

Use of Psychotropic Medication in the General Population of France, Germany, Italy, and the United Kingdom

Maurice M. Ohayon, D.Sc., Ph.D., M.D., and
Malcolm H. Lader, O.B.E., D.Sc., Ph.D., M.D., F.R.C.Psych., F.Med.Sci.

Background: The use of psychotropic medications and its association with sleep and psychiatric and physical illnesses were studied in the general population.

Method: A cross-sectional telephone survey was carried out using the Sleep-EVAL knowledge-base system. A representative sample of the noninstitutionalized general populations of France, Germany, Italy, and the United Kingdom, aged 15 years or over, was interviewed (N = 18,679; participation rate: 78.8%; target population: 204,605,391 inhabitants). Questions were asked about psychotropic medication intake (name of medication, indication, dosage, duration of intake, prescriber), sociodemographics, physical illnesses, and DSM-IV mental disorders.

Results: At the time of the interview, 6.4% of the subjects took a psychotropic medication. Anxiolytics were reported by 4.3% of the sample, hypnotics by 1.5%, antidepressants by 1.0%, and neuroleptics and other psychotropics by less than 1.0%. Hypnotics and anxiolytics were mostly used as a sleep disorder treatment. Antidepressants were taken appropriately for a depressive illness in only 44.1% of cases. Low doses of hypnotics and anxiolytics were found in about 10% of cases and low doses of antidepressants in 31.7% of cases. Subjects with a psychiatric disorder received a psychotropic treatment only infrequently (between 10% to 40.4%, depending on the disorder). All psychiatric disorders, including mood disorders, were treated mainly with an anxiolytic. A concomitant physical illness increased the likelihood of using a psychotropic treatment and was a strong predictor of adequate psychotropic dosage.

Conclusion: Psychiatric pathology and sleep disorders remained mostly untreated or inadequately managed in the general population. Depression is underdiagnosed by the physicians and is treated with antidepressant in only 7% of cases. By contrast, anxiolytics are extensively prescribed, especially in France and Italy. The co-occurrence of organic and psychiatry disorders increases the frequency of medical consultations and the likelihood of being given a prescription for the mental disorder.

(*J Clin Psychiatry* 2002;63:817-825)

Received Jan. 22, 2001; accepted Jan. 3, 2002. From Stanford University School of Medicine, Stanford, Calif. (Dr. Ohayon); and the Institute of Psychiatry, King's College London, London, United Kingdom (Dr. Lader).

This research was supported by the Fond de la Recherche en Santé du Québec (FRSQ #971067) and by an unrestricted educational grant from the Sanofi-Synthelabo Group, Paris, France, to M.M.O.

The collaboration of Professor Robert G. Priest (University of London, England), Professor Jürgen Zülley (University of Regensburg, Germany), and Professor Salvatore Smirne (State University and Istituto Scientifico San Raffaele, Italy) in the support of the surveys in their respective countries was highly appreciated.

Corresponding author and reprints: Maurice M. Ohayon, D.Sc., Ph.D., M.D., Stanford Sleep Epidemiology Research Center, Stanford University School of Medicine, 401 Quarry Rd., Suite 3301, Stanford, CA 94305 (e-mail: mrcohayon@aol.com).

Some community-based surveys have quantified the use of psychotropic medication in the general population. These studies showed that the prevalence varied considerably between the various countries, ranging from 1.5% to 10%,¹⁻¹⁰ but some characteristics remained constant; women were consistently heavier users than men and the use of psychotropics increased with age. In the general population, few studies have attempted to investigate the relation between the use of psychotropic medication and current mental disorders of these users. An example is that study by Ohayon and colleagues² in which U.K. data suggested that psychotropic drug usage tended to be long term and often inappropriate.

Studies performed in primary care settings have reported that many individuals with mental health problems remain undiagnosed,^{11,12} misdiagnosed, or untreated.¹¹⁻¹⁴ Furthermore, as many as 40% of individuals with anxiety or depression do not seek medical help.¹¹ Therefore, the recognition and adequate treatment of mental disorders pose a great challenge in general medical practice. A World Health Organization study¹⁵ performed in primary care settings in 15 countries reported that attendees with a major depressive illness very seldom consulted for depressive symptoms but complained primarily of somatic symptoms or pains in about 40% of cases and of fatigue and sleep problems in about 12% of cases. This situation obfuscates the adequate recognition and treatment of the disorder: the pitfall for the physician is to treat these associated symptoms, without tackling the underlying cause.

As a result, the patient fails to improve, except superficially.

This study investigates the relation between the use of psychotropic (hypnotic, anxiolytic, antidepressant, and neuroleptic) medication and current mental disorders, alcohol abuse, and physical illness in the psychotropic drug users. It was hypothesized from previous work that patterns of psychotropic usage would vary across the 4 largest countries in Western Europe so that excessive prescribing of any class of medication could be brought to the attention of the prescribers.

METHOD

Subjects

This study includes 18,679 subjects, representative of the general population aged 15 years and over in 4 countries (target population = 204,605,391 inhabitants): 5622 subjects were interviewed in France in 1993, 4972 subjects in the United Kingdom in 1994, 4115 subjects in Germany in 1996, and 3970 in Italy in 1997. In each country, a representative sample was drawn using a 2-stage procedure. In the first stage, the sample was selected according to the geographic distribution set out in the latest available national census figures of each country. In the second stage, a household member was selected by the Kish method,¹⁶ which uses a random selection procedure that maintains a representative sample in terms of age and sex.

The verbal consent of the subject was necessary before the interview. The verbal consent of parents when the participant was younger than 18 years was also requested. Individuals with insufficient fluency in the national language, with a hearing or speech impairment, or with an illness precluding completion of an interview were excluded.

All the countries, with the exception of Germany (68.1%), had a participation rate of 80% or over. The rate was 80.8% (5622 of 6966 eligible subjects) in France, 79.6% (4972 of 6249 eligible subjects) in the United Kingdom, 68.1% (4115 of 6047 eligible subjects) in Germany, and 89.4% (3970 of 4442 eligible subjects) in Italy. The overall participation rate was 78.8%.

