Study of a Cohort of Patients Newly Diagnosed With Depression in General Practice: Prevalence, Incidence, Comorbidity, and Treatment Patterns

Elisa Martín-Merino, BPharm, MSc; Ana Ruigómez, MD, PhD; Saga Johansson, MD, PhD; Mari-Ann Wallander, PhD; and Luis A. García-Rodriguez, MD, MSc

Objective: To estimate the prevalence and incidence of depression; investigate its association with risk factors including comorbidities and drug and health care use; and describe treatment patterns of depression in primary care using The Health Improvement Network database.

Method: In this cohort study, subjects with a first recorded diagnosis of depression (Read code) between January 1, 2002, and December 31, 2004 (n = 47,170) were identified from a source population of 1,287,829 subjects aged 10–79 years. A comparison group was sampled from the same population and frequency matched to the depression cohort by age, sex, and calendar year (n = 50,000). Depression diagnoses were validated using physician-completed questionnaires. Odds ratios and 95% CIs for the relationship of depression with a range of factors were estimated using unconditional logistic regression in a nested case-control analysis.

Results: The prevalence of depression was 11.23% (95% CI, 11.18–11.28). This prevalence decreased with increasing age and was higher in women than in men. The incidence was 13.89 per 1,000 person-years (95% CI, 13.82–14.08). Depression was associated with frequent use of health services, smoking, pregnancy in the previous year, anxiety, stress, sleep disorders, digestive and respiratory disorders, and pain. In the trimester following diagnosis, 82% of cases were treated—98% with antidepressants and 81.5% with selective serotonin reuptake inhibitors (SSRIs).

Conclusions: We found a high prevalence and incidence of depression diagnoses in primary care in the United Kingdom. Following diagnosis, the majority of individuals were prescribed SSRIs. A diagnosis of depression is associated with a number of prior comorbidities, which could mask the depression. This fact should be taken into account when screening individuals in primary care. *Prim Care Companion J Clin Psychiatry 2010;12(1):e1–e8* © *Copyright 2010 Physicians Postgraduate Press, Inc.*

Submitted: December 18, 2008; accepted April 6, 2009. Published online: February 18, 2010 (doi:10.4088/PCC.08m00764blu). Corresponding author: Ana Ruigómez, MD, PhD, Centro Español de Investigación Farmacoepidemiológica, Almirante 28 (2°), Madrid 28004, Spain (aruigomez@ceife.es). Depression is a common mental disorder, symptoms of which can become chronic or recurrent and can lead to substantial impairments in an individual's ability to cope with everyday activities. In severe cases, depression can lead to suicide.¹

Clinical depression can affect all age groups, from the young to the very elderly, and both biologic and emotional factors may influence its development. Depression disorders are common in patients with lifethreatening and chronic physical illness, for example those with chronic pain, sleep disorders, diabetes, arthritis, cerebrovascular disease, heart disease, and malignancies.^{2,3} People with limited social support or other adverse social circumstances, such as a personal or family history of psychological disorder, alcoholism, or substance misuse, are particularly prone to depression.⁴ The disorder is also associated with poor health and reduced functional status and quality of life.⁵

According to national statistics in the United Kingdom, 1 in 8 adults in Great Britain had a neurotic disorder (such as anxiety or depression) in 2000,⁶ and 1 in 7 had considered suicide at some point in their lives.⁷ Neurotic disorders were more common in women (14%) than in men (9%), and mixed anxiety and depression occurred in 8% of women and 5% of men.⁶

Despite its enormous clinical and public health importance, depressive illness can be underdiagnosed and undertreated,⁴ particularly when there is an overlap of symptoms with a physical illness. Primary care physicians (PCPs) play a key role in screening for depression and selecting appropriate treatment.^{4,8}

Our study aimed to estimate the prevalence and incidence of depression in the general UK population in a primary care setting using The Health Improvement Network (THIN) database. In addition, we aimed to study risk factors associated with the initial diagnosis of depression and to evaluate comorbidity and treatment patterns in individuals with depression.

