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ORIGINAL PAPER

Depression Diagnosis and Antidepressant Treatment among Depressed VA Primary Care Patients

Chuan-Fen Liu · Duncan G. Campbell · Edmund F. Chaney · Yu-Fang Li · Mary McDonell · Stephan D. Fihn

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Abstract This study examined the extent to which 3559 VA primary care patients with depression symptomatology received depression diagnoses and/or antidepressant prescriptions. Symptomatology was classified as mild (13%), moderate (42%) or severe (45%) based on SCL-20 scores. Diagnosis and treatment was related to depression severity and other patient characteristics. Overall, 44% were neither diagnosed nor treated. Only 22% of those neither diagnosed nor treated for depression received treatment for other psychopathology. Depression treatment performance measures dependent on diagnoses and antidepressant prescriptions from administrative databases exclude undiagnosed patients with significant, treatable, symptomatology.

C.-F. Liu (✉) · D. G. Campbell · E. F. Chaney · Y.-F. Li · M. McDonell · S. D. Fihn
Department of Veterans Affairs, Health Services Research and Development Center of Excellence, VA Puget Sound Health Care System, 1100 Olive Way, Suite 1400, Seattle, WA 98101, USA

C.-F. Liu · D. G. Campbell · S. D. Fihn
Department of Health Services, University of Washington, Seattle, WA, USA

E. F. Chaney
Department of Psychiatry and Behavioral Sciences, University of Washington, Seattle, WA, USA

Y.-F. Li
Department of Biobehavioral Nursing and Health Systems, University of Washington, Seattle, WA, USA

S. D. Fihn
Department of Medicine, University of Washington, Seattle, WA, USA

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Introduction

Depression is prevalent in the general population and even more common in primary care settings, where 10–15% of patients evince significant depressive symptomatology (Katon & Schulberg, 1992; Ormel et al., 1994). Despite its prevalence, depression is underdetected and undertreated in primary care. Estimates of nondetection rates range from 30% to approximately 70% of depressed primary care patients (Coyne, Schwenk, & Fechner-Bates, 1995; Rost et al., 1998; Schulberg, Block, Madonia, Scott, Rodriguez, Imber et al., 1996; Simon, Goldberg, Tiemens, & Ustun, 1999). Adding to the problem of poor recognition, treatment of detected depressed patients is frequently inadequate. Less than half of detected primary care patients receive adequate depression care (Simon, VonKorff, Wagner, & Barlow, 1993).

Whereas some suggest that undetected depression in primary care is mild and does not necessarily require intervention (Coyne et al., 1995; Coyne, Klinkman, Gallo, & Schwenk, 1997), others maintain that undetected patients manifest serious symptomatology that persists over time (Rost et al., 1998). Findings that detected patients evince greater improvement in depression symptoms than undetected patients argue that increased detection represents a necessary first step toward improvement of primary care depression treatment (Simon et al., 1999). To date, successful primary care depression management improvement efforts have had multiple components and have included increased screening for the illness, patient and provider education, and systems-level interventions designed to reorganize practice.

In an attempt to provide guidance for evidence-based interventions at the level of the healthcare system, various health care agencies have developed clinical practice guidelines (CPG) and methods of quality care assessment. Essentially, these efforts are designed to remedy problems with and describe variability in depression care (Agency for Health Care, 1993; American Psychiatric Association Workgroup on Major Depressive Disorder, 2000; VHA Department of Defense, 2000). To assess the quality of care within particular health care systems, for example, the National Committee on Quality Assurance's (NCQA) Health Plan Employer Data and Information Set (HEDIS) gauges concordance with published CPGs. HEDIS (NCQA State of Health Care Quality Report 2003) formulae define depression ‚caseness' and delineate features of adequate antidepressant treatment using administrative databases. Via mechanisms such as HEDIS, ongoing surveillance of depression detection problems, non-treatment and outcome of treatment should yield improved outcomes for individuals who experience the illness.

