Morbidity, deprivation, and antidepressant prescribing in general practice

IAN F MACKENZIE  
KEN BUCKINGHAM  
JAN M WANKOWSKI  
MIKE WILCOCK

SUMMARY

Background. Although the link between depression, unemployment, and measures of deprivation and morbidity has been previously documented, the relationship between general practice prescribing of antidepressants, morbidity, and the social demography of general practice populations is poorly understood.

Aim. To consider whether morbidity and the social demography of general practice populations influence the prescribing costs of individual practices.

Method. Data were analysed, using a forward stepwise regression procedure, of all 78 practices served by the Cornwall and Isles of Scilly Health Authority. Data on prescribing for antidepressants were provided by the Prescription Pricing Authority for the period from July to December 1995 and converted into defined daily doses (DDDs) to standardize for the variation in prescribing practice between general practitioners.

Results. A significant positive correlation exists between the rates of prescribing DDDs of antidepressants by general practices and the prevalence of permanent sickness in the areas in which these practices serve.

Conclusion. Demonstrating an association between morbidity and prescribing rates for depression may prove helpful in setting prescribing budgets.

Keywords: depression; prescribing; social demography.

Introduction

Health authorities are required to set prescribing budgets for general practices and primary care groups. The budget-setting process was initially based on an annual up-lift on historical spending on drugs, corrected for changes in list size. The process has become more sophisticated and now incorporates, via the ASTRO-PU (age, sex, and temporary resident originated prescribing unit), a recognition of the demographic features of the practice population that alter the likelihood of consulting and the cost of receiving treatment with a prescription.1

The variation in prescribing rates and cost between health authorities is known to be associated with the standardized mortality ratio of the health authority for its population aged under 75 years.2 Other studies have shown that morbidity and socioeconomic factors, including unemployment, are associated with the variation in general practice prescribing costs when the data were

1 F Mackenzie, MPH, consultant in public health medicine; K Buckingham, PhD, health economist; J M Wankowski, MSc, scientific officer; and M Wilcock, MRPharm, pharmaceutical adviser, Directorate of Public Health Medicine, Cornwall and Isles of Scilly Health Authority. Submitted: 23 February 1998; final acceptance: 5 June 1999.

times more expensive than traditional antidepressants. The DDD is defined as ‘the assumed average dose per day for a drug used on its main indication in adults’.10

We should acknowledge that some of the drugs that we have assumed to be for the treatment of depression will have been used for other indications; for example, for the treatment of chronic pain (where the antidepressant amitriptyline is commonly used), or for enuresis in children; however, these minor indications are unlikely to have materially altered our findings.

Since our main concern was to identify the impact of sociodemographic factors on the use of antidepressant drugs, it would have been preferable to have age-standardized the dependent variable to exclude the influence of age in our modelling. However, age-specific use rates for antidepressants were not available. Since the evidence on consultation rates for depression11 suggests that consultations are rare among younger people and tend not to vary substantially by age among adults, age standardization of practice populations was not considered essential. Instead we used the practice population of all people over the age of 15 years as the denominator in the calculation of use rates.

The explanatory variables

The principal explanatory variables were derived from the 1991 Census and were selected on the evidence provided in our review of the literature. Using information on the residential postcode of patients registered with practices in our sample, we assigned patients to enumeration districts, and thereby determined, for each practice, weighted average values for each of the Census variables under examination. The variables used are listed with abbreviations in Table 1.

Results

We see from the row headed ‘DDDs per capita’ in Table 2 that this variable has highly significant correlations with both ‘long-term illness’ and ‘permanent sickness’. Somewhat weaker, but still statistically significant, correlations are evident with the variables ‘lone parents’ and ‘class I or II’. All the correlations have the ‘expected’ signs, with higher morbidity and more lone parents being associated with greater use of antidepressants, and higher social class being associated with lower use of antidepressants.

As expected, many of the sociodemographic variables (with the exception of ‘ethnicity’ and ‘family size’) are strongly correlated with one another. Furthermore, both measures of morbidity recorded in the Census (‘permanent sickness’ and ‘long-term illness’) correlate highly with many of the sociodemographic variables. Strong correlations exist between ‘long-term illness’ and ‘unemployment’, ‘education’ and ‘class I or II’ (higher levels of education and higher social class being associated with less ‘long-term illness’). These high levels of intercorrelation imply that we must be cautious when interpreting the results from multiple regression modelling, since variables that correlate strongly with one another can act as proxies, or may jointly enter into the equation with unexpected coefficients and/or signs.

Our first regression equation explained 24% of the variation in DDD per person; however, one practice was an ‘outlier’, with a very high standardized residual. To examine its influence on the model, we re-estimated the equation without this observation. With that observation excluded, the most significant variable was ‘permanent sickness’, which explained 20% of the variation in DDD per capita.