METHOD

Design and Source Population

A cohort study with a nested case-control analysis was performed using data from THIN, which has been

CLINICAL POINTS

- Depression is a disorder with a high prevalence and incidence in the United Kingdom; we found the highest rates among young female patients.
- Depression is associated with other comorbidities that could mask the diagnosis.
- Selective serotonin reuptake inhibitors were the first treatment choice among depressive patients in primary care.

validated previously for use in pharmacoepidemiologic research.⁹ This database includes information from participating PCPs on patients' demographics, consultations, referrals, hospitalizations, and laboratory tests. Diagnoses and test procedures are reordered using Read codes. Prescriptions ordered by the PCPs for these patients are generated and recorded automatically in the database using a coded drug dictionary (Multilex; www.firstdatabank.co.uk).

We identified all individuals who were aged 10–79 years and registered with THIN between January 1, 2002, and December 31, 2004 (the study period). These individuals were included in the source population for follow-up only if they had been registered for at least 2 years with their PCP prior to the start of the study period. Individuals aged 70 years or older who had fewer than 2 PCP visits during the follow-up period were excluded (proxy for incomplete data recorded). The date at which all the above eligibility criteria were met was defined as the patient's start date. Finally, all individuals with a recorded diagnosis of depression before the start date were excluded. After these exclusions, the source population numbered 1,287,829 individuals.

Identification of the Depression Cohort

All members of the source population were followed from the start date until the earliest of the following end points: diagnosis of depression (identified from Read codes), death, reaching the age of 80 years, or end of the study period (December 31, 2004). We initially identified 53,483 patients who received their first diagnosis of depression during the study period. Of these, we excluded patients who had 5 or more prescriptions for antidepressants before the recorded diagnosis, because such treatment patterns were highly unlikely to represent incident cases (6,313 individuals). The final depression cohort therefore comprised 47,170 individuals. The index date in this population was the date of depression diagnosis.

Identification of a Comparison Cohort

All members of the source population who did not have a recorded diagnosis of depression were assigned a random date within the study period as an index date. If this index date fell within the individual's period of contribution to the study, he or she was eligible for inclusion in the comparison cohort. The same eligibility criteria as for the depression cohort were applied, with the added condition of having no diagnosis of depression before December 31, 2004. From the pool of eligible individuals, a sample was selected and frequency matched to the depression cohort by age (± 1 year), sex, and calendar year. The size of this comparison cohort was 50,000 individuals.

Validation of Depression Diagnosis

For a random sample of depression cases (n = 140), we sent a questionnaire to the PCP requesting confirmation of the diagnosis of depression, as well as other information associated with the diagnosis (eg, intensity, related symptoms, related conditions, treatment followed, and referrals or hospitalizations related to the depression). We received 135 valid completed questionnaires: 121 of which confirmed that the patient was diagnosed with depression for the first time during the study period (confirmation rate, we did not validate the remaining depression cases.

Data Collection

Other demographic data, including sex, age, smoking status, body mass index (BMI), alcohol consumption, use of health services, morbidities, and medication status, were collected from the database for both cohorts at the index date.

We ascertained past morbidity status by examining the database for Read codes suggestive of any of the following conditions at any time prior to the index date: cardiovascular, gastrointestinal, inflammatory, and respiratory diseases; psychiatric and psychological disorders; and hyperlipidemia, diabetes, pain, and cancer, as well as addiction problems. History of pregnancy or any surgery in the year before the index date was assessed. We also collected data on any diagnoses of anxiety within a month of the index date.

