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Evidence Briefings on Interventions supporting safer Transitions of Care

Digital approaches to facilitate safer medication management at transitions of care

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Digital Approaches to Facilitate Safer Medication Management at Transitions of Care

PURPOSE

This briefing paper summarises the evidence on the effectiveness of digital tools and approaches that can facilitate the implementation of strategies to achieve safer medication management at transitions of care (TOC). It is designed to assist health organisations and relevant health professionals across all settings consider how digital solutions, when used appropriately, can enhance communication and support medication management during TOC.

CURRENT EVIDENCE SHOWS

- Effective multidisciplinary communication using digital approaches can improve safe and high-quality medication management during TOC.
- Digital approaches, including the use of My Health Record, can assist with collating a best possible medication history (BPMH) and conducting medication reconciliation.
- Electronic medical records make multidisciplinary collaboration, such as partnered pharmacist medication charting and multidisciplinary discharge summaries, more efficient.
- Electronic discharge summaries improve many elements of data quality and accuracy and can improve clinical outcomes.

Background

Digital enablement is increasingly recognised for enhancing medication management during transitions of care (TOC) to overcome causes of missing or inaccurate information, communication breakdowns, and delays, which may compromise patient safety.[1] In Australia , medication-related errors lead to over 250,000 hospital admissions annually, costing an estimated $1.4 billion.[2, 3] Digital solutions provide avenues to mitigate risks by enabling information transfer, updates, and decision support to improve accuracy and enhance patient safety. The digital approaches that can be used to facilitate TOC strategies are described below.

Methods

A rapid literature review investigated studies describing digital approaches to support safe and high-quality medication management during TOC, published from 2013 to 2023. The search included the PubMed, Scopus, and Embase databases alongside an environmental scan of 58 organisations. The studies included were written in English with full text available, and all study designs were encompassed, including randomised controlled trials (RCTs) and observational studies.

Results

The literature search identified 11,383 articles, of which 39 studies were selected for analysis. Of these studies, five focused on admission, 29 focused on discharge and/or post-discharge follow-up and five studies focused on both admission and discharge. Overall, digital approaches for medication management at TOC involved using (1) electronic health and medical records (EHR and EMR), (2) the tools that are integrated into EHR and EMR and (3) digital enablement of follow up care after discharge.

1 Electronic Health and Medical Record (EHR and EMR):

Implementation of EHR and EMR significantly improved the TOC process by facilitating the documentation of a best possible medication history (BPMH),[4-13] medication reconciliation,[4-13] partnered pharmacist medication charting,[14] communication among health care professionals and provision of discharge summaries.[15-18] While EMR and EHR are often used interchangeably, EMRs are primarily used within healthcare services such as hospitals and general practices. EHRs, on the other hand, extend across organisations and include summaries of health-related events sourced from multiple EMRs.[19] Both EMR and EHR are widely utilised during TOC. These electronic records reduce medication errors,[20] and enable the sustainability of health data, save time, reduce the risk of misplaced documentation, and help protect health data privacy.[21] However, effective utilisation of electronic records requires addressing barriers such as digital literacy, willingness to adopt new technologies, information technology (IT) infrastructure challenges, and user-centric design that facilitates ease of navigation and use.[21] These measures are crucial to optimise the benefits of EMR and EHR and reflect a commitment to digital maturity.

