Pharmacist prescribing within a UK NHS hospital trust: nature and extent of prescribing, and prevalence of errors

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ABSTRACT

Objectives Suitably qualified pharmacists in the UK are able to prescribe all medicines. While doctors’ prescribing errors are well documented, there is little information on the rate and nature of pharmacists’ prescribing errors. Our aim was to measure the prevalence of prescribing errors by pharmacists.

Methods Prescribing by pharmacists, for inpatients admitted to three hospitals in North East England was studied. Part one measured the extent of prescribing by pharmacists as a proportion of all prescribing on a single day. The number of medication orders, reason for prescribing and therapeutic category were collected by the researcher (OC). In part two, pharmacist prescribing was reviewed for safety and accuracy by ward-based clinical pharmacists over 10 days; errors were documented and categorised as per EQUIP study.

Results Part 1: Pharmacists prescribed one or more medication orders for 182 (39.8%) of 457 patients, accounting for 12.9% (680 from 5274) of all medication orders prescribed on a single census day. Pharmacists prescribed medicines from 12 out of 15 British National Formulary categories (no prescribing of drugs used in malignancy, immunology and anaesthetics). Part 2: 1415 pharmacist-prescribed medication orders were checked by clinical pharmacists, with four errors (0.3%) reported.

Conclusions This study suggests that prescribing pharmacists can provide a valuable role in safely prescribing for a broad range of inpatients in UK general hospitals.

INTRODUCTION

Pharmacist supplementary prescribing was introduced in the UK in 2003. Pharmacist prescribing developed rapidly with the introduction of pharmacist independent prescribing (IP) in 2006, which resulted in pharmacists being able to prescribe, within their competence, except controlled drugs. Since then, successive legislative changes have resulted in pharmacists being able to prescribe across all therapeutic areas, as well as unlicensed medicines and controlled drugs.2

The white paper published in 2008, ‘Pharmacy in England: Building on Strengths, Delivering the Future’, outlined the importance of the pharmacist playing an integral role in the healthcare system and the desire to maximise the skills and roles of the pharmacist in the future.3 Recently, the Scottish Government’s report highlighted the importance of prescribing pharmacists in the delivery of high-quality pharmaceutical care for patients in Scotland.4 Generally, pharmacists’ prescribing has been positive with many examples of good practice and patient care.5 Authors have described pharmacist prescribing activity in a number of diverse areas; primary prevention of cardiovascular disease and hypertension,6–8 clinical nutrition9 and anticoagulation.10 Specifically, hospital pharmacists are prescribing in a number of specific therapeutic areas, including anticoagulation,11 antimicrobials,11 cardiovascular care,12 HIV clinics13 as well as having wider roles, for example, pharmaceutical care on surgical wards.14 While there is evidence that hospital pharmacists have the self-belief and skills to effectively and safely prescribe in a hospital environment,15 there is little published evidence for the extent of prescribing by pharmacists in hospital. While these examples show the diverse range of prescribing undertaken by pharmacists, there are reports of pharmacists who are qualified to prescribe but find they cannot because of lack of defined role or commissioned service, suggesting that further evidence is needed to support the case for prescribing by pharmacists.16

A prescribing error has been defined as causing an increase in risk of harm or reduction in the chance of a treatment being timely or effective17 and includes transcription errors, failure to communicate essential information and the use of drugs or doses inappropriate for the patient.18 Prescribing errors are common in hospitals with a systematic review carried out by Lewis et al reporting a median error rate of 7% of all inpatient medicines orders.19 A UK study of 6605 medicines orders written across three National Health Service (NHS) organisations cited an error rate of 14.7%, with a mean of 0.9 doses being administered before the error was discovered and corrected.20 Similar findings were reported from the Scottish PRescribing Outcomes for Trainee Doctors Engaged in Clinical Training (PROTECT) programme, where a review of 4710 patient charts and 47726 medicines showed an average error rate of 7.3%.21 Patients being admitted into hospital were particularly at risk, with many regular medicines being missed or incorrectly prescribed.22 Ahmed et al discovered unintentional discrepancies in medicines prescribed in 58% of patients at the point of admission.23

The General Medical Council’s EQUIP Study, involving 19 trusts in North-West England, found 11 077 errors from 124 260 medicines orders (8.9% prescribing error rate).22 The error rate varied according to prescriber: Foundation Year 1 doctors 8.4%, Foundation Year 2 doctors 10.3%, consultants 5.9%, nurses 6.1% and pharmacists 0%.22

Pharmacists have been recognised as being key to error identification and reduction.24 25 The role of

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hospital pharmacists in identifying and rectifying errors before they reach the patient has been well documented for some time now. Pharmacists corrected or discussed with prescribers the majority of errors reported in a study of doctors’ prescribing across three NHS organisations.

It is well recognised that involving pharmacists in the prescribing pathway reduces the risk of an error reaching the patient. What is less well understood is whether using pharmacists reduces the risk of an error reaching the patient. The EQUIP study found no errors by pharmacists, however, the sample size was very low with only 172 medication orders being prescribed by pharmacists. Our aims were to measure the extent and nature of prescribing by pharmacists as a proportion of all prescribing, and to measure the prevalence of prescribing errors by pharmacists.

