ORIGINAL ARTICLE

Prevalence of Depression and Its Treatment in an Elderly Population

The Cache County Study

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Background: Previous estimates of the prevalence of geriatric depression have varied. There are few large population-based studies; most of these focused on individuals younger than 80 years. No US studies have been published since the advent of the newer antidepressant agents.

Methods: In 1995 through 1996, as part of a large population study, we examined the current and lifetime prevalence of depressive disorders in 4559 nondemented individuals aged 65 to 100 years. This sample represented 90% of the elderly population of Cache County, Utah. Using a modified version of the Diagnostic Interview Schedule, we ascertained past and present *DSM-IV* major depression, dysthymia, and subclinical depressive disorders. Medication use was determined through a structured interview and a "medicine chest inventory."

Results: Point prevalence of major depression was estimated at 4.4% in women and 2.7% in men ($P=.003$). Other depressive syndromes were surprisingly uncommon (combined point prevalence, 1.6%). Among subjects with current major depression, 35.7% were taking an antidepressant (mostly selective serotonin reuptake inhibitors) and 27.4% a sedative/hypnotic. The current prevalence of major depression did not change appreciably with age. Estimated lifetime prevalence of major depression was 20.4% in women and 9.6% in men ($P<.001$), decreasing with age.

Conclusions: These estimates for prevalence of major depression are higher than those reported previously in North American studies. Treatment with antidepressants was more common than reported previously, but was still lacking in most individuals with major depression. The prevalence of subsyndromal depressive symptoms was low, possibly because of unusual characteristics of the population.

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DEPRESSION IS a common cause of disability in the elderly. Among its consequences are reduced life satisfaction and quality, social deprivation, loneliness, increased use of health and home care services, cognitive decline, impairments in activities of daily living, suicide, and increased nonsuicide mortality.[1] Interest in geriatric depression has increased in recent years, and several population studies have examined its prevalence, with results ranging from 1% to 20%; however, methodological differences may account for this variability.[1-3] Studies using *DSM-IV* criteria generally report lower rates than those applying other systems, especially for major depression.[1] Several studies have suggested that the prevalence of depressive disorders decreases after age 65 years.[4-13] However, most of these studies included few individuals older than 80 years. Other reports that include very elderly individuals suggest that the prevalence of depression may increase after this age.[10,11,14-18]

Depressive disorders of late life include not only major depression but other, milder conditions that are nonetheless associated with significant morbidity. An example is dysthymic disorder, a chronic and often undertreated condition with substantial attendant disability.[19] Other elderly individuals may suffer from a depressed mood that does not meet *DSM-IV* criteria, even though it can cause significant impairment and alter sense of self and interpersonal interactions. Judd et al[20] have suggested that such "subsyndromal" depressive disorders may be considered a separate and legitimate entity, while Kessler et al[21] have argued that these "minor depression" syndromes may be a variant of the more severe depressive disorders. Such minor depressive conditions have been reported to be more common in the elderly than the full syndrome of major depression,[3,6-8,22,23] and their frequency may increase with age.[7,24,25]

Despite the widespread use of psychotropic drugs by elderly populations, sev-

SUBJECTS AND METHODS

SAMPLING FRAME AND SUBJECTS

Cache County lies in a large mountain valley that extends north to the Idaho border. Its predominantly (91%) Mormon population has unusual features, such as low prevalence of alcohol use and smoking and low rates of cardiovascular disorders, cancer, and other degenerative disorders. The population is close-knit and is among the longest lived in the United States.[34] At the beginning of the study, it included 717 individuals older than 85 years (552 in the present sample, with interview data). Only 4% reported currently drinking an average of 2 or more drinks per week of alcoholic beverages.

We used a Medicare enrollee list provided by the Health Care Financing Administration to identify permanent county residents 65 years and older as of January 1, 1995. We invited 5677 individuals to participate and enrolled 5092 participants (90%) over an 18-month period. Of these, 176 resided in a nursing home or assisted living facility, and 2 were in the local hospital. Participants received a baseline cognitive screening examination and completed a face-to-face interview that included an assessment of lifetime and current depressive disorders. The present analyses excluded 335 subjects with prevalent dementia[35] and another 198 individuals who did not provide information regarding depression at the initial interview. The responding sample was thus composed of 4559 subjects: 2608 women and 1951 men. These subjects were 99.4% white. One percent of them had fewer than 8 years of education; 82% had 12 years or more.

