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RESEARCH ARTICLE

Accuracy of pharmacist electronic discharge medicines review information transmitted to primary care at discharge

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Abstract

Background The poor quality of discharge summaries following admission to hospital, especially in relation to information on medication changes, is well documented. Hospital pharmacists can record changes to medications in the electronic discharge note to improve the quality of this information for primary care. *Objective* To audit the pharmacist-completed notes describing changes to admission medication, and to identify improvement opportunities. *Setting* 750-bed teaching district general hospital in England. *Methods* An evaluation of pharmacist written notes was conducted at a 750-bed teaching district general hospital in England. A sample of notes was analysed in three consecutive years, 2016–2018. Analyses were performed using descriptive statistics. *Main outcome measure* The number of discrepancies in the note compared to the discharge summary medication list. *Results* Notes were analysed for 125, 120 and 120 patients in 2016–2018 respectively. We saw an overall improvement in the accuracy of our notes from 12% of patients having an inaccurate note in 2016 to 4.2% in 2017 and 5.8% in 2018. The percentage of discharge medicines affected by these discrepancies reduced from 1.7% (2016) to 0.6% (2017) and 0.9% (2018). *Conclusion* Discrepancies were due to changes in the patient's medicines journey not being fully captured and documented. The overall reduction of discrepancies over the three consecutive audits was felt to be largely due to formalisation of the discharge medicines reconciliation process and reminding staff on how to complete a note. We are planning to utilise informatics surveillance tools along with system developments to sustain this elimination of out of date notes being transmitted to primary care.

Keywords Audit · Care transitions · Clinical pharmacy · England · Medical errors · Patient discharge

Impacts on practice

- Pharmacists can improve the quality of communication on medication changes at discharge from hospital.
- Standardisation of the noting process and pharmacist education improves accuracy of notes.
- Hospital electronic prescribing systems in England can provide a means of tracking medication changes.

Introduction

A discharge summary is a clinical report prepared by a physician or other healthcare professional (HCP) at the conclusion of a patient's hospital stay or series of treatments. As regards medication, UK prescribing guidance states that when an episode of care is completed, such as at hospital discharge, the responsible HCP is obliged to provide the patient's general practitioner (GP) with details of changes to the patient's medicines (existing medicines changed or stopped and new medicines started, with reasons), length of intended treatment(s), monitoring requirements, and any new allergies or adverse reactions [1]. However, numerous studies have shown that discharge summaries often lack sufficient information with deficiencies in completeness, accuracy and timeliness all highlighted [2–4].

Though guidelines exist to improve the quality of discharge summaries and standardise their format [5], poor communication about prescribed medication when patients

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are discharged from hospital back to primary care can lead to serious errors, and is a potential patient safety risk [6]. Hospital doctors may view discharge summaries as an administrative burden and so rush their completion, resulting in important information being overlooked and omitted [7], whilst foundation year 1 and 2 trainee doctors report inadequate training and guidance regarding preparation and ideal content of discharge summaries [8]. Due to hospital workforce shift patterns, a discharge summary may be completed by a doctor who has not been responsible for the patient's inpatient stay and therefore only has information documented in the medical notes from which to work [9]; information which may not reliably record the inpatient medication journey. These problems with discharge summaries, especially in relation to explanations around medication changes whilst in hospital, have been described nationally [10–12], and internationally [2, 13]. The level of completion of each summary can vary and one study found that one of the most common pieces of information left off discharge summaries was 'medication changes', either which medications had actually been changed or the reason why [14]. Discharge prescribing error prevalence has been reported to range from 0.81 errors per patient to 17.5% medicines with errors [15].

Medication reconciliation is one of the key elements to improve patient safety by decreasing medication errors at discharge and transitions of care [16, 17]. Typically, this consists of the following steps that help to ensure patient safety across the healthcare system: (1) verification: the current medication list is obtained e.g. at hospital admission; (2) clarification: the medication and dosages are checked for adequacy; (3) reconciliation: newly-prescribed and previous medications are compared and documented i.e. documentation in hospital of those new medicines started, those altered and those ceased; and (4) transmission: an updated and verified medication list is communicated to the next healthcare provider e.g. the GP who would then perform their own reconciliation.

Opportunities for improving the medicines reconciliation process involve the role of the hospital pharmacy team both at admission and at discharge. For instance, the accuracy of medication information transferred upon discharge can be improved by expanding the role of hospital pharmacists to include documenting medication changes [18, 19], and transcribing of discharge prescriptions by the pharmacy team [20].