The Veterans Health Administration (VA) employs HEDIS criteria to track performance of depression management. Collectively, VA primary care users are predominantly older males and, when compared to other samples, constitute a particularly ill group of primary care patients with more co-morbid medical conditions and a greater prevalence of psychiatric illness (Hankin, Spiro, Miller, & Kazis, 1999; Kazis, Ren, Lee, Skinner, Rogers, Clark et al., 1999; Randall, Kilpatrick, Pendergast, Jones, & Vogel, 1987). Depression is one of the most common chronic conditions among VA primary care outpatients, with a prevalence approaching 30% (Hankin et al., 1999). In light of the prevalence and impact of the illness, improving depression treatment and detection in primary care is a VA priority (Kirchner, Curran, & Aikens, 2004).

The present study had two objectives. First, we used administrative databases to describe the frequency of depression diagnosis and antidepressant treatment among VA primary care patients who were identified as having significant depressive symptomatology via a valid and reliable self-report measure. Second, we identified factors (i.e., demographic, illness-related, and past treatment-related) that demonstrated associations with depression diagnoses and treatment.

Extant research examining the extent of depression under-diagnosis and under-treatment in primary care has employed several methodologies and examined multiple settings (e.g., the general public, VA primary care, etc.). For instance, procedures for identification of depression cases and treatment have ranged from surveillance of the medical chart (Charboneau, Rosen, Ash, Owen, Kader, Spiro et al., 2003; Rost et al., 1998) to specific questions posed to providers or patients (Burns, Ryan Wagner, Gaynes, Wells, & Schulberg, 2000; Coyne et al., 1997; Simon et al., 1999). In comparison to existing studies, the present analysis is unique in its combination of self-report and administrative data. Specifically, it provides an assessment of depression diagnosis and treatment prevalence from administrative data for 1 year among a large sample of VA primary care patients who had reported significant depressive symptomatology on a reliable and valid measure. As the sampling method was independent of whether patients with depressive symptoms were actually diagnosed and treated, the analyses were able to examine factors associated with depression detection and diagnosis in a sample that included those with undetected illness. Furthermore, this study allows assessment of the extent to which current administrative database-based performance measures, such as those employed by HEDIS and VA, monitor care for patients with depressive symptomatology.

Method

Sample

The sample was drawn from patients in primary care clinics from seven VA medical centers (VAMC) in six states that participated in the Ambulatory Care Quality Improvement Project (ACQUIP), a multi-center, a group randomized trial conducted between 1997 and 2000 (Fihn, McDonell, Diehr, Anderson, Bradley, Au et al., 2004). Participating sites included White River Junction, Vermont; Birmingham, Alabama; Little Rock, Arkansas; Richmond, Virginia; San Francisco, California; Seattle, Washington; and West Los Angeles, California. The ACQUIP trial provided visit-based reports to providers about their patients' health status and sought to determine whether these reports combined with routine clinical data and information about clinical guidelines would enhance patient care outcomes. Eligible patients included those who were assigned a primary care provider and had had a least one primary care visit in the year prior to the study intervention. The ACQUIP study and the present analysis were approved by the Institutional Review Board at the University of Washington.

Figure 1 presents a flow diagram that identifies the ACQUIP sample subset that was used in the present study. Of 34,103 subjects who were ACQUIP eligible, 21,260 (62%) returned a completed initial health condition screen before June 30, 1997. About 6462 (30%) of these either scored greater than 17 on the 5-item Mental Health Inventory (Berwick et al., 1991) or reported that they had previously been told by a physician that they had depression. These patients were sent the 20-item Hopkins Symptom Check List depression scale (SCL-20) (Derogatis,

