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Relationships, Caring, and Near Misses: Michael's Story

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Abstract: Health care errors are costly to both patients, insurance companies, and put additional strain on existing resources. This research paper is a case study about a patient's experience in health care with the electronic health care record and the information used to deliver care. This case study will demonstrate that although the electronic health care record does provide information, the information contained within it can be confusing, contribute to health care errors, near misses, and may have an impact on health provider relationships with patients. Information and systems issues are identified with recommendations to help avert health care errors and near misses in the context of the electronic health care record and health service delivery.

INTRODUCTION

Error in the provision of care is one of the top priorities and one of the deep concerns for patient safety and costs that health care organizations face (Office of Legislative Counsel, 2010; James & Bayle, 2006; Agency for Healthcare Research and Quality, 2003). Essential for patient safety and cost reduction is the accuracy of health information used for determining care. Today, the push for the electronic health record with meaningful use means that organizations will need to use effective processes to ensure that providers, caregivers, and patients are getting the right information and that the information is communicated with accuracy (Office of the National Coordinator for Health Information Technology, 2011). One positive result of the meaningful use of electronic health record (EHR) is that the patient's information is electronically stored, retrieved, used, and care is provided based on the information contained in the EHR (The Joint Commission, 2011-2012; American Medical Association, 2007).

In the United States, more than 100,000 implantable cardioverter-defibrillators (ICDs) are implanted annually (Hohnloser & Isreal, 2013). ICDs have been used for the past 40 years to prevent sudden cardiac death for individuals with heart disease and generally have a service life of 4.4 years and cost \$37,000 each to replace excluding physician and anesthesia costs (Sohail, Henrikson, Braid-forbes et al, 2011). People with ICD's may need to have their devices replaced approximately 4-6 times during their lifetime at a cost of over \$200,000.

Medication use in health care also represents large costs. More than 80% of all adult Americans take at least one medication and nearly 30% take more than five (Slone Epidemiology Center at Boston University, 2006). In the United States, 3.5 billion of dollars in health care costs are incurred because of medication related issues (Centers for Disease Control and Prevention-b, 2012). Today, there are more than 18.8 million people diagnosed with diabetes and 90-95% of those is classified as Type 2 and requires medication to manage their disease (National Diabetes Education Program, 2008). The risk of death for people with diabetes is double as compared to people without the disease.

The aims of this article are twofold. First, it is to present a real case in which a patient has encounters with an Emergency Department and examines a 15-month ordeal to identify risks where the provider assessment in the EHR could be linked to high risks tests to prevent sentinel events or near misses and to identify where a common medication given to diabetic patients can be life threatening if not managed as intended. Second, through a careful walkthrough, potential and real errors are identified, along with recommendations, for further improvement of patient care and safety in a technology-rich environment.

Our real case showed many near misses occurred due to misuse or no-use of information in the electronic health record. It was quite unfortunate that our case took place in a top rated safety hospital. These near misses will never be discovered unless organizations have a distinct plan to seek them out through some process driven strategies.

To make our case presentation easy, the real patient is de-identified as “Michael” in this paper. This article is written to benefit all people, including clinical professionals and patients, who are involved in the health care delivery to understand the importance of both the access and accuracy of information, relationships, and caring with its impacts on service outcomes. Next, the methodology, framework followed by Michael’s history and experiences are presented with each problem encountered and recommendations to minimize the problems. The ensuing discussion provides further enlightenment followed by a conclusion.

METHODOLOGY

A case study methodology is used to gain understandings of complex issues and to illuminate and extend what is known about a topic (Yin, 1984). The case study methodology is used to understand real-life contexts and has an established and extensive history. While there are criticisms regarding the validity, reliability, and generalizability of the case study methodology, it continues to be used to examine real life situations, problems and events particularly in the social sciences (Yin, 1984, Crowe, Cresswell, Robertson, Huby, Avery, Sheikh, 2011). This case study examines a patient’s experience in the health care setting over a period of 15 months. No explicit dates are provided although the experiences started in 2011. Emergency Departments and the patient’s name are not identified to protect the anonymity of the patient and hospital. The patient “Michael” shared information and documentation for the writing of this article along with in-depth discussions for optimal understanding of his experiences. At times, direct observation was used to gain information. Whenever possible, “Michael” requested copies of emergency care documentation to improve understanding and for verification purposes.

