-assessment and evaluation).

All participants were evaluated in groups of three (Physician, Nurse, Pharmacist) in a

simulated error disclosure scenario. In these groups, the participants were given a scenario in

which an error had occurred (see Appendix F for the error disclosure scenario). They had 10

minutes to prepare their disclosure communication, as a team. They then had 10 minutes to

communicate the error to a family member in a simulated environment. An actor was used to

play the role of the family member. Following the simulation the participants a 10 minute

debriefing occurred.

Data were collected during the error communication simulation phase only, not during

the preparation or debriefing phases. The participants were assessed as a team, and their error

disclosure skills were evaluated using the error disclosure assessment instrument, providing a

score for the effectiveness of the disclosure.

Data Analysis

The performance scores from the participants who complete the IPE workshop and the

performance scores from participants who completed the online self-study PowerPoint were

compared using Statistical Package for Social Sciences (SPSS). The independent t-test was used

to analyze the data.

Ethical Consideration (Human Subject Protections)

Institutional Review Board (IRB) approval from the study site was obtained from the

Human Subjects Institutional Review Boards at Children's Hospital Central California, and the

School of Nursing, Human Subjects Institutional Review Board, California State University,

Fresno.

Potential Risks

The participants were assessed in a simulated environment. Studies show that simulation

can be a stressor (Sørensen, et al., 2013). It has been suggested that simulation can raise the

stress hormone cortisol level above baseline levels in students, while actual clinical experience

did not (Jones, et al., 2011). Other studies identify increased stress during simulation and suggest

this perceived stress could come from multiple sources including anticipation of the event, the

acuity of the scenario as well as by being watched and/or videotaped by peers/educators as well as being afraid of becoming embarrassed or feeling stupid (Haskvitz & Koop, 2004).

The possibility of increased stress could have created potential psychological risks for the participants. In particular participants may have had concerns regarding their performance in a simulated scenario being reported to other peers and or evaluators/supervisors. They may also have felt uncomfortable during the simulated error disclosure scenario, especially if they feel they performed poorly.

Precautions Taken to Minimize Risks

Risks were mitigated by allowing the participants to leave the study at any time. Additionally, a pre-briefing occurred prior to the simulated error disclosure scenario which emphasized that the participant's performance was confidential and would not be reported to their supervisor/evaluator or peers. Debriefing was utilized immediately following the simulated error disclosure scenario. Data from debriefing was not collected. Its primary purpose was for participants to be able to reflect on the simulation. If a participant was especially upset one-on-one debriefing would occur.

Scores and performance in the simulated environment were confidential. Assessors did not know the participants, or work with or at the study site. No identifiable information was collected from the participants, and their names were not used on the assessment tools. They were only identified as Nurse 1, Pharmacist 1, Physician 1, etc. Participants were assured that their performance and test scores would only be reviewed by the Principal Investigator, and the data was protected using a password protected computer system that could only be accessed by the Principal Investigator.

The informed consent document (see Appendix B for informed consent) was presented to the participants on initial invitation to participate in the study, on follow up email correspondence outlining, at the start of the study and prior to the assessment phase. Waiver of documentation of consent was requested and approved from the study site as the research presents no more than minimal risk of harm to subjects and involved no procedures for which written consent was normally required outside of the research.

Potential Challenges

Challenges with scheduling interprofessional education were a potential barrier, and one previously faced (Gilbert, Limon, & Carlson, 2012). Participation was voluntary and participants were required to complete the education and assessment in their own time. To overcome these challenges the study was designed to minimize the length of time the participants need to be involved. The education interventions were one hour and the total time for the assessment was 30 minutes. The education and assessment occurred on the same day.

Potential Benefits

For the participants the education provided evidence-based information regarding the current recommendations relating to error disclosure and communication. This potentially increased awareness, knowledge, and proficiency in the providers involved with the study. For the organization the pilot study provided data to complete a power analysis for larger studies. The pilot study also assessed the feasibility of both methods of education. Effectiveness and feasibility are important factors in planning education.

Bias

Precautions taken to protect the study from investigator bias included the principle investigator not facilitating the workshop, and not being involved with the assessment, either as

an evaluator or facilitating the pre-brief session. The raters had no association with the study site and were blinded to the method of education the participants had completed.

Summary

Individuals from three different professional groups were recruited in a randomized controlled study. The study compared two learning strategies, self-study and interprofessional workshop, to teach error communication. Effectiveness of the education strategies was measured by assessing participants in teams of 3, a physician, a pharmacist, and a nurse, communicating an error to a family member in a simulated environment.

CHAPTER 4 - RESULTS

Data analysis involved descriptive statistics, independent *t*-tests, Cohen's d, paired samples *t*-test and qualitative analysis. The results were divided into 3 categories:

1. Performance in a simulated error communication scenario (Rater score)

2. Self-reported confidence scores

3. Education experience evaluation

Performance in a Simulated Error Communication Scenario

Descriptive statistics and independent *t*-tests were conducted to compare the means participant's performance scores in a simulated error disclosure scenario between the two education intervention groups (self-study and interprofessional education (IPE)). A minimum score of 0 and a maximum score of 10 could be achieved per item.

Individual item mean scores

Individual item scores were calculated using the average scores of the two raters.

