Mental illness in primary care: a narrative review of patient, GP and population factors that affect prescribing rates

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Background. Mental illness poses a large and growing disease burden worldwide. Its management is increasingly provided by primary care. The prescribing of psychotropic drugs in general practice has risen in recent decades, and variation in prescribing rates has been identified by a number of studies. It is unclear which factors lead to this variation.

Aim. To describe the variables that cause variation in prescribing rates for psychotropic drugs between general practices.

Methods. A narrative review was conducted in January 2018 by searching electronic databases using the PRISMA statement. Studies investigating causal factors for variation in psychotropic prescribing between at least two general practice sites were eligible for inclusion.

Results. Ten studies met the inclusion criteria. Prescribing rates varied considerably between practices. Positive associations were found for many variables, including social deprivation, ethnicity, patient age and gender, urban location, co-morbidities, chronic diseases and GP demographics. However studies show conflicting findings, and no single regression model explained more than 57% of the variation in prescribing rates.

Discussion. There is no consensus on the factors that most predict prescribing rates. Most research was conducted in countries with central electronic databases, such as the United Kingdom; it is unclear whether these findings apply in other healthcare systems. More research is needed to determine the variables that explain prescribing rates for psychotropic medications.

Background

Mental health disorders are a major and growing global disease burden, and the World Health Organization estimates their lifetime prevalence to be 18.1–36.1% worldwide (Kessler *et al.* 2009). They represent the largest contributor to disease burden in Europe, and effect up to a third of Europeans annually (Wittchen *et al.* 2011). Mental illness represents a large cost to healthcare budgets, and is associated with shorter lifespans, co-morbidities and chronic ill health (Wykes *et al.* 2015). The European Commission emphasised the prevention of depression and suicide as one of the five key priorities for mental health in EU member states (European Commission, 2008). Over 800 000 people die due to suicide each year, and it is the second leading cause of death among 15–29 year olds worldwide (World Health Organization, 2015). In Ireland, there were 451 deaths due to suicide in 2015 (Central Statistics Office, 2015). In 2014, 3187 inpatients

and 517 day patients with mental diseases or disorders were discharged from acute public hospitals, with a mean length of stay of 7.5 days (Healthcare Pricing Office, 2014).

Most patients with mental health disorders are treated in primary care (World Health Organization, 2001; McDaid, 2013). The most common mental health issues treated in primary care are depression, anxiety and substance abuse (World Health Organization, 2001). The prescribing of psychotropic drugs in general practice has risen in recent years. A UK review of 138 general practices found that antidepressant prescribing more than doubled between 1995 and 2011 (Mars *et al.* 2017). The United States saw a similar growth in antidepressant prescribing rates, from 6.5% to 10.4% between 1999 and 2010 (Mojtabai & Olfson, 2014). There has also been a growth in the prescription of antipsychotic drugs in a number of countries (Verdoux *et al.* 2010). The cause of this rise in prescribing remains unclear (Munoz-Arroyo *et al.* 2006), though studies suggest it may be attributable to new drug classes such as selective serotonin reuptake inhibitors (Mars *et al.* 2017), an increase long-term psychotropic treatment of mental illness (Moore *et al.* 2009) or

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a lack of proactive medication review (Johnson *et al.* 2017).

A number of studies have found variation in psychotropic prescribing rates between general practices. Factors found to influence prescribing rates include patient factors such as age (Hull *et al.* 2005), ethnicity (Morrison *et al.* 2009) and educational level (Mackenzie *et al.* 1999); GP factors such as gender (Morrison *et al.* 2009) and country of qualification (Hull *et al.* 2005); and population factors such as ethnic density (Schofield *et al.* 2016) and social deprivation (Walters *et al.* 2008). Many of such studies only documented variation in single sites (Mant *et al.* 1983; Bellantuono *et al.* 1989) or from national-level data without analysing differences between practices (Butterworth *et al.* 2013; Marston *et al.* 2014; Hughes & Erskine, 2016). As the diagnosis and treatment of mental illness continues to evolve, and its care increasingly moves to primary care, it is important to understand the variation in prescribing rates between general practices, and to determine the social and demographic factors that influence this variation. This narrative review aimed to identify and review studies examining the variables that cause variation in prescribing rates for psychotropic drugs between general practices, and to determine how much of this variation could be explained by known factors.

