Canadian Oncology Nursing Journal

Revue canadienne de soins infirmiers en oncologie

Volume 26, Issue 3 • Summer 2016
ISSN: 1181-912X (print), 2368-8076 (online)

Canadian Association of Nurses in Oncology
Association canadienne des infirmières en oncologie

Delays in Discharge in Neuro-Oncology: Using a Lean Six Sigma-Inspired Approach to Identify Internal Causes

by Karen Rezk and Catherine-Anne Miller

ABSTRACT

Discharge planning processes have implications for patients and families, healthcare providers, and organizations at large. As such, delays in discharge may result in suboptimal patient outcomes, increased resource utilization, and overall disruptions to patient flow. A quality improvement project was conducted using a Lean Six Sigma approach to identify internal causes of delays in discharge in newly diagnosed patients with a high grade glioma on a neurosurgical unit. Internal causes of delays in discharge were related to communication. The main subthemes were multidisciplinary rounds, incongruent messages being delivered to patients and families, and discrepancies between team members resulting in unclear plans. Findings from this project may be used to promote more effective communication that will facilitate safe and timely discharge for neuro-oncology patients.

INTRODUCTION

Efficient patient flow through the healthcare system is an important objective for inpatient units with complex patient needs. An effective discharge planning process is vital in ensuring that patients move safely through the system in a timely manner, thus reducing lengths of stay in hospital. The discharge planning process involves a comprehensive assessment of current patient needs, anticipation of continuing and future needs (Holland, Knafl, & Bowles, 2013), and a smooth transition of care across settings (Holland & Harris, 2007). Multidisciplinary approaches to care from admission to discharge are vital to the success and optimization of safe and timely discharge (Pethybridge, 2004). Obstacles in the discharge planning process can lead to delays in discharge, whereby the actual date of discharge surpasses the estimated date for discharge for non-medical reasons (Ou et al., 2009). These delays may negatively impact patients and their families as well as resources within the healthcare system.

This quality improvement (QI) project focuses on the discharge planning process for patients with a high grade glioma (HGG) in a specialized neurosurgical unit. Cancer of the brain accounted for an estimated 2,700 of all new cancer cases in Canada and approximately 1,800 deaths in 2011 (Canadian

Cancer Society, 2011). HGGs are aggressive and often require complex management (Louis et al., 2007), such as surgery, radiation therapy, chemotherapy, or a combination of these treatment modalities (Brain Tumour Foundation of Canada, 2015). Patients diagnosed with HGG have a shortened life expectancy; the median prognosis is 14.6 months for grade IV gliomas (Krex et al., 2007, Stupp et al. 2005). The declining physical and cognitive functioning that accompanies the progression of the disease (Halkett, Lobb, Oldham, & Nowak, 2010) often leads to complex and challenging decision-making processes, particularly during the discharge planning process, and may result in delays in discharge. The purpose of this QI project was to employ the first three phases of the Lean Six Sigma approach to identify possible causes of delays in discharge for newly diagnosed patients with HGG on a neurosurgical unit.

LITERATURE REVIEW

There is limited literature on the specific causes of delays in discharge in neuro-oncology. Causes of delays in discharge in general are reported as multifaceted, taking into account patient and family factors, clinical and organizational factors, and post-discharge factors (Greenwald, Denham, & Jack, 2007). Internal functions in acute care, such as inadequate or lack of communication between members of the multidisciplinary team, have been identified as the greatest contributing factors hampering the discharge planning process (Watts, Gardner, & Pierson, 2005). Studies have shown that ineffective communication between various healthcare professionals impedes timely discharge and results from differing opinions, role confusion, and competing priorities (Atwal, 2002; Connolly et al., 2010).

Ineffective communication between members of the multidisciplinary team may also result in incongruent communication with patients and families regarding patient care and management. A study on surgical patients' perspectives revealed that patients often received contradictory advice from different members of the multidisciplinary team (McMurray, Johnson, Wallis, Patterson, & Griffiths, 2007). In the brain tumour population, consistent communication between healthcare professionals and patients and their family is important because of the complexity of the disease trajectory and the need for detailed discharge planning.