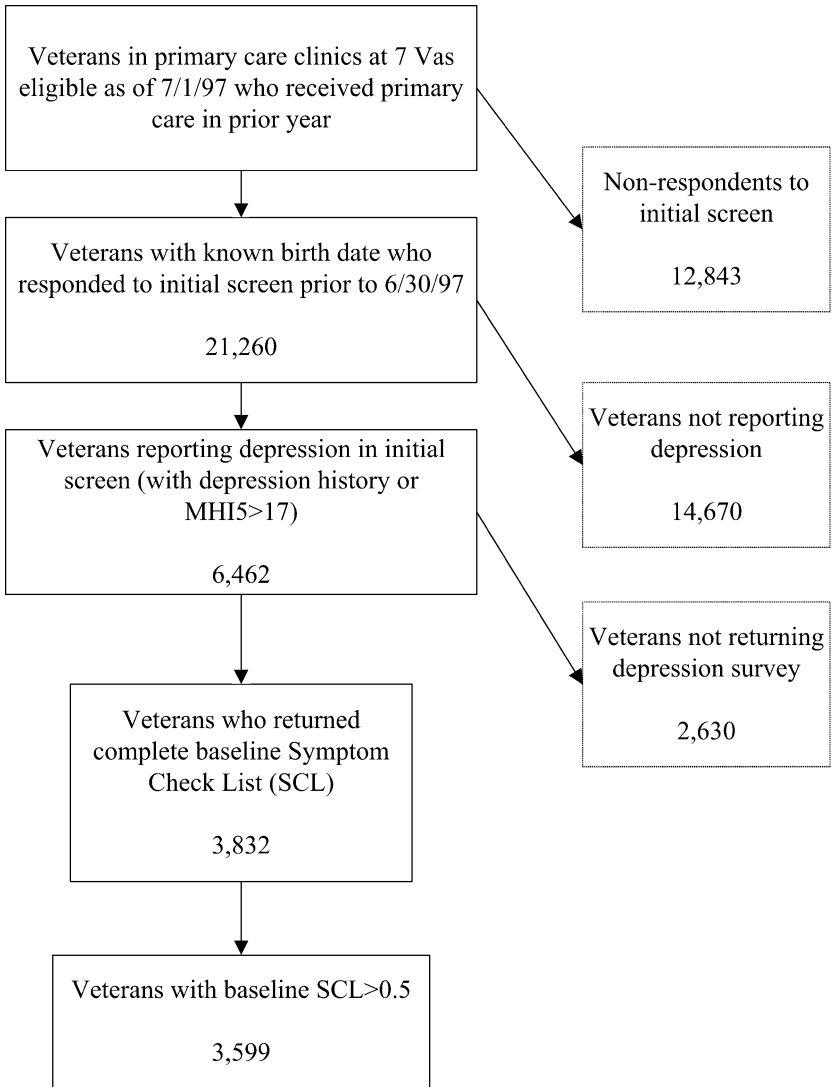

Fig. 1 Flow diagram of Veterans with Depression from ACQUIP trial

Lipman, Rickels, Uhlenhuth, & Covi, 1974). The SCL-20 has been used as a depression outcome measure in several primary care studies of depression (Hedrick, Chaney, Felker, Liu, Hasenberg, Heagerty et al., 2003; Katon, Robinson, Von Korff, Lin, Bush, Ludman et al., 1996; Katon, Rutter, Ludman, Von Korff, Lin, Simon et al., 2001; Katon, Von Korff, Lin, Simon, Walker, Unutzer et al., 1999; Katon, Von Korff, Lin, Walker, Simon, Bush et al., 1995; Simon, VonKorff, Heiligenstein, Revicki, Grothaus, Katon et al., 1996, Simon, VonKorff, Rutter, & Wagner, 2000; Unutzer, Katon, Williams, Callahan, Harpole, Hunkeler et al., 2001; Williams, Barrett, Oxman, Frank, Katon, Sullivan et al., 2000). It provided an assessment of severity of depressive symptomatology in the present study. As Fig. 1 shows, 3832 (59%) of the veterans sent the SCL-20 completed it. Because SCL-20 scores of .5 and above indicate depressive symptomatology of mild or worse severity (Simon, Katon, VonKorff, Unutzer, Lin, Walker et al., 2001), the present sample included 3559 patients with an SCL-20 score greater than .5. Among these primary care patients, 36.6% had one or more mental health clinic visit in the past 6 months. This percentage was similar to findings observed in other samples of depressed primary care patients (McQuaid, Stein, Laffaye, & McCahill, 1999).