Methods

Method

This narrative review used the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) statement (Moher *et al.* 2009). To identify all potentially eligible studies, an electronic search was conducted using the following databases: OVID MEDLINE, EMBASE (Elsevier), CINAHL Plus (EBSCO) and Science Direct. Reference lists of included studies were screened to identify any further relevant studies. Results of this search were then refined by applying inclusion and exclusion criteria. The search was conducted in January 2018, and no date range was imposed for included studies.

Search terms and outcome

The electronic database search in titles and abstracts included three main terms and their variations: general practice (family practice, primary care); prescribing (prescription); and mental health (mental illness, mental disorders) or psychotropic, antidepressants, anxiolytics, hypnotics or sedatives. An example of the search strategy for one electronic database is as follows: ((general practice OR family practice OR primary care) AND (prescribing OR prescription) AND (mental
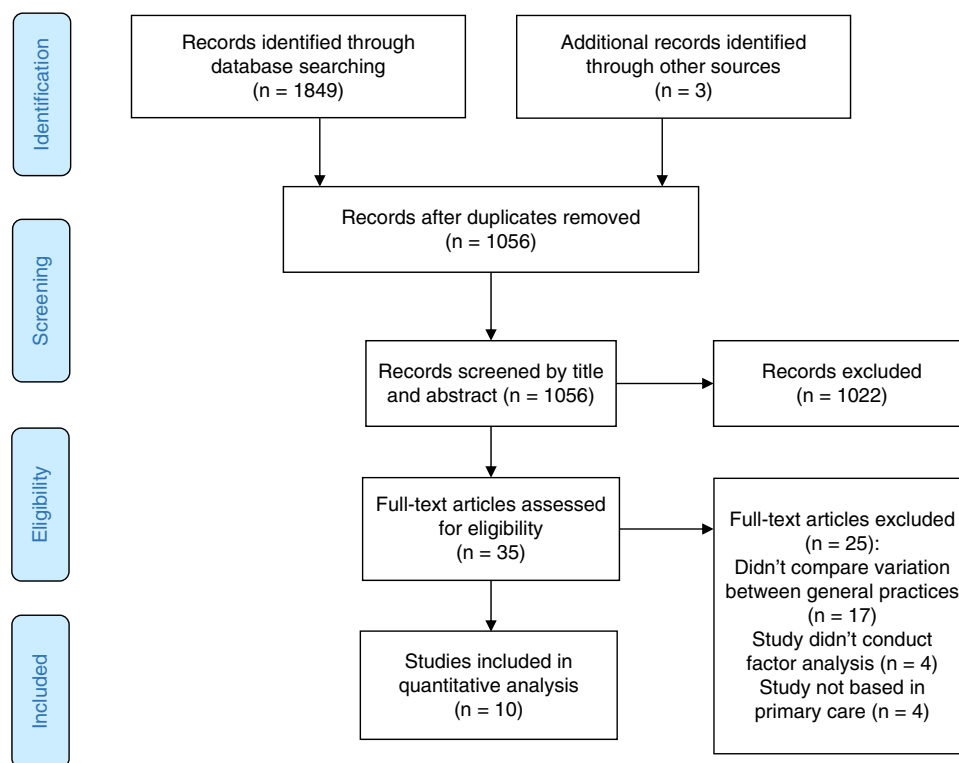

Fig. 1. Study selection flow diagram.

health OR mental illness OR mental disorders OR psychotropic OR anti-depressant* OR anxiolytic* OR hypnotic* OR sedative*)) [Title/Abstract]. The search yielded 1849 studies. Duplicates were removed and the lead author reviewed 1056 titles and abstracts according to the inclusion and exclusion criteria listed below (Fig. 1).

Inclusion criteria

1. Studies of factors affecting prescribing rates for mental illness in primary care
2. Studies that compared variation between at least two general practice sites
3. Studies that conducted a statistical factor analysis to investigate the causal factors of variation
4. If more than one profession is studied, GP results are reported separately
5. Published before January 2018
6. English language
7. Published in peer-reviewed publications.