We also collected information on various drug treatments prescribed at any time before the index date, including analgesics, anti-inflammatory drugs, drugs affecting the central nervous system (CNS), drugs used to treat cardiovascular diseases, and acid-suppressing drugs. These treatments were identified by examining Figure 1. Prevalence of Depression by Age and Sex During the Study Period (January 1, 2002–December 31, 2004)



the Multilex codes recorded in the database. We divided therapeutic drug exposure into 4 categories: "current users," whose supply of medication from the most recent prescription lasted until the index date or ended in the 30 days before the index date; "recent users," whose supply lasted until 31–365 days before the index date; "past users," whose medication ended more than 1 year before the index date; and "non users," who had no prescription recorded before the index date. Among patients with depression, we also collected information on specific treatment with antidepressants, hypnotics, anxiolytics, and antipsychotics during the year after the initial diagnosis of depression. Again, drug use was identified from the recorded Multilex codes.

Cohort Analyses

The prevalence of depression was calculated by summing all cases of depression during the study period together with all patients who had a recorded diagnosis of depression in the 2 years before 2002. This number was divided by the number of individuals in the source population, including those who were later excluded for a diagnosis of depression (either before or during the study period). The prevalence was then expressed as a percentage. Age-specific and sex-specific prevalence rates of depression were estimated.

Incidence was calculated by dividing the number of newly diagnosed cases of depression by the total person-time accrued during the followup period. We corrected the incidence estimates by weighting them using the confirmation rate obtained in the validation study (89.6%).

Case-Control Analysis

A nested case-control analysis was performed to quantify the association between newly diagnosed depression and demographic factors, use of health





services, comorbidities, and use of therapeutic drugs. We estimated odds ratios (ORs) and 95% CIs by unconditional logistic regression. All risk estimates were adjusted by frequency-matched variables (age, sex, and calendar year), as well as by smoking status, PCP visits, and the presence of stress, sleep, and anxiety disorders (variables for which the OR was higher than 2.0). The risk estimates were not modified when adjusted for BMI or alcohol consumption.

RESULTS

Prevalence

The prevalence of depression was 11.23% (95% CI, 11.18–11.28): 7.46% in men and 14.73% in women. Among women, the highest prevalence was in those aged 30–39 years (20.39%), and this prevalence then decreased with age to 11.52% in those aged 70–79 years. The prevalence in men followed a broadly similar trend with age but varied to a lesser degree than in women (Figure 1).

Incidence

In a total of 3,043,254 person-years of observation, we identified 41,170 new diagnoses of depression. The incidence of depression was therefore 13.89 per 1,000 person-years (95% CI, 13.82–14.08). The corresponding incidence was 10.07 per 1,000 person-years in men and 17.98 per 1,000 personyears in women. The highest incidence was found among women aged 20–29 years (Figure 2).

Risk Factors, Comorbidity, and Drug Use

The risk of a diagnosis of depression was higher in current smokers (OR = 1.67; 95% CI, 1.62-1.73) or ex-smokers (OR = 1.19; 95% CI, 1.13-1.24) compared with those who had never smoked (Table 1). A diagnosis of depression was also associated with