Procedure

The participants participated in a telephone interview directed by the Sleep-EVAL expert system.^{17,18} Over 90% of households in the European countries involved have a telephone. All interviewers were native speakers of the targeted country. Data collected during the interview included sociodemographic information, sleep/wake schedule, sleeping habits, treatments, and sleep and mental disorders according to *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition (DSM-IV)¹⁹ and *International Classification of Sleep Disorders* (ICSD)²⁰ classifications.

The Sleep-EVAL system, designed by M.M.O., is a computer software system able to make positive and differential diagnoses of sleep and mental disorders using DSM-IV and ICSD. It possesses a causal reasoning mode capable of formulating diagnostic hypotheses and then validating these through further queries and deductions. It was designed specifically to conduct epidemiologic studies on sleep habits and disorders in the general population.²¹

Sociodemographic information, sleep/wake schedule, health status, and health care utilization were first investigated with a standard questionnaire applied to the whole sample. From the responses to this standard set of questions, the system formulated initial diagnostic hypotheses and allowed concurrent diagnoses in accordance with the DSM-IV classification. Mental health questions were asked in order from the less threatening (sleep disorders) to the most private (mental disorders). This organization may have varied from one subject to another, depending on the symptoms presented. For example, a subject with enough criteria to trigger the exploration of DSM-IV primary insomnia would first be asked about other mental disorders because the latter needed to be eliminated before the system could confirm the presence of this disorder. Therefore, the differential process was based on a series of key rules allowing or prohibiting the co-occurrence of multiple diagnoses. Once all diagnostic possibilities were exhausted, the system closed the interview. The expert system's questionnaire was designed so that the decision regarding the presence of a symptom was based on the interviewee's responses, rather than on the interviewer's judgment. This approach has been proven to yield good agreement between lay interviewers and psychiatrists with respect to the diagnosis of minor (anxiety and depressive disorders) psychiatric disorders.²²

The system selected and phrased the questions to be administered and provided examples and instructions on how to ask them. The interviewer simply read them out as they appeared on a computer monitor and entered the responses. Most questions were close-ended (e.g., yes-no, present-absent-unknown, 5-point scale), although some were open-ended (e.g., name of illness, duration). The system has been tested in various contexts; in clinical psychiatry, overall kappa values between the diagnoses of 4 psychiatrists and those of the system ranged from 0.44 (1 psychiatrist) to 0.75 and over (3 psychiatrists) (N = 114 cases).²³ In a study performed in the general population (N = 150),²³ the diagnoses obtained by 2 lay interviewers (inexperienced in sleep and psychiatric assessments) using Sleep-EVAL were compared against those obtained by 2 clinician psychologists. A kappa of 0.85 was obtained in the recognition of sleep problems and of 0.70 for insomnia disorders. In another study performed in 2 sleep disorders centers (Stanford, Calif.,

Table 1. Prevalence of Use of the Different Types of Psychotropics by Age and Sex in 4 European Countries, 1993–1997^a

Variable	Hypnotics	Anxiolytics	Antidepressants	Neuroleptics	Others
	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)	% (95% CI)
Age group, y					
15–44	0.4 (0.3 to 0.5)	1.8 (1.5 to 2.1)	0.6 (0.4 to 0.8)	0.1 (0.0 to 0.2)	0.2 (0.1 to 0.3)
45–64	1.9 (1.5 to 2.3) ^b	5.6 (5.0 to 6.2) ^b	1.5 (1.2 to 1.8) ^b	0.5 (0.3 to 0.7) ^b	0.2 (0.1 to 0.3)
≥ 65	4.1 (3.4 to 4.8) ^b	9.5 (8.5 to 10.5) ^b	1.4 (1.0 to 1.8) ^b	0.5 (0.3 to 0.7) ^b	0.2 (0.1 to 0.3)
Sex					
Male	1.1 (0.9 to 1.3)	2.8 (2.5 to 3.1)	0.7 (0.5 to 0.9)	0.2 (0.1 to 0.3)	0.2 (0.1 to 0.3)
Female	1.9 (1.6 to 2.2) ^b	5.6 (5.1 to 6.1) ^b	1.3 (1.1 to 1.5) ^b	0.3 (0.2 to 0.4)	0.2 (0.1 to 0.3)

^aFrance (1993), Germany (1996), Italy (1997), and the United Kingdom (1994).

^b95% confidence interval (CI) significant at the .05 level with the lowest figure.

United States; Regensburg, Germany),²⁴ the diagnoses of the Sleep-EVAL system were compared with those of the sleep specialist. Overall agreement on any sleep-breathing disorder was 96.9% ($\kappa = 0.94$). More than half the patients were diagnosed with obstructive sleep apnea syndrome (OSAS); the agreement rate for this specific diagnosis was 96.7% ($\kappa = 0.93$), with no significant difference between the 2 sites.²⁴

Variables

Information about medication intake was elicited using several questions. Subjects were asked if they were currently using a medication: (1) to help them sleep, (2) to reduce anxiety, (3) to reduce depressive thoughts. For each positive response, subjects were asked to give the name of the medication, its dosage, the duration of usage, and the medical specialty of the prescriber. They were also asked if they were taking any other kind of medication (prescribed or not), the name of the medication, and its indication.

Subjects were also asked whether they were consulting a physician for mental health reasons at the time of the interview. If so, they were asked whether they were taking medicines for this and the name(s) of the medication. When subjects could not recall the name of their medication, interviewers asked them to find the container, spell out the name, and give the dosage.

Psychotropic medications were grouped as follows according to the appropriate National Compendium of Pharmaceutical Specialties: hypnotics, anxiolytics, antidepressants, neuroleptics, and other psychotropics (e.g., mood regulators). "Adequate use" of the compound was defined as usage according to the licensed indication and recommended dosage in each country. No adjustments for age, sex, or comorbidity were made unless specified in the appropriate Data Sheet.

Data Analyses

The data were weighted according to geographic regions, age, and gender to compensate for disparities between the sample and the national census figures for the noninstitutionalized population aged 15 or over.