Within the Royal Cornwall Hospitals NHS Trust we use an electronic prescribing system (EPS, JAC Computer Services Ltd.) throughout all inpatient areas with the exception of the intensive care unit. An audit carried out in early 2016 identified that all 50 patients studied had some changes to their medication during their admission, of which approximately one-third of added medicines and one-half of discontinued medicines were not explained in the discharge summary. As a pharmacy department we decided to take action and implemented a process of adding a discharge medication reconciliation (DMR) note to the patient's EPS record. This usually occurs when the pharmacist identifies a significant change has been made to the patients medication regimen that was recorded at admission. Such a note may also be made when preparing the discharge medication. These notes are automatically transferred into the discharge summary sent to GPs, and are also transmitted to community pharmacies via PharmOutcomes® (Pinnacle Health Partnership) where patients have consented to a transfer of care service [21].

In addition, as part of the 2015/16 Commissioning for Quality and Innovation framework to reduce harm from acute kidney injury (AKI) [22], we decided to utilise the capabilities of our EPS to transfer information on medication changes as a result of AKI in a similar way to the DMR note. A discharge note (entitled AKI) is added to the EPS detailing information about medication changes and the requirement for follow up bloods or medication review. We have the ability to report on the number of DMR and AKI notes added to the EPS and are therefore able to monitor our departmental performance against these key indicators.

Though approximately 2000 patients undergo medicines reconciliation and subsequent discharge each month from the trust, at the commencement of our quality improvement cycle in 2016 about one-quarter of these discharge communications had a note (DMR or AKI) attached, and this proportion did not change substantially over the subsequent 2 years. We set out to audit the accuracy of the pharmacist-inputted notes appearing in the e-discharge against the list of medicines prescribed at discharge, and to consider actions to improve the service.

Aim of the study

The aim of this study was to audit the accuracy of the pharmacist-inputted notes appearing in the e-discharge against the list of medicines prescribed at discharge, and to consider actions to improve the service.

Ethics approval

Ethics approval was not sought because this was a retrospective assessment involving no changes to the service delivered to patients. The principles of ethical research, such as confidentiality and anonymity, were followed.

Method

Setting

This retrospective observational study (clinical audit) of pharmacist-written notes (DMR or AKI) was conducted at a 750-bed teaching district general hospital in England. In each of the three audits undertaken we compared the details of the notes on EPS to the discharge medication list for a sample of patients. Any discrepancies identified were examined further by looking at the timeline of the patient's EPS record to understand how medication had changed between admission and discharge, with a focus on changes made to those medicines recorded at admission. The standard was that 100% sampled e-discharges would have discharge medication lists that accurately match the pharmacists' notes describing changes made to admission medication. Methodological differences between these three retrospective audits related to how the patient sample was chosen, and number of patient records reviewed.

For the first audit, undertaken in July 2016, we reviewed paper copies of discharge prescriptions for the first 125 patients who had undergone a transfer of discharge medication information to a community pharmacy and where the discharge contained a note. The results of this audit were shared with the clinical pharmacy team late in 2016 with advice on how to improve the process of completing notes. The second audit examined information extracted electronically from EPS for the first 120 patients discharged in June 2017 with a note. The third audit likewise examined information extracted electronically from EPS for the first 120 patients discharged in September 2018 with a note. Elements of the learning from the first audit were incorporated into the criteria for the third audit, namely the note should contain the name of the pharmacist who wrote the DMR or AKI note.

In all three audits one pharmacist (MW) assessed any potential discrepancies and, in conjunction with another pharmacist colleague, concluded if they were genuine discrepancies. Neither assessor had been actively involved in the process of recording any of the reviewed notes onto the EPS.

Results

In the first audit in 2016, prescriptions and pharmacists' notes for 125 patients (60 male) were reviewed. Mean age was 75.6 years (range 23–95 years). Overall there were 1201 medicines prescribed (mean 9.6 per patient, range 2–20). For 43 (34.4%) of these patients, the notes described medication changes due to AKI. Discrepancies were identified for 20 (1.7%) medicines affecting 15 (12%) patients. For 10 of these 15 patients the notes reflected an AKI review when medicines were initially described as held or stopped, but were later restarted during the inpatient stay. For 5 patients the medication list contained errors such as omitted medicine, different medicine or different dose compared to the notes.

The second audit in summer 2017 involved an electronic extract of records for 120 patients (59 male) with a mean age of 71 (range 34–93) and 932 drugs (mean 7.8 per patient, range 1–18). For 30 (25%) of these patients, the notes described medication changes due to AKI. Discrepancies were identified for six (0.6%) medicines affecting five (4.2%) patients.

The third audit in late 2018 involved an electronic extract of records for 120 patients (65 male) with a mean age of 70 (range 1–98) and 1095 drugs (mean 9.1 per patient, range 1–33). For 22 (18.3%) of these patients, the notes described medication changes due to AKI. Discrepancies were identified for ten (0.9%) medicines affecting only seven (5.8%) patients. For the new criterion examined in this audit, 18% (22/120) of patient notes did not contain the name of the pharmacist. Table 1 provides examples of identified discrepancies from the three audits.

