A comparison of psychotropic medication prescribing patterns in East of England prisons and the general population

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Abstract

While the prevalence of mental illness is higher in prisons than in the community, less is known about comparative rates of psychotropic medicine prescribing. This is the first study in a decade to determine the prevalence and patterns of psychotropic medication prescribing in prisons. It is also the first study to comprehensively adjust for age when making comparisons with the general population. Four East of England prisons, housing a total of 2222 men and 341 women were recruited to the study. On census days, clinical records were used to identify and collect data on all prisoners with current, valid prescriptions for hypnotic, anxiolytic, antipsychotic, antimanic, antidepressant and/or stimulant medication, as listed in chapters 4.1 to 4.4 of the British National Formulary. Data on 280,168 patients were obtained for comparison purposes from the Clinical Practice Research Datalink. After adjusting for age, rates of psychotropic prescribing in prison were 5.5 and 5.9 times higher than in community-based men and women, respectively. We also found marked differences in the individual psychotropic drugs prescribed in prison and community settings. Further work is necessary to determine whether psychotropic prescribing patterns in prison reflect an appropriate balance between managing mental illness, physical health risks and medication misuse.

Keywords

Prison, medication, psychopharmacology, offenders, psychiatry, Clinical Practice Research Datalink

Introduction

The prevalence of mental illness is significantly higher in prisons than in the general population (Fazel and Danesh, 2002). Several studies have examined prescriptions for psychotropic medicines in incarcerated populations (Baillargeon and Contreras, 2001; Baillargeon et al., 2001; Elger et al., 2002; Harcouët, 2010; Kjelsberg and Hattvig, 2005a, 2005b; Singleton et al., 1998); however, only two of these studies included a formal community comparison group (Elger et al., 2002; Kjelsberg and Hattvig, 2005b) and none adequately accounted for age and gender differences between populations, making direct comparisons of prescribing rates problematic.

High-quality, robust prescribing data are not routinely available from prisons, yet these are essential to managing the overall clinical, cost-effective, and safe use of psychotropic medicines (Department of Health, 2003). A large-scale Office for National Statistics survey of psychiatric morbidity in prison found that a fifth of men and half of women received some form of psychotropic medication or medication for substance dependence (Singleton et al., 1998). However, this research was conducted 15 years ago; during this time the prison population has significantly increased, budgetary and commissioning responsibility for prison healthcare has transferred to the National Health Service (NHS) and numerous new psychotropic drugs have entered the market. More recently, questions have been raised regarding the equity, continuity and appropriateness of prescribing for mentally ill prisoners. For example, Hassan et al. (2011) found evidence of discontinuity of supply of medicines between the community and prison. During the week following entry into custody, half of all psychotropic medicines prescribed in the community were not continued in prison, often without evidence of clinical review, provision of substitute medication or other recorded justification. Furthermore, in qualitative studies patients have commonly reported difficulties in accessing prescribed psychotropic medications in prison, causing significant frustration and distress (Bowen et al., 2009; Plugge et al., 2008). Conversely, others have raised concerns that psychotropic medicines may be inappropriately over-prescribed in custody, illicitly traded or sought for their euphoric, anxiolytic or sedative, rather than therapeutic, effects (HM Inspectorate of Prisons, 2007; RCGP, 2011).

We conducted a study to determine prevalence and patterns of psychotropic medication prescribing in prisons and to make robust comparisons with the wider community.

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Methods

A cross-sectional, epidemiological survey was used to measure the prevalence of psychotropic prescribing among adult prisoners in the East of England (which covers the counties of Bedfordshire, Cambridgeshire, Essex, Hertfordshire, Norfolk and Suffolk), compared with a sample of community GP-registered patients from the Clinical Practice Research Datalink (CPRD; formerly known as GPRD). The study was approved by the Northern and Yorkshire Research Ethics Committee (Ref: 09/H0903/54), the National Offender Management Service, the CPRD’s Independent Scientific Advisory Committee and the NHS and private sector management bodies responsible for healthcare at each prison.

Sample

Four prisons in the East of England in 2010 were recruited to the study. Sites were selected to represent a range of prisoner populations, including adults, young offenders (18–21 years), men, women, unconvicted and convicted prisoners (Table 1). A census day was selected at each prison. Dates were dependent on access arrangements and thus varied between sites (18th August 2010 to 14th April 2011). All prisoners aged 18 years and over and in custody at participating prisons on census days were included in the survey, yielding a final sample of 2222 men and 341 women. Individuals aged less than 18 years were excluded as prescribing guidelines differ for children and young people.