Item	Behavior
1	Conducts explicit disclosure of error to parent
2	Responds forthrightly to parents questions about event
3	Apologizes upfront and early in conversation
4	Exhibits general communication skill with the parent
5	Conducts blame-free disclosure, acknowledges personal role
6	Offers plans to prevent future errors
7	Plans follow up with parent

Table 1. *Individual Item Mean Scores by Group*

Item	Strategy	*n*	*M*	*SD*	*SEM*
1	IPE	4	9.00	0.41	0.20
	Self-study	4	8.13	0.48	0.24
2	IPE	4	8.38	0.85	0.43
	Self-study	4	7.50	0.41	0.20
3	IPE	4	7.38	1.88	0.94
	Self-study	4	7.88	1.93	0.97
4	IPE	4	8.38	0.48	0.24
	Self-study	4	6.63	2.17	1.09
5	IPE	4	8.25	0.96	0.48
	Self-study	4	7.63	1.11	0.55
6	IPE	4	8.13	1.55	0.77
	Self-study	4	7.25	0.87	0.43
7	IPE	4	8.00	1.47	0.74
	Self-study	4	7.50	0.71	0.35

Figure 2. Individual item mean scores by group

	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7
Self study (Mean)	8.13	7.5	7.88	6.63	7.63	7.25	7.5
IPE (Mean)	9	8.38	7.38	8.38	8.25	8.13	8
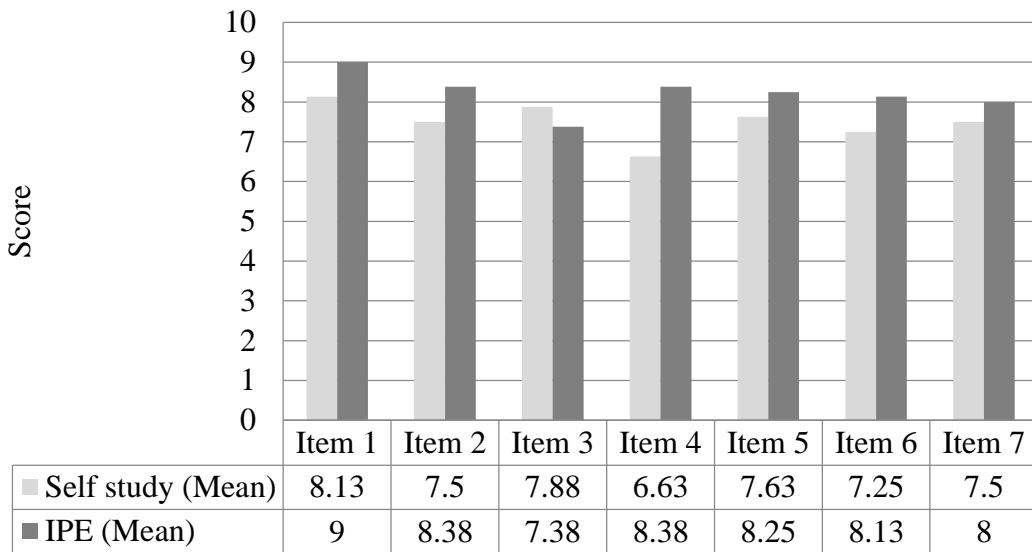
Total mean scores

Total mean scores were calculated using the sum of the 7 item scores. A minimum total score of 0 and a maximum total score of 70 could be achieved.

Table 2. *Total Mean Scores by Group*

	Strategy	n	M	SD	SEM
Total	IPE	4	57.88	6.33	3.16
score	Self-study	4	52.75	5.55	2.77

Figure 3. Total mean scores and SD by group
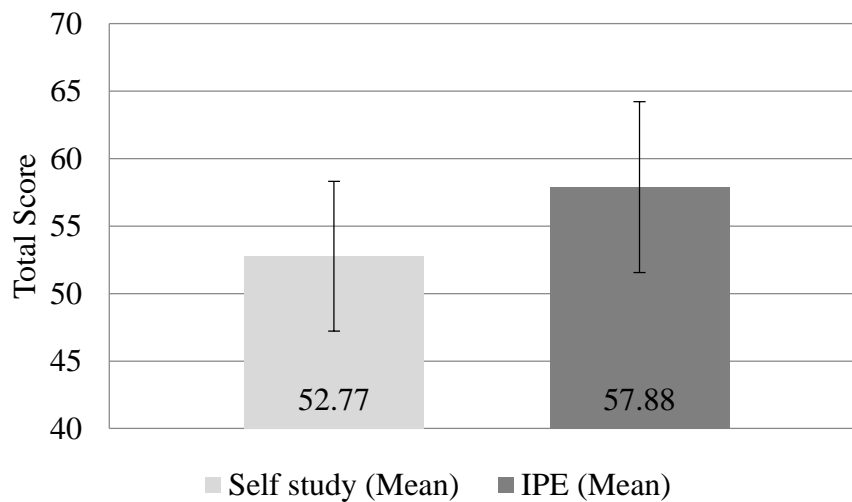
Investigating statistical significance in mean scores

An independent t-test was conducted to compare the total and individual item mean scores of the two education intervention groups (self-study and interprofessional education (IPE))

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Table 3. *Independent Samples T test for Total Mean and Item Mean Scores by Group*