Discussion

Our three audits found that the notes for 12% (2016), 4.2% (2017), and 5.8% (2018) of patients contained discrepancies compared to the final discharge medication list. The percentage of discharge medicines affected by these discrepancies reduced from 1.7% (2016), to 0.6% (2017) and 0.9% (2018). We believe the large drop in the discrepancy rate

Table 1 Examples of note/discharge medication list discrepancies

1. Note at discharge indicated ticagrelor had been commenced but it was actually stopped on ward after 4 days
2. Note at discharge indicated clopidogrel had been commenced but it was actually stopped on ward after 5 days
3. Note at discharge indicated simvastatin had been commenced but this was actually switched to atorvastatin prior to discharge
4. Note at discharge indicated metformin had been commenced but this was actually stopped on ward after 1 day
5. Note at discharge indicated omeprazole had been switched to ranitidine but the patient was discharged home on omeprazole
6. Note at discharge indicated aspirin and ticagrelor had been commenced but both actually stopped on ward after 6 days
7. No note existed at discharge indicating that amiodarone as part of admission medication was stopped on ward
8. Note at discharge indicated lisinopril had been held but the patient was discharged home on lisinopril

between 2016 and 2017 was due to the discharge medicines reconciliation process becoming formalised during that time, alongside reminding staff both verbally and as part of a written policy on how to complete a note. This reduction was sustained in the 2018 sample reflecting further ongoing reinforcement to the team of the importance of these notes capturing the patient's medication journey.

Discharge letters, electronic or paper, are the standard communication tool between hospitals and primary care. However, it is well known that discharge letters from acute hospitals are frequently prone to errors and do not always meet GPs expectations. Improvement interventions have been described in the literature. Marvin and colleagues suggest quality improvement methods such as education and training of relevant staff, and the introduction of medication documentation templates for communicating information on medicines in discharge summaries [23]. Others have shown that pharmacists can optimise the transfer of medication-related information [24], though even when pharmacists complete the medication management plans in the discharge summary errors do still occur [19].

It has been suggested that the use of mandatory fields on EPS to remind doctors to include relevant information at the time of completing the discharge may encourage documentation of reasons for medication changes [25]. However, information describing such changes is only as good as the information available to the doctor completing the summary. This is heavily reliant on the documentation of medication changes in medical notes or other patient documentation during the inpatient stay. If such information then needs to be manually extracted from the medical record the success of such a forcing function may be limited, causing delay to completing the discharge documentation as well as being viewed as burdensome by the completing doctor.

Another approach is to optimise the functionality of EPS to enable medication change information (including reasons for changes) to be captured prospectively in the electronic system. This could be by auto-population into the e-discharge with EPS enabling (or mandating) prescribers to contemporaneously record the reasons for changes. Our EPS system does not currently force the indication for a new medication to be input and only forces reasons for discontinuation or changes from a limited pre-populated list. This is therefore of limited usefulness.

The majority of the discrepancies found in the first audit were due to the patient's medication journey progressing and were factually correct at the time the note was written. AKI notes in particular are often written very close to admission at the time of diagnosis, and therefore there is a higher risk that changes will be made to medications prior to discharge as the AKI resolves. DMR notes are usually undertaken closer to the point of discharge including when preparing the discharge medication, with pharmacists using them as a means of communicating key changes to GPs, and community pharmacists. Initiatives within the hospital encourage prescribers to write discharge prescriptions as early as possible in the patient's admission and sometimes there are last minute changes to a discharge prescription, such as stopping a medication, after pharmacy has been involved. Any note on the system at the point of discharge will automatically be transferred into the discharge letter whether the note is current or not.

We are investigating whether surveillance of newly prescribed or amended items on discharge prescriptions would be viable and introducing a process of revisiting discharge prescriptions that have been changed and ensuring that notes are up to date. We are also moving to a process whereby the capturing of the patient's medication journey in a note on our EPS does not auto-populate into the discharge summary. Any note for the e-discharge will then be completed as a separate summary of the patient's medication journey.

Limitations of this study include the audits being undertaken in one hospital and hence results may not be generalizable. There was no attempt to ascertain if discrepancies caused difficulties for the GP. Data were collected retrospectively on a sampling basis, so there is a potential for an inaccurate reflection of the overall picture.

Conclusion

Our pharmacist-led discharge medicines reconciliation process attempted to address the accuracy of discharge information by capturing changes made to patients' admission medication. The reduction of discrepancies per patient over the three audits was felt to be largely due to formalisation of the discharge medicines reconciliation process and pharmacist education. In order to improve the accuracy and completeness of the notes we are planning to keep the medicines journey information separate from the discharge information and looking at using informatics surveillance to track changes to discharge prescriptions after pharmacy input.

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Conflicts of interest None.

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