Pharmacist transcribing of drug histories to drug charts: a UK study

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ABSTRACT

Objectives The pharmacy department at St Mary's Hospital, Isle of Wight, UK, introduced a service whereby pharmacists took on the role of transcribing drug histories to drug charts as a method to attempt to reduce the number of discrepancies between the drug history and drug chart occurring on admission to hospital.

Method Between February and March 2014, 52 drug histories transcribed by pharmacists and 52 transcribed by doctors were validated to identify any discrepancies. These discrepancies were then reviewed by a multidisciplinary panel to determine the potential consequence.

Results Doctors were found to be 54 times more likely to make an unintentional discrepancy than pharmacists ($\chi^2=185.5$, $p<0.001$). The absolute risk reduction when a pharmacist transcribed the medicines was 36%; the number needed to treat was 2.8 (CI 95% 2.43 to 3.21).

Conclusion The pharmacist transcribing service has been shown to significantly reduce the number of discrepancies.

INTRODUCTION

There are two main processes by which medicines are written on the hospital drug chart; the first is via the prescribing of new medicines or making changes to the existing medicine regimen based on a prescribing decision, and the second is via the transcribing of drug history medicines. While the outcome is the same, that is, administration of medicine to the patient, these two processes differ somewhat.

- Prescribing is carried out by a practitioner responsible and accountable for the assessment and clinical management of a patient.¹ When 'independently prescribing', the practitioner must assess the patient in the context of their clinical condition and make a decision as to the most appropriate medication (if any) to prescribe.¹
- Transcribing is a generic term describing the process of making an exact copy.² Within NHS, England, the Nursing and Midwifery Council defines transcribing as 'any act by which medicine products are written from one form of direction to administer to another'.³ The UK Medicines Ethics and Practice guide for pharmacists states that they have the necessary skills to undertake transcribing tasks, such as the transcribing of discharge medicines.⁴ In the context of drug histories, transcribing is the process of copying the drug history to the drug chart. The prescribing decisions have previously been

made, and authority to administer is covered by the original prescription. Traditionally, the process of transcribing the drug history is completed by a doctor when clerking the patient on admission to hospital, and is often carried out in conjunction with prescribing tasks such as the initiation of new treatment.

The transcribing of drug histories

The drug history (ie, the complete, accurate list of a patient's current medicines prior to admission⁵) has often been shown to be inaccurately taken and/or poorly recorded on admission.^{5–8} This type of medication error, referred to within this article as a discrepancy, can result in unintentional changes to medicines on admission.⁵

The UK National Institute for Health and Care Excellence (NICE) has estimated that discrepancies between drug history and currently prescribed medicines occur in 30%–70% of medicines on admission.⁵ These discrepancies may have a negative clinical impact; one study showed that one-third of patients ($n=173$) had at least one discrepancy (such as omission or incorrect prescription), and >25% of these discrepancies were considered potentially harmful.⁸

One of the largest studies, by Dodds in 2010, involving 8621 patients over >50 NHS Trusts, identified 11 366 discrepancies (an average of 1.32 discrepancies per patient).⁹

CURRENT PRACTICE

There is an important role for pharmacy in reducing the risks associated with discrepancies, the current gold standard service being medicines reconciliation.

Medicines reconciliation is the process of identifying the drug history and comparing that list to the current list in use, to identify and document any intentional changes and any discrepancies.⁶ It is an effective tool to minimise the risk of medication errors,^{5 10} and in the UK, NICE specifically recognises the value of pharmacy in carrying out this task.⁵

It has been highlighted that traditional clinical pharmacist roles, such as prescription review, medicines reconciliation and monitoring, were quite reactive, waiting for an error to occur before intervention.¹¹ There may also be significant time delays between the error occurring, identification and resolution. It has, therefore, been recognised that while time-consuming, a more proactive approach would be safer for patients.¹¹

Only partial successes via medicines reconciliation have been reported by a number of studies. Islahudin *et al* reported that nearly half (77/161) of

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the discrepancies identified during medicines reconciliation remained unresolved 24 h after identification.¹² Byrne *et al.*,¹³ while evaluating the effectiveness of medicines reconciliation in 88 patients, found that there was at least one unresolved discrepancy 48 h after medicines reconciliation in 65% of patients. Similarly, in Dodds' study, only 65% of documented discrepancies were successfully resolved.⁹ One study (n=111 discrepancies) found that 13% of identified discrepancies were resolved on the day of discharge, and in another, 19% remained unresolved at discharge¹⁴ with the potential for discrepancies to be continued by the patient and general practitioner post discharge.