Exclusion criteria

1. Studies in secondary care settings
2. Studies based in a single general practice setting.

At the title and abstract screening, 1022 records were excluded based on the above inclusion and exclusion criteria. The full text of 35 studies was assessed for eligibility, and 24 were excluded: 17 did not compare variation between at least two general practices; four did not conduct factor analysis to investigate causal factors of variation; and three were not based in primary care settings. A total of 10 papers were included for quantitative analysis.

Results

A total of 10 studies met the inclusion and exclusion criteria and were included in this review. Their key characteristics are presented in Table 1. Five related to antidepressant prescribing (Mackenzie *et al.* 1999; Hansen *et al.* 2003; Walters *et al.* 2008; Morrison *et al.* 2009; Johnson *et al.* 2014), one to anxiolytics and hypnotics (Tsimtsiou *et al.* 2009), and four to multiple psychotropic medications (Pharoah & Melzer, 1995; Hull *et al.* 2001, 2005; Rubio-Valera *et al.* 2012). All were based in one of three European countries: eight related to UK general practices (Pharoah & Melzer, 1995; Mackenzie *et al.* 1999; Hull *et al.* 2001, 2005; Walters *et al.* 2008; Morrison *et al.* 2009; Tsimtsiou *et al.* 2009; Johnson *et al.* 2014), one to Dutch practices (Hansen *et al.* 2003) and one to Spanish practices (Rubio-Valera *et al.* 2012). The data were relatively old, with only five of the studies published in the last decade (Walters *et al.* 2008;

Table 1. *Research settings*

References	Issue	Year, country	n practices	Prescribing variability	% variance explained by multiple regression model
Morrison *et al.* (2009)	Antidepressants	2009, UK	983	2.24–13.84% standardised prescribing ratio	49.4%
Walters *et al.* (2008)	Antidepressants	2008, UK	8430	10–15066 average daily quantities	44%
Hansen *et al.* (2003)	Antidepressants	2003, The Netherlands	174	2.58% (10% percentile)–5.46% (90% percentile)	Univariate regression only
Mackenzie *et al.* (1999)	Antidepressants	1999, UK	78	Not reported	Univariate regression only
Johnson *et al.* (2014)	Antidepressants	2014, UK	11	9576–65409 defined daily doses per 1000 patients	Univariate regression only
Tsimtsiou *et al.* (2009)	Anxiolytics and hypnotics	2009, UK	8469	3093 (5% percentile)–24967 (95% percentile) average daily quantities	17.7% for antidepressants
Hull *et al.* (2005)	Antidepressants and anxiolytics	2005, UK	139	0.60–24.47 average daily quantities per practice population (annual)	57% for antidepressants
Hull *et al.* (2001)	Antidepressants and anxiolytics	2001, UK	138	0.5–12.4 daily dose per practice population	47.7% for antidepressants
Pharoah & Melzer (1995)	Antidepressants, anxiolytics and hypnotics	1995, UK	61	11-fold difference for hypnotics 13-fold difference for anxiolytics 8-fold differences for antidepressants	25% hypnotics 19% anxiolytics 34% antidepressants
Rubio-Valera *et al.* (2012)	Antidepressants, anxiolytics and hypnotics	2011, Spain	78	Not reported	Univariate regression only

Table 2. *Explanatory factors for variation in antidepressant prescribing*

References	Morrison et al. (2009)	Walters et al. (2008)	Hansen et al. (2003)[a]	Mackenzie et al. (1999)[a]	Johnson et al. (2014)	Hull et al. (2005)	Hull et al. (2001)	Pharoah & Melzer (1995)	Rubio-Valera et al. (2012)[a]
Population factors									
Social deprivation		+	+						
White ethnicity		+							
Asian ethnicity		−						−	
Black ethnicity		−							
Urban location	+								
Patient factors									
Co-morbid chronic diseases		+		+					
Standardised illness ratio	+								
Minority ethnicities	−								
Female						+		+	+
Increased age						+			+
Educational level				−					
Lone parent				+					
Temporary residents								+	
GP and practice factors									
Female gender	+								
Increased age	−								
Non-UK-native	−								
Qualified in UK						+			
Practice list size	−					−			
Group practice	+		−				+		
Availability of psychology services	−		+						
Practice manager							+		
High surgery consultation rate			+						
High general prescribing prevalence			+						
GP seniority			−						

+, increased prescribing; −, decreased prescribing.
[a] Univariate regression only.