1.1 Personal Health Record

Personal Health Records (PHRs) are a type of EHR that benefits patients and healthcare providers. They empower patients by allowing them to access and manage their health information.[22] This increases patient engagement and education about their health conditions.[23] Also known as electronic patient portals, PHRs can enhance medication adherence, patient satisfaction and safety.[6] During TOC from hospital to home, community pharmacists' access to these records allows them to identify and proactively resolve medication errors and has improved patient safety.[24] PHRs can serve as a secondary source for obtaining a BPMH and verifying patients' medication histories. In Australia, the PHR known as My Health Record demonstrated that among 82 patients with 1,207 medications, 59.2% had complete or partial matches in My Health Record compared to their BPMH. However, only 4.2% of the medications (n=51/1,207) had clinically relevant deviations.[25] It is important to note that the role of My Health Record in enhancing the TOC process requires further investigation, as it is not consistently updated and remains an unrealised and underutilised opportunity to improve TOC. Forgetfulness has been described as a major barrier to clinicians updating the records, highlighting the need to increase clinician awareness of My Health Record for improved utilisation.[24] My Health Record also presents usability challenges for patients and clinicians, including complexities and graphic design issues, significantly impacting users with low digital health literacy.[26] Therefore, providing adequate education on electronic health records can ensure their effective use and improve user experience.

2 Electronic medical records tools:

2.1 Medication reconciliation tools

Integrating a medication reconciliation tool in EMR can enhance the medication reconciliation process. Two systematic reviews have explored the application of EMR tools.[20, 27] One review revealed that electronic tools to perform medication reconciliation significantly reduced the proportion of medications with unintentional discrepancies during TOC.[20] The other systematic review identified specific functionalities to improve medication history-taking efficiency, such as displaying medication lists side by side, employing various filters for sorting unreconciled medications, and consolidating information from multiple sources. Careful consideration of context and implementation is necessary to optimise usability and adherence to such tools.[27]

2.2 Computerised Physician Order Entry (CPOE)

The integration of CPOE in EMR has transformed medication order entry, offering enhanced efficiency and accuracy in healthcare communication. It also has demonstrated a positive impact on preventing medication errors. [12, 28] CPOE has been shown to decrease unintended discrepancies in medication reconciliation,[28] medication errors during Intensive Care Unit (ICU) transfer,[12] reduced readmission rate and shortened the length of stay in asthma patients.[29] However, the positive outcomes associated with CPOE are not universal, as one RCT failed to observe significant differences in hospital stay duration, complications, or quality of life in surgical patients. This result may be attributed to the study's limitations, as adverse drug events were significantly lower than expected, rendering the study underpowered for the primary outcome despite being a large deprescribing trial with 5,698 participants.[30]

Although CPOE systems are intended to reduce medication errors and enhance patient safety, they may also unintentionally introduce new types of errors due to features such as auto-population and drop-down menus.[31, 32] Furthermore, the system's medication data may not reflect the most current prescribing information or warnings, leading to the potential for prescribing medications that are no longer considered safe or effective.[33] Observations of CPOE reinforce the importance of safety assurance in digital health implementation to maximise benefit and minimise unintended consequences.

2.3 Clinical Decision Support (CDS)

Implementing computerised CDS into EMR can enhance medication reconciliation, medication review and prescribing during TOC, as evidenced by positive outcomes. Several CDS have been explored:

- Integrating CDS into a structured pharmacist medication review improved medication reconciliation and identified potential medication-related issues [34]
- Incorporating CDS with chronic obstructive pulmonary disease (COPD) guidelines demonstrated enhanced adherence to discharge recommendations, including medication management.[35]
- CDS using Drug Burden Index (DBI) scores contributed to stopping or reducing DBI-contributing medications upon discharge.[36]
- MedWise Risk Score™, a CDS used in the USA and Canada, effectively aided pharmacists in identifying clinically relevant medication-related problems.[37]
- Medsafer™, CDS employed for prescription monitoring in hospitalised older adults with polypharmacy in Canada, suggested improvements in deprescribing but demonstrated limited short-term effects on medication harm.[38]

In conclusion, the positive impact of CDS on prescribing during TOC is evident; however, clinicians must ensure they use their clinical judgement, as these systems are designed to complement, not replace clinical decisions.