Pharmacists transcribing the drug history to the drug chart

Research in Wales demonstrated the benefits of having a pharmacist prescriber on an acute surgical ward, particularly in the transcribing of patients' regular medicines on admission.¹⁵ A Scottish study comparing pharmacists writing drug histories onto drug charts versus doctors showed that in the pharmacist arm, there were 3/60 (5%) of drug charts with errors compared with 39/60 (65%) of drug charts with errors in the doctors arm.¹⁶

With this in mind, St Mary's Hospital on the Isle of Wight (IOW), UK, introduced a service whereby a pharmacist would take the drug history of a patient and transcribe it to the electronic drug chart at the point of admission, ready for the clinical team to review during the clerking process.¹⁷

STUDY AIM

The aim of this study was to evaluate the effectiveness of the newly implemented service involving pharmacy-led transcription of drug histories to the drug charts of emergency admission patients.

METHOD

This study was conducted at St Mary's Hospital on IOW, a district general hospital, which forms part of the IOW NHS Trust. The study was conducted by a pharmacist researcher (NW) between February and March 2014. Ethics approval for the study was obtained from IOW NHS Trust and the University of Portsmouth.

Comparison of pharmacist transcribing with doctor transcribing of drug histories

The Electronic Prescribing and Medicines Administration (EPMA) system was used to identify non-elective patients where medicines had been transcribed by a pharmacist or doctor. This information was randomly ordered by the EPMA system, was imported into Microsoft Excel spreadsheets on a daily basis, and from this, up to the first five transcribed drug histories on the spreadsheet list per day in the pharmacist arm (with a matched number from the doctor arm) were selected for validation.

As patient characteristics may have differed outside the transcribing service hours of between 08:00 and 20:00, including them in the study may have been a confounder when comparing pharmacist with doctor transcribing. This was avoided by only including patients admitted during transcribing service hours.

Validation of each of these transcriptions was carried out by the lead medicines management pharmacy technician who completed medicines reconciliation, and documented the number of drug history medicines and any discrepancies. This process was piloted with four patients to ensure that it was clear and to confirm adherence to the standard operating procedures. From

this validation process, a summary of the validated patients in both arms of the study, including number of patients validated, number of drug history medicines, number of discrepancies and number of patients with at least one discrepancy, was produced. A variety of statistical tests were used to analyse these data, including χ^2 , t test, relative and absolute risk reduction and number needed to treat (NNT). A power calculation was used to confirm that a sufficient sample size had been accrued. The number of discrepancies made was then analysed.

The National Patient Safety Agency risk matrix identified that the severity or potential consequence of a discrepancy contributes to its risk level.¹⁸ Severity can be graded from 1 (insignificant) to 5 (catastrophic).

A multidisciplinary panel consisting of a medicines management technician, a senior clinical pharmacist and a medical consultant independently reviewed each discrepancy within the study to determine the severity score and from this, a mean severity score was calculated.

RESULTS

Demographics

A total of 52 drug charts where medicines were transcribed by a pharmacist, and 52 drug charts where medicines were transcribed by a doctor, were validated.

Validation results

Table 1 shows that there was similar and statistically non-significant representation of male and female patients in the sample of validated drug histories ($\chi^2=0.038$, $p=0.844$). The average age of the patients included was 73.8 years (range 28–102 years); the difference in numbers of patients aged above and below 60 years was not found to be statistically significant ($\chi^2=1.075$, $p=0.300$).

A total of 805 medicines were associated as drug history for these patients (55% of these medicines were drug history for the pharmacist arm of the study, and 45% were drug history for the doctor arm). As can be seen in table 2, there was a discrepancy in 136 out of these 805 medicines, representing an overall 17% discrepancy rate. There was an average discrepancy rate of 1.31 per patient, a figure close to the 1.32 discrepancies per patient found by Dodds.⁹

There was a large difference in discrepancy rate between the two arms of the study; there were three discrepancies recorded in the pharmacist arm (0.68% discrepancy rate) compared with 133 discrepancies (36.84% discrepancy rate) in the doctor arm. The lower discrepancy number for pharmacist transcribers occurred despite the median number of medicines transcribed being slightly higher for pharmacists. This difference was not statistically significant (Mann–Whitney U test $p=0.1624$). This may have been due to the wide range of drug history medicines per patient, which varied between 0–27 medicines per patient in the doctor arm and 1–22 medicines per patient in the pharmacist arm.