	Depression Cohort	Comparison Cohort		
Characteristic	(n = 47, 170)	(n = 50,000)	Odds Ratio ^b	95% CI
Sex				
Male	17,667 (37.5)	18,728 (37.5)	NA ^c	NA ^c
Female	29,503 (62.5)	31,272 (62.5)	NA ^c	NA ^c
Calendar year				
2002	15,659 (33.2)	14,769 (29.5)	NA ^c	NA ^c
2003	17,356 (36.8)	16,368 (32.7)	NA ^c	NA ^c
2004	16,985 (36.0)	16,033 (32.1)	NA ^c	NA ^c
Age, y				
10-19	3,999 (8.5)	4,242 (8.5)	NA ^c	NA ^c
20-39	19,279 (40.9)	20,431 (40.9)	NA ^c	NA ^c
40-59	16,256 (34.5)	17,232 (34.5)	NA ^c	NA ^c
60-79	7,636 (16.2)	8,095 (16.2)	NA ^c	NA ^c
Body mass index (kg/m ²)				
13–19	2,909 (6.2)	3,196 (6.4)	1.10	1.04 - 1.17
20-24	15,022 (31.8)	14,113 (0.0)	1	
25–29	11,343 (24.0)	11,041 (28.2)	1.01	0.97 - 1.05
≥30	6,304 (13.4)	6,935 (22.1)	1.07	1.03 - 1.12
Unknown	11,885 (25.2)	14,422 (13.9)	1.05	1.01 - 1.10
Alcohol use (units/wk)				
No use	15,274 (32.4)	14,729 (29.5)	1	
1-15	17,060 (36.2)	18,412 (36.8)	0.91	0.88 - 0.94
<43	3,359 (7.1)	3,352 (6.7)	0.91	0.86-0.96
≥43	553 (1.2)	350 (0.7)	1.21	1.05 - 1.40
Unknown	10,924 (23.2)	13,157 (26.3)	1.00	0.95-1.06
Smoking status				
Nonsmokers	20,660 (43.8)	25,628 (51.3)	1	
Smokers	14,777 (31.3)	10,729 (21.5)	1.67	1.62 - 1.73
Ex-smokers	5,700 (12.1)	5,061 (10.1)	1.19	1.13 - 1.24
Unknown	6,033 (12.8)	8,582 (17.2)	1.11	1.06 - 1.15
Primary care physician visits ^d				
0-2	9,902 (21.0)	20,283 (40.6)	1	
3-10	23,296 (49.4)	22,966 (45.9)	2.01	1.95 - 2.08
≥11	13,972 (29.6)	6,751 (13.5)	4.03	3.87-4.20
Referrals/hospital ^a				
No	24,343 (51.60)	33,851 (67.7)	1	
Yes	22,827 (48.4)	16,149 (32.3)	1.32	1.28 - 1.36
Psychotherapy ^a				
No	47,057 (99.8)	49,989 (100.0)	1	
Yes	113 (0.2)	11 (0.0)	6.70	3.54-12.69

Table 1. Demographic Characteristics and Health Care Utilization Among Individuals With a Diagnosis of Depression Compared With Individuals With No Diagnosis of Depression, and Their Association With a Diagnosis of Depression^a

^aData are presented as n (%).

^bOdds ratios adjusted for age, sex, calendar year, smoking, primary care physician visits, stress, and sleep and anxiety disorders.

Not applicable due to the matched design.

^dHealth care contacts in the year before the index date.

Symbol: . . . = no data.

more frequent visits to a PCP in the year prior to the index date (OR = 2.01; 95% CI, 1.95–2.08 for 3–10 visits and OR = 4.03; 95% CI, 3.87–4.20 for \geq 11 visits compared with 0–2 visits) and with being referred or hospitalized (OR = 1.32; 95% CI, 1.28–1.36).

In terms of comorbidity, previous diagnoses of psychological disorders such as stress (OR = 2.85; 95% CI, 2.70–3.01), anxiety (OR = 2.31; 95% CI, 2.21–2.42), or sleep disorders (OR = 2.11; 95% CI, 1.99–2.23) were the strongest predictors of a diagnosis of depression (Table 2). Sixteen percent of patients with a diagnosis of depression had previously consulted a physician concerning an anxiety disorder, and 15.5% of patients were also diagnosed with anxiety within a month of their depression diagnosis. We also found that a history of addiction problems was associated with a diagnosis of depression (OR = 1.68; 95% CI, 1.55-1.81).

As shown in Table 2, individuals with a history of other chronic diseases were also at increased risk of being diagnosed with depression; however, this increase in risk was small (Table 2). Pregnancy within the preceding year was associated with a diagnosis of depression (OR = 1.43; 95% CI, 1.33-1.53), as was a recent history of surgery (OR = 1.17; 95% CI, 1.13-1.21).