INTERVIEW PROCEDURE

All contact with participants employed procedures previously approved by the institutional review boards of Duke University Medical Center, Durham, NC, the Johns Hopkins School of Public Health, Baltimore, Md, and Utah State University, Logan. We obtained informed consent at the time of each new contact or procedure. Lay interviewers (most with some education beyond high school) received 40 hours of training followed by a field readiness examination, all supervised by a neuropsychologist (K.A.W-B) and geropsychiatrist (J.C.S.B.). Each participant was visited at his/her residence and was given 1 of 3 alternate versions[36] of the modified Mini-Mental Status Examination (MMSE).[37] Participants were then given an extended interview that included sections on demographic variables; medical history (including a detailed accounting of medication history); occupational history; smoking and alcohol use history; and a structured family history assessment. The latter focused on history of cardiovascular disease, stroke, other neurological illness, and memory problems.

All subjects were asked whether they had experienced a lifetime history of at least 2 weeks of any of the following: (1) depressed, sad or blue mood; (2) loss of interest or pleasure; or (3) irritability (included because it is a common depressive symptom in the elderly). Subjects who endorsed at least 1 of these symptoms were given a modified version of the Diagnostic Interview Schedule (DIS)[38] section on depression, enriched with questions about specific treatments, including hospitalization. Subjects who did not endorse any of the 3 stem questions were diagnosed as nondepressed in all diagnostic categories. We asked about age at onset of first, most recent, and most severe depressive episodes. More specific questions inquired about the phenomenology of the current or most recent episode. To ensure that the protocol was followed closely, a board-certified geriatric psychiatrist (D.C.S.) reviewed the interviews (including comments).

DEFINITIONS OF DEPRESSIVE DISORDERS

We categorized the spectrum of depressive disorders following the example of Blazer et al,[7] using *DSM-IV* criteria when possible. Major depression thus required 5

eral studies have shown that only a small minority of those with depression are treated with antidepressants.[25-30] For example, Skoog et al[31] reported that only 19% of elderly individuals with depressive disorders (24% of those with major depression) were taking antidepressants. Unfortunately, anxiolytics and hypnotics are commonly prescribed for depressed elderly patients instead of antidepressants.[23,31-33] No population study on geriatric depression has been performed in the United States since the introduction of the better-tolerated selective serotonin reuptake inhibitors (SSRIs). Therefore, it is not clear whether previously reported prescribing practices have improved. In 1995 through 1996, we therefore conducted a survey of the prevalence and treatment of depression and depressive symptoms in the elderly (ages 65-100 years) population of an entire county in northeastern Utah.

RESULTS

STEM QUESTIONS

In the full sample of 4559 individuals, 25.1% (SE, 0.64) endorsed sadness, 12.4% (SE, 0.49) endorsed anhedonia, and 7.9% (SE, 0.40) endorsed irritability. Significantly more women endorsed the 3 screening items than men. Women endorsed sadness (32.7% [SE, 0.92]) more often than men (15.0% [SE, 0.81]; $\chi^2=203.8$, $P<.001$). Similarly, women endorsed anhedonia (15.8% [SE, 0.71]) and irritability (9.0% [SE, 0.56]) more often than men (7.8% [SE, 0.61] and 6.3% [SE, 0.55], respectively; $\chi^2=75.7$ and $\chi^2=15.0$, respectively; $P<.001$ for both).

There were 1228 (27.0% [SE, 0.66]) of 4559 individuals who endorsed at least 1 of the 3 screening symptoms, including 327 (16.8% [SE, 0.85]) of the 1951 men and 901 (34.5% [SE, 0.93] of the 2608 women. Among those who endorsed at least 1 of these screening items, 92.8% (SE, 0.74) reported sadness, 45.8% (SE, 1.42) reported anhedonia, and 29.1% (SE, 1.30) reported irritability (**Table 1**). No subject reported irritability while denying dysphoria and anhedonia. Within the subsample of 1228 individuals, women reported a higher frequency of sadness ($\chi^2=8.59$; $P=.003$), while men reported more irritability ($\chi^2=13.55$; $P<.001$).

