Designing Mobile Clinical Decision Support Systems

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# Abstract

Optimal perioperative patient management is crucial to avoid surgery related complications, especially postoperative venous thromboembolism (VTE). Approximately 2–13 in every 1000 elective surgical admissions in Australia develop a symptomatic postoperative VTE and this is associated with a 10% case fatality rate. This project aims to address this challenge by minimising VTE through designing a mobile Clinical Decision Support System (CDSS) for perioperative patient management. Between 2013 and 2018 we completed and tested the clinical efficacy of a mobile CDSS designed for this purpose in a leading Australia cancer hospital. A relative risk reduction of 79% of VTE rates was observed. With efficacy and proof of concept established, our subsequent focus is to gain the approval of the Therapeutics Goods Administration (TGA) of Australia for commercialisation and broader use nationally and internationally. While we have moved the CDSS beyond initial design to a standardisable and commercialisable model, there remains no clear guideline for designing more useful and usable mobile CDSSs. To address this, this project combined Design Science Research Methodology with co-design to enable collaboration between clinicians and technology developers. We summarise the critical success factors of a mobile CDSS under the theoretical lens of Fit-Viability assessment, which includes Task Technology Fit assessment, internal and external factors of partnering organisations, and user satisfaction, fidelity, and ease of use. The project will culminate in a rubric that guides best practice design, development, and assessment of mobile CDSSs. This rubric will help clinicians and technology developers to collaborate to design more fit for purpose mobile CDSS. Given the initial observation of 79% reduction of relative risk of VTE events, wider adoption of the mobile CDSS developed through this work has the potential to significantly reduce VTE events across Australia and beyond.

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