

Drug history errors in the acute medical assessment unit quantified by use of the NPSA classification

By Stuart Rees, Peter Thomas, Ashit Shetty and Kehinde Makinde

The concept of pharmaceutical care has been defined as “the responsible provision of drug therapy for the purpose of achieving definite outcomes that improve a patient’s quality of life”.¹ To ensure this definition becomes a working reality it is imperative that the pharmacist starts with an accurate medication history. Only then will the pharmacist be certain that the medicines prescribed for an inpatient are the correct ones. It will then be possible to assess their effectiveness and appropriateness in light of the a patient’s clinical status.

Accurate medication histories at the time of hospital admission are an important element of medication safety. They may uncover reasons for a patient’s illness, such as adverse drug events or non-adherence to drug therapy.

Medication history errors could result in interrupted or inappropriate drug therapy during and following the hospital stay. Errors or omissions discovered on discharge may delay the patients’ departure from hospital.

Several studies have shown that pharmacists can elicit a more complete medication history than doctors or nurses, resulting in more appropriate prescribing.²⁻⁴ In addition the Audit Commission’s “Spoonful of sugar” report states that in some hospitals in England 30 per cent of patients have incorrect or incomplete medicines recorded on admission.⁵

In an attempt to improve patient safety and patient flow through Prince Philip Hospital, Carmarthenshire NHS Trust, the pharmacy department decided to pilot the introduction of a pharmacy technician on the acute medical admissions unit (AMAU).

The technician’s role was to record an accurate medication history for patients admitted to the AMAU. In order to ensure a high level of confidence in the documented history, a minimum of two sources was used.

There have been previous studies demonstrating the deficiencies of the current system of recording medication histories on admission to hospital and comparing the documented accuracy between different health care professionals. However, few studies, if any, have quantified the importance of the errors/omissions in terms of actual or potential patient harm.

The aim of the study was to quantify the importance of any detected errors or omissions in medication history using a recognised scoring system.

Abstract

Aim

To determine the extent and quantify the importance of medication history errors made during the clerking of patients being admitted to an acute medical assessment unit (AMAU).

Design

A prospective study.

Subjects and setting

200 acute medical patients admitted to the AMAU at a district general hospital.

Outcome measures

Number of errors recorded, and the severity of each error as scored independently by a multidisciplinary panel using a National Patient Safety Agency risk assessment tool.

Results

A pharmacist and pharmacy technician reviewed 200 acute medical patients. 123 patients had at least one discrepancy noted when comparing the medication prescribed in AMAU with the medicines taken before admission. A total of 234 errors were recorded with an average of 1.9 errors per patient. When assessed (independently by four health professionals) against the NPSA risk assessment tool, 185 (79%) were perceived as only of minor consequence, 46 (20%) as moderate and 1 (0.4%) as being potentially of major consequence.

Conclusion

We would advocate the use of multiple sources of information by appropriately trained personnel who are able to process the information effectively and therefore arrive at an accurate medication history. Despite resource implications, utilising a pharmacy technician, together with a clinical pharmacist, would ensure continuity between primary and secondary care and help attain the national targets in reducing the number of serious medication errors.

To focus the study the following objectives were used:

- Define the medication history
- Determine the extent of the problem, ie, the proportion of inaccurate medication histories during the study period
- Quantify their importance using a recognised scoring system

Method

This prospective study was performed on the AMAU in a 230-bed district general hospital. The AMAU is a 14-bed area used for the initial assessment of unselected acute admissions. Patients are admitted via accident and emergency or via GPs.

A small pilot study identified the importance of having more than one source of information to verify that the history was current and accurate. The study population comprised the first 200 patients admitted to the AMAU who were seen by both the pharmacy technician and a clinical pharmacist. The study period began in March 2006 and included those patients reviewed during

pharmacy working hours (9am to 5pm, Monday to Friday inclusive). A senior pharmacy technician (accredited medicines management) recorded an accurate medication history for patients admitted to the AMAU. In order to ensure a high level of confidence in the documented history a minimum of two sources of information were used (eg, GP surgery, the patient, patient’s own drugs, nursing home medication chart, etc). The sources used were documented on the proforma used for recording the drug history.

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A clinical pharmacist reviewed the drug history documented by the pharmacy technician. Any discrepancies between the history and the inpatient medication chart, written by the clerking medical staff, were noted and investigated. A medication history error was defined as an inconsistency between the inpatient chart and the patient's preadmission medication, which on contacting the hospital prescriber resulted in the inpatient chart being amended to reflect the patients' original medication. Intentional changes made to preadmission medication and errors involving medication initiated in hospital were excluded.

Two senior doctors, one senior nurse and one experienced pharmacist, using the National Patient Safety Agency risk assessment tool⁶ (Panel 1), assessed the potential clinical significance of the errors independently. The scores reflect the individual's perceived importance of the error with regards to potential patient harm.

Guidance from the local ethics committee indicated that ethical approval was not required.