Rates are point prevalence: current use of medication means subjects were taking a medication at the time of the interview regardless of how frequently it was taken. Current diagnosis was defined as a disorder that met all the obligatory criteria as defined by the DSM-IV at the time of the interview.

Descriptive and qualitative variables were analyzed using the chi-square statistic. Ninety-five percent confidence intervals (CIs) were also calculated for prevalence rates. Logistic regression²⁵ was used to compute odds ratios (ORs), using the SUDAAN software (Research Triangle Institute, Research Triangle Park, N.C.) that allows an appropriate estimate of the standard errors from stratified samples by means of a Taylor series linearization method. Reported differences were significant at the .05 level.

RESULTS

Overall, 6.4% (95% CI = 6.0% to 6.8%) of the sample was taking a psychotropic medication at the time of the interview: 5.7% (95% CI = 5.4% to 6.0%) of the sample was taking only 1 type of psychotropic and 0.7% (95% CI = 0.6% to 0.8%) took 2 or 3 classes of psychotropics. The most frequent association was anxiolytic with antidepressant (0.3% of the sample; $N = 58$) and hypnotic with anxiolytic (0.2% of the sample; $N = 41$). Table 1 shows that the usage of the main groups of psychotropic drugs rises with age. Women use these drugs at almost twice the rate of men.

Distribution of Psychotropic Medications

Hypnotics. Current hypnotic use was reported by 1.5% (95% CI = 1.3% to 1.7%) ($N = 277$) of the sample. The highest rate of hypnotic users was found in France (2.5%) followed by the United Kingdom (1.6%). The rate of current hypnotic use was 0.7% in Germany and in Italy.

The most frequent hypnotic used was temazepam followed by zopiclone, nitrazepam, and zolpidem. Table 2 displays the other most frequently reported hypnotics.

Almost all of the hypnotics (81.5%) were prescribed by a general practitioner. A psychiatrist prescribed a hyp-

Table 2. Distribution of Drugs Among Hypnotic, Anxiolytic, Antidepressant, and Neuroleptic Users in 4 European Countries, 1993–1997^a

Hypnotic (N = 277)		Anxiolytic (N = 797)		Antidepressant (N = 188)		Neuroleptic (N = 53)	
Drug	%	Drug	%	Drug	%	Drug	%
Temazepam	16.3	Lorazepam	32.7	Amitriptyline	20.1	Levosulpiride ^b	9.4
Zopiclone ^c	15.9	Bromazepam ^c	23.0	Fluoxetine	17.3	Promethazine ^{c,d}	9.4
Nitrazepam ^c	13.9	Diazepam	6.7	Clomipramine	9.1	Sulpiride ^c	9.4
Zolpidem	12.7	Oxazepam	6.5	Fluvoxamine	8.9	Alimemazine ^{c,d}	7.5
Flunitrazepam ^c	11.1	Clorazepate	6.3	Dothiepin ^c	8.3	Flupentixol ^{b,c}	7.5
Loprazolam ^{c,d}	8.4	Prazepam ^b	5.0	Doxepin ^d	6.1	Cyamemazine ^{b,e}	7.5
Triazolam	7.4	Alprazolam	4.6	Mianserin ^c	4.6	Perazine ^{b,f}	7.5
Lormetazepam ^c	7.4	Meprobamate	2.2	Paroxetine	4.3		
		Chlordiazepoxide	1.8	Maprotiline	3.5		
		Nordazepam ^{b,c}	1.6	Amineptine ^{b,c,g}	3.3		
		Febarbamate ^c	1.3				
		Clobazam ^c	1.3				

^aFrance (1993), Germany (1996), Italy (1997), and the United Kingdom (1994).

^bNot sold in United Kingdom; ^cnot sold in United States; ^dnot sold in Italy; ^esold only in France; ^fsold only in Germany;

^gnot sold in Germany.

notic in 5.7% of users. The remainder was prescribed by other types of specialists.

Most users had been taking the hypnotic for more than 1 year; 35.4% between 1 year to 5 years; and 36.1% for more than 5 years. Only 8.8% took a hypnotic for 1 month or less, and 19.7% used it for between 1 month to 1 year.

According to the subjects, they were taking a hypnotic to help them to sleep in 89.1% of cases; 4.1% said it was to help them to sleep and to lessen anxiety; and 3.1% said it was to help them to sleep and to reduce depression. When the hypnotic was taken in association with an anxiolytic, it was to help them to sleep and to reduce anxiety in 66.3% of cases; 13.2% said it was to help them to sleep and to reduce depression; and 18.6% said it was to help them to sleep and to reduce anxiety and depression.

The dose of the hypnotic medication was lower than the recommended therapeutic range in 10.4% (N = 29) of cases and was higher in 3.9% (N = 11) of cases. Lower doses were mainly found in subjects that took the medication for sleep. Higher doses were observed in subjects who were taking the medication for more than one purpose.

Anxiolytics. Anxiolytics were currently taken by 4.3% (95% CI = 4.0% to 4.6%) (N = 797) of the sample. France had the highest proportion of anxiolytic users (9.0% of the French subjects) followed by Italian subjects (5.8%). The rate was only 0.7% in Germany and 0.6% in the United Kingdom. Lorazepam was the most frequently reported medication followed by bromazepam. Other most frequently reported anxiolytic medications can be found in Table 2. Sixty-two subjects reported taking 2 different anxiolytics.

General practitioners prescribed 69.8% of anxiolytics. Psychiatrists were the prescribers in 6.1% of cases. The rest were prescribed by other specialists.

Anxiolytics were taken for 1 month or less in 8.4% of cases, 22.2% of users took them for between 1 month to 1

year, 31.1% for more than 1 year to 5 years, and 38.4% were using such drugs for more than 5 years.

Subjects said they were taking an anxiolytic to help them to sleep in 52.9% of cases; 24.5% said it was to reduce anxiety; and 15.8% said it was to help them both to sleep and to reduce anxiety. Anxiolytic medication was taken with a lower dose than the recommended therapeutic range in 13.9% (N = 110) of cases and was higher in 3.2% (N = 25) of cases. Low doses were mainly found in subjects that took the medication for sleep.