CURRENT PREVALENCE OF DEPRESSION AND ITS TREATMENT

The current prevalence of any clinical depression (**Table 2**) was 3.2% (SE, 0.40) in men and 5.1% (SE, 0.43) in women (adjusted prevalence odds ratio [OR],

symptoms, which included depressed mood or loss of interest or pleasure. Major depression with bereavement was assigned if a current episode of major depression followed the death of a loved one within the prior 8 weeks. Dysthymia was assigned when symptoms did not meet criteria for major depression but participants endorsed persistent (≥2 years) significant depressed mood plus at least 2 of the following: appetite change, sleep change, low energy, or poor concentration (questions about decreased self-esteem and feelings of hopelessness were not included). Our methods did not allow us to distinguish "true" *DSM-IV* dysthymia from chronic major depression in partial remission. In effect, therefore, current major depression and dysthymia became mutually exclusive categories. We grouped these various *DSM-IV*–like diagnoses under the rubrics of depressive syndromes or (equivalently) clinical depressions.

Depressive categories that did not meet criteria for clinical depression were labeled as subclinical depressive disorders. Among these, we assigned a category of subsyndromal depression when at least 2 depressive symptoms were endorsed (akin to depression not otherwise specified in *DSM-IV*). We also divided this group into those with and without bereavement (depending on whether depressive symptoms occurred exclusively in the context of bereavement). Finally, monosymptomatic depressed mood was assigned when a mood change was the only depressive symptom but had lasted 2 weeks or longer.

TREATMENTS

Current medication use was assessed during a "medicine chest" inventory, in which we asked participants to show all medicines taken in the past 2 weeks, whether on a regular basis or as needed, and including both over-the-counter and prescription medications. Using the Veterans Administration Medication Classification system,[39] we then assigned these medicines to appropriate categories of anxiolytics/hypnotics, antidepressants, and antipsychotics. Individuals who endorsed a lifetime history of depression were asked if they had ever told a physician about their depression, and whether they had received any treatments (counseling or psychotherapy, any type of medication, or electroconvulsive therapy or "shock treatment") for it. We also asked about hospitalization for depression.

QUALITY ASSURANCE

A 10% sample of the interviews were taped (with consent) and reviewed by the project's field supervisors. Quality assurance specialists also carefully monitored informed consent procedures and checked responses for consistency and obvious errors. Data were entered in duplicate, cross-checking for accuracy.

STATISTICAL ANALYSIS

Prevalence proportions were calculated for each group in the depression classification. Prevalence and types of treatment were compared across age groups (65-74, 75-84, and ≥85 years) and sex. The χ^2 comparisons ($df=1$ unless otherwise noted) of individual features across the sexes were standardized for age. We used multiple logistic regression models to estimate the probability of a report of a depressive syndrome as a function of age and sex. Likelihood ratio χ^2 tests were used in these models to evaluate the significance of improved fit with introduction of additional terms. All statistical analyses assumed that the Cache County population is a sample of a superpopulation of subjects with similar demographic characteristics. Therefore, finite population variance corrections were not used. All tests were 2-tailed and used a conventional threshold of $\alpha=.05$ for significance.

1.64; 95% confidence interval [CI], 1.20-2.23; $P=.002$). The most common category by far was major depression, with a prevalence of 2.7% (SE, 0.37) in men and 4.4% (SE, 0.40) in women (adjusted prevalence OR, 1.66; 95% CI, 1.19-2.31; $P=.003$), but no difference by age ($P=.79$). Major depression with bereavement, dysthymia, subsyndromal depression, uncomplicated bereavement, and monosymptomatic depressed mood were all uncommon, each with no more than 1% prevalence. There were no significant differences by sex for any of the latter depression categories.