Depression Diagnosis

Inpatient and outpatient International Classification of Diseases, 9th edition, Clinical Modification (ICD-9-CM) diagnostic codes were obtained from two VA administrative databases—the Patient Treatment File (PTF) and the Outpatient Clinic File (OPC). The PTF file contains records of inpatient stays in VA facilities. The OPC file contains all outpatient care services provided in VA facilities.

We established depression diagnoses by investigating administrative data from the PTF and OPC and using the same diagnostic codes employed by HEDIS and the VA/DoD depression performance measure. Eligible ICD-9 CM

diagnostic codes were primary or secondary and included the following: 296.2 (Major depressive disorder, single episode), 296.3 (Major depressive disorder, recurrent episode), 298.0 (Depressive type psychosis), 300.4 (Neurotic depression, dysthymia), 309.1 (Prolonged depressive reaction), or 311 (Depressive disorder, not elsewhere classified) (Office of Quality & Performance, 2005). For each patient, depression was assumed to be diagnosed if he or she had at least one eligible depression diagnosis during the year following baseline. Because the study employed administrative databases, primary or secondary diagnoses in the medical chart entered by *any* VA provider (i.e., primary care, specialty care, etc.) counted.

Depression Treatment

Data regarding antidepressant fills were obtained from VA outpatient pharmacy databases. During the study period, because the VA pharmacy co-payment was only $2 per prescription, patients had strong financial incentives to obtain all medications from VA pharmacies. Indeed, in two previous VA studies, 98–100% of patients reported obtaining all medications from VA facilities (Elixhauser, Eisen, Romeis, & Homan, 1990; Steiner, Koepsell, Fihn, & Inui, 1988). We established depression treatment by investigating whether or not each patient filled at least one antidepressant medication prescription at the VA during the 12-month period following baseline. As with diagnosis, the pharmacy database captured antidepressant treatment initiated in *any* VA setting (i.e., primary and specialty care), thereby including antidepressant treatment that resulted from referral. Pharmacological depression treatment was represented by a dichotomous variable where a ''1'' indicated that a patient received at least one fill of antidepressant medication and a ''0'' indicated otherwise. Eligible antidepressant medications were those identified by the VA performance measure and included the following: (1) Tricyclic and other cyclic antidepressants; (2) Selective serotonin reuptake inhibitors; (3) Monoamine oxidase inhibitors; (4) Serotonin–norepinephrine reuptake inhibitors; and (5) Other antidepressants (Office of Quality & Performance, 2005).

Other Psychotropic Medication Treatment

We also examined whether patients received treatment with other psychotropic medications, using the disease categories constructed from the RxRisk-V, a pharmacy-based risk adjustment measure tailored to the VA population (Sales, Liu, Sloan, Malkin, Fishman, Rosen et al., 2003; Sloan, Sales, Liu, Fishman, Nichol, Suzuki et al., 2003). The RxRisk-V assigned patients into disease categories based on outpatient pharmacy data during the 12-month period following baseline. Based on prescribed psychotropic medications patients were classified as being treated for anxiety, bipolar, or other psychotic disorder. Antidepressant medication may have been used adjunctively for patients with anxiety, bipolar or other psychotic disorders.

Depression Diagnosis and Antidepressant Treatment Groups

Combining the status of the depression diagnosis and antidepressant treatment designations, each patient was categorized into one of four groups: (1) Diagnosed and treated (i.e., received at least a diagnosis from administrative data and filled at least one antidepressant prescription); (2) Diagnosed, not treated; (3) Not diagnosed, treated; or (4) Neither diagnosed nor treated.

Depressive Symptom Severity

The SCL-20 was used to determine depressive symptom severity (Simon et al., 2001). A score between .5 and 1.0 (>.5 and ≤1.0) indicated mild symptomatology. Scores greater than 1.0 and less than or equal to 2.0 (>1.0 and ≤2.0) indicated moderate symptomatology, and SCL-20 scores greater than 2.0 suggested severe symptomatology.