We observed that prior use of drugs that act on the CNS was more frequent among patients newly diagnosed with depression than in the comparison cohort (Table 3). Twelve percent of depression patients were taking

	Depression Cohort	Comparison Cohort		
Variable	(n=47,170)	(n = 50,000)	Odds Ratio ^b	95% CI
Cardiovascular				
Ischemic heart disease	2,320 (4.9)	1,678 (3.4)	1.07	1.00 - 1.15
Cerebrovascular disease	1,346 (2.9)	904 (1.8)	1.26	1.15-1.38
Atrial fibrillation	619 (1.3)	428 (0.9)	1.11	0.97 - 1.27
Heart failure	473 (1.0)	264 (0.5)	1.28	1.09 - 1.51
Psychological				
Stress	6,380 (13.5)	2,034 (4.1)	2.85	2.70-3.01
Sleep disorder	4,828 (10.2)	1,893 (3.8)	2.11	1.99-2.23
Anxiety disorder	7,552 (16.0)	2,969 (5.9)	2.31	2.21-2.42
Addiction problems	2,329 (4.9)	1,059 (2.1)	1.68	1.55 - 1.81
Digestive				
Gastroesophageal reflux disease	4,568 (9.7)	3,215 (6.4)	1.16	1.10 - 1.22
Irritable bowel syndrome	3,202 (6.8)	2,311 (4.6)	1.11	1.05 - 1.18
Dyspepsia	7,098 (15.0)	5,125 (10.3)	1.13	1.08 - 1.17
Peptic ulcer	1,562 (3.3)	1,081 (2.2)	1.19	1.09-1.30
Respiratory				
Chronic obstructive pulmonary disease	993 (2.1)	548 (1.1)	1.32	1.18 - 1.47
Asthma	7,924 (16.8)	6,611 (13.2)	1.12	1.08 - 1.16
Pain				
General pain	37,239 (78.9)	33,546 (67.1)	1.28	1.24-1.32
Low back pain	12,131 (25.7)	9,421 (18.8)	1.14	1.10 - 1.18
Migraine	4,155 (8.8)	3,110 (6.2)	1.22	1.15-1.28
Other				
Cancer	2,279 (4.8)	1,709 (3.4)	1.19	1.11-1.28
Chronic liver disease	223 (0.5)	100 (0.2)	1.60	1.25-2.05
Subanalysis in women				
Pregnancy ^c	2,993 (10.1)	1,600 (5.1)	1.43	1.33-1.53

Table 2. Prior Comorbidity Among Individuals With a Diagnosis of Depression Compared With Individuals With No Diagnosis of Depression, and Their Association With a Diagnosis of Depression^a

^aData are presented as n (%).

^bOdds ratios adjusted for age, sex, calendar year, smoking, primary care physician visits, stress, and sleep and anxiety disorders.

^cIn the year before the index date. Depression cohort: n = 29,503; comparison cohort: n = 31,272.

Table 3. Prior Use of Central Nervous System Drugs Among Individuals With a Diagnosis of Depression Compared With Individuals With No Diagnosis of Depression, and Their Association With a Diagnosis of Depression^a

	Depression Cohort	Comparison Cohort		
Variable	$(n=47,170)^{b}$	$(n = 50,000)^{b}$	Odds Ratio ^c	95% CI
Antidepressants overall ^d	5,782 (12.3)	540 (1.1)	9.97	9.10-10.91
TCA-Ser	1,064 (2.3)	238 (0.5)	3.18	2.74-3.68
TCA-Nor	131 (0.3)	11 (0.0)	8.78	4.68-16.48
SSRIs	4,058 (8.6)	229 (0.5)	15.59	13.61-17.86
SNRIs	386 (0.8)	33 (0.1)	8.44	5.86-12.14
MAOIs	2 (0.0)	0(0.0)		
Other antidepressants ^e	331 (0.7)	41 (0.1)	5.25	3.75-7.33
Migraine drugs	398 (0.8)	281 (0.6)	1.29	1.10-1.52
Hypnotics	2,041 (4.3)	342 (0.7)	4.55	4.03-5.13
Anxiolytics	1,290 (2.7)	280 (0.6)	3.05	2.66-3.50
Antipsychotics	918 (2.0)	312 (0.6)	2.18	1.90 - 2.50

^aData are presented as n (%).