METHODS
The study was undertaken across three North East England district general hospitals belonging to the NHS Foundation Trust where the authors worked. The study comprised of two discrete parts; prevalence of pharmacist prescribing and prevalence of prescribing errors by pharmacists. Both parts of the study were undertaken across all wards (medical, emergency admissions, elderly, surgical, paediatric and the coronary care unit) at the three hospitals. Prescribing pharmacists provide pharmaceutical services to all these wards routinely and this study assessed their usual practice. All prescribing was handwritten on inpatient treatment charts (medicines charts) as there was no electronic system at the hospitals.

Part one
Part one assessed the prevalence of prescribing by pharmacists. This was done by quantifying the number of medicines orders prescribed by pharmacists as a proportion of all prescribing by all prescribers on a single day. A standardised data collection form was developed and piloted. For the purposes of this study, a medicine order was defined as any medicinal or otherwise (e.g., sip-feeds, dressings) that has been prescribed on the inpatient treatment chart (medicines chart) since the patient’s admission to hospital.

Data were collected from all wards across the three hospitals by the same researcher between September and October 2012. Over this period, the researcher (OC) visited each ward once and collected information from the inpatient treatment charts (medicines charts) of every patient who was on the ward at that time. Data collection was undertaken on a Friday afternoon and each ward was visited once, with data collection ending when all wards across the three hospitals had been visited. Data collected included the number of medicines taken by the patient, reason for prescribing (existing medicine, new medicine, correction of error, medicine stopped, dose change or whether a medicine was rewritten for clarity) and where (clinical speciality) the prescribing occurred. Data were entered into a spreadsheet and analysed descriptively.

Part two
Part two was undertaken across all wards across the three hospitals. Ward-based clinical pharmacists, who were not prescribers, were asked to note all prescribing by prescribing pharmacists and clinically assess it for safety and accuracy. This clinical check of prescribing involved clinical pharmacists ensuring that it was correct and safe for the patient, taking into account dose, medicine choice, co-morbidity, interacting medicines, blood results and any other factors that may adversely affect the patient. Additionally, the clinical pharmacists were also asked to highlight prescribing that did not meet the trust’s prescribing policy (legible, legal and approved by the formulary committee).

A data collection form was developed and piloted with the clinical pharmacists. The data collection form was developed from the data collected and data collection forms used in the EQUIP study. Data were collected over 10 days (Monday to Friday) over two consecutive weeks in November 2012. The number of medication orders taken by the patient, reason for prescribing (existing medicine, new medicine, correction of error, medicine stopped, dose change or whether a medicine was rewritten for clarity) and where (clinical speciality) the prescribing occurred was collected.

Prescribing by pharmacists was identified from the signature/name box on the inpatient treatment chart. Additionally, prescribing pharmacists annotated IP against patients’ names on the ward handover documentation in order to highlight to other clinical pharmacists that they had prescribed for those patients. Prescribing pharmacists were fully aware of the study.

An error was identified as any intervention the clinical pharmacist had to make to ensure that the prescribing was clinically correct and legal. The clinical pharmacists were asked to classify the type of error using the 29 error categories used by the authors of the EQUIP study. These error categories fell into four harm categories: potentially lethal error, serious error, significant error and minor error. Data were entered into a spreadsheet and analysed descriptively.

Advice on ethical approval was sought from the trust’s Research Development Unit, which advised that NHS ethical approval was not needed.

RESULTS
Part one
A total of 457 patients on 26 wards across three hospitals were included in part one of the study with the pharmacist prescribing for 182 (39.8%) patients. Pharmacists prescribed 12.9% of all medication orders (680 from 5274 orders). Pharmacists prescribed a wide variety of medicines from 12 out of the 15 BNF therapeutic categories (no prescribing of drugs used in malignancy, immunology and anaesthetics). The majority of prescribing was for central nervous system, cardiovascular and respiratory medicines.

The majority of the prescribing (68.1%) was done at the point of medicines reconciliation when patients were first admitted and involved prescribing regular medicines that the patient was taking prior to admission (table 1). The remaining prescribing was for new medicines that were started in hospital by the pharmacist (18.7%), correcting incorrectly prescribed medicines (7.5%) and stopping medicines (2.9%).