A two-sample t test confirmed the difference in mean discrepancies per patient between the pharmacists and doctors to be statistically significant (T-value=6.83, $p<0.001$), and the Mann–Whitney U Test confirmed the difference in median discrepancies per patient, adjusted for ties, was statistically significant ($p<0.001$).

Discrepancy rate

Table 3 shows that the relative risk of a discrepancy is 54.2; in other words, a doctor is 54 times more likely to make a discrepancy compared with a pharmacist. The overall relative risk

Table 1 Demographics of the patients whose drug histories were transcribed and subsequently validated

Transcriber	No. of male patients (%)	No. of female patients (%)	No. of patients aged <60 years (%)	No. of patients aged ≥60 years (%)	Average age of patient (SD) (in years)	Age range of patients (in years)
Pharmacist	26 (50)	26 (50)	11 (21)	41 (79)	71.8 (17.74)	28–102
Doctor	27 (52)	25 (48)	7 (14)	45 (87)	75.8 (14.49)	29–95
All	53 (51)	51 (49)	18 (17)	86 (83)	73.8 (16.24)	28–102

reduction is approximately 98%. The NNT was calculated to be 2.8, which means that pharmacists would need to transcribe approximately three medicines to prevent a discrepancy (95% CI 2.43 to 3.21). The difference between the number of discrepancies resulting from doctor compared with pharmacist transcribing was shown to be statistically significant ($\chi^2=185.5$ and $p<0.001$), and had a power of 0.99, supporting this conclusion.

Analysis of discrepancies

Table 4 shows that more than one-third of discrepancies ($n=51$) were scored as moderate severity, and these would have the potential to have a negative impact on the patient, and may even cause harm.

The majority of discrepancies were categorised as insignificant or minor severity. This would suggest that most discrepancies are unlikely to have a significant impact on patient safety or clinical outcome, but nonetheless, may lead to inconvenience or confusion for the patient, and may still have cost implications (such as prescribing the wrong inhaler device, which is later discarded when the correct device is prescribed).

Inter-rater agreement

In order to review inter-rater agreement between these responses, attribute agreement analysis was performed to identify Kendall's coefficient of concordance (KCC).¹⁹ There was substantial agreement between all members of the multidisciplinary panel, which was found to be statistically significant ($KCC=0.667$, $p<0.001$).

DISCUSSION

Limitations

The generalised application of these results may be limited due to the single hospital focus and the fact that pharmacist transcribing is a relatively new concept, not widely practiced at other sites currently. The IOW population and demographics of its inpatients may not be comparable with other sites, and standard operating procedures, training, roles and responsibilities will almost certainly be different to those at other hospitals; that said, the concept of the transcribing service is not complicated,

and is arguably an extension of medicines reconciliation, which is carried out in organisations globally currently.

The analysis of discrepancies was based on a relatively small sample of patients; while this was similar to some studies,¹⁴ and was sufficient to produce a significant power, it is difficult to compare results with large multicentre studies.^{9–20} Discrepancy analysis was determined by a multidisciplinary panel as has been done before¹⁴; however, such a method is subjective, and ratings would vary based on the experience of the panel members. It has also been argued that raters from different disciplines score severity differently.²¹

Recommendations

- ▶ Transcribing of drug histories presents an exciting opportunity for pharmacists to use their skills for the benefit of patients. This model of working could be considered at other hospital organisations where doctor transcription has been shown to be problematic. It would then be useful to repeat this study at additional sites in order to compare results and gain a greater understanding of the benefits of pharmacist transcribing.
- ▶ An important factor in the pharmacist transcribing process is interprofessional working. It has been recognised that 'continuing to work in professional silos is destructive for the [healthcare] professions and for the population they purport to serve'.²² Pharmacist transcribing could help to support a movement away from 'silo' working towards closer teamwork that uses profession-specific knowledge, skills and expertise. The transcribing pharmacist uses their expertise to complete the transcribing of drug histories in preparation for the doctors to review the chart in the context of the patient's presenting condition and to make prescribing decisions based on this information. This type of interprofessional working should, therefore, be actively encouraged.