For comparison purposes, we obtained data on a sample of community patients from the CPRD. CPRD collects data on more than five million patients from 625 primary care practices, covering approximately 8% of the population. All CPRD patients who were a) alive, b) aged 18 years or over and c) registered with a General Practitioner (GP) in the East of England throughout 1st January and 30th July 2010 were included in the study, yielding a final sample of 138,803 men and 141,365 women. Previous population comparisons have indicated that CPRD patients are representative of the general UK population with respect to age and gender (Office for National Statistics, 2000).

Procedure

On census days at participating prisons, prison healthcare staff used electronic clinical database management systems or clinical records (if prescribing was done manually) to identify all patients with a current, valid prescription for at least one psychotropic medication. For the purposes of this study, psychotropic medication was defined as any medication listed in chapters 4.1–4.4 of the British National Formulary (BNF, 2010), which covers hypnotic and anxiolytic (4.1), antipsychotic and antimanic (4.2), antidepressant (4.3) and stimulant (4.4) medications. For each patient in receipt of prescribed psychotropic medication, prison healthcare staff extracted demographic and prescription-related data from individual clinical records. These data were anonymous, therefore individual patient consent was not required.

The CPRD supplied equivalent, anonymised individual-level data for all community-based patients that met the inclusion criteria and were in receipt of at least one prescribed psychotropic medication on our chosen census date, 30 July 2010. Data were provided as a series of tables, linked by an anonymous patient identifier, which were imported into a Microsoft Access relational database.

The CPRD and each participating prison also provided total population counts, stratified by age and gender, for use as denominators. These data, in combination with individual-level data on individuals prescribed psychotropic medicines, enabled us to calculate prevalence rates.

Data analysis

The principal outcome measure was the point prevalence rate of psychotropic prescribing among prisoners. Prescribing rates and 95% confidence intervals were calculated for each prison and GP-registered community patients, stratified by BNF chapter and gender. Prevalence rate ratios (PRRs) were also generated to compare prescribing rates between prisons and the community. Where indicated, prescribing rates were indirectly standardised, using the community sample as the reference group, to account for differences in age distribution between prison and community samples. Statistical analyses were performed using Stata version 10 software for Windows.

Results

Table 2 describes point prevalence prescribing rates for psychotropics in prison by medication type. Overall, psychotropic medications were prescribed to 19.6% (CI 17.9–21.3%) of men and 44.0% (CI 38.6–49.4%) of women in prison; a female:male ratio of...
of 2.3:1 (CI 1.9–2.6). Among prisoners prescribed psychotropic medications, 67.2% (n = 393) were prescribed a single psychotropic medication, 25.8% (n = 151) were prescribed two medications and 6.8% (n = 40) were prescribed three or more medications. Antidepressants were the most commonly prescribed type of psychotropic medication, prescribed to 13.8% of men and 33.4% of women. Among patients prescribed any psychotropic medication, prisoners were more likely to be prescribed two or more psychotropic medicines concurrently than patients in the community (32.8% vs. 18.4; RR 1.8, CI 1.6–2.0). When compared with the community, prescriptions for hypnotics and anxiolytics were particularly elevated in prisoner populations (Table 2).

After adjustment for age, rates of psychotropic prescribing in prison were 5.5 times higher among men and 5.9 times higher among women than in community populations. Women in prison were at least 12 times more likely than women in the community to be prescribed antipsychotic and antimanic medications. Rates of psychotropic prescribing also varied by prison type (Table 3). Lower rates of psychotropic prescribing were observed in the training prison for sentenced male prisoners (Prison B) than in male local prisons which served the courts (RR 0.6, CI 0.5–0.7); in particular, there was reduced prescribing of hypnotic and anxiolytic medications.

The most frequently prescribed hypnotic/anxiolytic drug in prison was diazepam, which accounted for half of prescriptions in this category (Table 4). Rates of promethazine and diphenhydramine prescribing were higher in prison than in the community (RR 11.3, CI 7.7–16.7; RR 38.9, CI 14.6–103.4). Temazepam accounted for 18.2% (n = 1116) of hypnotic and anxiolytic prescriptions in the community, but was not prescribed at all in prison. The most common antipsychotics prescribed in prison were olanzapine and quetiapine; among patients prescribed antipsychotics, both these drugs were more commonly prescribed in prison than the community (RR 2.0, CI 1.6–2.6; RR 1.5, CI 1.2–2.0). Mirtazapine was the most frequently prescribed antidepressant in prison (31.4%), but accounted for just 5.1% of community antidepressant prescriptions. Prisoners prescribed an antidepressant were six times as likely to receive mirtazapine as patients prescribed an antidepressant in the community (RR 5.9, CI 5.1–6.8), but less likely to receive a tricyclic antidepressant (RR 0.6, CI 0.5–0.8). There were just two instances of CNS stimulant prescribing in prison (both methylphenidate, which is commonly prescribed for Attention Deficit Hyperactivity Disorder).

