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Extending Pharmacy Services to the Point of Discharge

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Abstract

Aim

The aim of this study was to determine the impact of introducing a clinical pharmacist led discharge service on medication safety at the point of discharge and its acceptability to healthcare staff.

Methods

A retrospective chart review to identify medication discrepancies was undertaken before and after the introduction of a pharmacist led discharge service. An evaluation was undertaken by means of a questionnaire to community pharmacists, GPs and hospital clinicians.

Results

The pharmacist led discharge service significantly reduced errors from 50% (n=17) to 7% (n=2) of patients ($p<0.001$) and 10% (n=22) to 1% (n=2) of medication orders ($p=0.001$). The evaluation revealed that the majority of clinicians found the service useful, had the potential to reduce errors and improve communication.

Conclusion

Pharmacist involvement at the point of discharge had a significant impact on medication safety. Crucially, in this project, we show the service was received well by medical personnel and improved communication between primary and secondary care, enhancing implementation potential.

Keywords: pharmacy, point of discharge, medication reconciliation, medication error, safety.

Introduction

It has been suggested that one of the greatest risks to patient safety occurs when the patient passes across the boundaries of care, whether between professionals or between organisations[1-2]. Medication reconciliation has been proposed[3] and the inclusion of clinical pharmacists and physicians in the process shown to enhance patient safety[4].

In the Republic of Ireland, hospital pharmacists are not routinely involved in the discharge process[5]. The discharge medication list is transcribed, usually by the most junior doctor of the treating team, onto the discharge prescription and the discharge summary for the patient's community pharmacist and general practitioner (GP), respectively. This process raises concerns as medication errors at the point of discharge are common, affecting 11%-66% of patients[6-12]. Furthermore, adverse drug events represent the most frequent cause of patient harm post discharge and approximately one-third of these are the result of preventable errors[2,13]. The risk of re-admission is also increased. Williams and Fitton reported that 59% of unplanned re-admissions could have been prevented with improved discharge planning, including providing timely and accurate information to the GP and more effective management of medication[14]. Medication safety, including effective communication between care environments, is therefore of vital importance.

The aim of this study was to determine the impact of introducing a clinical pharmacist led discharge service on medication safety at the point of discharge and its acceptability to healthcare staff.

Methods

Medication discrepancies were those identified if the medication list across the admissions drug history, inpatient prescription chart, discharge prescription and medication list on the discharge summary revealed an inconsistency, and the reason for such was not clinically apparent and/or documented in the patient notes. Omission of medication prescribed on a "when required basis" during inpatient stay was not recorded as a discrepancy. A prescribing error was defined as a prescribing decision or prescription writing process that results in an unintentional, significant reduction in the probability of treatment being timely and effective or increase in the risk of harm, when compared with generally accepted practice[15]. Any medication discrepancy detected by the pharmacist was discussed with the prescribing doctor and if unintentional, was recorded as a prescribing error.

Phase 1 consisted of normal practice, where the treating doctor hand wrote the prescription and hand wrote the discharge medication list onto the discharge summary. The pharmacist was not involved in the discharge process. In phase 1, over a three-week period, a retrospective clinical review of the discharge medication lists was undertaken by the pharmacist, reconciling the pre-admission medication and inpatient prescription chart with the discharge medication lists. Any discrepancies/prescribing errors identified were discussed with the treating team. Patients who were discharged from the study ward during pharmacy business hours and received reconciliation of pre-admission medication by a clinical pharmacist were included.

As part of the pilot introduction of a pharmacist led service (phase 2), electronic prescription and medication report (see supplementary material) forms were designed for the patient's community pharmacist and GP. In addition to the standard information required for a prescription, the electronic format included information on allergies, notes relevant to the discharge medication and changes to pre-admission medication made during the inpatient stay. The medication report also included reasons for changes made to pre-admission medication, as well as indications for the discharge medications prescribed. Both documents were generated simultaneously with single data entry. The pharmacist generated the documents, reconciling the pre-admission medication with the inpatient prescription chart and undertaking a clinical medication review.

The doctor from the treating team reviewed both documents electronically and if an amendment was required, the pharmacist was contacted. When satisfied, the doctor printed, signed and dated both documents as per legal requirements. Controlled drug prescriptions and discharges out of pharmacy hours were completed by the doctor in the traditional handwritten format. Patients included were those who were under the care of the endocrinology and the gastroenterology teams, were discharged from the study ward during pharmacy business hours and received reconciliation of pre-admission medication by a clinical pharmacist.

In phase 2, over a five-week period, a clinical review of the discharge medication lists was undertaken by the pharmacist, reconciling the pre-admission medication and inpatient prescription chart with the pharmacist then creating an accurate discharge medication list. A retrospective review was undertaken post discharge by a senior pharmacist of the discharge medication lists generated by the pharmacist.

Anonymous study evaluation data was extracted retrospectively by the pharmacist for both phases. While part of the clinical treatment of patients, data was identifiable to those on the treating team. The data extracted for use in the research component was anonymous with only aggregated fully anonymous data extracted.