		Levene's Test for Equality of Variances		t-test for Equality of Means				
		F	Sig.	*t*	*df*	Sig. (2-tailed)	Mean Difference	Std. Error Difference
Total score	Equal variances assumed	0.02	0.90	1.22	6	0.27	5.13	4.21
	Equal variances not assumed			1.22	5.90	0.27	5.13	4.28
Item 1	Equal variances assumed	0.50	0.51	2.78	6	0.03	0.88	0.31
	Equal variances not assumed			2.78	5.85	0.03	0.88	0.31
Item 2	Equal variances assumed	1.93	0.21	1.85	6	0.11	0.88	0.47
	Equal variances not assumed			1.85	4.30	0.13	0.88	0.47
Item 3	Equal variances assumed	0.01	0.93	-0.37	6	0.72	-0.50	1.35
	Equal variances not assumed			-0.37	6	0.72	-0.50	1.35
Item 4	Equal variances assumed	3.72	0.10	1.57	6	0.17	1.75	1.11
	Equal variances not assumed			1.57	3.29	0.21	1.75	1.11
Item 5	Equal variances assumed	0.17	0.70	0.85	6	0.44	0.63	0.73
	Equal variances not assumed			0.85	5.88	0.43	0.63	0.73
Item 6	Equal variances assumed	1.07	0.34	0.99	6	0.36	0.88	0.89
	Equal variances not assumed			0.99	4.71	0.37	0.88	0.89
Item 7	Equal variances assumed	1.00	0.36	0.61	6	0.56	0.50	0.82
	Equal variances not assumed			0.61	4.32	0.57	0.50	0.82

There was no statistical difference in the total mean scores of the IPE group (*M*=57.88, *SD*=5.55) and the Self-study group (*M*=52.75, *SD*=5.55); *t*(6)=1.2, *p*=0.27

There was a statistical difference in the mean scores for item 1 (Conducts explicit disclosure of error to parent) between the IPE group (*M*=9.00, *SD*=0.41) and the self-study group (*M*=8.13, *SD*=0.48); *t*(6)=2.78, *p*=0.03

There was no statistical difference in the mean scores for item 2 (Responds forthrightly to parents questions about event) between the IPE group (*M*=8.38, *SD*=0.85) and the self-study group (*M*=7.5, *SD*=0.41); *t*(6)=1.85, *p*=0.11

There was no statistical difference in the mean scores for item 3 (Apologizes upfront and early in conversation) between the IPE group (*M*=7.38, *SD*=1.88) and the self-study group (*M*=7.88, *SD*=1.93); *t*(6)=0.37, *p*=0.72

There was no statistical difference in the mean scores for item 4 (Exhibits general communication skill with the parent) between the IPE group (*M*=8.36, *SD*=0.48) and the self-study group (*M*=6.63, *SD*=2.17); *t*(6)=1.57, *p*=0.17

There was no statistical difference in the mean scores for item 5 (Conducts blame-free disclosure, acknowledges personal role) between the IPE group (*M*=8.25, *SD*=0.96) and the self-study group (*M*=7.63, *SD*=1.11); *t*(6)=0.85, *p*=0.44

There was no statistical difference in the mean scores for item 6 (Offers plans to prevent future errors) between the IPE group (*M*=8.13, *SD*=1.55) and the self-study group (*M*=7.25, *SD*=0.87); *t*(6)=0.99, *p*=0.36

There was no statistical difference in the mean scores for item 7 (Plans follow up with parent) between the IPE group (*M*=8.00, *SD*=1.47) and the self-study group (*M*=7.5, *SD*=0.71); *t*(6)=0.61, *p*=0.56

Effect size

Cohen's d was used to calculate the effect size

(IPE group mean-self-study mean)/pooled SD

Cohen's d = 0.86

Sample size/power calculation

DSS Research sample size/power calculator website was used

(https://www.dssresearch.com/KnowledgeCenter/toolkitcalculators/samplesizecalculators.aspx)

A sample size of 17 per group for 80% power in future studies

Self-Reported Confidence Scores

Participants were asked to identify their level of confidence on seven key behaviors. These items were the same as those assessed in the simulated error disclosure scenario. A paired samples t-test was conducted to compare the self-reported total confidence score (the sum of the seven item scores) pre and post education intervention. A minimum score of 0 and a maximum score of 70 could be reported.

Self-Study Group

Table 4. *Self-Study Paired Samples Descriptive Statistics – Pre and Post Education Self-Reported Confidence Score*

		M	*n*	*SD*	*SEM*
Pair 1	Total_Pre	40.60	10	10.41	3.29
	Total_Post	50.00	10	9.93	3.14

Table 5. *Self-Study Paired Samples t-Test - Pre and Post Education Self-Reported Confidence Score*

| | Paired Differences | | | *t* | *df* | Sig. (2-tailed) |
	M	*SD*	*SEM*			
Total_Pre - Total_Post	-9.40	16.45	5.21	-1.81	9	0.10

There was not a significant difference in scores for self-study group self-reported confidence pre-score (*M*=40.6, *SD*=10.41) and post-scores (*M*=50.00, *SD*=9.93); *t*(9)=1.81, *p*=0.10

IPE Group

Table 6. *IPE Paired Samples Descriptive Statistics – Pre and Post Education Self-Reported Confidence Score*

		M	*n*	*SD*	*SEM*
Pair 1	Total_Pre	38.25	12	15.67	4.52
	Total_Post	56.42	12	6.68	1.93

Table 7. *IPE Paired Samples t-Test - Pre and Post Education Self-Reported Confidence Score*

	Paired Differences			*t*	*df*	Sig. (2-tailed)
	M	*SD*	*SEM*			
Total_Pre - Total_Post	-18.17	16.47	4.76	-3.82	11	0.003

