Improving quality of intensive care

Optimizing audit & feedback with actionable indicators and an action implementation toolbox

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Chapter 4

Development of a web-based quality dashboard including a toolbox to improve pain management in Dutch intensive care

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Abstract

Background
Audit and feedback (A&F) is a common strategy to improve quality of care. Meta-analyses have indicated that A&F may be more effective in realizing desired change when baseline performance is low, it is delivered by a supervisor or colleague, it is provided frequently and in a timely manner, it is delivered in both verbal and written formats, and it includes specific targets and an action plan. However, there is little information to guide operationalization of these factors. Researchers have consequently called for A&F interventions featuring well-described and carefully justified components, with their theoretical rationale made explicit.

Purpose
This paper describes the rationale and development of a quality dashboard including an action implementation toolbox for four previous developed pain indicators, guided by Control Theory.
Introduction

Audit and Feedback (A&F) is a common strategy to improve quality of care. It provides health professionals with a summary of their clinical performance over time [1] and is delivered to them in different formats such as a benchmark report or dashboard.

A Cochrane review showed that A&F is effective in improving provider compliance with desired practice, but with only a small median absolute improvement of 4.3% (interquartile range 0.5% to 16%) [2]. Meta-analyses have indicated that A&F may be more effective in realizing desired change when baseline performance is low, it is delivered by a supervisor or colleague, it is provided frequently and in a timely manner, it is delivered in both verbal and written formats, and it includes specific targets and an action plan [2-4]. However, there is little information to guide operationalization of these factors [5], which may lead to recommendations for improvement that are suboptimal [6]. Researchers have consequently called for A&F interventions featuring well-described and carefully justified components, with their theoretical rationale made explicit [1, 7].

Recently, our research group of the National Intensive Care Evaluation (NICE) quality registry [8] developed an A&F intervention that aims to improve clinical performance of Dutch intensive care units (ICUs) on pain management. Feedback is provided on four quality indicators through a web-based quality dashboard. We guided the design of our intervention by Control Theory and findings from a previous intervention undertaken by our research group among similar ICUs. A qualitative evaluation of the previous A&F intervention [9, 10] showed that ICUs experienced barriers to achieving improvement, including a lack of normative standards and benchmarks, inadequate case-mix adjustment, lack of knowledge on how to improve, and insufficient allocated time and staff [11]. To address all except the last barriers, we incorporated several strategies into the quality dashboard including explicit benchmark information, patient subgroup analyses, lists of patients who had not achieved the indicator target, and an action implementation toolbox containing potential barriers and suggested actions to improve practice.

This paper describes the rationale and development of the action implementation toolbox for four previous developed pain indicators [12]. The effectiveness of the toolbox will be evaluated in a randomized controlled trial.


Methods

Theoretical rationale
Our theoretical rationale of the mechanisms through which health professionals aim to improve their clinical performance is based on Control Theory as shown in Figure 4.1. Control Theory hypothesizes that behaviour is goal-driven, and professionals are prompted to change behaviour (e.g., execute improvement actions) when observing a negative discrepancy between their current performance and a goal, until the discrepancy is eliminated. Feedback reports are input for comparing perceived clinical performance to performance goals (see upper-left grey box in Figure 4.1). However, if professionals lack skills, knowledge or strategies for action, they may disengage from goal attainment and stop trying to achieve the goal [13]. Feedback may, therefore, be more effective when accompanied by action plans to inform behavioural adjustment to reduce discrepancy (see bottom-right grey box in Figure 4.1) [6]. Our toolbox will supply in action planning by supporting ICU professionals to translate their intentions into actions, and enhances the likelihood that actions will be completed by providing supporting material to execute those planned actions.