DATA, INFORMATION, KNOWLEDGE, WISDOM CONTINUUM (DIKW)

Data, information, knowledge, and wisdom are the fundamental tenets of information science (Ackhoff, 1989). Data refers to unstructured raw facts that alone have no meaning. Information is data that are contextualized to provide meaning. Knowledge is the application of what we know to the information and wisdom is knowing when and how to use knowledge and information to solve problems. This model has been used in the health care industry for years and is particularly suited for those who study health informatics and many other fields (Rowley, 2007; Ackhoff, 1989; American Nurses Association, 2008). Therefore, this study will use the DIKW continuum as the lens through which this case study is analyzed.

BACKGROUND

Michael - His Background and Health History

Michael is a young looking 62-year-old married man who stands about six foot tall with a weight of 246 pounds and has four grown children. Michael has had many experiences in the health care system due to his severe spinal degeneration, muscle weakness, and nerve damage derived partly from heavy lifting and back injuries sustained during his younger years in late 1978. He has severe spinal stenosis, nerve root compression, and a history of an attempted spinal fusion approximately 30 years ago. His mobility has progressively worsened over the past six years and has continued to be in a steady decline. During the last 18 months, three stair-lifts were installed (one on each staircase) to move him up the stairs to facilitate entry into the house, and two more to move him from the main level of the home to the second level for access to bathroom, shower, and bedroom.

Michael has had diabetes for about 20 years managed by oral medication and idiopathic dilated cardiomyopathy, which further draw upon resources - both his own and health care system. His diabetes started about age 40. After a proper diagnosis, Michael changed his diet and began monitoring fluids, fats, cholesterol containing foods, and salts. To date, he has been able to reduce his diabetic oral medications and has lost weight. Michael is faithful in checking his blood glucose every day and understands how the food he eats influences his blood glucose levels. Generally, Michael’s blood glucose range between 90-110 mg/dl consistently and his average glycosylated hemoglobin is six or less. This is considered good control.

Michael’s experience with idiopathic cardiomyopathy started in late summer ten years ago. Within about 5 months of the initial diagnosis, an implantable cardioverter-defibrillator (ICD) was implanted to avoid sudden death. During the history of his cardiomyopathy, Michael’s cardiac output (ejection fraction) has ranged from a low 12 % (almost needing a heart transplant) to 50% (almost normal).

Due to Michael's medication regime, fluid management, and diet, he has not had an admission to the hospital for cardiomyopathy or heart failure since his original diagnosis. Michael outlived his five-year prognosis and now has surpassed the 10-year mark. Michael still has an ICD device that is not compatible with some testing devices like the Magnetic Resonance Imaging (MRI), which is used to obtain an in-depth view of human systems (bones, nerves, etc.). If Michael were to have an MRI while the ICD is still in his body, it will likely cause certain death. In addition to these health problems, Michael also has sleep apnea and a history of renal insufficiency. The following is an accounting of errors and near misses that can be corrected given a technologically appropriate EHR and clinicians who are experienced with using them. The following narrative begins in the year 2011.

Month A – The Beginning of Health Needs

In early start of a new year, Michael started having incidences of severe pains, loss of muscle, and diminished strength in his legs. He mentioned these problems to his physician who prescribed pain medications to provide some relief; however, sustained relief did not come. Repeated visits to the family physician showed continued mobility issues and many limitations. Eventually, Michael was referred to a specialist and was scheduled for an electromyography (a study of the electrical activity to the skeletal muscles) that showed abnormal results. The abnormalities were simply recorded and sent to the family physician and no follow-up occurred between the patient and the physicians. Michael waited for input from the physician, barring none; he thought the results of the test were normal.