Results

The age range of the study population was 18–99 years, with a mean age of 68 years. Of the 200 patients included in the study 123 (62 per cent) had at least one discrepancy noted when comparing the medication prescribed in the AMAU to the medicines taken before admission, as corroborated by the technician (Table 1). A total of 234 errors were recorded with an average of 1.9 errors per patient (range 1–6), in the 62 per cent of patients noted to have at least one discrepancy. All of these errors were resolved before the patient left the AMAU.

Table 2 illustrates the types of errors recorded. Omitted medication (62 per cent) was the most common medication history error. The second most common error type was the prescribing of an incorrect dosage.

Only one of these errors was assessed as being of potential major consequence (Table 3). This was a prescription for insulin detemir, 100 units at night, instead of 28 units. One of the doctors and the pharmacist perceived this as being of major consequence while the other doctor and the nurse perceived it as being of potential moderate consequence.

The nurse also perceived another error, where prochlorperazine was prescribed instead of betahistine, as potentially having moderate consequence. However, this was deemed to have potential moderate consequence by one doctor and only minor consequence by the other doctor and pharmacist.

Examples of other errors deemed to have potentially moderate consequences (mean score of the four assessors; range of scores is shown in brackets) include:

- Flecainide 100mg twice daily omitted from inpatient chart (3)
- Fentanyl patch 25µg/h omitted from inpatient chart (2–3)

Table 1: Distribution of errors (n=123)

Number of errors per patient	Number of patients	Percentage
1	65	52.8
2	28	22.0
3	13	10.0
4	11	8.9
5	5	4.1
6	1	0.8

Table 2: Number and types of error

Error type	Number	Percentage
Omission	145	62.0
Incorrect dose	59	25.2
Incorrect drug	20	8.6
No dose	4	1.7
Timing of dose	4	1.7
Incorrect form	1	0.4
Contraindicated	1	0.4

Table 3: Classification of importance of errors recorded using NPSA definitions

Consequence of error	Number recorded	Percentage
None	2	0.9
Minor	185	79.1
Moderate	46	19.6
Major	1	0.4
Catastrophic	0	–

Table 4: Different sources of information available to clerking doctor (n=35)

Source of information	Number	Percentage
Patient's own drugs/monitored dosage system	21	60.0
GP letter or fax	10	28.6
GP repeat prescription list	8	22.9
Nursing home chart	7	20.0

- Ramipril initiated when patient already on perindopril (2–3)
- Sodium valproate MR 300mg daily prescribed instead of twice daily (2–3)

Both doctors scored the above errors the same.

A sample of 35 patients with a documented inaccurate medication history was assessed to determine what sources of information, if any, were available at the time of clerking. It was found that 26 (74 per cent) had one source, 7 (20 per cent) had two sources and two (6 per cent) had three sources available to the clerking doctor. However, at least one error was made when prescribing these patients' medicines. The sources of information available are shown in Table 4.

Discussion

This study reinforces the shortfalls of current practice in obtaining an accurate medication history in an acute setting. This takes the analysis further by use of the NPSA classification. The NPSA is a special health authority created to co-ordinate the efforts of all those involved in health care and, more importantly, to learn from patient incidents occurring in the NHS. This assessment tool was chosen because it has been developed by a nationally recognised body that aims to improve patient safety in the UK in a number of different ways, including through reducing medication errors. It affords an evaluation of the degree of risk involved in these scenarios, ie, gives a practical handle on how to assess the degree of severity of risk to patient safety.

The error rate identified in this study (62 per cent) is consistent with Tam *et al*'s medication history accuracy study that found that up to 67 per cent of histories contained some degree of error. However, Slee *et al*⁶ reported a significantly lower error rate of 38 per cent in their study. The different error rates reported could be attributed to a number of factors including:

- Experience of the clerking doctor
- The number of patients presenting outside the normal working hours of 9am to 5pm
- The percentage of patients admitted as being genuinely acutely ill

The last two factors given will limit the sources of information available to the admitting doctor. In this study omissions accounted for almost 62 per cent of errors (145 of 234), suggesting that insufficient information was available at the point of admission. This highlights the fact that current transfer of information, specifically patients' current medication, is inadequate to ensure patient safety is maintained, especially on emergency admission to hospital. Information is difficult to obtain on a 24-hour basis. Thirty-five patients who had incorrect histories documented had at least one source of information available on clerking while two patients had three. This available information did not prevent errors occurring in these patients' medication. Possibly, owing to time constraints, information from these sources is not fully used by doctors or in these cases the information was deficient. This indicates that when information is transferred to the AMAU it may be incomplete.