Effective communication and open dialogue are vital to minimizing delays in discharge. In an exploratory study on factors that enhance or impede the discharge planning process in critical care, effective multidisciplinary communication was identified as the most important factor for enhancing the

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DOI: 10.5737/23688076263215220

discharge planning process (Watts et al., 2005). Similarly, a study on decision-making during the discharge planning process found that inpatient rehabilitation teams identified teamwork, leadership, and communication as crucial for ensuring good health outcomes and clear plans (Pethybridge, 2004). Moreover, multidisciplinary rounds, whereby various professionals approach a scenario (Oxford Libraries, 2016), are an essential component to facilitating inter-professional communication to ensure timely discharge for patients and minimize unnecessary delays. Studies on multidisciplinary approaches to discharge planning in acute care suggest that daily multidisciplinary rounds reduce lengths of stays, minimize delays, and improve multidisciplinary communication (Cowan et al., 2006; Mudge, Laracy, Richter, & Denaro, 2006; Sen et al., 2009).

We are currently unaware of any QI projects that specifically seek to identify causes of delays in discharge in patients with HGG. As such, we undertook a QI project on a neurosurgical unit in a tertiary neurological hospital to gain a better understanding of root causes of delays in discharge. This project was implemented with the hopes of providing a springboard for future interventions that will reduce delays in discharge while ensuring safe and timely transitions for patients from hospital to community settings.

METHODS

The first three phases of the Lean Six Sigma DMAIC (Define, Measure, Analyze, Improve, Control) method were used to guide this project. The DMAIC method is a problem-solving approach that uses both qualitative and quantitative tools in order to improve current processes (Arthur, 2011; Snee, 2010). The tools assist in defining the scope and objective of the project (define), outlining the possible defects within current processes (measure), and identifying and analyzing the root causes of delays in discharge (analyze) (Arthur, 2011). The Lean Six Sigma DMAIC methodology has been employed with success in many acute care hospital settings, achieving reductions in hospital length of stay of almost 50% for trauma patients (Niemeijer, Trip, Ahaus, Does, & Wendt, 2010) as well as a reduction of three days for liver transplant patients (Toledo et al., 2013).

The multidisciplinary team involved in the care of brain tumour patients, including medical, nursing, social work, and rehabilitation professionals, was assembled from a neurological hospital in Quebec, Canada. Along with input from the team, the authors defined the focus of the project. The objective was to analyze the discharge planning process for newly diagnosed HGG patients who were in the post-operative phase of their trajectory on an inpatient neurosurgical unit and transferring to community settings. We decided not to include individuals who had been readmitted and those with any external factors (e.g., lack of beds in rehabilitation centres) or medical factors (e.g., acquired hospital infections) that caused delays in discharge. In addition to defining the project objective and outlining the inclusion and exclusion factors, project leaders identified and approached multidisciplinary team members, from rehabilitation, nursing, medicine, and social work, who

would support and champion this project. Achieving 'buy-in' from team members is crucial for the success of QI projects as it helps to build momentum, while encouraging ongoing participation and implementation of interventions for QI (Comm & Mathaisel, 2000).

The primary author conducted seven semi-structured interviews with key team members involved in the care and discharge planning of HGG patients. Questions were intentionally open-ended in order to elicit in-depth discussion (Turner III, 2010) and to gain an understanding about current discharge planning processes and each professional's respective involvement. Interviews lasted an average of 45 minutes; responses were noted by hand by the project leader and transcribed thereafter. Qualitative analysis was used to explore perceptions and reveal insights into shortcomings of the discharge planning process (Bradley, Curry, & Devers, 2007).

Themes were identified which described the causes of delays in the discharge planning process, as perceived by the team members.

