VitalsAssist - A mHealth Application for Early Detection and Escalation of Deteriorating Patients based on National Early Warning Score

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Introduction: Efficient patient monitoring and timely escalation would aid in reducing severe consequences. The latest advancement in the adoption of mobile technology and increasing feasibility and convenience of mobile health (mHealth) applications in healthcare have attracted interest among healthcare providers, policy makers, hospitals, and patients.

Study Objectives: One part of this research project was focused on three core areas applied to patient monitoring; (a) designing of a user-friendly vital signs monitoring application for clinicians with their engagement and feedback; (b) develop a mobile application for vital signs monitoring in real-time with integrated medical devices for automated escalation of deteriorating patient using national early warning score and (c) use of a structured medical data for rich clinical decision support for point-of-care decision making.

Methods: In order to measure the usability of the application, we adopted the international standard organisation's three usability measurable attributes: (1) Effectiveness: accuracy and completeness with which users achieve specified goals; (2) Efficiency (time): resources expended in relation to the accuracy and completeness with which users achieve goals, and (3) Satisfaction: freedom from discomfort and positive attitudes towards the use of the product. Four individuals took part in the evaluation; a medical doctor, a registered nurse, an experienced medically trained patient effectiveness advisor and a user experience designer.

Results: We successfully designed a user-friendly and interactive mobile application with integrated medical devices and clinical decision support functionality for clinicians. We conducted a task-based usability and accuracy test and found that the average accuracy was 97%, time taken for each task to complete was 7.5s (average) and the overall navigation was termed as 'easy to understand' by the users.

Conclusion(s): Initial usability results suggest that the proposed application is suitable to be implemented in the in-patient (acute care) settings for vital signs monitoring and auto-escalation of deteriorating patients based on the national early warning score. The next steps for this research is to validate the proposed application in the hospital (acute care) setting.