Problem 1 Information: Information systems and their processes are used to generate, store, retrieve and process data. While the performance of an electromyography was helpful to determine correct patient care and provided answers to the Michael's problem, the results (information) must be processed and communicated with appropriate health care providers and their patients. The follow-up communication between the specialist, primary care physician and the patient was lacking and impaired successful relationships. Failure to notify patients of test results has resulted in a significant increase in medical malpractice (Gale, Bissett-Siegel, Davidson, & Juran, 2011)

Recommendation 1: Automated reminders are needed to ensure that the results from referral services are communicated with patients. The EHR must be designed to provide a method so that physicians and other providers are alerted when patients have not been informed of test results-especially those obtained by specialists and delivered to the primary physician for action. While the patient made an assumption that the test was normal due to lack of follow-up from a physician, it is necessary that patients become engaged to seek results in order to avoid delays in care through active collaboration and participation with the physicians and other health providers. Informing patients of test results and other pertinent information is known to enhance relationships and satisfaction with care.

Nine Months Later – The Epoch of a Near Miss Error

Suddenly one evening, Michael had pain that could not be relieved; it was severe, excruciating, and unrelenting. Eventually, Michael went to the local emergency department (ED2) where they took a full history including the knowledge that he had an ICD. The physician left the room to write some orders and provide treatments for Michael. When the doctor returned to the room, Michael was informed that he would have an MRI very soon. Although the physician had been told about Michael's ICD and it was recorded in the chart, a MRI (a test) was scheduled. As Michael was waiting in the ED2 suffering in pain, a family member reminded the physician that Michael has an ICD. As a result, the MRI was cancelled and a computerized tomography (CT) test was scheduled and completed. This is a near miss because Michael should not have been scheduled for an MRI in the first place. While new research is emerging on the issue of MRI and ICDs, to date, only 700 patients with certain types of ICD's have been successfully administered a MRI (See & Ginzburg, 2008).

Problem 2 Wisdom: Wisdom is used by individuals to respond and act critically to a situation. Wisdom in decision making increases effectiveness of those decisions. In order to have wisdom the data must be processed correctly. As discussed previously more than 100,000 ICDs are implanted into individuals yearly and each of those people are at risk for death if they undergo an MRI. James recently reported that 200,000-400,000 preventable adverse events occur yearly (2013). For Michael's case, clinicians who ordered the wrong test due to lack of attention to data shows lack of wisdom and can contribute to preventable adverse events. Patients who are subjected to near miss errors can lose confidence in their health care provider.

Recommendation 2: The EHR can be designed to prohibit the ordering of a test that is incongruent with implanted devices such as the ICD. This can be facilitated by linking the provider assessments to treatment orders. A link such as this will reduce the costs of care by eliminating wasted effort that occurs through duplication and repetition of work and will promote patient safety.

Potential Medication Complications

The CT scan showed severe stenosis and severe degeneration of the spinal disks. After the CT scan, Michael was given a Medrol Dose Pack® and a steroid injection. The Medrol Dose Pack and steroid injections will cause high blood glucose levels that must be managed with people who have diabetes. Michael did not receive any instructions to manage his blood glucose. Uncontrolled high blood glucose levels are life threatening.

Problem 3 Knowledge: While Michael received information that his blood glucose would increase because of the medication, he was not given the know-how to manage glucose. Know-how facilitates the transformation of information to instructions. Therefore, this is a knowledge problem. However, it is not clear that the provider had the know-how to instruct the patient in how to adjust his oral diabetic medications or if the provider considered glucose control as a problem he/she should manage. In the United States, 17 people out of every 100,000 die of hyperglycemic (high glucose) episodes (Centers for Disease Control and Prevention-a, 2012). Patients depend on their provider to look out for their safety. There were some misunderstandings as to who would manage blood glucose levels for this diabetic given steroid medication. This is a problem that must be corrected.

Recommendation 3: Using the capabilities of the EHR, direct links need to be provided that guide the clinician toward helping patients understand how to manage blood glucose prior to discharge from the emergency department. Patients need to be taught how to be persistent with health care providers in order to get information and know-how (knowledge) necessary for safe care. When patients are in the emergency department on weekend days, contacting the primary physician for glucose control is not routinely practiced but should be encouraged by both patients and healthcare providers.

