Analysis of paediatric prescribing profiles in two health-funding systems

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Objective. To investigate the adequacy of two large South African medical administrative databases in providing prescribing profiles for paediatricians and general practitioners (GPs) respectively.

Design. Statistical analysis of data captured during 1994. Data were analysed retrospectively with frequency analysis and non-parametric tests.

Setting. Two industry databases, one covering a prepaid health maintenance organisation (HMO), the other providing a chronic medication programme for medical schemes and their members.

Main outcome measures. Comparison of prescribing profiles of specialists and GPs.

Main results. Data from the HMO revealed that referrals to paediatricians were mainly for gastro-intestinal and respiratory problems. Paediatricians' prescriptions for treatment of gastro-oesophageal reflux and/or abdominal pain represented 15.5% of all items prescribed and accounted for 40.7% of total paediatric medicine costs. GPs used formulary items more frequently, and cost per prescription was two-thirds that of specialists. Data from the chronic medication programme were used to compare treatment of asthma by the two provider groups. There were significant differences in the prescribing profiles of the two groups, with specialists using more in the way of 'third-line agents' and newer, expensive products. Significant numbers of prescriptions did not conform to national guidelines for treatment of asthma.

Conclusions. Industry databases provide a viable and valuable source of information; however, some problems were experienced in extracting the required data. Prescribing profiles revealed certain practices that require review, in particular the relatively low use of generic products, the early resorting to drug therapy for gastro-oesophageal reflux, and non-conformity with national guidelines for management of childhood asthma.

Subjects and methods

Two industry databases were reviewed and analysed.

Medicines utilisation review organisation

This system has recently been established specifically to review the prescription of drugs used in the management of a variety of chronic diseases. At the request of medical schemes and/or administrators, patients and their doctors co-operate with the organisation, with the sole purpose of...
rationalising care. The organisation serves 14 medical schemes, covering some 300 000 beneficiaries.

For the purpose of this study, data pertaining to GPs and paediatricians were extracted and all prescriptions for the treatment of asthma in subjects under 16 years of age were selected. Specific attention was directed at items prescribed, dosages, frequency of administration and drug interactions. Claims for the period January to September 1994 were reviewed.

Statistical analysis (Statpak, Version 4.0; Northwest Analytical, Portland, Oreg.) utilised frequency analysis (chi-square, Fisher's exact test) and the Mann-Whitney test for datasets which were not normally distributed. The study was approved by the University of the Witwatersrand Committee for Research on Human Subjects.

Results

**Medicines claims processing database**

Data from the HMO included 119 965 GP prescriptions and 408 paediatrician prescriptions. These were generated by some 200 GPs and 8 paediatricians during the period under review.

Frequency analysis of items prescribed by paediatricians and GPs according to therapeutic class shows significantly different prescribing profiles (Table I). Review of items dispensed by GPs suggests that the data apply to a broader range than the 0 - 16 years requested. This conclusion is drawn from the number of prescriptions for substances such as fluoxetine, digoxin, verapamil, furosemide, β-blockers and angiotensin-converting enzyme inhibitors. These are substances variously directed at the treatment of cardiac failure, arrhythmias, depression and hypertension, none of which is prevalent in the 0 - 16-year age group. However, what is apparent from the GP prescriptions is that as 'gatekeepers' they chose to refer mainly patients with respiratory and gastro-intestinal problems to the paediatricians.

<table>
<thead>
<tr>
<th>Therapeutic class</th>
<th>Paediatricians</th>
<th>GPs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gastro-intestinal</td>
<td>25.6</td>
<td>10.7</td>
</tr>
<tr>
<td>Cardiovascular</td>
<td>2.8</td>
<td>16.4</td>
</tr>
<tr>
<td>Hormonal†</td>
<td>8.4</td>
<td>2.5</td>
</tr>
<tr>
<td>Anti-infective</td>
<td>11.3</td>
<td>11.8</td>
</tr>
<tr>
<td>Musculoskeletal</td>
<td>2.4</td>
<td>12.7</td>
</tr>
<tr>
<td>Central nervous system†</td>
<td>9.8</td>
<td>17.1</td>
</tr>
<tr>
<td>Respiratory</td>
<td>30.0</td>
<td>14.6</td>
</tr>
</tbody>
</table>

The prescribing profiles are significantly different (P < 0.0001) for all categories except anti-infective.

† Predominantly corticosteroids, used in treatment of asthma.

Medicines utilisation review organisation

Data from the utilisation review database included 216 GP- and 55 paediatrician-generated prescriptions directed at treatment of asthma in subjects aged under 16 years. Both groups of providers prescribed between 1 and 10 items per prescription. However, frequency analysis showed that the distribution curves were significantly different (P < 0.05). The median for GPs was 2 items per prescription, while that for paediatricians was 3 per prescription. Specific items prescribed by the two groups are shown in Table III. These two profiles are significantly different (P < 0.0001), with paediatricians prescribing more of the newer inhaled corticosteroids, β-stimulants and antihistamines, while GPs used more salbutamol and theophylline preparations. For those items for which generic equivalents are available (beclomethasone and salbutamol), GPs prescribed generic formulations significantly more often than did paediatricians (49.3% of cases v. 34.0%; P < 0.05).