**Discussion**

This study is the first in-depth analysis of psychotropic prescribing in prisons in the UK in the 21st century. A fifth of men and almost half of women were prescribed at least one psychotropic drug in prison, with antidepressants as the most commonly prescribed type of medication. After adjusting for age differences, women and men in prison were at least five times more likely than community populations to be prescribed psychotropic medication.
Hypnotics and anxiolytics, % (n)
Antidepressants, % (n)

<table>
<thead>
<tr>
<th>Rank (prison)</th>
<th>Hypnotics and anxiolytics</th>
<th>Antipsychotics and antimanics</th>
<th>Antidepressants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drug</td>
<td>Prison</td>
<td>Community</td>
<td>Drug</td>
</tr>
<tr>
<td>1</td>
<td>Diazepam</td>
<td>51.7 (105)</td>
<td>Olanzapine</td>
</tr>
<tr>
<td>2</td>
<td>Zopiclone</td>
<td>20.7 (42)</td>
<td>Quetiapine</td>
</tr>
<tr>
<td>3</td>
<td>Promethazine</td>
<td>15.3 (31)</td>
<td>Risperidone</td>
</tr>
<tr>
<td>4</td>
<td>Chlorpromazine</td>
<td>6.4 (13)</td>
<td>Carbamazepine</td>
</tr>
<tr>
<td>5</td>
<td>Diphenhydramine</td>
<td>3.9 (9)</td>
<td>Pericyazine</td>
</tr>
<tr>
<td>All</td>
<td>100 (203)</td>
<td>100 (6143)</td>
<td>100 (180)</td>
</tr>
</tbody>
</table>

Psychotropic prescribing rates

Our findings are consistent with previous studies, which have reported higher rates of both mental illness and prescribing for psychotropic medications in prisons, particularly among women (Baillargeon and Contreras, 2001; Baillargeon et al., 2001; Elger et al., 2002; Fazel and Danesh, 2002; Harcoûtet, 2010; Kjelsberg and Hartvig, 2005a, 2005b; Singleton et al., 1998; Steadman et al., 2009).

It has been suggested that psychotropic prescribing rates reflect the prevalence of psychiatric morbidity in prison (Kjelsberg and Hartvig, 2005a). After accounting for age differences, a meta-analysis of 62 studies in Western countries estimated a two to four-fold increase in psychosis and major depression in prison populations compared with the community (Fazel and Danesh, 2002). In comparison however, the prescribing ratios generated in the current study for antipsychotics and antidepressants were much higher; while comparisons should be made cautiously, this could potentially suggest an excess of psychotropic prescribing in prisons. There have been concerns about overreliance upon psychotropic medicines in prison and insufficient access to alternative forms of treatment and support (Bradley, 2009; HM Inspectorate of Prisons, 2007). Furthermore, the findings of a recent qualitative study indicated that psychotropic medicines served multiple purposes in prison, contributing towards maintaining order and reducing insomnia in addition to treating symptoms of mental illness (Hassan et al., 2013).

In particular, we found elevated rates of antidepressant prescribing: since the last UK study to consider psychotropic prescribing in prisons in 1997 (Singleton et al., 1998), rates have doubled among men and have increased by 50% among women. Although we cannot be certain, this apparent increase in antidepressant prescribing in prisons would appear to mirror the more general long-term, upward trend in antidepressant prescribing in the wider UK population (Middleton et al., 2001). Several explanations have been proposed for increased antidepressant prescribing rates including improved recognition of depression, increased help-seeking behaviour among patients and lower thresholds for prescribing (Middleton et al., 2001; Moore et al., 2009). It could also be that that increased prescribing of newer antidepressants may be a reflection of the desire to reduce benzodiazepine prescribing, which has greater problems with abuse, withdrawal and dependence. Such factors may have also accounted for the apparent increase in prescribing observed in prisons, at least since 1997, suggested by this study.

Among patients prescribed psychotropic medication, prisoners were almost twice as likely to be prescribed two or more psychotropic medicines concurrently. This is an important finding, given that polypharmacy puts patients at increased risk of drug–drug interactions and adverse effects, in some cases without empirical evidence for improved clinical outcomes (Mojtabai and Olfsen, 2010). Furthermore, research has shown that comitant use of certain psychotropic medicines may increase the risk of mortality (Joukamaa et al, 2006).