Antidepressants. Antidepressants were currently taken by 1.0% (95% CI = 0.9% to 1.1%) (N = 188) of the sample without significant variations between countries.

The most frequently used antidepressant was amitriptyline followed by fluoxetine. The list of the most frequently reported antidepressant medication can be seen in Table 2. Tricyclics represented 54.7% (N = 103) of the antidepressants; selective serotonin reuptake inhibitors (SSRIs), 30.6% (N = 57); and other types of antidepressants, 14.8% (N = 28).

Antidepressants were prescribed by a general practitioner in more than half of cases (55.8%). A psychiatrist had prescribed the antidepressant in 15.4% of cases. The rest were prescribed by other types of specialists.

Most of antidepressants were taken for between 1 month to 1 year (42.4%); one quarter were taken for between 1 year to 5 years; and 21.2%, for longer than 5 years.

Subjects said they were taking an antidepressant to reduce depression in 30.7% of cases; 25.5% said it was to help them to sleep; in 24.5%, it was to reduce anxiety; and in 13.4%, it was to help them to sleep and to reduce anxiety and depression. When the antidepressant was taken in association with an anxiolytic, 45.1% said they were taking these medications to help them to sleep and to reduce anxiety and depression, and 33.8% of the subjects said it was to help them to sleep and to reduce anxiety.

Table 3. Percentage of Respondents With Each DSM-IV Psychiatric Disorder Who Used Psychotropics in 4 European Countries, 1993–1997^a

Psychiatric Disorder	N	Hypnotic	Anxiolytic	Antidepressant	Neuroleptic	At Least 1 Medication
		% (N ^b)	% (N ^b)	% (N ^b)	% (N ^b)	% (N ^b)
Anxiety disorders						
Agoraphobia	123	4.9 (6)	11.9 (15)	7.8 (10)	0	19.1 (23)
Panic disorder	354	3.4 (12)	11.0 (39)	6.3 (22)	1.2 (4)	19.0 (67)
Specific phobia	314	3.6 (11)	11.9 (37)	2.5 (8)	0	16.5 (52)
Social phobia	99	4.9 (5)	10.4 (10)	4.9 (5)	1.2 (1)	18.5 (18)
PTSD	129	1.2 (2)	4.7 (6)	8.3 (11)	1.5 (2)	13.5 (17)
OCD	149	5.7 (9)	24.8 (37)	2.9 (4)	1.7 (2)	30.7 (46)
Generalized anxiety	323	7.3 (24)	33.1 (107)	7.4 (24)	1.3 (4)	40.4 (130)
Adjustment disorders	223	0.8 (2)	1.9 (4)	2.1 (5)	0	4.4 (10)
Depressive disorders	569	5.1 (29)	12.9 (73)	6.9 (39)	1.5 (9)	22.3 (125)
Bipolar disorders	317	0.7 (2)	3.6 (11)	3.6 (11)	0.6 (2)	6.9 (22)
Alcohol abuse	529	2.1 (11)	6.4 (34)	0.9 (5)	0.6 (3)	9.1 (48)
Insomnia disorders						
Due to a psychoactive substance	96	8.0 (8)	11.9 (11)	4.2 (4)	1.0 (1)	20.7 (20)
Related to another mental disorder	313	8.9 (28)	26.0 (82)	7.6 (24)	2.5 (8)	37.9 (119)
Due to a medical condition	212	8.5 (18)	18.0 (38)	3.3 (7)	0.5 (1)	28.4 (60)
Primary insomnia	502	5.9 (29)	9.1 (46)	1.6 (8)	0.5 (2)	17.0 (86)
At least 1 of the above disorders	2846	4.3 (122)	9.2 (263)	3.3 (94)	0.7 (21)	15.9 (452)

^aFrance (1993), Germany (1996), Italy (1997), and the United Kingdom (1994).

Abbreviations: OCD = obsessive-compulsive disorder, PTSD = posttraumatic stress disorder.

^bRounded weighted N value.

Overall, 31.7% (N = 60) of antidepressant users were taking a lower dose than the recommended therapeutic range. This situation occurred mainly when the medication was taken for sleep, anxiety, or for both purposes. High doses of antidepressants were found in only 2 subjects.

Neuroleptics. Neuroleptics were currently taken by 0.3% (95% CI = 0.2% to 0.4%) (N = 53) of the sample without significant difference between countries. Levosulpiride, promethazine, and sulpiride were each reported by 9.4% of antipsychotic users. Table 2 shows the most frequently reported neuroleptics.

Neuroleptics were prescribed by a general practitioner in 31.7% of cases. Psychiatrists prescribed them in 22.5% of cases.

When a neuroleptic was taken alone, 34.7% of subjects said it was to reduce anxiety; 25.7% said it was to help them to sleep; 14.8% said it was to reduce depression; and 10.3% said it was to reduce both depression and anxiety.

Other psychotropics. Other classes of psychotropics were taken by 0.2% (95% CI = 0.1% to 0.3%) (N = 32) of the sample without significant difference between countries. Lithium and propranolol were reported each by 17.0% of the users. Carbamazepine came next (13.7%), followed by clonidine (11.4%).

Subjects reported that they were taking this medication to help them to sleep in 28.4% of cases; 29.6% to reduce anxiety; and 23.2% both to reduce anxiety and to help them sleep.

Relationship of Psychotropic Medications to DSM-IV Psychiatric Disorders

Table 3 displays the psychotropic medication used for each psychiatric disorder diagnosis. The most frequently treated subjects were those with a generalized anxiety disorder (GAD); 40.4% of them were taking at least 1 psychotropic, mainly an anxiolytic. Subjects with an obsessive-compulsive disorder (OCD) were taking at least 1 psychotropic medication, again mainly an anxiolytic, in 30.7% of cases. Subjects with insomnia related to another mental disorder were taking a psychotropic medication in 37.9% of cases; it was mainly an anxiolytic. Subjects with a depressive disorder took at least 1 psychotropic medication in 22.3% of cases, but only 7% were taking an antidepressant medication.

Tricyclic antidepressants were associated with a depressive disorder in 48.8% of cases, while 58.9% of SSRI users and 66.6% of other-type-of-antidepressant users had a depressive disorder.