The Next Month – An Error that Should Never Happen

In the next month, Michael underwent a minimally invasive laminectomy on a Friday afternoon at Affiliated Hospital 1(AH1). A few hours later, he was discharged and given a prescription for pain medications. Later that evening and onto the next day, Michael suffered terrible pain and discomfort that was not relieved with the pain medications. Several calls were made to the on-call physician, yet help only came in the form of reassurance to Michael and Lynn that his pain would decrease. On Sunday, another call was made and it was discovered that the physicians at AH1 forgot to give Michael a prescription for a muscle relaxer, a standard of care and a routine medication for those who have a laminectomy. Muscle relaxers such as Flexeril®, Valium® and others are generally given for short-term use to manage back pain after for operations such as laminectomy (Johns Hopkins Heart and Vascular Institute, 2012). Neither Michael nor Lynn knew that he should have been given a muscle relaxer. For two days, Michael suffered unnecessarily because an essential medication was missed upon discharge and not identified as missing with return telephone calls to the physician.

Problem 4 Information, Knowledge, Wisdom: First this is an information (what, when, how) problem because the health care provider failed to notice that Michael was not given a muscle relaxer which comes from the storage, retrieval, processing and use of data. Second, although multiple telephone calls were made, the provider did not provide the know-how (knowledge) to manage the patient's pain, so the information was not transformed into knowledge. Lastly, the provider did not apply wisdom –the ability to increase effectiveness or add value. Michael did not receive the correct treatment or standard of care for the procedure and second, the physician failed to notice the omission. Omissions in the standard of care for patients can prolong and make recovery in certain conditions worse. Patients can lose confidence in their care provider and this will negatively influence the relationship between the patient and healthcare provider.

Recommendation 4: In accordance with the standard of care, if the discharge medication is linked to the standards of care determined by the organization, omissions or deviations from the standard can signal an alert for correction or documentation of why the standard was not followed. Standards of care are used and view as a growing methodology to provide the best care. The link between the standard and what actually occurs is necessary in the EHR to assure that fundamental mistakes or omissions in care are minimized. Perhaps it may be helpful to initiate better triage systems using the functionality available in the EHR.

Three Months Later – Another Near-Miss Error

In the early part of the next year, again Michael experienced excruciating pain late at night that could not be relieved with activity or medications. The pain was unbearable. A trip was made to ED2, and ensued with another MRI order. Again, a MRI was scheduled, which was later intervened by Lynn and Michael to avoid the life threatening error. Instead, a CT scan was ordered and compared with the previous record. This time a different level in the lumbar area was involved. For a temporary relief, Michael was given a steroid injection and oral steroid medications without instructions to prevent a potential rise of the blood glucose. Before being sent home, Michael was given an injection for pain and a prescription for pain medications for home use with instructions to follow up with his physician, if the pains resurface.

Problem 5 Wisdom and Knowledge. As noted, the repetitive nature of **problem 2** (ordering inappropriate tests for a patient) and **problem 3** (providing steroid medications to a diabetic without instructions to preserve health) is cause for concern. Knowledge is acquired through the synthesis of information from various sources. The occurrence of identical problems at different points in time suggests that the processing of information and transformation of that information to knowledge is lacking. As a result, the EHR in its present design is not helping the provider to use wisdom in the care and treatment of patients in certain contexts.

Recommendation 5: By identifying and attending to repeating risk patterns, improvements in care can occur. Different clinicians made exactly the same error at each ED2 visit. This is suggestive of a systematic error that can be corrected through proper integration and design of the EHR. This error was identified via this case study. Routine use of case studies of patient care delivery from the patient's perspective may be very beneficial to catch repeated high risk errors or near misses.

Spring – A Trip Alone to ED2 with Little Help

In the spring of the same year, the identical scenario happened again, ended with another trip to ED2 at midnight. This time, since Lynn was out of town, Michael drove alone to ED2. He communicated his medical history. However, health providers at ED2 could not give Michael any pain medication injections because he had nobody to drive him home. Rather, Michael was given a steroid injection and sent him home with oral steroids and pain medication. Because of severe pains, Michael could not remember when and how much medication to take by himself and overmedicated himself.