There was a significant difference in scores for IPE group self-reported confidence pre-score (*M*=38.25, *SD*=15.67) and post-scores (*M*=56.42, *SD*=6.68); *t*(11)=3.82, *p*=0.003

Education Experience Evaluation

Participants were asked to comment on the length of the workshop/self-study session, their overall satisfaction, and any additional comments (identifying anything that they enjoyed/disliked, or any additional comments)

Figure 4. Length of session

	Too short	Just right	Too Long
Self-study	30%	60%	10%
IPE	8%	92%	
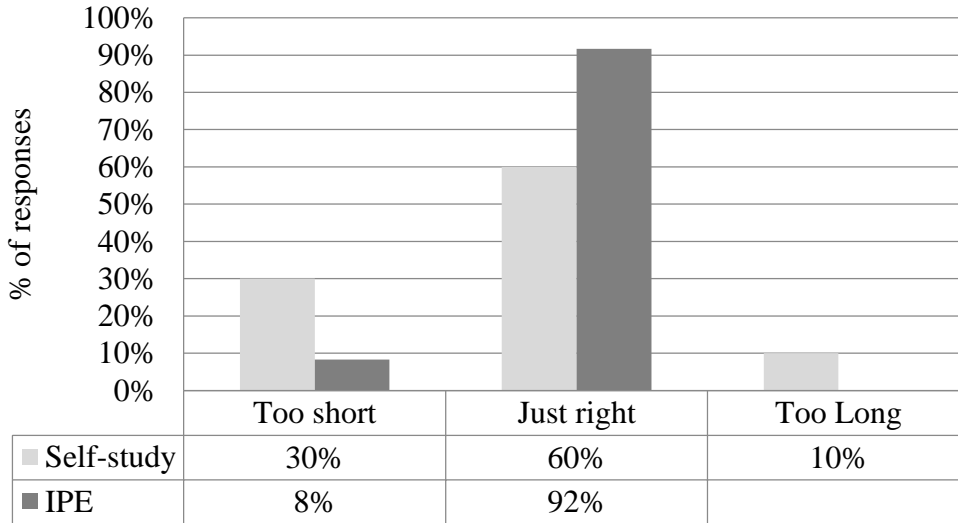
Figure 5. Overall satisfaction

	Very satisfied	Satisfied	Neither satisfied or dissatisfied	Dissatisfied	Very dissatisfied
Self-study		70%	30%		
IPE	58%	42%			
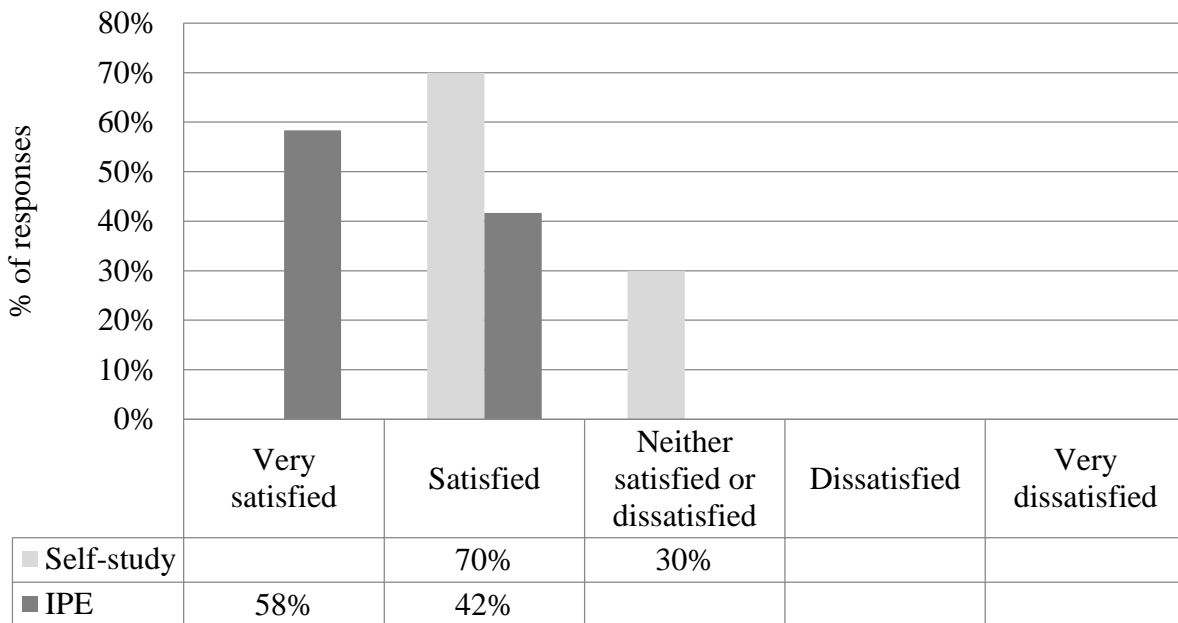
**Additional comments**

40% of participants in the self-study group included additional comments.

83% of participants in the IPE group included additional comments.