Only 60 (35.7% [SE, 3.70]) of 168 individuals with current major depression were using an antidepressant; 46 (27.4% [SE, 3.44]) were using a sedative/hypnotic; and 2 (1.2% [SE, 0.84]) were using an antipsychotic medication (**Table 3**). Overall, 86 (51.2% [SE, 3.86]) were using a medication in at least 1 of these categories. The percentages of antidepressant medication use were similar in men and women. Among the 60 individuals taking antidepressants, 45 (75% [SE, 5.59]) were receiving 1 of 3 commonly used SSRIs, (ie, fluoxetine, paroxetine, or sertraline). There were 87 men (4.6% [SE, 0.48]) and 261 women (10.7% [SE, 0.63]) in the population who were taking antidepressants but did not report current depressive symptoms ($\chi^2=57.47$; $P<.001$). Among these, only 22 men and 86 women endorsed lifetime major depression. In fact, of these 348 individuals, only 30 men (34.4% [SE, 5.08]) and 127 women (48.6% [SE, 3.09]) endorsed at least 1 of the 3 stem depression questions. In logistic analyses, there was a significant association between age and the use of sedatives/hypnotics ($P=.048$), a trend toward association with the use of antidepressants ($P=.06$), but no association with the use of antipsychotics ($P=.82$). Women used sedatives/hypnotics ($P<.001$), antidepressants ($P<.001$), and antipsychotics ($P=.04$) more frequently than men.

LIFETIME PREVALENCE OF DEPRESSION AND ITS TREATMENT

Our methods could not assess lifetime prevalence for disorders other than major depression (with or without bereavement). Across all ages, the lifetime prevalence of major depression (**Table 4**) was 9.6% (SE, 0.68) for men, 20.4% (SE, 0.78) for women, and 15.8% (SE, 0.54) overall (adjusted prevalence OR for women, 2.54; 95% CI, 2.12-3.04; $P<.001$). In 86% of the subjects, the last episode was reported to be after 1960 (ie, after the introduction of tricyclic antidepressants). Prevalence decreased with age (adjusted prevalence OR, 0.96 for each

incremental year of age; 95% CI, 0.95-0.97; $P<.001$). Of the 720 participants with lifetime major depression, 427 (59% [SE, 0.73]) had told their physician doctor about their depression, while 344 (48% [SE, 0.74]) reported past or current treatment with medication (not necessarily antidepressants). Past treatment with electroconvulsive therapy was reported by 22 subjects (3% [SE, 0.25]), while 174 (24% [SE, 0.63]) had received counseling or psychotherapy and 66 (9% [SE, 0.42]) reported having been hospitalized for depression. Women were more likely than men to have told a physician about their depression ($\chi^2=5.43$; $P=.02$), but were equally likely to have received counseling ($\chi^2=0.004$; $P=.95$), medication ($\chi^2=2.203$; $P=.14$), electroconvulsive therapy ($\chi^2=0.122$; $P=.73$), or hospitalization ($\chi^2=0.132$; $P=.72$). When we stratified subjects into those aged 65 to 74, 75 to 84, and 85 years or older, younger individuals were also more likely to have received counseling ($\chi^2_2=19.70$; $P<.001$), but no age differences were found in the percentage of those who told a physician about their depression ($\chi^2_2=3.26$; $P=.19$), received medication ($\chi^2_2=5.89$; $P=.05$), electroconvulsive therapy ($\chi^2_2=2.93$; $P=.23$), or hospitalization ($\chi^2_2=2.89$; $P=.24$).

Finally, multiple logistic regression models were used to describe the probability, π, of the binary outcome of a report of lifetime major depression and current major depression. The best model for lifetime major depression included female sex (adjusted prevelance OR, 2.57; 95% CI, 2.15-3.08) and age (adjusted prevalence OR, 0.96; 95% CI, 0.95-0.97). For current major depression, logistic regression indicated a significant effect of sex (adjusted prevalence OR, 1.66; 95% CI, 1.19-2.31) but no significant improvement by addition of an age term (adjusted prevalence OR, 1.0; 95% CI, 0.97-1.02). As is customary, we nonetheless report the model with both age and sex terms. Thus, all reported adjusted prevalence ORs for sex are adjusted for age, and vice versa.

