

A survey of prescription errors in general practice

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AIM • To classify errors on prescriptions from general practices and to measure the frequency of these errors. To determine whether error rates differ between prescribers in different general practice surgeries and to determine whether error rates are higher on handwritten prescriptions.

DESIGN • A retrospective analysis.

SUBJECTS AND SETTINGS • The study was conducted on prescriptions from 23 doctors (three general practices) presented to three community pharmacies over the course of two months.

RESULTS • From 37,821 prescribed items, 2,816 errors were detected giving an error rate of 7.46 per 100 items (95% CI 7.2–7.8). The most common errors related to

directions (n=1,056) giving an error rate of 2.8 per 100 items (95% CI 2.6–3). Doctors from the three surgeries had significantly different error rates with median (inter-quartile range) for doctors in each surgery: 9.1 (1.86), 3.4 (1.9) and 1.9 (1.4), Kruskal Wallis chi-square 11.6, df = 2, $P = 0.003$). Errors were found on 140 of the 1,373 handwritten items presented during the study period (10.2%) compared with 1,233 of the 33,772 computer-generated items (7.9%) (chi-square 15.65, df = 1, $P < 0.0001$).

CONCLUSION • Prescribing errors on general practice prescriptions are common and this study has demonstrated a wide range of different types of error. The error rate varied significantly between prescribers in different general practices and was relatively high on handwritten prescriptions.

The process of prescription generation and dispensing is governed by regulatory systems, the purpose of which is to maximise the safety and efficacy of the product supplied. Community pharmacists have an important role in checking prescriptions to ensure they are appropriate to dispense.

Error is defined as “the failure of a planned action to be completed as intended or the use of a wrong plan to achieve an aim”.¹ Errors can happen in all stages of the care process, from diagnosis to drug administration. Not all errors result in harm. Those that do result in an injury are sometimes known as preventable adverse events. According to Reason, errors occur as a result of two kinds of failure: either the correct action does not proceed as intended (an error of execution) or the original intended action is not correct (an error of planning).² In relation to prescribing, errors of omission and errors of commission have been described.³ Errors of omission are where a prescription is incomplete in some way whereas errors of commission contain incorrect information.

It is the prescriber who takes responsibility for initiating, monitoring and terminating any drug treatment, no matter what the role of the patient may be, or to what extent he or she has relied on others to undertake this responsibility.⁴ The pharmacist on the other hand is responsible for ensuring the quality of medicines and meticulous dispensing. The pharmacist's task is also to encourage the patient to use the medicine in the best possible manner. This is achieved by communicating with the patient to make sure that he or she has the ability, will and knowledge to use the dispensed medicine correctly.⁵

Several studies have shown that incorrect prescribing, inadequate information given by the prescriber or the pharmacist and incorrect use of medicines by the patient can cause suffering to patients and expense to both patients and the community.^{6–12}

In contrast to hospital practice where information is easily available, the situation in community practice is different. A community pharmacist has limited access to background patient information, such as diagnoses and laboratory reports. The advent of new technology, new understanding, and change in legislation^{13,14} may give the community pharmacist better access to this vital information in the future. At present, however, the pharmacist has to use a considerable amount of professional judgement when assessing the risks of prescriptions.

Various studies^{15–18} have looked into the issues of poor control of safety in the prescribing system. The system can become unstable and vulnerable if management and clinical controls are not well defined. The magnitude of the problem may not be appreciated until a major adverse event happens. Therefore, it is important to monitor the performance of the system by paying attention to any problems that may arise.

The study reported here has focused on

identifying errors associated with prescriptions from general practices. The main objectives were to classify errors on prescriptions from general practices and to measure the frequency of these errors. We also looked at whether there were differences in the error rates of prescribers from different general practices and whether error rates were higher on handwritten rather than computer-generated prescriptions.

METHOD

Setting The study was done in three pharmacies within a four mile distance of each other. The doctors were from three general practices located near these pharmacies. In one of the practices there were eight doctors and in each of the other practices there were seven (total 23). The doctors involved were made aware of the study but data were collected without their knowledge.

Design A pilot study was done in one of the three community pharmacies to develop a system to classify the prescribing errors. One of us, a community pharmacist based in that pharmacy, collected the data and all of us were involved in developing and refining the classification system. We decided to include all types of error, including administrative and legal errors. One of the error categories was about incomplete directions on the prescription. We were aware that incomplete directions (including terms such as “as required” or “as directed”) are common with certain groups of drugs and do not always imply error. For this reason we excluded the following groups of drugs from our data collection and analysis: antacids, laxatives, non-opioid analgesics and topical

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skin treatments. We also excluded prescriptions for unlicensed medicines or unlicensed indications, since it can be difficult to determine whether or not these constitute errors.