Self-study education evaluations – Additional Comments

Table 8. *Self-Study Category and Sub-category Codes*

Category	Sub-category
CD = Content Delivery (62.5%)	CD (more interaction) (2/5 = 40%)
	CD (case studies more detail) (2/5 = 40%)
	CD (not engaging/satisfying) (1/5 = 20%)
CV = Content Valuable (37.5%)	CV (I) = for individual (2/3 = 66.6%)
	CV (team) = for team (1/3 = 33.3%)

Table 9. *Self-Study Comments and Codes*

Comment	Code
I feel that in the examples though, it was very basic and parents reactions will be worse	CD (case studies more detail)
I would suggest that the intervention studied BE an active intervention, with role playing	CD (more interaction)
A PowerPoint is not engaging; I only paid attention because I'm invested	CD (not engaging)
I truthfully feel "somewhat satisfied" but that wasn't an option in the outcome	CD (not engaging)
I am not sure if my confidence has changed after the PowerPoint, I actually feel less prepared. This situation may benefit from more practice	CD(more interaction)
I liked the examples given in the PowerPoint of the 7 key target behaviors	CV (I)
I enjoyed this training. I have never been exposed to error communication and appreciate this opportunity	CV (I)
Great job on bringing a relevant issue to the forefront of a team-based approach to family centered care	CV (team)

Interprofessional education evaluations – Additional comments

Table 10. *IPE Category and Sub-category Codes*

Category	Sub-category
IAV = Interactive approach valuable (64.3%)	IAV (5/9 = 55.5%)
	IAV (more cases) (2/9 = 22.2%)
	IAV (more detail) (2/9 = 22.2%)
	IAV (recommendation) (1/9 = 11/1%)
CV = Content valuable (35.7%)	CV (I) = for individual (1/6 = 16.7%)
	CV (team) = for team (5/6 = 83.3%)

Table 11. *IPE Comments and Codes*

Comments	Codes
Will help ease communication for me	CV (team)
This is very useful for residents, pharmacists and nursing staff	CV(team)
Should definitely make this into the curriculum	CV(team)
Promoted interdisciplinary approach	CV(team)
I felt this was very useful and everyone who communicates with family should have this training	CV(team)
Videos were a great teaching tool to help facilitate discussion	IAV
Appreciated discussions and group activity as an interdisciplinary team.	IAV
Videos and examples were helpful	IAV
Thought that interactive approach was great	IAV
Practicing the scenario was key!	IAV
Would like to practice another scenario	IAV (more cases)
Case studies were great, might be more beneficial if they contained more detail	IAV (more detail)
Can also consider videotaping us for educational purpose	IAV (recommendation)
Running through more cases would always be beneficial	IAV(more cases)

CHAPTER 5 - DISCUSSION

Summary of Findings

The data collected in this study were performance scores in a simulated environment, self-reported pre and post confidence level, and participant's satisfaction. The total performance score for the IPE group was higher than the self-study group, although this was not statistically significant. It was noted that one of the performance criteria was statistically different between the two groups. The mean score for item 1 on the assessment, "Conducts explicit disclosure of error to parent" was higher for the IPE group than the self-study group.

The IPE group reported an increase in their self-confidence following the workshop which was statistically significant. The self-study group also reported an increase in their confidence following the self-study PowerPoint. However, this was not statistically significant.

Participants in both groups evaluated the education positively. It was noted that the majority of participants (58%) in the IPE group, compared to no participants in the self-study group, reported that they were "very satisfied" with the education. The majority of participants in the self-study group (70%) reported that they were "satisfied" with the education. The majority of participants in both groups (IPE 92%; self-study 60%) reported that the education was an appropriate length.

Both groups made additional comments regarding the delivery approach. Common themes to emerge from the self-study group were that the delivery approach was not engaging, and more interaction would have been useful. Within the IPE group, the delivery was identified as valuable, particularly pertaining to the interactive approach.

Both groups also identified that the content was valuable for the team and the individual. It was noted that the IPE group made more frequent comments regarding the value for the team compared to the self-study group.

Interpretation

The difference between the performance total scores between the groups warrants further discussion. While the difference was not statistically significant, the large Cohens d suggests a large mean difference between the two variables. The lack of statistical significance may have been related to the small sample size. Using data generated in this study a power calculation was completed.

It was noticeable that participants in the IPE group reported a statistically significant improvement in their self-confidence in error communication. Whereas the increase in self-confidence of participants in the self-study group was not statistically different.

Interprofessional education involves learning with, from, and about each other (World Health Organization, 2010). A large portion of the IPE workshop involved small group activities. The learners worked in groups of three, a physician, a nurse, and a pharmacist. They were provided with case studies in which an error occurred. They worked together to plan what and how they would communicate the error, and then practiced the communication skills required.

Working in interprofessional groups increased the social encounters with other disciplines and potentially promoted a greater insight into other disciplines perspective. Working together allowed the participants to master the concept of error communication that may have been challenging to understand in isolation (Craddock, O'Halloran, McPherson, Hean, & Hammick, 2013). Although the participants in the self-study group received the exact same

content, they worked in isolation in reviewing the material.

Vygotsky's sociocultural learning theory has been applied explicitly in several IPE curriculum development initiatives and implicitly in others (Craddock et al., 2013). A crucial component of Vygotsky's sociocultural theory is that social interactions lead to cognitive development. The social encounters that the participants in the IPE group engaged in potentially influenced the meanings and understanding of the concept, influencing their self-confidence. It is this opportunity for sociocultural learning that differentiates IPE from uniprofessional education (Hean, Craddock, & O'Halloran, 2009). This could be the noteworthy variable between the two pedagogical approaches, and could also have influenced the participant's satisfaction between the two groups.

