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Research paper

A retrospective explanatory case study of the implementation of a bleeding management quality initiative, in an Australian cardiac surgery unit

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ABSTRACT

Background: Bleeding management in cardiac surgery is challenging. Many guidelines exist to support bleeding management; however, literature demonstrates wide variation in practice. In 2012, a quality initiative was undertaken at The Prince Charles Hospital, Australia to improve bleeding management for cardiac surgery patients. The implementation of the quality initiative resulted in significant reductions in the incidence of blood transfusion, re-exploration for bleeding; superficial leg and chest wound infections; length of hospital stay, and cost. Given the success of the initiative, we sought to answer the question; “How and why was the process of implementing a bleeding management quality initiative in the cardiac surgery unit successful, and sustainable?”

Methods: A retrospective explanatory case study design was chosen to explore the quality initiative. Analysis of the evidence was reviewed through phases of the ‘Knowledge to Action’ planned change model. Data was derived from: (1) document analysis, (2) direct observation of the local environment, (3) clinical narratives from interviews, and analysed with a triangulation approach. The study period extended from 10/2011 to 6/2013.

Results: Results demonstrated the complexity of changing practice, as well as the significant amount of dedicated time and effort required to support individual, department and system wide change. Results suggest that while many clinicians were aware of the potential to apply improved practice, numerous barriers and challenges needed to be overcome to implement change across multiple disciplines and departments.

Conclusions: The key successful components of the QI were revealed through the case study analysis as: (1) an appropriately skilled project manager to facilitate the implementation process; (2) tools to support changes in workflow and decision making including a bleeding management treatment algorithm with POCCTs; (3) strong clinical leadership from the multidisciplinary team and; (4) the evolution of the project manager position into a perpetual clinical position to support sustainability.

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1. Introduction

Bleeding management in cardiac surgery faces challenges with an ageing population, complex procedures, augmented comorbidities, and increased use of anticoagulants and antiplatelet agents.^{1,2} Risk of bleeding is high, and blood transfusion is a commonly relied-on treatment option. Accumulating evidence questioning the efficacy of blood transfusion and association with adverse events remain a concern.^{1,3–5} Moreover, a reduction in transfusion of *all* blood products with appropriate bleeding management strategies has been associated with reduced morbidity, mortality, and cost.^{1,6–8} In 2012, The Prince Charles Hospital ([TPCH], 560 bed, tertiary referral centre), in Brisbane, Australia, implemented a quality initiative (QI) to improve the management of bleeding for cardiac surgery patients. The QI was supported by the cardiac, anaesthesia, perfusion, and intensive care unit (ICU) departments at TPCH, where approximately 1200 primary cardiac surgery procedures are performed annually. Eight cardiac surgeons, 12 anaesthetists, 10 ICU consultants, seven perfusionists, 20 anaesthetic technicians, and 228 nurses were directly involved in providing patient care.

The implementation of a bundle of evidence-based bleeding management strategies as a part of the QI resulted in statistically significant reductions in the incidence of allogeneic blood transfusion, re-exploration for bleeding, superficial leg and chest wound infections, length of hospital stay, and cost.¹ Given the success of the bleeding management QI, we sought to answer the question: “How and why was the process of implementing a bleeding management QI in the TPCH adult cardiac surgery unit during the financial year of 2012–2013, successful and sustainable?” The purpose of this article was to describe the results of the case study undertaken to understand and explain the implementation process used to support the change in practice and factors that influenced that process.

2. Methods

2.1. Design

A retrospective, single, explanatory case study design was chosen to explore the QI.⁹ The case study was approved by the institutional Human Research Ethics Committee (HREC/16/QPCH/103) and Griffith University HREC (2016/598).

2.2. Data analysis

In line with Yin's methods, data for this study were derived from: (1) document analysis; (2) direct observation of the local implementation environment; and (3) clinical narratives from interviews.⁹ Multiple data were collated in a study database to maintain a chain of evidence forming the development of a comprehensive and chronological synopsis of the case. All three data sources were considered (triangulation approach), and the knowledge to action (KTA) action cycle was used to identify themes and guide data analysis (Appendix 1).¹⁰ The KTA framework is somewhat unique and valuable in that it not only acknowledges and conceptualises the “creation” and “synthesis” of knowledge but also supports “actions” for guiding the implementation and translation of knowledge into practice.¹¹ The KTA “action cycle” was chosen as a framework because (1) it provides a model for analysing the progression of knowledge into clinical practice and (2) it can be used as a practical guide to apply knowledge in a real-world way. The QI time-period analysed by the case study extended from October 2011 to July 2013.

2.2.1. Document analysis

Primary goals of document analysis were to: (1) reconstruct of the evolution of the QI; (2) provide background and context; (3) uncover meaning; and (4) develop insight into the underlying motivation, mindset, and the vision of the core group of clinicians who pioneered the project, as well as those who were subsequently involved.^{9,12} To achieve this, the following documents were collated: project reports, meeting minutes, group/*ad hoc* emails, diary entries, e-calendar appointments, in-service records, questionnaire responses, and morbidity/mortality meeting data. Analysis of these documents included (1) skimming, the initial preliminary examination to identify which documents required more in-depth review; (2) reading, a thorough revision of selected documents; and (3) interpretation, including thematic analysis for identification of emerging themes.¹² Documents were then categorised for analysis according to the phases of the KTA action cycle.

2.2.2. Direct observation

Direct observation of the QI context comprised of: (1) structural inputs, including infrastructure, the availability of educational resources and process tools to support bleeding management and (2) process inputs including requests for consultation, in-service, viscoelastic haemostatic assays and platelet function testing. These data were used to inform context and were further validated during the interview phase.

2.2.3. Interviews

A study specific interview guide was developed with questions grouped according to the action phases of the KTA cycle. Interview questions were pilot-tested for face and content validity with clinicians identified as key stakeholders (cardiac surgeons, anaesthetists, perfusionists, blood management nurses, and nurse unit managers/directors). Modifications were made based on feedback. After informed consent, nine face-to-face, semistructured individual interviews lasting approximately 30 min were conducted by the lead investigator, with the stakeholders matching the purposive sample above. Interviews were taped, transcribed, and analysed using thematic analysis: (1) verbatim transcription; (2) meaningful words; phrases and patterns elucidated, and codes generated; (3) codes combined into themes; (4) interview data reviewed in relation to themes; and (5) themes defined and named.^{13,14} This process was performed independently by two researchers (BP/YLF) and compared. Where disagreement with codes/themes occurred, explanation and clarification supported reaching a consensus. Member checking validation was achieved whereby a summary of themes were provided to participants, who confirmed these reflected their experience.

3. Results, discussion, and reflection

The results, including tables of representative samples of interview data, discussion, and reflection are presented below and have been themed by phases of the KTA cycle.¹⁰

3.1. KTA phase 1: identifying a problem; identifying, reviewing, and selecting knowledge

Typically, “Knowledge to Action” cycles commence with either recognition of a problem, then identification and critical appraisal of knowledge that may solve it, or by an initial awareness of new knowledge that triggers investigation into whether a knowledge-practice gap exists.^{10,15} Our experience followed the former path. A bleeding management problem was identified through monthly cardiac surgery morbidity and mortality meeting data and *ad hoc* data queries, which revealed a 50% incidence of packed red blood

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