With the input of team members, the authors created a process map (see Appendix A for a condensed version) to illustrate patient flow from admission to discharge across the pre-operative, intra-operative, and post-operative stages of a patient's trajectory. Delays were highlighted using appropriate Lean Six Sigma symbols representing start and end points, documents used, possible decisions, and various processes. The process map was presented on several occasions to some of the team members who had been interviewed and revisions were made according to their input. Process maps offer several benefits, including: identifying organization processes, improving communication across disciplines, identifying processes that require improvements, identifying root causes of problems, and providing a visual representation of existing processes (Henriksen et al., 2005; Savory & Olson, 2001).

During the final phase, a root cause analysis was conducted during a meeting with 11 of the members of the multidisciplinary team. Discussion was facilitated by the co-authors. During this meeting, the final process map was presented to the team and the 5 *Why* methodology was used to identify what, how, and why bottlenecks in the current discharge planning process were occurring (Rooney & Heuvel, 2004). This methodology seeks to identify root causes of defects in current processes as opposed to highlighting symptoms (Arthur, 2011).

The team unanimously agreed that the root cause analysis should address the question: *why are there current delays in decision-making about discharge for patients diagnosed with HGG?* Team members were asked to write their responses to the questions on post-it notes to maintain confidentiality (Birjandi & Bragg, 2009). The root causes were then grouped into causal factors and a sixth 'why' question was asked to ensure that the root cause was definitively identified. Open discussion followed to achieve consensus among team members regarding the possible root causes of delays in discharge for patients with HGG.

Ethical considerations

This QI project was conducted in congruence with all ethical principles observed within the organization in which it was employed.

RESULTS

This QI project employed the first three phases of the DMAIC approach to Lean Six Sigma and produced three main outcomes including qualitative interviews, the process map, and the root cause analysis.

Qualitative interviews

Two common themes emerged from the interviews conducted separately with 11 members of the multidisciplinary team: communication gaps between the multidisciplinary team members and identified shortcomings related to multidisciplinary rounds.

Communication gaps between multidisciplinary team members. All of the team members interviewed spoke about communication gaps between members of the multidisciplinary team. This was cited as one of the main causes of delay in the discharge planning process. Plans were often made independently with minimal communication between various team members involved in patient discharge planning. In particular, discrepancies occurred between the rehabilitation team and the medical teams. These gaps in communication often resulted in patients staying on the unit until consensus was achieved between team members regarding where patients are to be discharged and whether they are candidates for rehabilitation centres, long-term care facilities, or palliative care. At times, there were differences in opinions as to what constituted realistic outcomes or goals for a patient and, based on criteria, the patient's eligibility for rehabilitation or long-term care. There were some differences in opinion as to who would be best positioned to predict patient outcomes and some also tended to have misconceptions regarding the rehabilitation team's role. For example, some team members were under the erroneous impression that the rehabilitation team was devoted solely to brain tumour patients.

Another identified gap in communication pertained to mixed messages patients and their families were receiving from different members of the multidisciplinary team or at different points during the patient's trajectory. From the perspective of the interviewed team members, family members were often given hope or information regarding discharge plans that would not ensue. This created a division in the trust among patients and families and the various members of the team. This was identified as a potential cause of delays in discharge because families were confused by the contradictory information they received, which usually affected their acceptance of discharge plans.

Identified shortcomings related to multidisciplinary rounds. The majority of the team members thought being present at the multidisciplinary rounds was important. A concern was expressed that not having the specialists present during multidisciplinary rounds made communication difficult and

often resulted in inconclusive discharge plans. Team members mentioned that plans discussed during multidisciplinary rounds were relayed to Neurosurgeons via the Clinical Nurse Specialist, Nurse Clinicians, or Social Worker. Direct conversation between the medical staff and the rehabilitation professionals was rare and subtleties of their evaluation were often lost through third party communication.