Morrison *et al.* 2009; Tsimtsiou *et al.* 2009; Rubio-Valera *et al.* 2012; Johnson *et al.* 2014). Sample sizes ranged from 11 to 8469 general practices.

Prescribing rates were measured differently across studies. Some measured average daily quantities, whereas others measured patient population percentages or standardised prescribing ratios. Where reported, prescribing rates between the highest and lowest practices varied considerably. The highest rate of variation was 10–15 066 average daily quantities (Walters *et al.* 2008). Six of the studies carried out multivariate regression (Pharoah & Melzer, 1995; Hull *et al.* 2001, 2005; Walters *et al.* 2008; Morrison *et al.* 2009; Tsimtsiou *et al.* 2009) and four carried out univariate regression only (Mackenzie *et al.* 1999; Hansen *et al.* 2003; Rubio-Valera *et al.* 2012; Johnson *et al.* 2014). The multivariate models explained from 17.7% to 57% of variance in antidepressant prescribing rates.

Factors explaining variation were inconclusive. One study of antidepressants, the most studied psychotropic drug from the identified articles, found population characteristics such as social deprivation to be the

most important (Walters *et al.* 2008; Johnson *et al.* 2014), while others reported patient (Pharoah & Melzer, 1995; Mackenzie *et al.* 1999; Rubio-Valera *et al.* 2012) or GP (Hansen *et al.* 2003; Morrison *et al.* 2009) characteristics as primary causal factors (see Table 2). Of the population factors, social deprivation, urban location and the proportion of the population with White ethnicity appear to have positive associations with antidepressant prescribing. Patients with comorbid chronic diseases, female gender and increased age were reported to have higher rates of antidepressant prescriptions, as were lone parents and temporary residents. Minority ethnicities and those of lower educational levels had lower rates of antidepressant prescribing.

GPs who were female, younger, more junior, native to and qualified in the country in which they were practicing had higher prescribing rates. Practices with smaller patient list sizes, a practice manager and high general prescribing and consultation rates also had higher antidepressant prescribing rates. There were some conflicting findings: group practices and the availability of psychology services were both positively and negatively associated with rates of prescription.

Discussion

Summary of main findings

A total of 10 articles exploring the causal factors for variation in psychotropic prescribing rates between general practices were found. Eight were from the United Kingdom, all from Europe, and half were over a decade old. The most common drugs studied were antidepressants and anxiolytics. A large variation was found between practices for rates of psychotropic medication prescribing. There was no consensus on the factors that explained this inter-practice variation in prescribing rates, and the current literature has some conflicting findings. The reviewed studies identified a large number of explanatory variables, and no regression model explained >57% of the variance. Some studies suggested that patient and GP characteristics are the primary predictors (Hull *et al.* 2001; Hull *et al.* 2005; Morrison *et al.* 2009); others found that social deprivation and population ethnicity were more important (Pharoah & Melzer, 1995; Walters *et al.* 2008; Johnson *et al.* 2014).

Comparisons to existing literature

Variation in psychotropic prescribing has been identified more widely in the scientific literature, including studies which did not meet inclusion criteria of this review. Variation has been identified in other settings such as paediatric primary care practice (Mayne *et al.*

2016) and hospital clinics (Morabia *et al.* 1992), and in descriptive papers which did not carry out factor analysis to explore causation (Hughes *et al.* 2016; Brijnath *et al.* 2017). Despite the potential consequences of this for patient care, the mechanism of how these factors influence prescribing rates is unclear.