Analysis All prescriptions presented to the three pharmacies were analysed during the two-month study period. One of us, a community pharmacist, was based in one of the three pharmacies included in the study. Each week he went through all prescriptions that had been presented to the pharmacies to detect and classify any errors. Prescription errors were identified in two other ways. First, the prescription return book used by the pharmacies to record details of prescriptions sent back to prescribers was checked. Secondly, any errors identified by patients, eg, incorrect quantities or extra prescriptions, were recorded by pharmacy staff during the course of the study. We did not undertake a formal validation of the data collection procedures, but the data were checked to make sure that errors were being classified accurately.

The data were collected on a form designed by the authors. The data were entered on a spreadsheet, Microsoft Excel 97. The data analysis was done using SPSS Version 8 for Windows. The error rate was calculated by dividing the number of errors detected by the total number of prescribed items. This figure was multiplied by 100 to give a value as a percentage, as calculated in previous studies.¹⁹ The same method was used to calculate the error rates for individual prescribers. Ninety-five per cent confidence intervals were calculated for each rate. The Kruskal-Wallis Test was used to compare the error rates of prescribers from the three practices. The chi-square test was used to test whether there was a difference between handwritten and computerised prescriptions in the proportions of items classified as erroneous.

TABLE 1: PRESCRIBING ERRORS LISTED IN RANK ORDER			
Type of error	Number of errors	Error rate per 100 prescriptions	Per cent of total errors (%)
1. Directions not mentioned at all	715	1.89	25
2. Prescribed item was not requested (usually an item on a repeat prescription)	510	1.35	18
3. Directions incomplete, not legible, or written "as directed"	321	0.85	11
4. More than one month's supply given on separate repeat prescriptions without the patient's request	306	0.81	11
5. Strength missing where a product existed in various strengths, and no guidance was available in the BNF	260	0.69	9
6. The prescribed quantity was not clearly written, missing, or too large	229	0.61	8
7. Prescriber's signature missing	132	0.35	5
8. Details of a prescribed appliance not correct	52	0.14	2
9. Prescriptions for aminophylline m/r, theophylline s/r, diltiazem s/r, nifedipine s/r, and ciclosporin were prescribed by generic names.	31	0.08	1
10. Controlled Drugs Schedule 3 prescription writing requirements not met	31	0.08	1
11. Medicinal products discontinued for over 3 months, and stocks unavailable	27	0.07	<1
12. Prescription for any discontinued medicine, or wrong medicine due to a transcription error from the hospital discharge letter	25	0.07	<1
13. Prescribed dosage form was either unsuitable or was against the specific request of the patient	23	0.06	<1
14. Name of the medicine was not clear due to bad handwriting, failure of the printing device, or spelling mistakes	20	0.05	<1
15. Directions were potentially hazardous, and were changed after contacting the prescriber	20	0.05	<1
16. Date absent on prescription	19	0.05	<1
17. Wrong strength was prescribed, and was changed after contacting the prescriber	18	0.05	<1
18. Prescribed item printed more than once on the same prescription form, occasionally with the same name, or with different brand names	18	0.05	<1
19. Patient suffered from short supply of medicine due to special pack rules	17	0.04	<1
20. Potentially hazardous drug interactions as indicated by the symbol • in the BNF; prescription changed after contacting the prescriber	14	0.04	<1
21. The strength was not clear where a product existed in various strengths, and no guidance was available in the BNF	12	0.03	<1
22. Prescription issued with incorrect patient's details, eg, when previous patients details were left on the computer screen	6	0.02	<1
23. Appliance not allowed in general practice on NHS prescription form	5	0.01	<1
24. Controlled Drugs Schedule 2 prescription writing requirements not met	3	0.01	<1
25. Item "blacklisted" (not allowed on NHS prescription form in general practice)	2	0.01	<1

RESULTS

Prescriptions A total of 37,821 prescribed items were analysed and 2,816 errors were detected giving an error rate of 7.5 per cent

(95 per cent CI 7.2–7.8). Of these errors, 467 (16.5 per cent) were identified by patients or their representatives. Table 1 gives details of the error rate for the different types of error. The highest error rate was found for instances in which the directions for use of a medicine were absent. The combined rate for all errors related to directions (see 1, 3 and 15 in Table 1) was 2.8 per cent (95 per cent CI 2.6–3) and this constituted 37.5 per cent of all errors. Overtly dangerous errors were relatively infrequent and included the following: a prescription for clomipramine when clomifene was intended; a prescription for diclofenac 50mg, two tablets twice daily when the maximum recommended dose is 150mg per day; methotrexate prescribed "as directed" and 14 potentially hazardous drug-drug combinations (see 20 in Table 1).