In addition, some team members mentioned concerns about the frequency of the rounds considering the high acuity and unpredictability of patient trajectories. A few team members mentioned that time lapse between surgical days and multidisciplinary rounds was currently too long to begin talking collaboratively about patient plans. It was suggested that holding rounds more frequently may minimize delays by virtue of advancing collaborative plans and facilitating safe and timely discharge.

Process map

Most of the bottlenecks identified on the process map were related to the decision-making process regarding the patient's destination upon discharge. Within this project some of the delays occurred because of waits for treatment clarifications, pathology results, and forms to be filled, as well as discrepancies between team members regarding the decision-making process.

Root cause analysis

Consensus about the main causal factors of discharge delays was achieved during the root cause analysis meeting. The two main causal factors were identified as communication and multidisciplinary rounds. The first identified cause seemed to stem from the lack of clarity and the misunderstandings regarding various team members' roles as well as the various forms and documents that were being used throughout the discharge planning process. Some team members were unsure about their colleagues' roles and their involvement in the discharge planning process. Secondly, team members commented on the need for rounds to be held more frequently and to be attended by the staff specialists to facilitate direct communication regarding patient plans.

Lastly, it was noted for many of the team members, the root cause analysis meeting was one of the first multidisciplinary meetings related to QI initiatives in which they had participated. They saw the meeting as important in setting a precedent for future meetings to discuss quality improvement in patient care.

DISCUSSION

The purpose of this QI project was to employ the first three phases of the Lean Six Sigma DMAIC approach to identify possible causes of delays in discharge for newly diagnosed HGG patients on a neurosurgical unit. This article reports on three possible causes of delays in discharge: misunderstandings pertaining to various healthcare professionals' roles within the team and the discharge planning process; the need for more frequent multidisciplinary rounds with the attendance of all members; and the importance of a multidisciplinary approach to QI initiatives.

Professionals in our project cited role confusion and misunderstanding other professionals' areas of expertise as barriers to communication, particularly within the discharge planning process. This is consistent with findings from Atwal (2002), who suggests that role ambiguity was one of the main barriers attributed to misunderstanding other team members' involvement in patient care. Moreover, research has shown that clarity concerning roles within a multidisciplinary team needs to be maintained to ensure consistent and constant communication regarding patient care plans (Jünger, Pestinger, Elsner, Krumm, & Radbruch, 2007; Wong et al., 2011).

Members of the multidisciplinary team mentioned that they were occasionally uncertain of other professionals' responsibilities within the discharge planning process and were not fully aware of all the documentation tools used during multidisciplinary rounds. This key root cause was important in realizing that delays in discharge may have been caused by team members not knowing whom to consult for specific concerns. This may also allude to the need for inter-professional education about the various professional roles of others within the multidisciplinary team to enhance collaborative practice and communication (MacDonald et al., 2010; Suter et al., 2009). This knowledge may optimize the team's working efficacy by facilitating common understanding about the resources each team member has access to and what knowledge they can impart about patients and the system at large.

Fostering an understanding of various roles may be better facilitated by more frequent multidisciplinary rounds and the presence of all team members involved in the decision-making process for discharge. Holding frequent rounds has been shown to decrease lengths of stay, improve communication among care providers, and ensure safe and timely discharge (Cowan et al., 2006; Dutton et al., 2003; Sen et al., 2009). Implementing more frequent rounds to discuss plans for patients can promptly take into account changes in patients' cognitive and physical health status as opposed to delaying discussion of these comprehensive plans until the following round meeting.

Furthermore, the importance of having the staff medical team present during multidisciplinary rounds is similar to findings from a study by Dutton et al. (2003). Authors noted several benefits in having senior trauma physicians attend daily multidisciplinary rounds including the elimination of communication lag due to face-to-face discussion regarding patient care as opposed to day-long email and phone call exchanges; having direct input of experienced personnel into the specialized and often complex nature of care for acute patients; and providing insight into system bottlenecks that may be resolved or brought to light during rounds. These benefits influence patient flow and minimize discharge delays.