Table 1. Individual Lifetime or Current Depressive Symptoms, by Sex, in the 1228 Subjects With a Reported Lifetime History of Sadness, Anhedonia, or Irritability

Symptoms	Men, % (SE) (n = 327)	Women, % (SE) (n = 901)	Total, % (SE) (N = 1228)
Lifetime Endorsed Depression Screening Questions			
Felt sad, blue, or depressed	89.3 (1.71)	94.0 (0.79)	92.8 (0.74)
Lost all interest/pleasure	46.3 (2.76)	45.6 (1.66)	45.8 (1.42)
Felt unusually cross or irritable	37.6 (2.68)	26.0 (1.46)	29.1 (1.30)
Other Current Depressive Symptoms			
Look sad or "down"	8.3 (1.53)	4.9 (0.72)	5.8 (0.67)
Recent appetite change	11.0 (1.73)	9.9 (0.99)	10.2 (0.86)
Weight change	12.5 (1.83)	10.6 (1.03)	11.1 (0.90)
Sleep difficulty	16.8 (2.07)	11.8 (1.07)	13.1 (0.96)
Feeling slowed down, restless, or fidgety	19.0 (2.17)	14.3 (1.17)	15.5 (1.03)
Low energy, tired	19.8 (2.20)	15.4 (1.2)	16.6 (1.06)
Feelings of guilt or worthlessness	13.8 (1.91)	9.5 (0.98)	10.7 (0.88)
Trouble concentrating	12.5 (1.83)	9.9 (0.99)	10.6 (0.88)
Suicidal ideation	7.3 (1.44)	6.1 (0.80)	6.4 (0.70)
Bereavement	12.5 (1.83)	10.7 (1.03)	11.2 (0.90)

COMMENT

In this large population study of older adults, we found a prevalence of current major depression that was slightly higher than has typically been reported in previous North American population studies using *DSM-IV* criteria,[4,5] especially the well-known Epidemiologic Catchment Area (ECA) studies,[10,13] which reported 0.7% to 1.4% current and 2.3% prevalence rates. However, the prevalence of the subclinical depressive disorders was remarkably low. Thus, the large majority of depressive conditions met criteria for major depression, with or without bereavement. The special characteristics of the sample may account in part for these results, but there are alternate explanations. Our use of *DSM-IV* rather than *DSM-III-R*

Table 2. Subject in Each Mutually Exclusive Depression Classification by Sex and Current Depression

		Depressive Diagnosis: Clinical Depressions, % (SE)				Depressive Symptoms: Subclinical Depressions, % (SE)				
		Major Depression					Subsyndromal Depression			
	No. of Subjects	Without Bereavement	With Bereavement	Dysthymia	All Clinical Depressions	Depressed Mood	Without Bereavement	With Bereavement	All Subclinical Symptoms of Depression	All Depressions, % (SE)
Men	1951	2.7 (0.37)	0.3 (0.12)	0.2 (0.10)	3.2 (0.40)	0 (0.00)	0.5 (0.16)	0.2 (0.10)	0.7 (0.19)	3.9 (0.44)
Age, y										
65-74	1098	2.8 (0.50)	0.5 (0.21)	0.1 (0.10)	3.4 (0.55)	0 (0.00)	0.5 (0.21)	0.2 (0.13)	0.7 (0.25)	4.1 (0.60)
75-84	668	2.5 (0.60)	0.1 (0.12)	0.1 (0.12)	2.8 (0.64)	0 (0.00)	0.6 (0.30)	0.1 (0.12)	0.7 (0.32)	3.6 (0.72)
≥85	185	2.7 (1.19)	0 (0.00)	0.5 (0.52)	3.2 (1.29)	0 (0.00)	0 (0.00)	0.5 (0.52)	0.5 (0.52)	3.8 (1.41)
Women	2608	4.4 (0.40)	0.5 (0.14)	0.2 (0.09)	5.1 (0.43)	0.04 (0.04)	0.8 (0.17)	0.5 (0.14)	1.3 (0.22)	6.4 (0.48)
Age, y										
65-74	1255	4.1 (0.56)	0.2 (0.13)	0.1 (0.09)	4.4 (0.58)	0.1 (0.09)	1.0 (0.28)	0.2 (0.13)	1.4 (0.33)	5.7 (0.65)
75-84	1036	5.0 (0.68)	0.6 (0.24)	0.5 (0.22)	6.1 (0.74)	0 (0.00)	0.6 (0.24)	0.8 (0.28)	1.4 (0.37)	7.4 (0.81)
≥85	317	3.8 (1.07)	0.9 (0.53)	0 (0.00)	4.7 (1.19)	0 (0.00)	0.6 (0.43)	0.3 (0.31)	0.9 (0.53)	5.7 (1.30)
All subjects	4559	3.7 (0.28)	0.4 (0.09)	0.2 (0.07)	4.3 (0.30)	0.02 (0.02)	0.7 (0.12)	0.4 (0.09)	1.1 (0.15)	5.3 (0.33)
Age, y										
65-74	2353	3.5 (0.38)	0.3 (0.11)	0.1 (0.07)	3.9 (0.40)	0.04 (0.04)	0.8 (0.18)	0.2 (0.09)	1.1 (0.22)	5.0 (0.45)
75-84	1704	4.0 (0.47)	0.4 (0.15)	0.4 (0.15)	4.8 (0.52)	0 (0.00)	0.6 (0.19)	0.5 (0.17)	1.1 (0.25)	5.9 (0.57)
≥85	502	3.4 (0.81)	0.6 (0.34)	0.2 (0.20)	4.2 (0.90)	0 (0.00)	0.4 (0.28)	0.4 (0.28)	0.8 (0.40)	5.0 (0.97)

