Embedding Electronic Medication Management Systems Into Practice: Identifying Barriers to Implementation Using a Theoretical Approach

Deborah Debono, PhD[1]
Natalie Taylor, PhD[2]
Joanne Travaglia, PhD[1]
David Carter, PhD[3]
Melissa Baysari, PhD[4]
Ric Day, PhD[5]
(1)Faculty of Health, University of Technology Sydney, Ultimo NSW 2007, Australia
(2)Cancer Council NSW, Woolloomooloo, NSW 2011, Australia
(3)Faculty of Law, University of Technology Sydney, Ultimo NSW 2007, Australia
(4)Centre for Health Systems and Safety Research, Australian Institute of Health Innovation, Macquarie University, Sydney, Australia
(5)Professor of Clinical Pharmacology, University of New South Wales, Sydney, NSW, Australia

Background

The aim of the study was to embed in practice technological advances designed to reduce medication errors to improve patient safety. In hospital, medication administration errors occur in 5-10% of all medication administrations (Australian Commission on Safety and Quality in Health Care 2013) with at least one error associated with 60% of intravenous infusion administrations (Schnock, Dykes et al. 2017). Medication administration errors potentially harm patients, undermine patient confidence in their care, and are costly (Choi, Lee et al. 2016, Kjellberg, Wolf et al. 2017). Internationally, sustained efforts have been undertaken to reduce medication error rates (e.g. Härkänen, Saano et al. 2017, Westbrook, Li et al. 2017, Pontefract, Hodson et al. 2018) including the introduction of electronic medication management systems (EMMS) (Jheeta and Franklin 2017, Risør, Lisby et al. 2018). However, the implementation of EMMS is a complex undertaking, and nurses do not always use EMMS as intended (Debono 2014, McLeod, Barber et al. 2015, Boonen, Vosman et al. 2017). Suboptimal use of EMMS undermines the capacity of EMMS to reduce error (van der Veen, van den Bemt et al. 2017) and nurses experience tension and feelings of professional vulnerability when they are unable to use EMMS as they are intended to be used (Debono 2014). Experience of job stress is associated with poorer patient safety (Hall, Johnson et al. 2016) and nurse attrition (Peterson, Hall et al. 2011). Therefore, a positive impact on patient safety, and nurses' job satisfaction, well-being and retention can be anticipated when reliable implementation of EMMS is achieved.

Examination of barriers to using EMMS has focused largely on the misalignment between workflow and technology which tend in turn to focus more specifically on challenges associated with using computers in clinical settings (Zadvinskis, Smith et al. 2018). While useful, this research does not directly address the fact that interventions to improve patient safety, including the integration of technology such as EMMS in clinical practice, require healthcare professionals to change their behavior. Theoretically informed approaches to identifying barriers to behavior change and related targeted interventions to address these barriers have been demonstrated to be successful, and to be more successful than non-theory driven approaches (Taylor, Lawton et al. 2013). The Theoretical Domains Framework Implementation (TDFI) approach is a validated and systematic approach that is used to detect and address key barriers to changing practice (Taylor, Lawton et al. 2013). Barriers to behavior change are represented by 14 domains based on 84 theoretical constructs from multiple psychological and organizational behavior change theories which have been mapped to specific behavior change techniques (BCTs) (Michie, Johnston et al. 2008) with the active components of behavior change interventions linked to each domain (Michie, Richardson et al. 2013). These BCTs can be used to develop targeted remedial interventions to elicit behavior change in clinicians and improve outcomes for patients. The TDFI combines a bottom up strategy with top down management support to co-design and implement, with front line clinicians, targeted interventions to address barriers to behavior change. Clinical, statistical and cost-effective

improvements in implementation of evidence-based practice have been achieved using the TDFI (Taylor, Lawton et al. 2013). This paper reports the identification of: a medication administration behavior targeted for change; barriers to nurses performing that behavior; and theoretically informed interventions co-designed with front line clinicians to address barriers to nurses performing the target behavior.

Methods

Nurses (n=30) at a large metropolitan hospital in Sydney participated in this pilot and feasibility study in 2017-2018, which used a mixed methods design. Step 1: An implementation team comprising nurses identified as champions for medication administration improvement (n=6) was formed. Step 2: Informal individual and group interviews (n=4) were conducted with implementation team members to identify the target behavior and process map medication administration on the ward. The choice of target behavior was confirmed with the ward Nursing Unit Manager and Clinical Nurse Educator. Step 3: The validated Influences on Patient Safety Behaviors Questionnaire (IPSBQ) was administered to identify key barriers to nurses performing the target behavior (n=30). Step 4: Individual interviews (n=3) and a focus group with four participants were conducted to confirm and explore the barriers to nurses performing the target behavior. Step 5: The most salient barrier domains were mapped to BCTs to generate remedial interventions to address barriers to nurses performing the target behavior. Step 6: A TDFI-guided focus group was conducted with nurses to co-design theoretically underpinned intervention strategies to overcome barriers that are amenable to change.

Results

The TDFI approach was embraced by nurses working in the study ward. The target behavior chosen was the independent check of all intravenous (IV) medication administrations by two nurses at the bedside using the EMMS, as per hospital policy. Salient barrier domains to two nurses going to the bedside to independently check IV medications included: environmental context and resources (e.g. availability of functioning mobile computer workstations and staff qualified to co-check IV medications); social influences (the influence of staff who expressed frustration at being asked to go to the bedside to complete a co-check for IV medication administration); beliefs about consequences (nurses weigh up the risk to decide which medications they will go to the bedside to co-check); motivation and goals (competing goals); and social/professional role and identity (different professional responsibilities assumed by the administering and checking nurses). We report a suite of theoretically informed interventions co-designed with front line clinicians to target these barriers.

