A classification of prescription errors

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SUMMARY. Three independent methods of study of prescription errors led to the development of a classification of errors based on the potential effects and inconvenience to patients, pharmacists and doctors. Four types of error are described: type A (potentially serious to patient); type B (major nuisance — pharmacist/doctor contact required); type C (minor nuisance — pharmacist must use professional judgement); and type D (trivial). The types of frequency of errors are detailed for a group of eight principals from one health centre. There were a total of 504 errors from 15 916 prescription items (3.17%) during a three month observation period. A close correspondence was found between individual doctor's types of error rates, suggesting that doctors who make type C and D errors are also likely to make type B (major nuisance) errors. A system of feedback of errors from each doctor was devised. No significant reduction was seen in error rates, possibly because the group of self selected doctors taking part had low error rates initially. It is suggested that pharmacists and doctors should work closely together to prevent the potentially harmful consequences of prescription errors.

Introduction

The 'average' general practitioner signs 13 000 prescription items per year of which approximately 5000 are written during consultations and 8000 are repeats.1 4 The greater numbers of elderly in the population and new drugs developed are likely to increase both the number and range of prescription items written per doctor per year.

In order to cope with this trend much effort has been directed towards rationalizing prescribing.3 7 A range of general practice formularies is now available,6 9 following research projects to evaluate their impact.10 11 Regulation of prescribing, whether by voluntary means such as self-regulation and peer group review or by compulsory means such as an extension of the limited list, will become an important feature of general practice in the 1990s. The changes in quality and quantity of feedback from the Prescription Pricing Authority can be seen as a first step towards regulation.12 13

Prescription errors are common14 and, while many errors are harmless, a number are potentially dangerous. In a recent case involving an FP10 script with poor legibility Daonil (Hoechst, glibenclamide) was dispensed instead of Amoxil (Bencard, amoxycillin) and the patient suffered irreversible brain damage. The doctor and pharmacist were held liable for a claim of £139 147.15

Pharmacists are aware of the extent and legal implications of the problem of prescription errors.16 Research and audit projects by doctors on their own prescribing habits inevitably uncover the problem of errors. Errors on prescriptions have been studied by Austin and Parish,17 Austin and Dajda,18 Jones14 and recently by Gregory.19 Most work on errors has concentrated on listing types of error and quantifying error rates. Little attention has been directed towards studying the potential effects of errors or of ways in which errors can be reduced or prevented.

In this study prescribing was monitored from three separate sources with the aim of producing a classification of errors based on the potential effects of errors. In an attempt to reduce error rates feedback about prescription errors was given to a group of doctors.

Method

The first method of classifying errors consisted of one of the authors joining a local retail pharmacist for a 15-day period during which 1358 prescription items were dispensed. For each error the disruption and inconvenience caused to the pharmacist and patient was observed as the pharmacist tried to establish the prescriber's intentions.

The second method involved one general practice recording all instances over a three-month period when retail pharmacists throughout the locality had cause to telephone the practice to query prescriptions or return incomplete prescriptions. The effects of all the enquiries from pharmacists were thus assessed in terms of inconvenience to doctors and their staff and of inconvenience or potential risk to patients.

The third method of investigating errors was from a study of all prescriptions written by eight principals at three general practices at the Westgate health centre, Dundee, over a three-month period (December 1985 to February 1986). The practices were involved in a long term project to introduce and evaluate a general practice formulary.20 This project required the use of special duplicate prescription pads for the issue of all prescriptions, whether 'new' or 'repeat', 'home visit' or 'surgery'.21 Prior to the introduction of this formulary duplicate copies of all 15 916 items prescribed in the three-month period were scrutinized by trained staff and items which did not conform to the criteria for prescription writing stated in the British national formulary were identified.22 Because each prescription item had to be entered into a computer file it was readily apparent if a prescription did not conform to formulary guidelines. Prescriptions which contained errors were then reviewed and the project staff assessed the potential effects of each error on patients, pharmacists and doctors.

Feedback to doctors

After the three-month observation period information on prescribing errors was fed back twice in confidence to the doctors: immediately preceding month five and again preceding month six. The feedback took the form of a typewritten statement detailing the number of prescriptions issued by the prescriber during the past month, the number of prescription items involved, the total number of errors, and the percentage error rate. Each error was listed on a named patient basis with an appropriate comment. The errors were analysed from the duplicate prescriptions for a three-month period (March to May 1986) and compared with errors from the three-month observation period.
**Statistical methods**

The error prescribing rates were analysed by fitting a linear logistic model, considering the number of errors to follow a binomial distribution with the number of trials given by the total number of prescriptions. The statistical package GLIM was used.\(^2\) The correlation between prescribing rates was assessed using Spearman’s rank correlation coefficient.

**Results**

**Classification of prescription errors**

The three independent methods of studying errors — prescription review within a retail pharmacy, monitoring of prescription queries to receptionist and doctors by pharmacists, and processing of duplicate prescriptions — led to the following classification of errors being devised:

**Type A: ‘potentially serious to patient’**: The prescription would be dangerous to the patient if dispensed. For example, dose of cardiac drug wrong by a factor of 10; confusion of handwriting between chlorpromazine or chlorpropamide.

**Type B: ‘major nuisance’**: The pharmacist has to contact the prescriber in order to dispense the prescription. Patient, doctor and pharmacist are thus all inconvenienced. For example, phenytoin prescriptions which omit to mention whether capsules or tablets; completely illegible script.