Context within Theoretical Framework

The theoretical framework combined a quality improvement model with a relationship-based care model (RBC); blending the structure, process, outcome health model by Donabedian (Donabedian, 1992), and the relationship-based care model by Koloroutis (Koloroutis, 2004). This framework supported the project well. The process of communicating an error to a parent could be divided into seven observable behaviors. These behaviors were measured in a simulated environment to yield a numeric score that was used to denote the effectiveness of the education provided, which reflected the outcome.

The three crucial relationships within RBC include the provider's relationship with the patient and family, the provider's relationship with self, and the provider's relationship with colleagues (Koloroutis, 2004). Being involved with an error and then having to communicate this mistake to colleagues and family members creates significant stress. It has been suggested that fear, guilt, shame, self-doubt, anger, and disappointment are frequently reported

consequences among providers involved with an error (Seys, et al., 2013). These feelings could negatively impact the provider's relationship with self, which is nurtured by self-knowing and self-care (Koloroutis, 2004).

Although the participants in the study hadn't been directly involved with the error, and it was in a simulated environment, it is possible they were still emotionally impacted by the scenario. Anecdotal observations by the raters noted that in some simulations, the nurses spoke very little to the family member. All of the nurses in this study were new graduate nurses and had been in practice for less than a year. This could have influenced their relationship with self as it pertains to being a nurse. Without this clear understanding of self, a person's emotional reactions may adversely affect their ability to provide care and interact well within a team (Koloroutis, 2004). Future studies will not limit the nursing sample to new graduate nurses as this may have been a confounding variable.

In RBC, the care providers relationship with the patient and family is one in which the provider consistently maintains the patient and family as the central focus (Koloroutis, 2004). It is recommended that the initial communication of an error should be by, or at least in the presence of, a caregiver with a prior relation of trust with the patient (Consensus statement of the Harvard Hospitals, 2006). In this study the providers had not had any interaction with the family prior to the scenario. It is unclear whether having a relationship with the family prior to this meeting would have had a positive or negative impact on the participant's performance. The lack of relationship was consistent for all providers, so probably had limited effect on the study outcome. However, this is worth considering, especially in regards to the generalizability of the findings.

Historically physicians have been the primary providers involved with communicating an error to the patient or family. However, because the delivery of healthcare is a team function, other healthcare providers may have played a role in the error and should therefore be involved in communicating the error to the patient (Shannon, et al., 2009). While there is still some contraversy regarding whether errors should always be disclosed using a team approach, it has been recommended that when the error involves a variety of professionals interacting with the patient, a team-based approach may be beneficial to both the team and patient (Jeffs., et al., 2010).

The scenario used in this study involved errors by the physician, nurse, and pharmacist. The patient was a 4 year-old who had been admitted to the Pediatric Intensive Care Unit (PICU) with recurrent seizures of unclear etiology. He was given a loading dose of Dilantin (300mg every 8 hours), then switched to daily maintenance dose of 300mg. On transfer out of the PICU, transfer orders mistakenly continued the larger loading dose (300mg every 8 hours) rather than the daily maintenance dose. This error was not picked up by the nurse or the pharmacist, and the patient continued to receive the loading dose. One day after transfer, the patient fell and hit his head. Dilantin level at that time was 29 (dangerously high), and his head CT was normal. The error used in this scenario was therefore appropriate for a team-based approach.

In RCB, the relationship among team members is important. The participants in this study had very limited experience of working directly with each other prior to this study, despite all working at the same facility. Anacdotal observations by the research team suggested that the IPE group participants had quickly developed some rapport with each other during the workshop. However, this observation may be biased as the research team was not blinded to participant's education group.

The raters made the interesting observation that there was an apparent lack of understanding by the participants regarding who should say what. In some groups each participant took responsibility for the part they played in the error and other groups were totally lead by the physician. RBC suggests that quality care occurs when team members respect each other's scope of practice and contributions to the team to work interdependently to achieve a common purpose (Koloroutis, 2004). Unlike emergency situations when there are clearly defined roles such as team leader, documenter, etc., there is a paucity of evidence on which to base recommendations for specific roles and responsibilities within a team-based error communication. This is an area for future investigation.

There may or may not be specific roles that each team member would assume to make error communication more effective. The raters in this study identified that certain teams appeared to have clearly discussed their plan and identified who would do what very effectively during the pre-brief period, whereas other seemed a little more disorganized. Again this was an anecdotal observation as data were not collected during the pre-brief period to compare to the team's performance in the simulation. This may be a consideration to include in the methodology for future studies.

Limitations

This study had several limitations. The sample size (N=24) was small. Nevertheless, the effect size for difference in performance between the two groups was large. A power calculation using data from this study suggests a N=102; IPE and self-study groups would each require 17 teams of 3 providers, for 80% power in future studies.

Another limitation was the restriction of nursing participants to new graduate nurses. This is not representative of the nursing population and needs consideration if attempting to generalize findings. Recommendations for future studies include adjusting the inclusion and exclusion criteria to be more representative of the provider population.

An additional limitation to the generalizability of the findings was that sample was self-selected. It is therefore unknown whether these participants are truly representative of all providers. Their intrinsic drive to learn and their interest in the education content may have influenced their willingness to participate and may not be matched by other providers.

Subjectivity of evaluation tool was another potential limitation of this study. "Very poor" and "excellent" behavioral anchors were identified for each item. The very poor behavior would score 0 and the excellent performance would score 10 on a 10 point Likert scale. The scale then indicated that a "poor" score should range from 1-3, an "average" score would range from 4-6, and a "good" score would range from 7-9. However, behavioral anchors were not identified specific to poor, average and good performance leading to potential subjectivity.