Part two
In part two, 1415 pharmacist-prescribed medication orders were clinically checked by clinical pharmacists over the 10 days, with four errors (0.3% error rate) reported. The errors found in this study were: (1) simvastatin 40 mg and amiodipine 10 mg coprescribed (maximum simvastatin dose with calcium channel blocker is now 20 mg); (2) morphine sulfate 10 mg/mL solution was prescribed instead of oxycodone 5 mg/mL solution; (3)
However, the results from the PROTECT study suggest that the level of prescribing errors made by other prescribers was not evaluated, and may not have been as high as the EQUIP study. Of the three sections of the BNF, pharmacists were not focusing on a limited formulary of medicines but are prescribing from all but three sections of the BNF. This underlines one of the potential strengths of pharmacists as prescribers, in that their underpinning knowledge gives them a good understanding of a wide range of medicines in many clinical settings. This allows pharmacists to use their prescribing expertise in varied environments such as wards, where they may be expected to prescribe a range of treatments for a range of conditions. This differs from many models of nurse prescribing where the majority of prescribing is specialist, focusing on a narrower range of medicines or a clinic-based model of pharmacist prescribing often seen in primary care. In both parts of the study, a small proportion of prescribing activity was to stop medicines; stopping medicines (de-prescribing) is an essential part of the prescribing pathway, preventing problematic polypharmacy, and can only be performed by prescribers.

The EQUIP study undertook regression analysis to identify errors between the type of prescription and stage of the hospital stay. Although these data were collected, statistical analysis was not appropriate as only four errors were detected. Of the four errors reported, three were potentially significant according to the EQUIP criteria and one had no impact on patient safety as the prescribing was not signed for. Two errors were for interacting drugs which had the potential to cause patient harm; increased risk of rhabdomyolysis. The final error was the substitution of oxycodone with morphine sulfate for breakthrough pain relief. This could have potentially led to insufficient pain relief. In all three cases, however, the patients came to no actual harm as errors were identified and corrected before they reached the patient.

A further potential limitation of part one of this study was that the data were collected over 2 months with each ward being visited once, rather than all data from all wards being collected at a single point in time. Our approach allowed the same researcher (OC) to undertake the data collection ensuring consistency of data collection. Finally, the prescribing pharmacists knew that the study was being undertaken and, thus, their prescribing accuracy may have potentially been subject to the Hawthorne effect.

This study suggests that prescribing pharmacists can provide a valuable role in safely prescribing for a broad range of inpatients in UK general hospitals, especially at the point of admission where medicines are known to be frequently omitted by admitting medical staff.

### Table 1 Part one—reason for prescribing by pharmacists

<table>
<thead>
<tr>
<th>Prescribing reason</th>
<th>Medication orders prescribed (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular medicine not prescribed</td>
<td>463 (68.1)</td>
</tr>
<tr>
<td>New medicine</td>
<td>127 (18.7)</td>
</tr>
<tr>
<td>Incorrectly prescribed medicine</td>
<td>51 (7.5)</td>
</tr>
<tr>
<td>Medicine stopped</td>
<td>20 (2.9)</td>
</tr>
<tr>
<td>Medicine dose change</td>
<td>10 (1.5)</td>
</tr>
<tr>
<td>Rewritten for clarity</td>
<td>9 (1.3)</td>
</tr>
<tr>
<td>Total</td>
<td>680 (100)</td>
</tr>
</tbody>
</table>

### Table 2 Reason for prescribing by pharmacists

<table>
<thead>
<tr>
<th>Reason for prescribing</th>
<th>Medication orders prescribed (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular medicine not prescribed</td>
<td>799 (56.5)</td>
</tr>
<tr>
<td>New medicine</td>
<td>184 (13.0)</td>
</tr>
<tr>
<td>Incorrectly prescribed medicines</td>
<td>102 (7.2)</td>
</tr>
<tr>
<td>Medicines stopped</td>
<td>10 (0.7)</td>
</tr>
<tr>
<td>Medicine dose change</td>
<td>27 (1.9)</td>
</tr>
<tr>
<td>Rewritten for clarity</td>
<td>49 (3.5)</td>
</tr>
<tr>
<td>Unknown</td>
<td>244 (17.2)</td>
</tr>
<tr>
<td>Total</td>
<td>1415 (100)</td>
</tr>
</tbody>
</table>
Provenance and peer review Not commissioned; externally peer reviewed.

Data sharing statement All data collected has been presented in the manuscript.

Contributors All authors were involved in the design and implementation of this study, OC was responsible for data collection. RM/WB/OC were responsible for data analysis. WB led the drafting of the manuscript with contribution from all authors, with all authors approving the final version. All authors contributed to rewriting the manuscript following comments from the reviewers.

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Data sharing statement All data collected has been presented in the manuscript.

References


What this paper adds

What is already known on this subject

▸ Pharmacist prescribers in the UK can prescribe all medicines available to the National Health Service (NHS).
▸ Prescribing errors (mainly by doctors) remain a problem in the NHS.
▸ Pharmacist are well recognised for preventing prescribing errors reaching patients.
▸ There is little research on prevalence of prescribing by pharmacists or prevalence of prescribing errors by pharmacist prescribers.

What this study adds

▸ Hospital-based pharmacists prescribe for a significant number of patients across a wide therapeutic spectrum.
▸ Pharmacist-prescribing in UK hospitals appears safe with a low error rate: 0.3% of medication orders.
▸ Further larger controlled studies are recommended to validate the results of this small study.

Key messages

Pharmacists are well recognised for preventing prescribing errors reaching patients.

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