It was intended to use the same study period for both phase 1 and phase 2 data collection, however, as only two units were included due to training time constraints in phase 2, the study period was extended due to lower patient through-put.

Prescribing errors were independently reviewed and categorised into their potential to cause patient harm by a panel consisting of two medical consultants, two senior pharmacists and a clinical nurse manager using the Dean & Barber visual analogue scale[16]. A mean score of 8-10 had the potential to cause severe patient harm, 3-7 moderate or <3 minor/ no harm.

In order to evaluate the service introduced, a questionnaire was developed and sent along with the prescription and medication report via the patient to the community pharmacist and GP, respectively. A questionnaire was also completed by the hospital doctors who participated in the study. Questionnaires were returned on an anonymous basis.

Analysis was carried out using the SPSS Statistics Package Version 17. Chi-squared analysis was used to compare proportions between Phase 1 and Phase 2. Analysis of variance (ANOVA) was undertaken to compare the mean number of errors between phases. Regression analysis was undertaken to determine the relationship between the number of errors and number of medications listed. A p-value of <0.05 was considered statistically significant.

Results

A total of 62 patients were included in the study: 34 patients in the Phase 1 and 28 in the Phase 2. Table 1 compares the baseline characteristics of discharge medication lists completed by the doctor to those completed by the pharmacist.

Table 1: Baseline Characteristics.

	Phase 1	*Phase 2*
Number of patients	34	28
Mean age (median; range)	70 (77.5; 37-90)	62.6 (67; 25-90)
Mean duration of stay (median; range)	12 (9.5; 1-33)	10.7 (5.5; 1-77)
Mean number of med orders (total)	6.5 (222)	7.4 (208)

The proportion of patients and medication orders affected by a prescribing error is illustrated in Table 2. A total of 22 and 18 errors were detected on the doctor written prescriptions (phase 1) and discharge summaries (phase 2), respectively. Of these, 61.5% were judged to have the potential to cause moderate patient harm and 38.5% minor/no harm. Omissions were the most frequently occurring errors (Figure 1). Examples of errors are provided (Table 3).

Table 2: Patients/medication orders affected by discharge prescribing error(s).

	Phase 1 N (%)	*Phase 2* N (%)	p-value
Patients	17 (50)	2 (7.1)	<0.001
Med orders	22 (9.9)	2 (0.96)	0.001

Figure 1: Types & frequency of errors per prescription & discharge summary/ medication report.

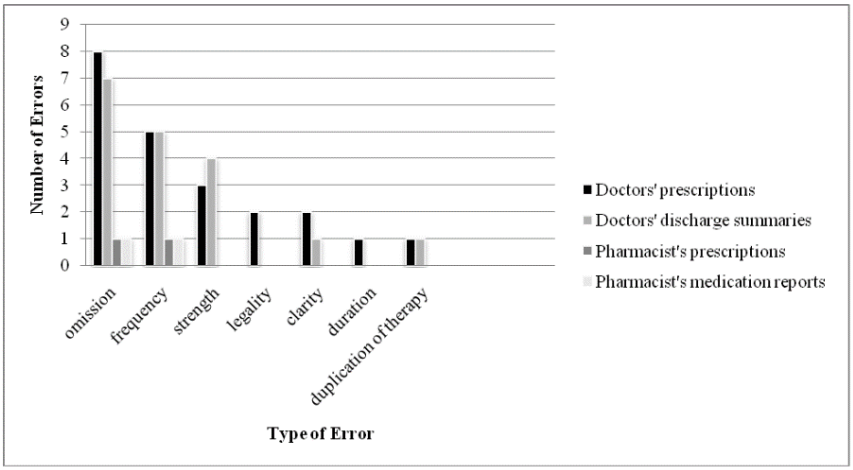

Table 3: Examples of errors detected.

Examples of errors on doctor written discharge medication lists (phase 1)					
Potential to cause	*Admission drug history*	*Inpatient prescription chart*	*Discharge prescription*	*Discharge summary*	*Indication*
Moderate harm	n/a	*Aspirin 75 mg daily*	*Omitted*	*Omitted*	*NSTEMI*
Moderate harm	*Novomix 30 bd*	*Novomix 30 bd*	*Omitted*	*Omitted*	*Type 2 diabetes*
Moderate harm	n/a	*Atorvastatin 10 mg nocte*	*Omitted*	*Omitted*	*NSTEMI*
Errors on pharmacist generated discharge medication lists (phase 2)					
Potential to cause	*Admission drug history*	*Inpatient prescription chart*	*Discharge prescription*	*Medication report*	*Indication*
Moderate harm	*Vitamin B12 inj. monthly*	*Omitted*	*Omitted*	*Omitted*	*Vitamin B12 deficiency*
Moderate harm	*Nebivolol 5 mg bd*	*Nebivolol 5 mg bd*	*Nebivolol 5 mg daily*	*Nebivolol 5 mg daily*	*IHD/ STEMI*

Two errors, one omission and one error of frequency were detected, by the senior pharmacist's retrospective review of the pharmacist's generated lists (phase 2). Both were considered to have the potential to cause moderate patient harm. In one case, corrective action was taken by contacting the patient's GP. The errors that occurred are listed (Table 3). No errors/amendments were detected/requested by the prescribing doctor.