To avoid this subjectivity in future studies a rubric-based assessment tool with behavior anchors for all levels should be used. Alternatively, rater training could be expanded. The raters in this study did receive rater training the week prior to the study. However, this training was relatively short and didn't describe in detail the assessment scale. Further refinement of the Likert scale (0-5), with clearly defined behavioral anchors, would likely improve inter-rater reliability.

Implications

Despite its limitations, this study represents a progression in the field of error communication education and research due to its innovative approach. As opposed to many

previous studies that involved single professions (primarily physicians), this work focused on an interprofessional approach to error communication. Additionally, due to the paucity of research comparing different pedagogies, this study incorporated a comparative design rather than a quasi-experimental design. Furthermore, many earlier studies used self-reported outcome measures to investigate effectiveness of error communication education. Due to discrepancies between what providers intend to do, what they actually do, (O'Connor et al., 2010), and providers having a limited ability to accurately self-assess (Davis, et al., 2006) a performance based assessment outcome was used in this study.

The findings suggest that an IPE approach is more effective for promoting team based error communication. A power calculation using data from this study suggests a sample size of 17 teams per group (IPE and Self-study) for 80% power in future studies.

Future Studies

This pilot study reports a large effect size however, but no statistical significance. This potentially could be a result of the small sample size and therefore future studies with larger samples are required

This study assessed performance at one time point. It would be interesting to investigate performance over a period of time to see if there is a difference in the retention of knowledge and skills relating to error communication between the two groups. Future longitudinal research would be beneficial in this area of study.

This study used a performance based evaluation in a simulated environment to assess the acquisition of specific communication skills. However, despite the attempt to quantify actual skills rather than self-reported skills, it is unclear whether the providers would be able to transfer these skills to a real patient family encounter. In the challenging area of error communication it

is ethically and morally questionable whether observers should be present during a situation with a family who may already be distressed. Nevertheless, alternative efforts should be made in future studies to investigate whether organizational performance in regards to transparent error communication occurs following provider training.

Conclusion

The literature advocates full, transparent communication following a medical error. However, many barriers to such communication exist. A significant barrier is that healthcare providers do not feel prepared for these difficult conversations. This can be particularly challenging if an error occurs in a pediatric setting when the conversation with a parent may be more demanding than similar conversations in the non-pediatric settings. The purpose of this study was to compare the effectiveness of two different pedagogical approaches to error communication training. A randomized controlled study was conducted to investigate whether the learning strategy used, interprofessional education (IPE) or self-study, influenced a team's performance in a simulated error communication. The findings suggest the IPE approach to error communication is potentially more effective in terms of observed behavior, self-reported confidence level, and participants' overall satisfaction. . Recommendations for further studies include: larger research studies, longitudinal studies, and organizational studies.

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APPENDIX A – INITIAL AND FOLLOW UP EMAILS

Initial email invitation

Dear ****

Communication with family members following an error is extremely challenging and the evidence suggests that, although healthcare providers want to be transparent, there are many barriers to effective communication. One barrier is the lack of education on how to do this effectively.

You are being invited to participate in an exciting research study to identify the most effective way to learn how to communicate an error with a patient and or family member. Please review details of the study attached, and contact me with any questions and interest.

Regards

Marie Gilbert DNP(c), RN, CHSE

Principal Investigator

mgilbert@csufresno.edu

Attachment – Informed consent

Follow up email

Dear ***

Thank you for your interest in the study on comparing different learning strategies to identify the most effective for error communication.

To be included in the study you need to have less than one year of clinical experience (RN, Pharmacist) and have not previously been involved in communicating an error with a family member.

Please reply and let me know if you meet these inclusion criteria.

Regards

Marie Gilbert DNP©, RN, CHSE

Principal Investigator

mgilbert@csufresno.edu

Attachment – Informed consent

APPENDIX B – INFORMED CONCENT
A comparison of pedagogical approaches to error communication training. A pilot study

You have been invited to participate in a research study to compare the effectiveness of two different learning strategies for error communication education. Your participation is voluntary and there will be no repercussions if you chose not to participate in this study. The Principal Investigator is Marie Gilbert

If you agree to be involved with the study you will be randomized into one of two groups. One group will participate in an interprofessional workshop. The other group will review the content of the workshop as self-study in an online PowerPoint. On completion of the education you will be assessed in teams of three (a resident, a nurse and a pharmacist) in a simulated error communication.

The education will take approximately 1 hour and the assessment will take approximately 20-30 minutes. The assessments will be scheduled every 10 minutes and you will be informed what time your assessment is scheduled. The education and assessment will occur at Children's Hospital in the afternoon of **Tuesday 2nd December, 2014.** The study will start with a study orientation at **1pm** and the final assessment will be completed by **4:30pm**.

Some participants may feel stressed performing is a simulated environment. This potential risk will be mitigated by allowing you to leave the study at any time. Additionally, a prebriefing and debriefing will occur prior to and following the simulation to allow you to ask questions or express concern. Scores and performance in the simulated environment will be confidential. Names will not be used on the assessment tools. Data will be protected using a password protected computer system that can only be accessed by the Principal Investigator.

Benefits
The education will provide you with evidence based information regarding the current recommendations relating to error disclosure and communication. This pilot study will assist in identifying the most feasible and effective learning strategy for error communication and is the next phase in an organizational initiative with the goal of improving transparency and effective error communication.