CONCLUSION

The concept of a pharmacist-led service providing drug history taking and transcription of the drug history to the current drug chart has been shown to significantly reduce the number of discrepancies. During this study period, there were no reported

Table 2 Validation of transcribing by pharmacist and doctor

All data	Pharmacist transcribed	Doctor transcribed	Total
No. of patients validated	52	52	104
No. of drug history medicines	444	361	805
Median drug history medicines per patient	8.0	6.5	
No. of discrepancies between drug history and current drug chart	3	133	136
Percentage of discrepancies between drug history and current drug chart	0.68%	36.84%	16.89%
Median discrepancies per patient	0.0	2.0	
No. of patients with at least one discrepancy between drug history and current drug chart	3	38	41
Percentage of patients with at least one discrepancy between drug history and current drug chart	5.77%	73.08%	39.42%

Table 3 An analysis of the number of discrepancies made by pharmacists and doctors

	Pharmacist	Doctor	Total
Event	3	133	136
No event	441	228	669
Total medicines	444	361	805
Event rate	0.007 or 0.70%	0.368 or 36.8%	

	Result	95% CI
Relative risk	54.2	
Absolute risk reduction	36%	31.13% to 41.20%
Relative risk reduction	98%	94.3% to 99.4%
Number needed to treat	2.8	2.43 to 3.21

cases of harm resulting from medicines being transcribed by a pharmacist. Feedback from the multidisciplinary team was very positive with the majority of front-line staff saying they fully supported the transcribing service.

In order to assess the effectiveness of the transcribing service, it must be reviewed in the context of Quality, Innovation, Productivity and Prevention (QIPP), a toolkit used within NHS organisations to help make decisions about patient care and the use of resources with the aims of improving productivity and reducing costs.²³

- **Quality:** quality of patient care was improved by the transcribing service as demonstrated by the lack of reported drug history-related adverse events in patients where the drug history was transcribed by a pharmacist compared with six reported adverse events when transcribed by a doctor during the study period.
- **Innovation:** the current gold standard service provided by pharmacy on admission is that of medicines reconciliation. The transcribing service has successfully demonstrated that through the innovative concept of pharmacist transcribing of drug histories, the number of discrepancies was decreased significantly, and in fact, pharmacists need only transcribe the drug histories of two patients to prevent a discrepancy. An integral part of the transcribing service is the close collaboration with the clinical team ensuring that transcribed medicines are reviewed in a timely manner; such integrated working appears to be a winning innovation. There was widespread support from nursing and clinical staff regarding this service.

Table 4 Number and percentage of discrepancies rated at various severity scores* (mean severity score based on results from the multidisciplinary panel†)

Severity score	No. of discrepancies	Percentage of discrepancies
1 (insignificant)	21	15
2 (minor)	63	46
3 (moderate)	51	38
4 (major)	1	0.7
5 (catastrophic)	0	0.0
Total discrepancy	136	
Median severity score	2	

*Based on NPSA severity score¹⁸

†Multidisciplinary panel comprised a pharmacy technician, clinical pharmacist and medical consultant. NPSA, National Patient Safety Agency.

- **Productivity:** this study has not measured productivity or the time taken to transcribe a drug history. Anecdotal feedback from pharmacists suggests, however, that it takes less time to take and transcribe a drug history compared with checking and correcting a doctor's drug history transcription. This is an area requiring further research.
- **Prevention:** the project demonstrated a 98% reduction in discrepancies when a pharmacist transcribed the drug history to the drug chart. Since a significant number of discrepancies made by the doctors were considered to be of moderate severity, a pharmacist transcribing service has the potential to reduce harm and improve patient safety. There were no reported adverse events resulting from this process.

Overall, pharmacist transcribing can be considered to be a QIPP service that has the potential to reduce harm to patients by using the skills of pharmacists.

SUMMARY

Healthcare systems in 2015 face significant challenges, including financial pressures, ageing populations with complex care needs, increasing numbers of emergency admissions and predicted shortfalls in future medical workforce.²⁴

It has been argued that such systems should make better use of the skills of allied health professionals. We believe that pharmacist transcribing is the next step in the evolution of pharmacy services, and poses an exciting opportunity for the profession to showcase its expertise and secure its future as a crucial part of the multidisciplinary team.

What this paper adds?

What is already known on this subject?

- Studies looking at medicines reconciliation have shown that discrepancies are common, and have the potential to cause harm to patients.
- Medicines reconciliation is a reactive process; it exists to correct an error that has already occurred.

What this study adds?

- Pharmacists have been shown to accurately transcribe the drug history to drug charts, resulting in a large reduction in discrepancy rate; hence, this is a proactive approach to reducing errors.

Collaborators Ann McCloskey, Julie Simmons, Abdul Hameed, Debbie Cumming. Dr Abdul Hameed, Julie Simmons and Ann McCloskey were involved in data collection and analysis. Dr Debbie Cumming provided proof-reading support.

Contributors NW is the primary author and lead researcher. GH and DB were also contributing authors.

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