Influence of Comorbidity on the Use of Psychotropic Medication

Psychotropic use was also analyzed for subjects presenting comorbidity between (1) anxiety and depressive disorders, (2) anxiety disorders and alcohol problems, (3) mood disorders and alcohol problems, (4) anxiety disorders and physical illness, and (5) mood disorders and physical illness (Table 4). However, the numbers in the samples become quite small.

Anxiety and mood disorders. Depressive disorder was found in 12.8% of subjects with an anxiety disorder. Conversely, 29.3% of subjects with a depressive disorder also had an anxiety disorder. When the anxiety disorder is associated with a depressive disorder, the usage of psychotropic treatment is greater for anxiety alone in some anxiety disorders but not others (cf. Tables 3 and 4). The highest usage was in subjects with agoraphobia and a depressive disorder who took psychotropic medication, mostly an anxiolytic, in 36.1% of cases. Next was comorbid posttraumatic stress disorder and depression (29.9%), followed by panic disorder and depression (22.0%). By contrast, usage in comorbid OCD and depression and GAD and depression was less than for uncomplicated OCD and GAD. This reflects the paucity of anxiolytic prescriptions when depression is present.

Table 4. Percentage of Respondents With Comorbid Psychiatric Disorders Who Used Psychotropics in 4 European Countries, 1993–1997^a

Comorbid Psychiatric Disorder	N	Hypnotic % (N ^b)	Anxiolytic % (N ^b)	Antidepressant % (N ^b)	Neuroleptic % (N ^b)	At Least 1 Medication % (N ^b)
Anxiety disorders + depressive disorder						
Agoraphobia	22	4.5 (1)	26.4 (6)	14.2 (3)	0	36.1 (8)
Panic disorder	67	4.2 (3)	2.5 (2)	10.6 (7)	4.2 (3)	22.0 (15)
Specific phobia	16	0	10.6 (2)	0	0	17.4 (3)
Social phobia	18	0	0	0	0	0
PTSD	39	4.1 (2)	7.6 (3)	17.9 (7)	0	29.9 (12)
OCD	13	7.7 (1)	7.7 (1)	7.7 (1)	0	15.3 (2)
Generalized anxiety	35	2.8 (1)	2.8 (1)	8.6 (3)	0	8.6 (3)
Anxiety disorders + alcohol problems						
Agoraphobia	7	0	14.3 (1)	0	0	14.3 (1)
Panic disorder	14	0	20.1 (3)	(1)	0	26.9 (4)
Specific phobia	11	15.7 (2)	15.7 (2)	0	0	22.3 (3)
Social phobia	3	0	33.3 (1)	0	33.3 (1)	79.1 (2)
PTSD	3	0	0	0	0	0
OCD	8	12.5 (1)	12.5 (1)	0	12.5 (1)	41.3 (3)
Generalized anxiety	17	5.9 (1)	46.3 (8)	0	0	46.3 (8)
Anxiety disorders + physical illness						
Agoraphobia	30	6.1 (2)	18.7 (6)	17.6 (5)	0	33.4 (10)
Panic disorder	111	5.8 (6)	9.6 (11)	12.2 (14)	1.8 (2)	25.6 (28)
Specific phobia	76	9.5 (7)	15.1 (11)	6.3 (5)	0	27.9 (21)
Social phobia	22	7.5 (2)	19.9 (4)	16.5 (4)	0	30.5 (7)
PTSD	48	3.3 (2)	6.3 (3)	10.4 (5)	0	18.3 (9)
OCD	48	14.0 (7)	35.5 (17)	4.9 (2)	0	45.0 (21)
Generalized anxiety	105	10.1 (11)	42.9 (45)	9.1 (10)	0.9 (1)	53.6 (56)
Depressive disorders + alcohol problems						
Depressive disorders + alcohol problems	28	9.5 (3)	15.1 (4)	3.6 (1)	0	24.6 (7)
Depressive disorders + physical illness						
Depressive disorders + physical illness	177	9.1 (16)	17.5 (31)	10.7 (19)	2.8 (5)	32.4 (58)
Bipolar disorders + alcohol problems						
Bipolar disorders + alcohol problems	21	0	4.8 (1)	0	0	4.8 (1)
Bipolar disorders + physical illness						
Bipolar disorders + physical illness	65	2.4 (2)	4.0 (3)	6.7 (4)	2.4 (2)	11.0 (7)
Adjustment disorders + alcohol problems						
Adjustment disorders + alcohol problems	17	0	0	0	0	0
Adjustment disorders + physical illness						
Adjustment disorders + physical illness	49	3.8 (2)	3.8 (2)	3.8 (2)	0	10.6 (5)

^aFrance (1993), Germany (1996), Italy (1997), and the United Kingdom (1994).

Abbreviations: OCD = obsessive-compulsive disorder, PTSD = posttraumatic stress disorder.

^bRounded weighted N value.

Mental disorders and alcohol problems. Alcohol problems were found in about 5% of subjects with an anxiety disorder, 4.9% of subjects with a depressive disorder, and 6.6% of subjects with a bipolar disorder. The highest proportion of subjects with an anxiety disorder and alcohol abuse who took a psychotropic treatment was found in subjects with a GAD: 46.3% of them were taking an anxiolytic (Table 4). Psychotropic usage was the same in depressive illness with or without alcohol problems.

Mental disorders and physical illness. A physical illness was found in 29.7% of subjects with an anxiety disorder; 31.1% of subjects with a depressive disorder; and 20.5% of subjects with a bipolar disorder. Generally speaking, the number of subjects who received any psychotropic treatment was higher when a physical illness was present. Subjects with GAD and a physical illness took anxiolytic medication in 42.9% of cases; 9.1% were treated with an antidepressant. Subjects with OCD received an anxiolytic in 35.5% of cases. Subjects with a depressive disorder and a physical illness took some psychotropic treatment in 32.4% of cases, mainly an anxiolytic (Table 4).