**Type C: ‘minor nuisance’**: The pharmacist has to make a professional decision before dispensing, although is able to do so without contacting the prescriber. This is annoying for pharmacists and can cause slight delays to patients. For example, wrong pack size of dermatological preparation.

**Type D: ‘trivial’**: The prescription does not strictly conform to the guidelines in the British national formulary although the prescriber’s intentions are not in doubt. For example, liquid instead of gel with antacid preparations; spelling errors.

**Application of classification in practice audit**

There were a total of 504 errors from 15 916 prescription items (3.17%). There were no type A (potentially serious to patient) errors during the three month observation period, but 169 type B (major nuisance) errors (1.06% of all items), 273 type C (minor nuisance) errors (1.72%) and 62 type D (trivial) errors (0.39%) were recorded. The nature of the errors and their classification into the four types are shown in Table 1.

A close correspondence was found between each doctor’s type B error rate and his or her type C and D error rates (Spearman’s rank correlation coefficient, \( r = 0.79, P < 0.05 \)). In other words doctors who make type C (minor nuisance) and D (trivial) errors also tend to make B (major nuisance) errors.

**Feedback to doctors**

After feedback of each error to each doctor participating in the formulary project no significant reduction was seen in error rates in the succeeding three months compared with the observation period. In fact there was one type A, potentially serious, error.

**Discussion**

The findings from the series of three monitoring projects described here allow the commonly held assumptions about prescription errors in general practice to be challenged.

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**Table 1. Classification of prescription errors according to the potential seriousness to the patient or the inconvenience to doctors, pharmacists and patients (developed from Jones\(^1\)).**

<table>
<thead>
<tr>
<th></th>
<th>Number (%) of errors ((n = 15 916))</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Type A (potentially serious to patient)</td>
</tr>
<tr>
<td><strong>Dose</strong></td>
<td></td>
</tr>
<tr>
<td>Strength of preparation not stated</td>
<td></td>
</tr>
<tr>
<td>(where several exist)</td>
<td></td>
</tr>
<tr>
<td>Dose wrong by multiple of 10</td>
<td>0</td>
</tr>
<tr>
<td>Other incorrect dose</td>
<td>0</td>
</tr>
<tr>
<td><strong>Quantity</strong></td>
<td></td>
</tr>
<tr>
<td>Wrong pack size</td>
<td>0</td>
</tr>
<tr>
<td><strong>Naming of drugs</strong></td>
<td></td>
</tr>
<tr>
<td>Incomplete description</td>
<td>0</td>
</tr>
<tr>
<td>Confusion of similar names</td>
<td>0</td>
</tr>
<tr>
<td>Wrong drug</td>
<td>0</td>
</tr>
<tr>
<td>Controlled drug regulations not followed</td>
<td>1</td>
</tr>
<tr>
<td><strong>Formulation</strong></td>
<td></td>
</tr>
<tr>
<td>Tablets instead of capsules or liquid</td>
<td>0</td>
</tr>
<tr>
<td><strong>Limited list</strong></td>
<td></td>
</tr>
<tr>
<td>Preparation not available on NHS</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>0</td>
</tr>
</tbody>
</table>

\(n\) = total number of prescription items analysed. NB: The same error can have different potential effects depending on the drug involved.
'I never make errors'. The prescription error rate for the average doctor — based on published work14,18 and from this study's monitoring of prescriptions in a retail pharmacy — is approximately 5%. Even doctors who can achieve error rates as low as 2% are liable to subject their local pharmacist to approximately 250 errors which require correction per year.

'Errors are trivial anyway.' The correspondence between type B error rates and type C and D rates in our study suggests that doctors who make minor nuisance or trivial errors are liable to make major nuisance errors and, by implication, potentially serious ones.

'Pharmacists will correct errors'. Doctors can be unaware of recurrent errors, particularly those such as type C which pharmacists feel competent to correct themselves. Not only is it poor professional behaviour to rely on others to correct one's mistakes but doctors who work in dispensing practices cannot rely on pharmacists to correct errors.

The fact that the error rate in the observation period was so low (around 3% for all types of error) could make it unrealistic to expect a reduction in error rates after feedback of individual results to the doctors. It also suggests that doctors with an existing interest in prescribing audit may be atypical and less likely to be influenced by feedback.

There are many ways of attempting to influence the behaviour of general practitioners.24 Unsolicited feedback of information does little to alter the activities of general practitioners25 or hospital doctors.26 Feedback which is requested may meet with more success. Peer group pressure or a series of ongoing meetings within a practice may produce favourable results.11 Face-to-face contact and an opportunity to explore mutual concerns and interests among different professionals is likely to influence behaviour. Pharmacists may have a key role in influencing general practitioners' prescribing habits. This role is underdeveloped and warrants further study.27-29 The prevention of prescribing errors is clearly an area where closer cooperation between doctors and pharmacists would be of benefit.

Conclusions

There are some simple practical steps available to prescribers who seek to reduce error rates:

1. Discuss the problem of errors with reception staff. Not all errors queried by pharmacists and relayed to surgeries are brought to the attention of the doctors.

2. Monitor the rate of incoming calls from pharmacists to reception staff. Recurrent errors soon become obvious.

3. A short audit project consisting of one or two months use of duplicate prescription pads followed by careful scrutiny of each prescription will uncover many errors.

4. Ask your pharmacist. Pharmacists can advise on the nature and frequency of serious, major and minor nuisance and trivial errors which appear on FP10s. A constructive dialogue between general practitioners and pharmacists may help to eliminate many errors, and ultimately reduce the risk of serious errors harming patients.

References


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