LIMITATIONS

During the root cause analysis, a possible limitation in gathering quality data was the possible power dynamics between the various healthcare professionals. Healthcare professional cultures and hierarchies have been well documented in the literature as being potential barriers to communication

and engagement in QI initiatives (Bartunek, 2011; Hall, 2005; Nembhard & Edmondson, 2006). While in our case the root cause analysis meeting elicited engagement from all members attending, there may have been reservations from certain professionals to openly discuss their opinions about root causes of discharge delays in the presence of others. While multidisciplinary collaboration was key to the success of this QI project, it is worth being aware of any potential barriers that may hinder future multidisciplinary QI initiatives. Nembhard et al. (2006) suggested that psychological safety and leader inclusiveness (leaders who encourage and welcome others' contributions and insights) within multidisciplinary teams predict engagement in QI projects and initiatives. Halbesleben and Rathert (2008) also support the importance of encouraging psychological safety within healthcare teams collaborating on QI projects in order to better address bottlenecks in work flows. Moving forward with a plan to complete the *improve* and *control* phases of this project, it is important to ensure that future QI projects continue to elicit input from all members of the multidisciplinary team.

IMPLICATIONS

This project has implications for both clinicians and patients, as well as the organization at large. Building on this project, it is anticipated that future multidisciplinary communication will become more systematic and frequent in order to have consistent and collaborative discharge plans for patients where delays are minimized. The DMAIC methodology used is expected to set a precedent in our institution for future multidisciplinary approaches to QI to improve patient flow, patient care, and the use of resources. Lastly, buy-in for this project was vital throughout the process of gathering information and discussing root causes. It was important for the success of this project and will be so for any future projects of a similar type. Also, the team members involved in this work recognized the need and importance of having regular meetings to discuss QI initiatives for improving patient care.

This project was conducted with a specific focus on one neurosurgical unit in a tertiary hospital in Quebec, Canada. Although the DMAIC approach used in this project may be replicable, our findings may not be generalizable to other units or hospitals with different practices and team dynamics. Secondly, detailed access to quantitative data from the hospital database proved to be a challenge within the short timeframe available. Quantitative data about length of stay may have provided the team with a more accurate description of the current situation and its relationship to delays in discharge as well as baseline information for determining whether future interventions are successful in improving delays in discharge. Lastly, time restrictions for this project made it difficult to hold several root cause analysis meetings. Several sessions may have provided deeper explanations to root causes of discharge delays.

Drawing on this project's findings, it would be important to implement solutions and monitor and control their effectiveness in the process as per the final two phases of the DMAIC approach. Comparing current delays in discharge and lengths of stay with those after a solution is implemented would

identify if interventions are successful in improving the discharge planning process. Furthermore, future projects should engage patient and families in the process as they may add unique and valuable perspectives to the decision-making process (Johnson, Ford, & Abraham, 2010; Lavoie-Tremblay et al., 2014) and a needed dimension to QI within the organization.

CONCLUSION

Using the DMAIC approach to identify causes of delays in discharge and minimize lengths of stay has been used with great success in previous QI projects in healthcare (Niemeijer et al., 2010; Toledo et al., 2013; Riblet et al., 2014). Our project used this approach to investigate and analyze possible causes of delays in discharge for patient with HGG in a tertiary hospital in Quebec, Canada. Team member buy-in was sought in order to ensure that findings from this project will be used

to complete the *improve* and *control* phases of the DMAIC approach and implement solutions that will hopefully improve the discharge planning process. We anticipate this will contribute to quality care, while improving multidisciplinary team communication, organization-wide patient flow, and cost-saving benefits in the future.

ACKNOWLEDGEMENTS

We would like to thank Dr. Alain Biron, N, BSc, MSc(N), PhD, for imparting his knowledge and expertise on quality improvement and for his continuous support throughout the phases of this project. We would also like to thank the MUHC Brain Tumour team for enthusiastically supporting this initiative and for their active participation and dedication throughout all phases of this project.

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Appendix A: Process Map – Selected Area