Table 5 shows the usage of psychotropic drugs in respondents with physical illnesses relating to various systems. Anxiolytics are the most frequently used. Table 6 shows the usage of psychotropic drugs according to the presence of psychiatric disorders and physical illnesses. More than 2% of the sample took a psychotropic drug without having a psychiatric disorder or a physical illness. The use of psychotropics dramatically increased in subjects with both a psychiatric disorder and a physical illness.

Medical Consultations in the Previous Year

Medical consultations in the previous year were about 74% in subjects with a mental disorder but without physical illness. Associations with another mental disorder or alcohol abuse did not increase the proportion of subjects who had consulted. The proportion of subjects who consulted a physician in the previous year was higher when a physical illness was present concomitantly with the mental disorder: between 93% to 98% of subjects with a mental disorder and a physical illness consulted a physician. Subjects with a mental disorder or a physical illness con-

sulted more frequently (respectively on average 6 times and 7.5 times) than subjects without a mental disorder or a physical illness (4 times on average) ($p < .001$).

The proportion of subjects using a psychotropic medication increased significantly with the number of consultations in the previous year. This proportion was 4.8% in those who consulted once or twice; 10.2% in those who consulted a physician 3 to 5 times; and 13.9% in those who consulted 6 times or more ($p < .0001$).

Predictive Factors of Adequate Dosage

Subsequently, logistic regression analyses were done to identify which factors predict adequately dosed anxiety disorders and depressive disorders. A treatment was considered adequate when it was prescribed with doses in the therapeutic range and when the subject had a full-fledged DSM-IV or partial mental disorder that the medication could treat.

For anxiety disorders. Independent factors entered into the models were age, sex, number of medical consultations in the previous year, alcohol abuse, physical illness, and the presence of a comorbid disorder. Factors that predicted an adequate dosage for anxiety disorders were being aged 45 to 64 years (OR = 2.5 [95% CI = 1.8 to 3.6]) or 65 and over (OR = 3.0 [95% CI = 2.1 to 4.3]); being a woman (OR = 1.3 [95% CI = 1.0 to 1.7]); having consulted a physician 1 or 2 times (OR = 2.6 [95% CI = 1.6 to 4.4]), 3 to 5 times (OR = 6.9 [95% CI = 4.2 to 11.1]), or 6 times or more in the previous year (OR = 7.6 [95% CI = 4.6 to 12.5]); and having a physical illness (OR = 1.3 [95% CI = 1.0 to 1.7]). However, only the presence of a physical illness was specific to the adequate dosage for anxiety disorders since the other factors (age, sex, number of medical consultations in the previous year) were also significantly associated with the use of anxiolytic medication without anxiety disorders or symptoms.

For depressive disorders. Factors associated with adequate dosage for depressive disorders were being aged 45 to 64 years (OR = 2.2 [95% CI = 1.4 to 3.5]), being a woman (OR = 1.9 [95% CI = 1.2 to 3.0]), having consulted a physician 3 to 5 times (OR = 2.4 [95% CI = 1.2 to 4.9]) or 6 times or more in the previous year (OR = 3.8 [95% CI = 1.9 to 7.8]), having a physical illness

Table 5. Physical Illness by Type of Psychotropics in 4 European Countries, 1993–1997^a

Physical Illness	N	Hypnotic	Anxiolytic	Antidepressant	Neuroleptic	At Least 1 Medication
		% (N ^b)	% (N ^b)	% (N ^b)	% (N ^b)	% (N ^b)
Musculoskeletal disease	1076	4.8 (52)	10.4 (112)	2.4 (26)	(4)	16.8 (181)
Cancer	76	10.3 (8)	13.5 (10)	4.6 (3)	(0)	20.9 (16)
Cardiovascular disease	948	4.5 (43)	11.1 (106)	2.1 (20)	(0)	15.9 (151)
Dermatological disease	126	0 (0)	4.2 (5)	0.9 (1)	(0)	5.8 (7)
Endocrinological disease	465	4.6 (22)	7.2 (34)	1.2 (5)	(2)	12.9 (60)
Gastroenterological	282	1.8 (5)	14.6 (41)	4.4 (12)	(1)	18.8 (53)
Genitourinary	73	0 (0)	6.5 (5)	6.3 (5)	(0)	12.6 (9)
Neurological disease	174	7.0 (12)	12.5 (22)	2.4 (4)	(1)	19.9 (35)
Respiratory	266	3.7 (10)	8.2 (22)	1.9 (5)	(1)	12.5 (33)
At least 1 illness	3261	4.1 (134)	8.7 (284)	2.3 (76)	0.5 (17)	13.7 (448)

^aFrance (1993), Germany (1996), Italy (1997), and the United Kingdom (1994).

^bRounded weighted N value.

Table 6. Comorbidity of Psychiatric Disorders and Physical Illnesses by Type of Psychotropic Drug in 4 European Countries, 1993–1997^a

Comorbidity	N	Hypnotic	Anxiolytic	Antidepressant	At Least 1 Medication
		% (N)	% (N)	% (N)	% (N)
No mental/sleep or physical illnesses	10,809	0.5 (50)	1.6 (176)	0.2 (23)	2.3 (251)
Physical illness only	1886	1.7 (32)	4.1 (77)	0.5 (9)	6.0 (112)
Mental/sleep disorder only ^b	4607	2.0 (92)	7.3 (336)	1.9 (89)	10.8 (497)
Mental/sleep ^b and physical illnesses	1375	7.4 (102)	15.1 (207)	4.9 (67)	24.4 (336)

^aFrance (1993), Germany (1996), Italy (1997), and the United Kingdom (1994).

^bInclude mental disorders partly meeting the criteria for the diagnosis.

(OR = 1.6 [95% CI = 1.0 to 2.5]), having a current anxiety disorder (OR = 7.6 [95% CI = 5.0 to 11.5]), and having an insomnia disorder (OR = 1.7 [95% CI = 1.0 to 2.9]). However, the presence of concomitant anxiety or insomnia disorder was also significantly associated with the intake of antidepressants in the absence of depressive disorders or symptoms.