In order to determine what would have been the most important determinant of prescribing in this highly co-linear dataset, had the ‘permanent sickness’ variable not been available, we repeated our forward stepwise regression after excluding ‘permanent sickness’ from the model. Under these circumstances the most powerful influence on prescribing is ‘long-term illness’, another measure of morbidity. This accounts for 19% of the variation in prescribing. ‘Education’ is selected together with ‘long-term illness’ in this forward regression procedure and explains a further 10% of the variation in prescribing. When we exclude both morbidity variables (‘permanent sickness’ and ‘long-term illness’), the only variable to enter the equation is ‘lone parents’, which accounts for 13% of the total variation in prescribing.

Discussion

The lack of evidence of a relationship between general practice demography and prescribing of antidepressants, as reported by Pharoah and Melzer,6 was surprising in the light of the other evidence for such a relationship. This may, in part, be explained by our findings, which indicate that population-based morbidity measures are more important than sociodemographic factors, and that social factors are more likely to enter the model once the effect of morbidity has been accounted for. Pharoah and Melzer’s failure to find a relationship may also, in part, have resulted from the way they used Census information to estimate practice characteristics. Although this seems to be the only method that is generally available,12,13 estimates can be unreliable because the Census information relates to geographical

### Table 1. Description of variables.

<table>
<thead>
<tr>
<th>Variable name</th>
<th>Variable definition</th>
<th>Mean</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>DDDs per capita</td>
<td>Defined daily doses per person aged over 15 years</td>
<td>4.555</td>
<td>1.607</td>
</tr>
<tr>
<td>No car</td>
<td>Proportion of residents in households with no car (used as a proxy measure of wealth)</td>
<td>0.245</td>
<td>0.072</td>
</tr>
<tr>
<td>Ethnicity</td>
<td>Proportion of residents in households with head of household born in the New Commonwealth</td>
<td>0.010</td>
<td>0.003</td>
</tr>
<tr>
<td>Lone elderly</td>
<td>Proportion of those of pensionable age living alone</td>
<td>0.292</td>
<td>0.028</td>
</tr>
<tr>
<td>Lone parents</td>
<td>Proportion of persons in lone parent households</td>
<td>0.075</td>
<td>0.016</td>
</tr>
<tr>
<td>Permanent sickness</td>
<td>Proportion of adult population that is permanently sick</td>
<td>0.037</td>
<td>0.008</td>
</tr>
<tr>
<td>Unemployment</td>
<td>Proportion of the economically active that is unemployed</td>
<td>0.054</td>
<td>0.012</td>
</tr>
<tr>
<td>Education</td>
<td>Proportion of persons aged 18+ with some qualification</td>
<td>0.117</td>
<td>0.031</td>
</tr>
<tr>
<td>Class I or II</td>
<td>Proportion of persons in households with head of household in social class I or II</td>
<td>0.344</td>
<td>0.072</td>
</tr>
<tr>
<td>Family size</td>
<td>Proportion of households with 1 or more dependent children</td>
<td>0.049</td>
<td>0.006</td>
</tr>
<tr>
<td>Marital status</td>
<td>Proportion of single, widowed, or divorced residents</td>
<td>0.497</td>
<td>0.022</td>
</tr>
<tr>
<td>Long-term illness</td>
<td>The ratio of the number of people recorded having limiting longstanding illness divided by the number of such people who would be predicted as having limiting longstanding illness using national prevalence rates by age.</td>
<td>0.132</td>
<td>0.013</td>
</tr>
</tbody>
</table>
areas rather than practice populations. The most reliable estimates occur when general practices have local monopolies: a condition that we found to hold for many of the practices in our sample. Moreover, Census-based estimates tend to be more precise when enumeration districts, rather than electoral wards (as preferred by Pharoah and Melzer), are used because the smaller size of the former allows a more precise attribution of populations to practices. The hypothesized relationship between need for antidepressants and social characteristics may also be difficult to identify using relatively small samples because of the variability of GP prescribing behaviour.

Conclusion
When considering the component of the prescribing budget necessary to meet the needs of the population of practices for drug treatment of depression, knowledge of the level of morbidity and social deprivation is important. It is clear that practice populations differ in the amount of morbidity they treat. It is also clear that this will have implications for their prescribing costs.

In setting prescribing budgets, medical and pharmaceutical advisers are asked to assess individual practices, taking into account local knowledge about the needs of patients. Demonstrating an association between morbidity and prescribing rates for depression will inform discussions with practices and provide an evidence base for increased allocations for this part of the prescribing budget to those practices in areas of higher morbidity.

References