![Figure 4.1](image-url) Illustration of hypothesized role played by feedback and the toolbox to promote development of improvement intentions and behaviour change. Adapted from Carver & Scheier’s Control Theory.
Toolbox development: identification of barriers and improvement actions

The quality dashboard provides feedback on the four previously developed quality indicators reflecting best practice for pain management: 1) perform pain measurements each shift; 2) achieve acceptable pain scores; 3) repeat pain measurements in case of unacceptable scores within 1 h; 4) normalize unacceptable pain scores within 1 h. To develop the action implementation toolbox we analyzed the pain management process in the ICU. The pain management process consists of three steps: 1) pain assessment, 2) medication or other treatment prescription, and 3) treatment effect evaluation. The Systems Engineering Initiative for Patient Safety (SEIPS) model provides a framework for understanding the structures, processes and outcomes in healthcare [14]. Based on the SEIPS model, two of the authors (MRB and JJS) identified potential barriers that could lead to poor performance on each of the four pain management quality indicators. Next, for each barrier we listed expert and guideline-based examples of goal-oriented actions that could be effective in attaining better performance. During an expert focus group the preliminary list of barriers and actions was discussed, prioritized and supplemented with other expert and practice-based actions. The expert panel consisted of two intensive care nurses; one hospital pharmacist; two anesthesiologist-intensivists; two internist-intensivists; and one research coordinator pain management. For the final list of actions we searched for supporting material in the literature. Additionally, we asked the expert panel for locally developed supporting material that could facilitate action implementation. These improvement actions and materials together with the quality indicators, were included in a web-based dashboard that will be offered to the ICUs. Potential end users critically assessed the dashboard for usability.

Results

The action implementation toolbox (Figure 4.2) consists of 18 unique barriers and 26 unique improvement actions. On average, the toolbox lists 12 barriers per indicator (range, 11 to 13) and 5 actions per barrier (range, 1 to 8). Six actions have supporting materials attached to facilitate its implementation, including posters, educational PowerPoint presentations, pocket cards, information leaflets and protocols. The toolbox is incorporated within the action plan in the dashboard, see Figure 4.2. ICU teams can develop action plans for each quality indicator included in the dashboard. To do so, they can select or deselect
potential barriers in their local care process organization, and pick actions. The toolbox displays actions that are associated with the selected barriers, and hides those that are only associated with deselected barriers. ICU teams can pick those actions they intend to undertake. Teams can also define their own barriers and actions. Each improvement action will be assigned by a deadline and responsible person(s).

**Discussion**

We developed a web-based quality dashboard with action implementation toolbox, guided by Control Theory, to assist Dutch ICUs in achieving better performance on pain management.

Behaviour change is most likely if feedback is accompanied by specific goals and action plans [6]. A previous trial of Ivers et al. [15] studying goal-setting and action planning did not lead to quality improvement. Their intervention lacked the inclusion of active, practice-based support and was therefore believed to be ineffective. Our toolbox does include expert-based actions complemented supporting material which enhances its employment. Following Control Theory [13], we believe that our toolbox may reduce the intention-action gap by
suggesting improvement actions in case they do not know what they can do to improve (lack of knowledge) and materials in case they do not know how to do it (lack of skills).

Our toolbox was designed to offer a comprehensive set of actions that are specific enough to be actionable [16], yet generic enough to be relevant for all ICUs. To overcome the problem of being confronted with a high number of inapplicable actions, e.g. because actions might have already been implemented or might not contribute to solving a local ICU’s specific barriers, teams can select those barriers from the toolbox that are relevant to their own context; the toolbox displays only those suggested actions associated with the selected barriers. Nevertheless, actions can still be too generic to guarantee swift implementation (e.g. increase efficiency of work process). We aim to continuously expand and improve the toolbox with new or revised actions and supporting materials to address this issue in the future.

We will evaluate the effectiveness of the action implementation toolbox in an upcoming head-to-head randomized controlled trial (ClinicalTrials.gov NCT02922101).

Conclusion

Our web-based quality dashboard is one of the first A&F interventions with an action implementation toolbox based on explicit theories. The toolbox offers a solution to ICU professionals in planning and executing more effective improvement strategies for pain management. Its effectiveness will be evaluated and if successful it will be applied to other areas of ICU care.
References