The administration of 100 units of insulin detemir was the only incident deemed to have potentially major consequences for patient safety. According to the NPSA assessment tool, this would have resulted in "permanent injury" with litigation to be "expected or certain". However, the panel of assessors was not in agreement when allocating a risk score to this event, a fact that was evident throughout many of the other errors. This may reflect the different education, training and experience of the individuals acting as assessors. Alternatively, it could be

Panel 1: National Patient Safety Agency risk assessment tool (adapted)

Level	Descriptor	Actual or potential impact on individual	Actual or potential impact on organisation	Number of persons affected	The potential for complaint/litigation
5	Catastrophic	<ul style="list-style-type: none"> ■ Death ■ Toxic offsite release 	<ul style="list-style-type: none"> ■ National adverse publicity ■ NAWF investigation 	<ul style="list-style-type: none"> ■ Many, eg, cervical screening disaster, evacuation etc 	<ul style="list-style-type: none"> ■ Litigation expected/certain
4	Major	<ul style="list-style-type: none"> ■ Permanent injury, eg, loss of body part(s) ■ RIDDOR reportable 	<ul style="list-style-type: none"> ■ Service closure ■ Long-term sickness 	<ul style="list-style-type: none"> ■ Moderate number, eg, through loss of specimens 	<ul style="list-style-type: none"> ■ Litigation expected/certain
3	Moderate	<ul style="list-style-type: none"> ■ Semi-permanent injury, eg, injury taking up to a year to heal ■ RIDDOR/MHRA reportable 	<ul style="list-style-type: none"> ■ Needs careful PR ■ Short-term sickness 	<ul style="list-style-type: none"> ■ Small number, three to 10 	<ul style="list-style-type: none"> ■ Litigation possible but not certain; high potential for complaint
2	Minor	<ul style="list-style-type: none"> ■ Short term injury/damage, eg, injury that can be resolved in one month 	<ul style="list-style-type: none"> ■ Minimal risk to organisation 	<ul style="list-style-type: none"> ■ One 	<ul style="list-style-type: none"> ■ Complaint possible; litigation unlikely
1	Insignificant	<ul style="list-style-type: none"> ■ No injury or adverse outcome 	<ul style="list-style-type: none"> ■ No risk to organisation 	<ul style="list-style-type: none"> ■ None or one 	<ul style="list-style-type: none"> ■ Unlikely to cause complaint; remote risk of litigation

Key: NAWF, National Assembly for Wales; RIDDOR, Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995; MHRA, Medicines and Healthcare products Regulatory Agency

seen as a limitation of the assessment tool used.

Patients in an AMAU cannot always be relied on to give an accurate record of their medication. They are often too ill to be interviewed and other sources (mentioned earlier) are used as alternatives. During the pilot study it was identified that any one given source had potential flaws in the information obtained. For example, a current monitored dosage system (MDS) can only inform us of the medicines included in that device. It cannot inform us of medicines, inhalers etc, that has not been included in the MDS. Thus a second source is needed to ensure a comprehensive history is recorded. Members of the pharmacy team using a minimum of two sources of information were able to detect and rectify errors involving preadmission medication early in the patients' journey thus removing the potential risk. Assigning a severity score to interventions is subjective and since, by their nature, interventions change the potential outcome of a prescription error, the potential outcomes (had there been no intervention) are difficult to identify. Hence, the impact on length of stay, etc, is difficult to assess.

A number of limitations are recognised in the design and execution of the study. Although a standardised process, including a data collection form, was followed for intervention recording and rating, it was not possible to standardise the training and experience of the pharmacists and technicians involved in the study. The training offered to the panel of assessors was done on an individual basis whereas, in hindsight, to ensure consistency it may have been more appropriate to approach the panel as a group. All four

assessors commented on the difficulty they had in interpreting the assessment tool in relation to medication errors that had been prevented. This possibly highlights that insufficient training was given to the assessors before scoring errors or that the current format of the tool needs adjustment if it is intended to be used as a standardised tool for measuring the potential consequences of medication errors.

Conclusion

The NPSA risk assessment tool is a useful method of standardising the method of determining the potential consequence of medication history inaccuracies. However, a more user-friendly version is required to reduce the element of subjectivity and ensure consistency between individuals.

The results presented in this study are reassuring for Prince Philip Hospital in the sense that there were no catastrophic errors. However, one "major" error detected in 200 cases does not bode well especially when the AMAU's assess large numbers of patients per annum. The case for change is clearly made.

The current methods of transferring information from primary to secondary care, and vice-versa, are deficient and need to be addressed urgently to prevent undetected errors.

In the interim we would advocate the use of multiple sources of information by appropriately trained personnel who are able to process the information effectively and, therefore, arrive at an accurate medication history. Despite resource implications, utilising a pharmacy technician, together with a clinical pharmacist, would ensure continuity between primary and secondary care and help attain

the national targets in reducing the number of serious medication errors.

ACKNOWLEDGEMENTS Many thanks to the pharmacists and pharmacy technicians who collected data for this study. Particular thanks to Andrew Daniel, Julie Evans (both clinical pharmacists) and Julie Graham (medicines management technician).

This paper was accepted for publication on 3 August 2007.

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