Social deprivation may be an important factor – its association with higher rates of prescribing 'inverse care law', whereby patients in deprived areas receive poorer care (Hart, 1971). Of the studies in this review, Walters *et al.* (2008) found higher prescribing and illness rates in areas with high social deprivation. Tsimtsiou *et al.* (2009) suggested that the higher rates of anxiolytic and hypnotic prescribing they found in deprived areas may represent a coping strategy for dealing with disadvantage and higher rates of physical illness. More affluent areas may also have more access to psychotherapies and alternative treatments for mental disorders (Tsimtsiou *et al.* 2009).

Patient ethnicity also appears significant – Walters *et al.* (2008) suggest that higher ethnic minority density might confer a protective mental health benefit to minority populations, reducing both depression prevalence and its psychotropic treatment. Hull *et al.* (2001) likewise found that Asian ethnicity was negatively associated with prevalence rates, which may be due to cultural differences in symptomatic experiences or practical difficulties in diagnosis and management.

GPs themselves may differ in their ideas about depression and whether it is predominantly social or biological, affecting their prescribing patterns (Hyde *et al.* 2005). Patient gender, economic status and expectations for treatment may also bias GPs' prescribing patterns (Hyde *et al.* 2005; Brijnath *et al.* 2017), and patients with longer-term disorders may become 'experts' in their conditions, choosing to seek higher medication doses or longer treatment duration (Johnson *et al.* 2014).

Limitations of current research

The studies identified in this review measured and incorporated into regression analysis for different variables – some measured population statistics gathered from census data, while others used GP and patient data only. This, therefore, affected the range of factors that were identified as significant. Different measures were used for patient and GP characteristics between studies, and so the results are not directly comparable. Only six conducted multiple regression analysis, and of these, no model predicted >57% of variance.

Many had small sample sizes and were carried out in specific populations such as east London (Hull *et al.* 2001, 2005) or Catalonia (Rubio-Valera *et al.* 2012); their

results may not be generalisable to other areas. Research suggests that antidepressant rates vary by country – one multicountry comparison found higher rates in the United Kingdom than in the Netherlands, Spain, Denmark or Germany (Abbing-Karahagopian *et al.* 2014) – and so the profile of psychotropic prescribing, its variation between practices and the causes of variation may differ. In addition, this review was a narrative review, rather than a systematic review. While a search strategy was used, and all eligible papers included, this review may not be a comprehensive summary of all studies on inter-practice variation in psychotropic prescribing. Formal risk of bias assessment was not carried out; this may reduce the validity of this paper's conclusions.

Implications for future research and clinical practice

Suicide and mental health problems are major public health issues (Wykes *et al.* 2015), and their prevention and management in primary care is an important yet understudied area (McDaid, 2013). This review identified a wide and only partially explained variation in prescribing rates for psychotropic medications. Though some of the variation may simply be random, the findings of this study do suggest differences in patient care, with major implications for patients, health professionals and health systems. To date, most of the studies of inter-practice variation have been conducted in countries with centralised electronic health records (Netherlands Institute for Health Services Research, 2018; Clinical Practice Research Datalink, 2018); however, the growing adoption of electronic health records worldwide would allow researchers to determine whether this variation exists in other health systems, and explore the explanatory factors if so. Population factors such as social deprivation appear to be significant when included in analysis models, and new mapping technologies and publically available population datasets would allow complex models exploring causal factors to be developed and tested. The impact of prescribing variation on patients' health outcomes for patients is also a potential area for future research.

Conclusions

A wide variation in psychotropic prescribing in general practice exists, and it remains unclear which factors explain this variation. Scientific knowledge has not progressed much in the past decade, and most research has been carried out in a single country. Only some studies incorporated population statistics such as deprivation into their analysis, though it was found to be a significant factor in those that did. This review found that a wide and complex range of population,

patient and GP variables appear to influence variation. Updated research in a wider range of countries and health systems is needed to identify the variables that explain prescribing rates for psychotropic medications. The impact of the significant variation seen in the existing research also needs urgent research attention.

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Conflicts of Interest

The authors declare that there are no conflicts of interest.

Ethical Standards

The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committee on human experimentation with the Helsinki Declaration of 1975, as revised in 2008. The authors assert that ethical approval for publication of this review article was not required by their local Ethics Committee.

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