Table 3. Current Psychotropic Drug Use by Age in Individuals With and Without Current Depression

	Drug Regimen, % (SE)			
	Antidepressants	Sedatives/Hypnotics	Antipsychotics	Any Psychotropics
Men (N = 1951)	5.5 (0.52)	5.3 (0.51)	0.2 (0.10)	9.7 (0.67)
Not currently depressed (n = 1875)	4.6 (0.48)	4.7 (0.49)	0.2 (0.10)	8.7 (0.65)
Any current depressive symptoms (n = 76)	27.6 (5.13)	18.4 (4.44)	0 (0.00)	35.5 (5.49)
Any current subclinical depression (n = 14)	0 (0.00)	7.1 (6.86)	0 (0.00)	7.1 (6.86)
Any current clinical depression (n = 62)	33.9 (6.01)	21.0 (5.17)	0 (0.00)	41.9 (6.27)
Current major depression (n = 53)	35.8 (6.59)	22.6 (5.74)	0 (0.00)	45.3 (6.84)
Women (N = 2608)	12.0 (0.64)	10.5 (0.60)	0.6 (0.47)	19.6 (0.78)
Not currently depressed (n = 2441)	10.7 (0.63)	9.3 (0.59)	0.5 (0.14)	17.7 (0.77)
Any current depressive symptoms (n = 167)	30.5 (3.56)	28.1 (3.48)	1.8 (1.03)	47.9 (3.87)
Any current subclinical depression (n = 34)	17.6 (6.53)	23.5 (7.27)	2.9 (2.88)	32.4 (8.03)
Any current clinical depression (n = 133)	33.8 (4.10)	29.3 (3.95)	1.4 (1.05)	51.9 (4.33)
Current major depression (n = 115)	35.7 (4.47)	29.6 (4.26)	1.7 (1.21)	53.9 (4.65)

Table 4. Prevalence and Treatment of Lifetime Major Depression by Age Within Sex*