This project has been approved by the Human Subjects Institutional Review Boards at Children's Hospital Central California. It has also been approved by the School of Nursing, Human Subjects Institutional Review Board, California State University, Fresno as this project will contribute towards completion of the Principal Investigators Doctorate in Nursing Practice.

Any questions and concerns about rights as a research subject should be directed to the Committee for the Protection of Human Subjects: Chair, (CHCC) Stephen Kassel, MD (559) 353-6740; Chair, (Fresno State) Terea Giannetta (559) 278-2808

Your decision to complete the education and assessment constitutes informed consent. If you have any questions regarding this study please contact, Marie Gilbert, by email at mgilbert@csufresno.edu or call 559.696.1842.

APPENDIX C – PRE-ASSESSMENT

<u>Error Communication Study Pre-assessment</u>

Workshop

The learning outcome for this workshop is that upon successful completion you will be able to demonstrate the seven key target behaviors required to disclose a medical error to a family member. Before completing the education please identify your level of confidence for each of the following behaviors:

(0 = No confidence and 10 = complete confidence)

	No confidence						Complete confidence				
	0	1	2	3	4	5	6	7	8	9	10
Conducting an explicit disclosure of an error to a parent											
Responding forthrightly to parents questions about event											
Apologizing upfront and early in conversation											
Exhibiting general communication skill with the parent											
Conducting a blame-free disclosure, and acknowledging personal role											
Offering plans to prevent future errors											
Planning to follow up with parent											

Thank You for your participation

APPENDIX D – POST-ASSESSMENT
Error Communication Study Evaluation

Workshop

The purpose of this form is to provide you with an opportunity to give feedback on the workshop you have just completed.

Identify your level of confidence 0 = No confidence and 10 = complete confidence

	No confidence						Complete confidence				
	0	1	2	3	4	5	6	7	8	9	10
Conducting an explicit disclosure of an error to a parent											
Responding forthrightly to parents questions about event											
Apologizing upfront and early in conversation											
Exhibiting general communication skill with the parent											
Conducting a blame-free disclosure, and acknowledging personal role											
Offering plans to prevent future errors											
Planning to follow up with parent											

The length of this workshop/self-study module was: Too short   Just right   Too long

Overall satisfaction with the workshop/self-study module:

Very satisfied   Satisfied   Neither satisfied   Dissatisfied   Very dissatisfied
                                                 nor dissatisfied

Additional comments (identify anything you enjoyed/disliked, or any other comments)

_____

_____

_____

_____

Thank You for your participation

APPENDIX E – ASSESSMENT TOOL

Error disclosure and communication assessment tool adapted from the web-based communication assessment tool (Kim, et al., 2011).

	Very Poor	0	1	2	3	4	5	6	7	8	9	10	Excellent
				Poor		Average			Good				
Conducts explicit disclosure of error to parent	Does not explicitly explain that an error took place and the patient had suffered as a result	0	1	2	3	4	5	6	7	8	9	10	Describes the nature and source of the error to the family member and consequences of the error to the patient
Responds forthrightly to parents questions about event	Avoids direct responses to a family members question												Responds truthfully to the family member's questions
Apologizes upfront and early in conversation	Does not apologize up front												Apologizes to the family member at the beginning of the disclosure conversation
Exhibits general communication skill with the parent	Remains aloof and distant to family member's emotional distress												Displays verbal and nonverbal empathy and support of the family member
Conducts blame-free disclosure, acknowledges personal role	Blames a team member in front of the family member												Avoids blaming of other team members, resists family members attempts to affix blame
Offers plans to prevent future errors	Does not address specific plans for preventing errors												Explains to family member what will be done to prevent such errors from occurring in the future
Plans follow up with parent	Does not offer to follow up with the family member												Offers to follow up with the family member for other potential questions they may have

Kim, S., Brock, D., Prouty, C. D., Odegard, P. S., Shannon, S. E., Robins, L., . . . Gallagher, T. (2011). A web-based team oriented medical error communication assessment tool: Development, preliminary reliability, validity, and user ratings. *Teaching and Learning in Medicine, 23*(1), 68-77.

APPENDIX F – ASSESSMENT SCENARIO

Assessment Scenario Instructions/Pre-brief

You are the interprofessional team who has been caring for Johnny Simpson.
Johnny is a 4 year old who was admitted to ICU with recurrent seizures of unclear etiology

He was given a loading dose of Dilantin (300mg TID), then switched to maintenance dose of 300mg QD

When Johnny was transferred out of ICU, transfer orders mistakenly continued the larger loading dose (300mg TID) rather than the maintenance dose.

This error was not picked up by the nurse or the pharmacist, and Johnny continued to receive the loading does.

One day after transfer, Johnny fell and hit his head. Dilantin level at the time Johnny fell was 29 (dangerously high), and his head CT was normal.

Mrs. Simpson is Johnny's grandma and legal guardian; she has been called and informed about Johnny fall, subsequent CT scan & transfer back to PICU. She is anxious and concerned about

Johnny as she thinks the fall was due to another seizure.

Mrs. Simpson has not spoken to any of the medical team since the fall, CT scan & transfer to the PICU. She doesn't know about the medication error, the lab results, or the CT scan results. She remains concerned.

You have contacted Risk Management per policy and they have asked you to talk to the family. A root cause analysis of the error has been initiated.

Spend 5 minutes planning your communication with the family and then enter the room.
The scenario will last no longer than 10 minutes