Evaluation Surveys

Thirteen community pharmacists (46%) completed the survey. In terms of the content of the new prescription format, 31% found it useful and appropriate and 69% found it very useful and appropriate. All were of the view that it had the potential to reduce the risk of medication errors and all felt it improved communication between secondary and primary care. The majority (85%) considered that the additional information on medication changes and allergies/adverse reactions should accompany all discharge prescriptions.

In particular, community pharmacists noted the avoidance of confusion:

"Many patients are confused about their medications when they are discharged and we regularly have to phone to clarify", "Printed prescription and clear indication of change to medicines will definitely help to reduce risk of medication errors".

Eleven completed (39%) GP questionnaires on the medication report were returned. In terms of the content of the new prescription format, 18% found it useful and appropriate, 73% found it very useful and appropriate while the remaining 9% found it partly useful and appropriate. All GP respondents were of the view that it had the potential to reduce the risk of medication errors, that it improved communication between secondary and primary care and that the information should accompany all discharge summaries.

GPs referred to patient safety improvements:

"List of changes to pre-admission medication very useful", "Much enhances safety of prescribing", "The communication of discharge medicines is of vital importance".

All five relevant doctors completed the hospital clinician questionnaire regarding the pharmacist led discharge service. All agreed that the pharmacist led discharge service saved a significant amount of time, reduced the risk of medication error and improved patient adherence:

"*Safer, ensures correct medications, encourages compliance, informs GPs", "Time saved in doing patient discharge. Also saves on unnecessary calls from GPs asking about changes in medications". "Patients more aware of the medication they are taking and dosing regimens", "Patient has better understanding of the indication of each medication and when they present to outpatient clinics or Accident and Emergency have a legible record of all current medications".*

According to respondents, the most positive aspects of the service were:

"*Reduces risk of errors on prescriptions*", "*Time saving*" and "*Safety – pharmacist is very thorough at reviewing why/when/which medications stopped*". No comments referred to any negative aspect of the service.

Discussion

Overall, 50% of patients were affected by at least one prescribing error on the doctor written discharge medication lists. While high, this is lower than that reported elsewhere in the Republic of Ireland and abroad, up to 66%[7,11]. The number of medication orders affected, 10%, was similar to that reported elsewhere in Ireland and in the UK[11,17,18].

The pharmacist led service resulted in a significant reduction in the proportion of patients affected (50% to 7%) and is comparable to that reported in the UK: 32% to 8%[19]. The reduction in discharge medication orders affected, from 10% to 1% was also statistically significant.

The questionnaires returned by the doctors involved in the pharmacist led service highlight the significant impact made and the need to develop pharmacist involvement in this area.

The survey data highlights the problems inherent in the traditional discharge process: patients are often confused about their medicines post discharge, medicines not relating to stay in hospital are omitted from prescriptions and community pharmacists frequently have to phone to clarify discharge medication. Therefore, enhanced communication between healthcare sectors is required, as previously identified in the UK[20-21].

As part of the pharmacist led discharge service, discharge medication lists were generated electronically. It is important to highlight that electronic prescribing support was not provided as data required manual entry.

Studies that have shown error reduction with electronic systems utilised comprehensive prescribing support[22-24]. Use of the electronic system did however reduce transcription burden, which has been associated with reduced error rate[25]. How significant this was in influencing the error rate on the pharmacist led service is unknown.

The response rate to the surveys on the new prescription format and medication report was moderate for both community pharmacists (46%) and GPs (39%). A limitation to the method of distribution was that patients were responsible for delivering the survey to their community pharmacy and GP. Therefore, it is not known whether all surveys were distributed. As surveys were fully anonymous, there was no follow up of non-responders. The survey results are based on a self-selecting sample which comes with inherent bias. This study was conducted in a real-world setting and was not designed to show causation; the patients included were a presenting sample over the study timeframe. A further limitation is that an economic assessment was not undertaken.

Pharmacist involvement at the point of discharge had a significant impact on medication safety. The pharmacist-led discharge service conferred a number of additional benefits: providing additional important information for the community pharmacist and GP, time saving for discharging doctors and improved use of pharmacist expertise. The importance of pharmacist involvement from admission to discharge and the benefits of a team-based approach in Ireland is supported by published evidence[4]**.** Crucially, in this project, we show that the service was received well by medical personnel and improved communication between primary and secondary care, enhancing implementation potential.

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Ethics approval:
Approval was granted from the Clinical Research Ethics Committee, University College Cork.

Declaration of Conflicts of interest:
The authors declare that they have no conflicts of interest.

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