^bPatients whose supply of medication from their most recent prescription lasted until the index date or ended in the 30 days before the index date.

^cOdds ratios adjusted for age, sex, calendar year, smoking, primary care physician visits, stress, and sleep and anxiety disorders.

^dThe numbers for the different groups sum to more than 5,782 because some patients were prescribed more than 1 type of antidepressant.

^eOther antidepressants: mianserin, bupropion, reboxetine, mirtazapine, dibenzepin, maprotiline, iprindole, nomifensine, viloxazine, trazodone, nefazodone, opipramol, flupentixol, and tryptophan.

Abbreviations: MAOIs = monoamine oxidase inhibitors, SNRIs = serotonin-norepinephrine reuptake inhibitors, SSRIs = selective serotonin reuptake inhibitors, TCA-Nor = tricyclic antidepressants with a predominant action on the reuptake of norepinephrine, TCA-Ser = tricyclic antidepressants with an inhibitory action on the reuptake of serotonin.

Symbol: . . . = no data.

Table 4. Use of Analgesic and Acid-Suppressing Drugs Among
Individuals With a Diagnosis of Depression Compared With
Individuals With No Diagnosis of Depression, and Their
Association With a Diagnosis of Depression ^a

	0	1		
	Depression	Comparison		
	Cohort	Cohort	Odds	
Variable	$(n = 47, 170)^{b}$	$(n = 50,000)^{b}$	Ratio ^c	95% CI
NSAIDs	3,420 (7.3)	2,303 (4.6)	1.25	1.17-1.33
Paracetamol	3,818 (8.1)	2,094 (4.2)	1.57	1.47-1.67
PPIs	2,609 (5.5)	1,428 (2.9)	1.31	1.22 - 1.41
H ₂ RAs	756 (1.6)	425 (0.9)	1.36	1.20-1.55

^aData are presented as n (%).

^bPatients whose supply of medication from their most recent prescription lasted until the index date or ended in the 30 days before the index date.

⁶Odds ratios adjusted for age, sex, calendar year, smoking, primary care physician visits, stress, sleep and anxiety disorders, and all drugs included in the table.

Abbreviations: H₂RAs = histamine-2 receptor antagonists,

NSAIDs = nonsteroidal anti-inflammatory drugs, PPIs = proton pump inhibitor.

antidepressants at the time of diagnosis compared with only 1% of the comparison group. Among depression cases, selective serotonin reuptake inhibitors (SSRIs) were the most frequently prescribed treatment (8.6%) followed by tricyclic antidepressants with an inhibitory action on the reuptake of serotonin (TCA-Ser) (2.3%). The use of other CNS drugs was less common.

Prior use of nonsteroidal anti-inflammatory drugs (NSAIDs) or paracetamol was a marker of an increase in the risk of a diagnosis of depression, as was the use of acid-suppressing drugs (Table 4). No associations were found with the other drug treatments studied, which included cardiovascular, antidiabetic, and hormone medications.

Treatment Patterns Among Patients With Depression

More than 82% of patients with a diagnosis of depression (n = 38,754) were treated with antidepressants, anxiolytics, and/or hypnotics within the 3 months following diagnosis (Table 5). The majority of these patients (70%) were new users and only started treatment after their diagnosis. Antidepressants were by far the most commonly used medication and constituted 97.8% of prescriptions, followed by hypnotics (11.3% of prescriptions). Less than 3% of the comparison cohort received an antidepressant, anxiolytic, or hypnotic drug within the first 3 months after the index date.