2.4 Electronic Discharge Summary (EDS)

The EDS includes a comprehensive compilation of prescribed medications and general medical information provided to facilitate communication with primary care providers and post-discharge medication review. EDS can enhance documentation, improve medication order completeness, and yield positive clinical outcomes such as better management of high blood pressure compared to paper-based summaries.[39, 40] Digital maturity and data quality continues to be a challenge and a failure to achieve digital health benefits could be attributed to inconsistencies in EDS quality and accuracy of the information.[41] Despite the importance of improving the accuracy of EDSs, they are often incomplete or inaccurate, creating risks of errors when this data is updated in the patients' health records. This issue is particularly significant in Australia, where EDSs are uploaded to patients' My Health Record as a source of communication among healthcare providers.[42] Addressing this requires specialty-specific templates, standards, and sufficient medical officer training. Emphasising timeliness of transmission, conciseness, and completeness is crucial to improve EDS quality and impact for use in practice.[41]

Pharmacist involvement in preparing EDS has been linked to a reduction in medication errors.[39, 43] Furthermore, the introduction of Pharmacist-to-Pharmacist Discharge Summary (P2PDS) in the USA significantly improved the percentage of patients receiving community pharmacist medication reconciliation post-discharge.[16] These findings highlight the importance of pharmacists' communication in enhancing patient safety and continuity of care during TOC and suggest an opportunity for other healthcare systems in other countries to implement P2PDS.

3 Post-discharge comprehensive digital multi-component approach

3.1 Virtual ward

Virtual wards are a hospital-managed alternative for inpatient care, providing acute or subacute care and monitoring outside the hospital setting, usually following an acute admission. Targeting high-risk patients is an important factor in determining the effectiveness of virtual wards as a TOC strategy. Existing literature on medication management at TOC using virtual wards is limited, with

only three studies exploring medication management interventions as part of this approach and investigating patient transfer from hospital to virtual wards.[44-46] The use of an integrated modified tool to identify patients at high risk of readmission and closely monitor patients for three months through a virtual ward resulted in significantly fewer readmissions.[45] Other studies that explored the use of virtual wards demonstrated no impact on readmission in two studies;[44, 46] however, these studies only included COPD patients[46] or high-risk patients without considering the risk of readmission as an inclusion criteria.[44]

3.2 Telehealth services

A systematic review involving 23 RCTs identified that telehealth services are central to medication safety at TOC.[47] Telehealth services may be used to conduct medication reconciliation, medication review, patient education, and health facility engagement (e.g. staff education).[47] However, using medication-focused telehealth services alone is unlikely to reduce hospital readmission.[47] Instead, multifaceted interventions involving medication adherence support and follow-up patient education facilitated by telehealth services are more likely to reduce hospital readmission.[48-55] Furthermore, findings from this review suggest that specific patient cohorts (such as those with heart failure) may benefit from post-discharge telehealth services more than others.[47] Importantly, digital enablement in the context of medication management needs to be localised to clinical and consumer needs while also leveraging common and standardised digital infrastructure, products and services.

Conclusions

The findings show digital approaches can assist and facilitate safe and high-quality medication management at TOC. However, organisational commitment to active communication and coordination between patients and healthcare professionals must also be implemented to improve patient outcomes. In particular, digital approaches allow healthcare professionals to identify medication-related information and collaborate more efficiently, support the development of a BPMH, provide guidance on improving prescribing and enable patients to receive medication-focused services remotely in a timely manner. Additional RCT level evidence would assist in understanding the impact of digital approaches on patient outcomes during TOC.

Lessons Learnt from Implementation

- Digital approaches require adequate resources and maintenance to ensure benefits on patient outcomes are realised.
- Digital approaches are unlikely to resolve TOC errors without active engagement from all key stakeholders (patients/carers, hospital practitioners, community, and residential care health providers).
- Digitally enabled BPMH are only as accurate as the sources they are drawn from.
- CPOE and other digital enablers can cause new unintentional errors through auto-population, inaccurate or outdated information, necessitating digital safety vigilance.

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