Differences in individual drugs

We found the particular psychotropic drugs prescribed in prison differed from those used in community settings. Short-acting benzodiazepines (e.g. temazepam), though commonly prescribed in the community, are discouraged in prison due to their dependence and misuse potential (RCGP, 2011). Dependence on benzodiazepines (both licit and prescribed) is common among prisoners entering custody, and English prisons operate a policy of routine benzodiazepine detoxification on entry to custody (Department of Health, 2006; RCGP, 2011). The BNF recommends patients are transferred to equivalent doses of diazepam, a longer-acting anxiolytic, as a precursor to such treatment (BNF, 2010). This could explain why diazepam accounted for half of all prescriptions for hypnotics and anxiety in prison and there were no instances of temazepam prescribing. It might also explain why rates of hypnotic and anxiolytic prescribing were lower in the prison for sentenced men, as such establishments do not usually accept prisoners currently undergoing detoxification.

Prisoners prescribed antidepressants were less likely to be prescribed tricyclic antidepressants than community-based patients. Tricyclic antidepressants have similar efficacy to other classes of antidepressant drugs, but are more dangerous in overdose (BNF, 2010). Given the high rates of suicide and self-harm among prisoners (Fazel et al., 2005), this may explain reduced use in prisons and could be regarded as a positive finding.

There was also a significant preference for mirtazapine (a noradrenergic and specific serotonergic antidepressant), olanzapine and quetiapine (both atypical antipsychotics) in prison compared with the community. Sedation and weight gain are side effects commonly associated with all three drugs (Miller, 2004; National Collaborating Centre for Mental Health, 2010; Newcomer, 2005). Anecdotal evidence suggests that in a prison setting, where sleep problems are common (Elger, 2007), sedative side effects may be viewed as desirable and therapeutically beneficial; unfortunately, hypnotic effects also increase the value of such drugs and potential for diversion among prisoners without mental illness (RCGP, 2011). Such factors, combined with
the lack of acceptable alternative medicines suitable for use in secure environments, may have contributed towards the increased frequency of mirtazapine prescriptions in prisons observed in this study. Mirtazapine, in particular, was more commonly prescribed in prisons than the community. Recent guidance issued on safer prescribing in prisons (RCGP, 2011) has reiterated that mirtazapine should not be prescribed as a sleeping tablet and should be prescribed second or third line for major depression only; in line with NICE guidance (National Institute of Health and Clinical Excellence, 2009). Finally, the propensity for weight gain associated with these drugs, particularly olanzapine (Newcomer, 2005), should not be overlooked. Indeed, there is increasing evidence that certain prescribed psychotropic medicines can increase metabolic and cardiovascular risks, thereby increasing the risk of morbidity (e.g. diabetes, obesity and stroke) and early mortality (Newcomer, 2007).

Strengths and limitations

Previously, relatively few studies internationally (Baillargeon and Conterras, 2001; Baillargeon et al., 2001; Elger et al., 2002; Harcouët, 2010; Kjelsberg and Hartvig, 2005a, 2005b), and just one UK study (Singleton et al., 1998), now over a decade old, have described rates of psychotropic prescribing in prisons. Furthermore, few have included a large, robust community comparison group and none have adequately controlled for age and gender. Despite these strengths, our study was not without limitations. No assessment of mental state was made, thereby limiting our ability to judge the appropriateness of prescribing; however, clinical diagnoses will be taken into account as part of a future study. Nor did we measure all potential factors which may have influenced prescribing, including drug costs, adherence to formularies (local lists of approved medicines), criminological characteristics (e.g. sentence status) and individual prescriber characteristics and/or behaviour. The cross-sectional, census design used eliminated non-response bias, but will have resulted in underrepresentation of prisoners with shorter sentences. All patients (prison and community) were located in the East of England, and thus care should be taken when generalising findings elsewhere, although there are no reasons to believe that prison populations or prescribing arrangements are substantially different in this region to others in the UK.

Conclusions

Prisoners represent a small proportion of the population, but their burden of mental health need is disproportionately high. In this study, rates of psychotropic prescribing in East of England prisons were at least five times higher than in the community, with discernable differences in drug choice. Given the complex health and security concerns that exist within secure settings, further work is necessary to determine whether these prescribing patterns are justified and appropriate. As a minimum, robust data on the prevalence and appropriateness of psychotropic prescribing on a national scale are essential to inform future medicines management policy in prisons. In particular, an important question is whether current patterns of psychotropic prescribing in prisons represent the optimum balance between effectively treating mental illness and preventing addiction, diversion and misuse of prescribed medication. Future studies could also consider whether differences observed in antidepressant and antipsychotic drug choice among prisoners are associated with increases in physical morbidity and mortality.

Conflict of interest

The authors declare that there are no conflict of interest.

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References