Conclusions

The TDFI proved to be a useful approach for employing evidence-based methods to identify barriers and co-design intervention strategies. Subsequent work will test the effects of these interventions on addressing barriers to nurses going to the bedside to independently check IV medications.

Title:
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Keywords:
Electronic Medication Management Systems, Patient Safety and Theoretical Domains Framework

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Abstract Summary:
Interventions to improve patient safety, including the integration of technology in clinical practice, require healthcare professionals to change their behavior. This study reports a validated theoretically informed approach to identify challenges to changing nurses' behaviour in order to integrate electronic medication management systems in clinical practice.

Content Outline:
Introduction

- In hospital, medication administration errors occur in 5-10% of all medication administrations (Australian Commission on Safety and Quality in Health Care 2013) with at least one error associated with 60% of intravenous infusion administrations (Schnock, Dykes et al. 2017).
- Medication administration errors potentially harm patients, undermine patient confidence in their care, and are costly.

Body

Electronic Medication Management Systems (EMMS) have been introduced to reduce medication administration errors (Jheeta and Franklin 2017, Risør, Lisby et al. 2018).

- Implementation of EMMS is a complex undertaking, and nurses do not always use EMMS as intended (Debono 2014, McLeod, Barber et al. 2015, Boonen, Vosman et al. 2017).
- Suboptimal use of EMMS undermines the capacity of EMMS to reduce error (van der Veen, van den Bemt et al. 2017) and nurses experience tension and feelings of professional vulnerability when they are unable to use EMMS as they are intended to be used (Debono 2014).
- Experience of job stress is associated with poorer patient safety (Hall, Johnson et al. 2016) and nurse attrition (Peterson, Hall et al. 2011).
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- This research does not directly address the fact that interventions to improve patient safety, including the integration of technology such as EMMS in clinical practice, require healthcare professionals to change their behavior.
- Theoretically informed approaches to identifying barriers to behavior change and related targeted interventions to address these barriers have been demonstrated to be successful, and to be more successful than non-theory driven approaches (Taylor, Lawton et al. 2013).
- The Theoretical Domains Framework Implementation (TDFI) approach is a validated and systematic approach that is used to detect and address key barriers to changing practice (Taylor, Lawton et al. 2013). Barriers to behavior change are represented by 14 domains based on 84 theoretical constructs from multiple psychological and organizational behavior change theories which have been mapped to specific behavior change techniques (BCTs) (Michie, Johnston et al. 2008) with the active components of behavior change interventions linked to each domain (Michie, Richardson et al. 2013). These BCTs can be used to develop targeted remedial interventions to elicit behavior change in clinicians and improve outcomes for patients.

- The TDFI combines a bottom up strategy with top down management support to co-design and implement, with front line clinicians, targeted interventions to address barriers to behavior change. Clinical, statistical and cost-effective improvements in implementation of evidence-based practice have been achieved using the TDFI (Taylor, Lawton et al. 2013).

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- We report a suite of theoretically informed interventions co-designed with front line clinicians to address these barriers.

Conclusions

- The TDFI proved to be a useful approach for employing evidence-based methods to identify barriers and co-design intervention strategies.
- Subsequent work will test the effects of these interventions on addressing barriers to nurses going to the bedside to independently check IV medications.

First Primary Presenting Author
Primary Presenting Author
Deborah Debono, PhD
University of Technology Sydney
Faculty of Health
Director of Studies, Health Services Management Program
Ultimo NSW
Australia

Author Summary: Deborah's academic qualifications, coupled with nursing experience in metropolitan, rural and remote acute health care settings in Australia provide her with research expertise as well as a first-hand understanding of clinical settings. Deborah investigates the influence of context, culture, technology, and social and professional relationships on health professionals' practice and the translation of evidence in practice. Deborah is currently working on a program of research to visualise vulnerabilities in relation to patient safety.

Second Author
Natalie Taylor, PhD
Cancer Council NSW
Senior Research Fellow
Woolloomooloo, NSW
Australia

Author Summary: Dr Natalie Taylor is passionate about facilitating healthcare professional and consumer-led change in the health system to improve outcomes for patients. Her research is focused on testing the impact of behaviour change and implementation science methods for enhancing the translation of clinical guidelines to improve practice and outcomes for cancer patients.

Third Author
Joanne Travaglia, PhD
University of Technology Sydney
Faculty of Health
Director, Centre for Health Services Management
Ultimo NSW
Australia

Author Summary: Professor Joanne Travaglia has decades of experience in cultural diversity, health services delivery and improving safety for marginalised groups. Professor Travaglia's work in health promotion and vulnerable groups in relation to patient safety is pivotal to patient safety.

Fourth Author
David Carter, PhD

University of Technology Sydney
Faculty of Law
Senior Lecturer
Ultimo NSW
Australia

Author Summary: David's area of expertise is in the corporate and regulatory practice of health care law and public health law, focusing on the history, philosophy and the jurisprudence of these areas. He has a particular interest in the private health sector.

Fifth Author
Melissa Baysari, PhD
Macquarie University
Centre for Health Systems and Safety Research, Australian Institute of Health Innovation
Associate Professor
Sydney
Australia

Author Summary: Melissa is a human factors researcher with expertise in both quantitative and qualitative evaluation of health information technology. Her research is focused on understanding and preventing prescribing errors, with a particular focus on the design and evaluation of computerised decision support.

Sixth Author
Ric Day, PhD
University of New South Wales
Professor of Clinical Pharmacology
University of New South Wales
Sydney, NSW
Australia

Author Summary: Professor Day is a Professor in the Faculty of Medicine at the University of NSW, Department of Clinical Pharmacology & Toxicology. His fields of research include: clinical pharmacology and therapeutics, rheumatology and arthritis, psychiatry, endocrinology and decision support and group support systems.