DISCUSSION

This epidemiologic study examined the use of psychotropic medication in relation to the current mental health disorders in a sample of 18,679 subjects representative of 4 major European countries. Important variations in the prevalence of current use existed between these countries mainly as regards the use of hypnotics and anxiolytics, both being most prevalent in France. However, it should be kept in mind that 4 years elapsed between the first surveyed country, France, and the last surveyed country, Italy. Therefore, changes in patterns of prescription and marketing of new compounds may have arisen within that time interval.

The demographic characteristics of users were consistent with the usual findings^{1–10}: lowest prevalences of hypnotic, anxiolytic, antidepressant, and neuroleptic medications were found in the younger subjects, while prevalence of hypnotic and anxiolytic use increased steadily with age. Furthermore, women were more fre-

quent users of hypnotics, anxiolytics, and antidepressants than were men.

Some limitations to our study should be discussed. First, the data were based on self-report and, therefore, could be prone to misclassification. The lower rate in Germany reflects some reluctance on the part of former East Germans to divulge personal information. Although several precautions were taken to ensure as much as possible the accurate report of medication intake, the data rely on the willingness of the subject to disclose the information. Therefore, the prevalence of psychotropic consumption may be a conservative estimate. Second, the reliability of sleep and mental disorders data collected by telephone could be raised. However, the literature suggests telephone interviews in general are appropriate and yield results comparable to other strategies.²⁶⁻²⁹

Current mental disorders were treated only infrequently. Thus, only 15% of patients with anxiety disorders were actually taking an anxiolytic. Although this seems low, the climate of opinion has moved against this class of drug, particularly for long-term use. It might, therefore, be argued that the usage in France and, to a lesser extent, Italy is actually too high, especially with the advent of antidepressants as treatment for the indication of anxiety. Generalized anxiety and obsessive-compulsive disorders had the highest proportion of patients that received a dosage that can be considered adequate. Conversely, depressive disorders were infrequently treated and when they were, treatment was mainly with an anxiolytic or with a combination of antidepressant and anxiolytic, rather than an antidepressant. The use of anxiolytics such as benzodiazepines as sole treatment for depressive illnesses was also reported in other community-based studies performed in Europe³⁰ and the United States.³¹ However, the use of benzodiazepines in the treatment of depressive illness always bears the risk of deepening the depression, particularly with extended use.³²

Insomnia disorders were also predominantly treated with anxiolytics regardless of the etiology of the disorder. In France and in Italy, anxiolytics remain one of the most common choices of treatment for sleep complaints among general practitioners. In the United Kingdom, antidepressants were more commonly used as sleep disorder treatment. Both of these 2 stratagems are controversial. Antidepressants, when they were used to treat sleep disorders, were usually prescribed in a dose lower than the recommended therapeutic range for depressive disorders.

Comorbidity of anxiety with depressive disorders or with alcohol abuse could, in some instances, increase the number of treated subjects. Thus, anxiety components were often the only recognized and treated features in most cases. The highest number of treated subjects was found when the mental disorder was associated with a

physical illness. In this case, about 45% of subjects with a generalized anxiety disorder and more than one third of those with obsessive-compulsive disorders were taking an anxiolytic. The proportion of treated subjects also increased when the depressive disorder was associated with a physical illness: near one third was taking a psychotropic medication. However, antidepressants were greatly underused: only 1 of 10 depressed subjects was taking an antidepressant. Anxiolytics remained the most frequently used medication.

Of patients with a mental disorder and a physical illness, almost all (more than 93%) consulted a physician in the previous year and on several occasions. The presence of physical illness was the most robust predictor of adequate dosage for both anxiety and depressive disorders. This is probably due to the fact that subjects with a physical illness consulted their physician more frequently. This situation may help the physician to recognize that a mental disorder is present, as the patient becomes better known and mood changes become apparent. When the general practitioner sees a patient only once per year and usually for less than 10 minutes, it is difficult to identify a mental disorder unless it is very severe. Furthermore, most patients consult the physician for somatic or sleep complaints,¹⁵ and only a careful examination will reveal the underlying mental disorder.

However, other studies have shown that even when there is an adequate recognition of the mental disorder by the primary care physician, this is not associated with an improvement in the pathology at follow-up 3 months³³ or 1 year later.³⁴ Two factors could account for that situation. First, less than 40% of the patients with a mental disorder are offered a treatment that could be beneficial or is in the appropriate therapeutic range.^{11,12,35} Second, the patient may not comply with the medical treatment: a recent review of studies that assessed treatment compliance with anxiety or depression pointed out that depressive patients were 3 times more likely to be noncompliant with their treatment than nondepressed patients.³⁶

This study clearly shows that educational efforts are needed with general practitioners to increase their ability to recognize and treat mental disorders. The relationship of the presence of a physical illness and mental disorder augments the likelihood of psychotropic prescription by increasing the likelihood of recognition and treatment of the mental disorder since patients with organic disease visit the doctor more often. It also suggests that the presence of a physical condition increases the propensity of a general practitioner to treat the mental disorder, compared to the likelihood of a prescription when only a mental disorder is present. One of the conclusions of this study is that the consumption of psychotropic drugs reflects the doctor's acknowledgment of the "seriousness" of the psychological symptoms, as evidenced by their relation with organic disease.

Drug names: alprazolam (Xanax and others), amitriptyline (Elavil and others), carbamazepine (Tegretol and others), chlordiazepoxide (Librium and others), clomipramine (Anafranil and others), clonidine (Catapres and others), clorazepate (Tranxene and others), diazepam (Valium and others), doxepin (Sinequan and others), fluoxetine (Prozac and others), fluvoxamine (Luvox and others), lorazepam (Ativan and others), maprotiline (Ludiomil and others), meprobamate (Equanil and others), oxazepam (Serax and others), paroxetine (Paxil), promethazine (Phenergan and others), propranolol (Inderal and others), temazepam (Restoril and others), triazolam (Halcion and others), zolpidem (Ambien).