<table>
<thead>
<tr>
<th>Medication</th>
<th>GP prescriptions</th>
<th>Specialist prescriptions</th>
<th>Chi-square statistic*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beclomethasone</td>
<td>68</td>
<td>19</td>
<td>11.0</td>
</tr>
<tr>
<td>Fluticasone</td>
<td>13</td>
<td>12</td>
<td>6.9</td>
</tr>
<tr>
<td>Budesonide</td>
<td>20</td>
<td>6</td>
<td>3.5</td>
</tr>
<tr>
<td>Salbutamol</td>
<td>147</td>
<td>28</td>
<td>16.2</td>
</tr>
<tr>
<td>Fenoterol</td>
<td>60</td>
<td>17</td>
<td>9.8</td>
</tr>
<tr>
<td>Other β-stimulants</td>
<td>18</td>
<td>17</td>
<td>9.8</td>
</tr>
<tr>
<td>Theophylline</td>
<td>52</td>
<td>6</td>
<td>3.5</td>
</tr>
</tbody>
</table>

Total 506 100 173 100 48.12

* Only significant differences shown.
Single items and combinations of drugs per prescription were assessed by a specialist pulmonologist, and categorised in terms of adherence to or deviation from local therapeutic guidelines. GPs prescribed according to guidelines in 41.7% of cases, while paediatricians conformed in 59.6% of cases. This difference is significant (P < 0.05).

Discussion

Health care databases are recognised as valuable sources of data. However, in South Africa little use has been made of potentially retrievable information, partly as a result of the previous Medical Schemes Act which entrenched guaranteed payment of providers conditional only upon charges being levied according to gazetted scales of benefit. Under the amended Medical Schemes Act, health funders are becoming fund managers rather than claims processors, and utilisation review, quality assurance and cost-containment are emerging as important strategies. This study highlighted several problems in data retrieval. Firstly, both organisations involved, while being totally co-operative, nevertheless required almost 5 months for processing of the requested data. Secondly, whereas the HMO was asked for GP information relating only to patients aged 0 - 16 years, the data provided clearly included subjects beyond the specified age range. Data analysts reviewed their programmes, but the latter result remained the same, indicating a problem in the recording of date of birth and/or age of beneficiaries within the system. Specialist data from the HMO were regarded as being accurate, and showed the preponderance of gastrointestinal and respiratory problems referred to paediatricians. The frequent use of omeprazole, cimetidine and cisapride by these specialists for treatment of gastro-oesophageal problems warrants scrutiny, and suggests a relatively low threshold for prescription of these products. Similarly, resorting to ciprofloxacin in ambulatory patients is worthy of mention.

Some of the effects of the abovementioned prescribing practices are shown in Table II: paediatricians prescribe from the formulary more frequently than GPs do (P < 0.0001), and their cost per prescription is 1.5 times that of GPs. While it can be argued that effective 'gatekeeping' by GPs is resulting in only the problem cases reaching the specialists, and that such problems require more expensive and more esoteric drugs, frequent usage of products such as omeprazole, cisapride and ciprofloxacin cannot be ignored. Data from the utilisation review organisation also show the significantly lower use of generic products by paediatricians. One may once again argue that the specialists are seeing more problematic patients being seen by paediatricians (Table III), which shows that paediatricians use more fluticasone, β-stimulators other than salbutamol, and antihistamines, it is possible that these practices also indicate specialist preference for the more recent, so-called 'third-line treatment' products.

The SA Childhood Asthma Working Group's consensus statement on the management of childhood and adolescent asthma has acknowledged the complex socio-economic issues of health care in South Africa. Two important issues are worthy of mention. Firstly, cheaper anti-asthmatics may not necessarily be more cost-effective in long-term management; secondly, as clearly illustrated in this study, there is a definite need for effective dissemination of guidelines in order to reduce the cost of this disease and also improve overall patient management. Non-adherence to guidelines does not necessarily imply poor management of childhood asthma; in many cases it is a matter of offering more cost-effective management through the use of fewer agents, or avoidance of duplication of treatments which have similar activity. However, the lack of conformity with the therapeutic guidelines which emerged in this study is of concern, in particular the continued use of theophylline, predominantly by GPs.

The data presented in this study are directed at health care funders and providers. It is hoped that funders will recognise the benefit and value of database development and analysis, and that providers will be stimulated to review their practices. Unfortunately, the literature suggests that simple feedback along these lines is relatively ineffective in modifying behaviour. Other strategies such as specific feedback to individuals and peer review are more likely to achieve results. Whichever method is used, nothing can take place unless the data are available. For this reason, every effort should be made to implement and comply with health information data collection systems, whether in individual, group, hospital or community practices.

The authors acknowledge the assistance and support of Mr David Boyce and Mrs Geraldine Bartlett of TPS/Medirekredit, Johannesburg, and Dr John Cowlin of Quality Health Services (Pty) Ltd, Cape Town.

REFERENCES


Accepted 17 July 1995.