Among patients treated within the first 3 months after diagnosis, 84.3% received antidepressants alone, while 8.7% were coprescribed an antidepressant and hypnotic, and 3.7% were coprescribed an antidepressant and anxiolytic (Table 5). Most of the patients treated in the first 3 months received an SSRI (81.5%), and 10.0% received a TCA-Ser. Antipsychotic drugs were used by 5.2% of patients with a diagnosis of depression.

Over the 3-year study period, treatment patterns remained relatively constant. However, the proportion

Table 5. Frequency of Antidepressant, Hypnotic, and Anxiolytic
Drug Use Within the First 3 Months After a Diagnosis of
Depression ^a

	Depression Cohort
Variable	(n=47,170)
Total treated (among patients with depression)	38,754 (82.3)
Antidepressants ^b	37,897 (97.8)
TCA-Ser	3,871 (10.0)
TCA-Nor	1,077 (2.8)
SSRIs	31,578 (81.5)
SNRIs	2,664 (6.9)
MAOIs	9 (0.0)
Other antidepressants ^c	1,802 (4.6)
Hypnotics	4,398 (11.3)
Anxiolytics	2,206 (5.7)
Overall treatment patterns	
Antidepressants alone	32,653 (84.3)
Antidepressants and hypnotics	3,356 (8.7)
Antidepressants and anxiolytics	1,433 (3.7)
Antidepressants, hypnotics, and anxiolytics	455 (1.2)

^aData are presented as n (% treated patients).

^bThe numbers for the different groups sum to more than 37,897 because some patients were prescribed more than 1 type of antidepressant drug.

^cOther antidepressants: mianserin, bupropion, reboxetine, mirtazapine, dibenzepin, maprotiline, iprindole, nomifensine, viloxazine, trazodone, nefazodone, opipramol, flupentixol, and tryptophan.

Abbreviations: MAOIs = monoamine oxidase inhibitors, SNRIs = serotonin-norepinephrine reuptake inhibitors,

SSRIs = selective serotonin reuptake inhibitors, TCA-Nor = tricyclic antidepressants with a predominant action on the reuptake of norepinephrine, TCA-Ser = tricyclic antidepressants with an inhibitory action on the reuptake of serotonin.

of patients receiving TCA-Ser prescriptions declined slightly from 9.1% to 7.3%, and the proportion receiving prescriptions for SNRIs increased from 5.0% to 6.0%.

DISCUSSION

In this study of depression in UK primary care, we found a prevalence of 11%, which is in line with the overall prevalence reported in a recent study of major depression in Europe.¹⁰ However, there were some differences due in part to variations in study methodology and diagnostic criteria used by the 2 studies. In particular, the European study¹⁰ found that the prevalence of depression among men in the United Kingdom was higher than was seen in our study (12.7% vs 7.5%). The higher rates of depression among young and middle-aged women (aged 20–49 years) found in our study are in keeping with other estimates.¹¹

We found that the incidence of depression decreased with age from 30 to 79 years. This fall was more marked in women than in men. The lower incidence in the elderly population could be explained by psychological factors such as decreased emotional responsiveness, increased emotional control, and psychological immunization to stressful experiences.¹² It may also be that, in some studies, depressive elderly patients are underrepresented because of the increased mortality in this age group.¹³ The results of our study show that a diagnosis of depression is associated with considerable chronic morbidity, which is in agreement with the findings of other studies.¹³⁻¹⁵ In particular, we found a diagnosis of depression to be associated with a prior diagnosis of common gastrointestinal diseases such as gastroesophageal reflux disease or irritable bowel syndrome. These associations are small in magnitude but do agree with the results of previous studies.^{16,17} However, the mechanisms underlying these associations are unclear, and it is possible that they are a consequence of increased health care utilization in individuals with depression.^{18,19}