Differences between prescribers The median error rate for the 23 doctors was 3.4 per 100 items (inter-quartile range 6.3). Further analysis revealed that doctors from the three surgeries had significantly different error rates with median (inter-quartile range) rates for prescribers in each surgery of 9.1 (1.86), 3.4 (1.9) and 1.9 (1.4) (Kruskal Wallis chi-square 11.6, df = 2, $P=0.003$).

Handwritten prescriptions Errors were found on 140 of the 1,373 handwritten items presented during the study period (10.2 per cent) compared with 1,233 of the 33,772 computer-generated items (7.9 per cent) (chi-square 15.65, df = 1, $P<0.0001$). There were no significant differences between the three general practices in their use of handwritten prescriptions.

DISCUSSION

This study has demonstrated a wide range of different types of error associated with prescriptions from general practice. Also, we have shown that prescribers from different surgeries vary in their error rates and that handwritten prescriptions are associated with a relatively high proportion of errors. Before discussing

these results further let us comment on our study design.

This was a relatively small study that was conducted over a short time. The data were collected by one pharmacist and we did not undertake a formal validation of the collection and processing of data. Therefore, our results may not be generalisable to other settings. Nevertheless, there is currently considerable interest in the detection and avoidance of error in the NHS^{20,21} and we believe that our study provides some important information.

Previous studies have shown wide variations in prescription error rates (from less than 1 per cent to over 40 per cent).^{9,11,22} The reasons for these variations relate mainly to study design. The lowest rates have been found in studies that focus on clinically significant problems and interventions made by pharmacists.¹¹ The highest rates have been found in studies that include even minor errors and where there are strict criteria as to what constitutes an error. For example in a Swedish study a 42 per cent error rate was reported, but nearly 70 per cent of these "errors" were due to the indication for the medication not being included on the prescription.²² In relation to previous studies the error rate found in our study is what one might expect given that we have recorded all types of error. Also, the wide range of errors detected is in keeping with the above mentioned Swedish study.²²

Even though relatively few of the errors detected in our study were serious, errors

can be time consuming for pharmacists.¹¹ Also, it is likely that some of the minor errors represent deficiencies in the prescribing system that might increase the risks of more serious errors taking place. For example, although most of the errors relating to "directions" were not serious, the prescription for using methotrexate "as required" could have had disastrous consequences if the patient had misunderstood any verbal directions that they had been given. Encouraging prescribers to give complete directions on all prescriptions might help to reduce the risk of serious errors.

Given the extent of the errors detected in this study it is clear that community pharmacists continue to have an important role in checking prescriptions. Also, given the range of errors it is likely that general practices could be helped to design systems to reduce the risk of these errors occurring.

In this context, our finding that prescribers in the three general practices differed in their error rates is important. The currently accepted approach to the prevention of error is to focus on systems rather than individuals²³ and further investigations have revealed that the practice with the highest error rate had inadequate systems in place to prevent error in the prescribing process. Given the current plans for reporting errors in the NHS²⁰ it is possible that community pharmacists could have an important role in drawing attention to general practices with particularly high error rates. These practices

could then be offered help to improve the safety of their prescribing processes, particularly with respect to repeat prescribing.²⁴

The fact that handwritten prescriptions showed a higher rate of errors compared with those that were computer generated is not surprising.²⁵ Computer-generated prescriptions automatically include certain pieces of essential information and prompt the prescriber to choose a specific formulation, a dose and a quantity. Also, the prescriptions usually avoid the problem of illegibility. Nevertheless, there is still considerable room for error on computer-generated prescriptions including the use of incorrect patient details (see 22 in Table 1).

CONCLUSION

Prescribing errors associated with general practice prescriptions are common and this study has demonstrated a wide range of different types of error. Most of the errors related to problems with the way in which prescriptions had been written and there were relatively few instances of dangerous prescribing. Nevertheless, without careful checking by the pharmacist patient harm could have resulted from a number of the errors.

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Correction

The results originally presented to *The Journal* by the authors of the paper "A survey of prescription errors in general practice" PDF (110K) (*PJ*, 15 December 2001, p860) were incorrect. The results should have read: "140 errors were found on 140 of the 1,373 handwritten items presented during the study period (10.2 per cent) compared with 2,676 errors on 2,527 of the 36,448 computer-generated items (7.34 per cent) (chi-squared 21.5, $df=1$, $P<0.0001$)."