REFERENCES

- Doi Y, Minowa M, Okawa M, et al. Prevalence of sleep disturbance and hypnotic medication use in relation to sociodemographic factors in the general Japanese adult population. *J Epidemiol* 2000;10:79–86
- Ohayon MM, Caulet M, Priest RG, et al. Psychotropic medication consumption patterns in the UK general population. *J Clin Epidemiol* 1998; 51:273–283
- Ohayon MM, Caulet M. Psychotropic medication and insomnia complaints in two epidemiological studies. *Can J Psychiatry* 1996;41: 457–464
- Ohayon M, Caulet M, Lemoine P. Sujets âgés, habitudes de sommeil et consommation de psychotropes dans la population française. *Encephale* 1996;22:337–350
- Ohayon MM, Caulet M. Insomnia and psychotropic drug consumption. *Prog Neuropsychopharmacol Biol Psychiatry* 1995;19:421–431
- Olfson M, Pincus HA. Use of benzodiazepine in the community. *Arch Intern Med* 1994;154:1235–1240
- Mari J, Aleida Filho N, Coutinho E, et al. The epidemiology of psychotropic use in the city of Sao Paulo. *Psychol Med* 1993;23:467–474
- Allgulander C, Nasman P. Regular hypnotic drug treatment in a sample of 32,679 Swedes: associations with somatic and mental health, inpatient psychiatric diagnoses and suicide, derived with automated record-linkage. *Psychosom Med* 1991;53:101–108
- Dunbar GC, Perera MH, Jenner FA. Patterns of benzodiazepine use in Great Britain as measured by a general population survey. *Br J Psychiatry* 1989;155:836–841
- Vazquez-Barquero JL, Diez-Manrique JF, Pena C, et al. Patterns of psychotropic drug use in a Spanish rural community. *Br J Psychiatry* 1989; 155:633–641
- Andrews G, Sanderson K, Slade T, et al. Why does the burden of disease persist? relating the burden of anxiety and depression to effectiveness of treatment. *Bull World Health Organ* 2000;78:446–454
- Wang PS, Berglund P, Kessler RC. Recent care of common mental disorders in the United States: prevalence and conformance with evidence-based recommendations. *J Gen Intern Med* 2000;15:284–292
- McQuaid JR, Stein MB, Laffaye C, et al. Depression in a primary care clinic: the prevalence and impact of an unrecognized disorder. *J Affect Disord* 1999;55:1–10
- Harris MF, Silove D, Kehag E, et al. Anxiety and depression in general practice patients: prevalence and management. *Med J Aust* 1996;164: 526–529
- Wittchen H-U, Lieb R, Wunderlich U, et al. Comorbidity in primary care: presentation and consequences. *J Clin Psychiatry* 1999;60(suppl 7):29–36
- Kish L. *Survey Sampling*. New York, NY: John Wiley & Sons; 1965
- Ohayon M. Knowledge Based System Sleep-EVAL: Decisional Trees and Questionnaires. Ottawa, Ontario, Canada: National Library of Canada; 1995
- Ohayon M. Improving decision making processes with the fuzzy logic approach in the epidemiology of sleep disorders. *J Psychosom Res* 1999;47: 297–311
- American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition*. Washington, DC: The American Psychiatric Association; 1994
- Diagnostic Classification Steering Committee. *International Classification of Sleep Disorders: Diagnostic and Coding Manual (ICSD)*. Rochester, Minn: American Sleep Disorders Association; 1990
- Ohayon MM, Guilleminault C, Paiva T, et al. An international study on sleep disorders in the general population: methodological aspects. *Sleep* 1997;20:1086–1092
- Lewis G, Pelosi AJ, Araya RC, et al. Measuring psychiatric disorder in the community: a standardized assessment for use by lay interviewers. *Psychol Med* 1992;22:465–486
- Ohayon MM. Validation of expert systems: examples and considerations. *Medinfo* 1995;8:1071–1075
- Ohayon MM, Guilleminault C, Zully J, et al. Validation of the Sleep-EVAL system against clinical assessments of sleep disorders and polysomnographic data. *Sleep* 1999;22:925–930
- Hosmer DW, Lemeshow S. *Applied logistic regression*. New York, NY: John Wiley & Sons; 1989
- Rohde P, Lewinsohn PM, Seeley JR. Comparability of telephone and face-to-face interviews in assessing axis I and II disorders. *Am J Psychiatry* 1997;154:1593–1598
- Slutske WS, True WR, Scherrer JF, et al. Long-term reliability and validity of alcoholism diagnoses and symptoms in a large national telephone interview survey. *Alcohol Clin Exp Res* 1998;22:553–558
- Fenig S, Levav I, Kohn R, et al. Telephone vs face-to-face interviewing in a community psychiatric survey. *Am J Public Health* 1993;83:896–898
- Watson CG, Anderson PED, Thomas D, et al. Comparability of telephone and face to face diagnostic interview schedules. *J Nerv Ment Dis* 1992; 180:534–535
- Tylee A, Gastpar M, Lepine JP, et al. DEPRES II (Depression Research in European Society II): a patient survey of the symptoms, disability and current management of depression in the community. DEPRES Steering Committee. *Int Clin Psychopharmacol* 1999;14:139–151
- Uhlenhuth EH, Balter MB, Mellinger GD, et al. Symptom checklist syndromes in the general population: correlations with psychotherapeutic drug use. *Arch Gen Psychiatry* 1983;40:1167–1173
- Clinical Practice Guideline Number 5: Depression in Primary Care, vol 2. Treatment of Major Depression. Rockville, Md: US Dept Health Human Services, Agency for Health Care Policy and Research; 1993. AHCPR publication 93–0551
- Tiemens BG, Ormel J, Simon GE. Occurrence, recognition, and outcome of psychological disorders in primary care. *Am J Psychiatry* 1996;153: 636–644
- Pini S, Perkonig A, Tansella M, et al. Prevalence and 12-month outcome of threshold and subthreshold mental disorders in primary care. *J Affect Disord* 1999;56:37–48
- Egberts AC, Leufkens HG, Hofman A, et al. Incidence of antidepressant drug use in older adults and association with chronic diseases: the Rotterdam Study. *Int Clin Psychopharmacol* 1997;12:217–223
- DiMatteo MR, Lepper HS, Croghan TW. Depression is a risk factor for noncompliance with medical treatment: meta-analysis of the effects of anxiety and depression on patient adherence. *Arch Intern Med* 2000;160: 2101–2107