In agreement with the literature, we observed that patients with chronic obstructive pulmonary disease had an increased risk of developing depression. Depression in patients with chronic obstructive pulmonary disease is associated with poorer survival, longer hospital stays, increased symptom burden, and poorer physical and social functioning.²⁰ Treatment with antidepressant drugs may therefore have a positive effect on quality of life in patients with chronic obstructive pulmonary disease. TCAs have shown efficacy in this regard, but their side effect profile limits their use, and the suitability of more recently developed antidepressants should be investigated in this group of patients.²¹

We found that anxiety was often diagnosed at the same time as depression, with 15.5% of patients newly diagnosed with depression receiving an additional diagnosis of anxiety within 1 month of the diagnosis of depression. Comorbidity of anxiety and depression is known to be a common occurrence in primary care.⁸ Treatment patterns in our cohort reflect this comorbidity: almost 5% of depression case patients were prescribed anxiolytics within 3 months after the diagnosis of depression.

We found that painful conditions were more common in individuals with a diagnosis of depression than in those with no such diagnosis. It is known that painful physical conditions can increase the severity of symptoms of depression, its duration, and recurrence.^{22,23} Therefore, the increased risk of depression observed with use of NSAIDs and paracetamol could be the result of confounding due to their indication for painful conditions. The symptoms of pain-related disorders might mask an underlying depression and are likely to be treated before a diagnosis of depression is considered. However, we found a small increase in the risk of a diagnosis of depression among users of certain drugs (eg, NSAIDs, paracetamol, migraine drugs, and acid suppressants) even after controlling for related comorbidity. The results of previous studies into the association between drugs and depressive symptoms are inconsistent,²⁴ possibly due to the confounding effects of concurrent diseases.²⁵

Although the majority of patients received treatment, a significant proportion (18%) did not receive

pharmacotherapy in the 3 months after their diagnosis. The reasons for this finding deserve further investigation. It is possible that these patients consulted for mild and/or time-limited episodes or were referred for psychotherapy rather than prescribed pharmacotherapy. The patterns of treatments for depression in our cohort are in line with published data.^{11,26} As expected, SSRIs were by far the most frequently prescribed antidepressants followed by TCAs, especially TCAs with an inhibitory action on the reuptake of serotonin. There was a substantial difference in the proportion of patients prescribed the 2 types of antidepressant (SSRIs: 82% vs TCA-Ser: 10% among treated patients). Very few patients were prescribed monoamine oxidase inhibitors.

In interpreting our results, it should be noted that we examined only the first recorded diagnosis of depression for each patient. This diagnosis could cover a range of disorders, from mild or time-limited conditions, such as postnatal depression or depressed mood, to severe and long-lasting episodes of depression. A further potential limitation is that patients who were not always seen or treated in primary care may have incomplete records in our study. Similarly, the first prescription of antidepressants or other treatments may have been missed in a minority of cases if it was issued by a specialist or in a hospital, and some referrals (eg, for psychotherapy) may not have been recorded.

In summary, this large longitudinal study found a high prevalence and incidence of diagnosed depression in UK primary care, particularly among young and middle-aged women. The risk factors and comorbidities identified in this study support previously published data. SSRIs were found to be the most commonly used pharmacologic treatment for depression, accounting for more than 80% of prescriptions following initial diagnosis.

Our study provides an estimate of the occurrence of new diagnoses of depression in the general population, as well as a quantification of the association of depression with various risk factors. These findings should help to increase the efficacy of screening instruments used to detect depression in primary care. We found depression to be associated with a number of psychiatric or psychological disorders, chronic diseases, and painful conditions. Improved management of these conditions is likely to also lead to improvements in patients' depression symptoms and may reduce the number of somatic symptoms that can be associated with depression.

Author affiliations: Centro Español de Investigación Farmacoepidemiológica (CEIFE), Madrid, Spain (Ms Martín-Marino and Drs Ruigómez and García-Rodriguez); AstraZeneca R&D, Mölndal, and Section of Preventive Cardiology, Gothenburg University, Sweden (Dr Johansson); and Department of Public Health and Caring Science, Uppsala University, Sweden (Dr Wallander).

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