Age, y	Prevalence of Lifetime Depression, % (SE) (n = 4559)	Treatment in Those With Lifetime Major Depression, % (SE) (n = 720)				
		Told Physician	Counseling	Medication	ECT	Hospitalization
Men	9.6 (0.68)	52.1 (3.64)	24.1 (3.12)	43.3 (3.61)	2.7 (1.18)	8.5 (2.03)
65-74	11.3 (0.94)	58.9 (4.42)	29.3 (4.09)	49.2 (4.49)	4.1 (1.78)	11.3 (2.84)
75-84	7.9 (1.05)	35.8 (6.59)	13.2 (4.65)	30.8 (6.34)	0 (0)	1.9 (1.88)
≥85	5.9 (1.75)	54.5 (15.01)	18.2 (11.63)	36.4 (14.57)	0 (0)	9.1 (8.67)
Women	20.4 (0.78)	61.8 (2.11)	24.3 (1.86)	49.6 (2.17)	3.2 (0.76)	9.4 (1.27)
65-74	23.5 (1.21)	63.4 (2.80)	30.6 (2.68)	52.4 (2.91)	3.7 (1.10)	10.2 (1.76)
75-84	19.4 (1.22)	61.2 (3.44)	15.9 (2.58)	48.0 (3.52)	2.0 (0.99)	8.0 (1.91)
≥85	11.4 (1.78)	52.8 (8.32)	19.4 (6.59)	36.1 (8.00)	5.6 (3.83)	11.1 (5.24)
Total	15.8 (0.54)	59.3 (0.73)	24.2 (0.63)	48.0 (0.74)	3.1 (0.25)	9.2 (0.42)
65-74	17.8 (0.79)	62.1 (1.00)	30.2 (0.94)	51.4 (1.03)	3.8 (0.40)	10.5 (0.65)
75-84	14.9 (0.87)	55.9 (1.20)	15.4 (0.87)	44.4 (1.20)	1.6 (0.34)	6.7 (0.62)
≥85	9.4 (1.28)	53.2 (2.23)	19.1 (1.75)	36.2 (2.14)	4.3 (0.87)	10.6 (1.40)

**ECT indicates electroconvulsive therapy.*

criteria (used in the ECA studies) might account for some differences. However, the most likely explanation is our use of a truncated version of the DIS, similar to that used by the National Comorbidity Study[21] (which also reported considerably higher depression prevalence than the ECA studies). Conceivably, a longer interview might fatigue elderly subjects or lead them to underreport symptoms to terminate the interview sooner. Unlike the ECA studies, we also included institutionalized subjects, an important consideration for elderly individuals. Different sex and age distributions across studies may also account for differences in prevalence. For example, our study included a large number of very elderly subjects. Finally, when calculating rates, we excluded subjects with dementia, a disorder that precludes a *DSM-IV* diagnosis of major depression. Because the prevalence of dementia increases with age, not excluding demented individuals from the denominator (as well as the numerator) will tend to depress rates with age.[1] Thus, Saunders et al[40] found that the decline in the prevalence of depression with age disappeared if demented subjects were excluded from the denominator.

In most other studies, subclinical depressive disorders have been reported as more common than clinical depression syndromes.[3,6-8,22,23] One reason for our contrasting results may be high rates of involvement in a church that prohibits alcohol or tobacco use, and whose members have low rates of cardiovascular disease,[41] cancer,[42] and other chronic disease risk factors for depression. The Mormon lifestyle also features social and religious involvement.[43] Rates of church attendance were high in this sample, with 72.5% of participants reporting involvement in church activities at least weekly. Religious involvement may be protective against depression.[44-48] Logically, religious involvement and a focus on spirituality might reduce the influence of psychosocial risk factors for subclinical depressive conditions, but have little bearing on important genetic and biological risk factors for major depression. An alternate explanation is that religious people may be reluctant to report "minor" mental health problems.

Another unusual finding in Cache County is its relatively higher rate (36%) of current antidepressant use among those with current major depression. This figure is substantially higher than the 10% to 20% reported in other population studies.[22,23,25-28,31] One explanation may be that Cache County residents are in better-than-average touch with their local physicians or, similarly, that these physicians are more skilled at detecting and treating depression than their counterparts elsewhere. An-

other explanation is that this is the first large US epidemiologic study of antidepressant use since SSRIs became widely prescribed in primary care. The higher rates of treatment may thus reflect the greater acceptability of SSRIs. However, it is important to note that the prevalence of depression is high despite the higher treatment rate.

We also noted that 4.6% of men and 10.7% of women who were currently not depressed used antidepressants. Indeed, most of those using antidepressants did not have a current depressive disorder. Furthermore, only a minority of these reported lifetime history of major depression. Possibly, these subjects had a prior depression that was successfully treated (but not reported), or they might have been receiving antidepressants for other indications than depression (eg, panic disorder or obsessive-compulsive disorder).