Refer to Problem 3 –Knowledge. Again, Michael was not given the know-how (knowledge) to manage his blood glucose levels using his oral medications. Due to the repeated nature of this problem, it is likely that providers are hesitant to address blood glucose management altogether. Perhaps it is too complicated. But if it is too complicated for the provider, how is the patient expected to do the task correctly? The patient was sent home in severe pain that was not adequately managed in ED2. While pain management may be difficult, ensuring that pain is managed and effective (**wisdom**) prior to discharge is important. The provider and nursing pain assessments need to be linked to the discharge plan to ensure that if pain management is not obtained, options such as a short stay may be considered by the patient.

DISCUSSION

Data and Systematic Errors. This case study examined one patient's interaction with the health care system for a consistent problem that showed disturbing results. In fact the potential errors and omissions were consistent across the visits to the ED2. As shown, health care providers repeatedly made the same mistake in ordering an MRI for a patient that cannot have one is a systematic error that can be corrected through appropriate links in the nursing and provider assessment or history to the test itself. If the systematic error can be corrected for patients such as Michael, it can be extended to other similar scenarios. Preventing systematic errors will likely improve patient satisfaction and reduce time spent in ordering the inappropriate tests for individuals with varied restrictions thereby reducing the costs of care. In this particular case study, the systematic error is related to data – simply an ICD that is not compatible with the MRI. Perhaps an algorithm can solve this issue and create a meaningful alert. Medication alerts have been established for medications and their interactions with each other. The same process could also apply to medical implanted devices.

Knowledge and Information. Michael was given steroid injections followed by steroid oral medications which have pushed Michael's blood glucose into the 600 range, which is extremely dangerous and life threatening. There is a repeated tendency to ignore the side effect of steroid medication and the management of blood glucose for this patient when treated by the emergency department personnel. The EHR needs to be design so that the administration of this particular class of medication for a diabetic patient and management of blood glucose cannot be ignored. This means that the information (what, when, and how many) and glucose management know-how (knowledge) are distributed. Hospitals need a clear plan to determine who is responsible for guiding the patient toward glucose control. People who use insulin may have some type of scale to work with; however this is not always the case. For diabetics who are managed with oral medications glucose changes are more difficult to manage. Who will be responsible for working with the patient? Is it the primary care physician/ provider or the ED personnel?

Knowledge, Wisdom and Clinical Decision Support. Based on Michael's experience after his first laminectomy in 2011 and the forgotten muscle relaxer, a checklist mechanism may be implemented to help physicians and/or nurses in prescribing proper medicines that will be appropriate for patients, like Michael, to meet their treatment need. Checklists in healthcare have been shown to reduce errors and omissions in care. In terms of the use of knowledge by health care providers, the environment in which they practice is filled with distractions, interruptions and high workloads. It is imperative that the systems used by health care professionals help draw that knowledge out for use, and in its absence provide the knowledge needed to both provider and patient. The day has come when an uninformed patient must change, become informed, and engaged in care, otherwise, their very life will be at risk.

Relationships between Patient and Provider. The difficulties that were experienced by Michael during this case study have profoundly affected his opinion and trust of health care providers in proving safe and satisfactory care. He identified himself as being at risk for death with each hospital and emergency department interaction. As frustration and errors become greater, it is likely we will see more people that are dissatisfied with health care delivery unless we do a better job of identifying and correcting errors and omissions in care.

CONCLUSION

This paper provides a narrative about the provider relationships, near misses, and use of information that comes from the electronic health record for medication reconciliation, patient care, and safety during ED visits. While many factors influence care, it is essential that the patient is not forgotten but rather respected and involved in care choices. This paper details fractured relationships, near misses, and medication concerns in health care that were avoidable and provides recommendations to improve them. Although errors can be eliminated with use of the EHR, it is not a time to be overly confident that the errors are actually reduced. Secondly, patients and providers need to improve relationships so together they can attend to the details of the discharge instructions and avoid unnecessary injury and adverse reactions due to errors and omissions. In this time of great change and influx of technology, it is important to remember that patient safety is expected, care is coordinated with the family, and patients are discharged with accurate and meaningful instructions and the know-how to manage their health effectively.

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