Several studies have suggested that sedatives/hypnotics are commonly prescribed for the depressed elderly instead of antidepressants,[23,31-33] probably because depressed elderly individuals often present with anxiety or sleep problems. Our finding that fewer than one quarter of subjects with major depression reported using anxiolytics/hypnotics suggests that, at least in Cache County, this practice may be waning. Again, the alternate explanation is a better-than-usual standard of practice among the county's physicians.

As with current depression, the reported lifetime prevalence of major depression was high in Cache County (20.4% in women and 9.6% in men), but decreased with age among both men and women. The youngest subjects were twice as likely to report lifetime major depression as the oldest group. This age relationship was not seen in current major depression. The lifetime prevalence finding might reflect selective survival of older individuals without a lifetime history of severe depression,[49-51] or a birth cohort effect. During the 20th century, such a cohort effect has often been noted, with higher prevalence of depression in later-born generations.[52,53] It is also possible that recall bias may account for decreased reported lifetime depression in older participants.

As has often been reported previously, rates of current and lifetime prevalence of major depression were higher in women than in men. Women were twice as likely as men to report an episode of major depression at some time in their life, and this sex difference was found in all age groups. Moreover, women with a lifetime history of depression were more likely than men to have received treatment. Therefore, it may be that women are more willing to acknowledge their depressive symptoms. An alternate, more speculative, hypothesis is that the higher rates of prevalence and treatment in women reflect a tendency of depressed men to show a less typical (thus, less well recognized) clinical picture of depression.[54]

Our study has several limitations. As with other population studies, we relied on reports of depressive symptoms from subjects themselves, assuming that information provided by others would be less reliable. This is one of the reasons we excluded subjects with dementia. However, even information obtained from direct interview is vulnerable to variable recall and willingness to report depressive symptoms, thus risking underreporting of symptoms in some groups. Underreporting may be particularly problematic in assessment of lifetime history. This difficulty prompted us to consider lifetime history only of major depression because we reasoned that other, less severe disorders would probably have been more easily forgotten or ignored. Even for major depression, there may have been some differential underreporting by men (a common occurrence in epidemiological studies that rely on recalled data). Such differential recall could explain why lifetime major depression was reported twice as frequently in women as in men, while current major depression was only 60% more prevalent in women.

As a further limitation, our diagnostic groups relied on the DIS in lieu of a clinical interview. While this approach, using a skipout interview strategy, is common in epidemiologic research, it has obvious attendant risks of underdiagnosis or even misclassification of symptoms. There may also be concerns about our definitions and categories of depressive disorders. For example, our definition of dysthymia does not exactly match that in *DSM-IV* because the interview did not ask about feelings of decreased self-esteem and hopelessness. Our reported current prevalence of less than 1% for both men and women may therefore underestimate the true prevalence of dysthymia in this population. In addition, errors in diagnosis because of reliance on the DIS may also explain underprescription in the DIS depressed group (false-positive diagnoses) and use of antidepressants in the DIS nondepressed group (false-negative diagnoses).

Among the study's advantages are its size, its careful exclusion of subjects with dementia, and its high participation rate (90%). A concern for all such studies is that nonrespondents may have different rates of psychiatric symptoms than respondents,[55] resulting in so-called response bias. Such bias should introduce less error when response rates are high. We suggest that, despite some unusual features of this population (high religious participation, low substance use, predominance of white race), many of our findings may be generalized to older white Americans. The lower rate of substance abuse in this sample may be regarded by some as a limitation to such generalizability, but it facilitates accurate depression diagnoses.

Epidemiologic studies, although often lacking detailed clinical data, can use large population samples to examine depression outcome while controlling for effects of a variety of demographic, social, economic, and medical variables. The present study examined depressive symptoms in an unusual sample with high response rates, low comorbid substance abuse, and an interview-based inventory of current medication use. The more severe forms of depression seem to be at least as common here as elsewhere. Although rates of treatment with antidepressants may be increasing with availability of SSRIs, almost two thirds of depressed individuals in this population remained untreated. Future work will examine several correlates and antecedents of depression and its treatment in this cohort, as well as outcomes, such as functional status, cognition, and mortality.

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