Medical Comorbidity

Medical comorbidity was assessed using the Seattle Index of Comorbidity (SIC). The SIC presents a score based on chronic condition indicators, age, and smoking status, as assessed in the initial ACQUIP questionnaire. The SIC was developed to predict clinical events and was validated against 2-year mortality and hospital admission (Fan et al., 2002). Higher scores on the SIC indicate greater medical comorbidity.

Statistical Analysis

A multinominal logit model assessed the relative risks of depression diagnosis and treatment associated with patient characteristics, including baseline demographic characteristics (age, race, gender, marital status, education, and employment status), VA utilization variables (i.e., years using VA care and use of out-of VA care), military service-connected disability status, illness-related and past treatment variables (i.e., depression history, antidepressant treatment in the previous year, SIC, depressive symptom severity). Study sites were included to control for site variation. Analyses also adjusted for the ACQUIP study intervention (Fihn et al., 2004). Standard errors were

estimated using Huber's estimate from a robust regression (Huber, 1967; STATA, 2003).

Results

Table 1 presents sample baseline characteristics. The average age of participants was 61 years and 96% were men. The study sample was older and included more men than the general veteran population seeking VA care (Rosen, Loveland, Anderson, Rothendler, Hankin, Rakovski et al., 2001). Seventy percent of patients had used VA care for more than 5 years, and 34% reported additional use of non-VA care. A majority of patients (86%) reported a history of depressive illness. Almost half (47%) had filled at least one antidepressant prescription in the prior year. Based on SCL-20 scores, 45% experienced severe depressive symptomatology; 42% evinced moderate symptomatology, and 13% had mild symptoms.

Table 2 presents percentages of patients who were diagnosed and/or treated with antidepressants in 1-year period by depressive severity. Overall, about one-third of patients (32%) were diagnosed. The percentage of diagnosed patients increased with depressive severity. For instance 40% of patients with severe symptomatology were diagnosed, compared to 27% of those with moderate symptoms and 23% of those with mild symptoms. Seven percent of all patients were diagnosed but not treated.

Almost half of patients (48%) were treated with antidepressants. As with diagnosis, the proportion of patients who were treated increased with depressive symptom severity. Fifty-seven percent of those with severe symptoms were treated with antidepressants, compared to 44% of those with moderate depression and 37% of those with mild symptoms.

Overall, only 25% of patients were diagnosed *and* treated with antidepressants. About one-third (32%) of patients with severe symptoms were diagnosed and treated with antidepressants. In contrast, 21% of those with moderate symptoms and 17% of those with mild symptoms were diagnosed and treated with antidepressants. Forty-four percent of patients were neither diagnosed nor treated in the 1-year period. Among patients with severe symptoms, 36% remained undiagnosed and untreated with antidepressants, compared to 50% of those with moderate symptoms and 56% of those with mild symptoms. Finally, 23% of patients were treated with antidepressants but not diagnosed.

Among patients treated with antidepressant medications (n=1757), 46% were treated with additional psychotropic medications. The majority of these patients received medications for anxiety (88%); 20% were treated for psychotic disorders and 5% were treated for bipolar disorder. The sum of the proportions across the three disease categories exceeded 100% because some patients received pharmacological treatment for multiple mental health conditions. A sensitivity analysis was conducted on the subgroup after excluding patients under medication treatment of bipolar and psychotic disorders. The sensitivity analysis indicated no differences from the primary analysis.

Table 3 presents patient characteristics by depression diagnosis. There were significant differences in race, education, years of VA care, use of non-VA care, service connected status, depression history, prior antidepressant use, and depression severity for diagnosed and undiagnosed patients. Patients who were non-white, were more educated, used only VA care, and had service-connected disability status were more likely to receive a depression diagnosis. Further, patients who reported a depression history, at least one antidepressant fill in the prior year, and severe depressive symptomatology were more likely to be diagnosed.

Table 4 presents the Relative Risk Ratios (RRR) associated with various patient characteristics for depression diagnosis only, antidepressant treatment only, and neither diagnosis nor antidepressant treatment. Results are from a multinomial logit model using patients who were diagnosed *and* treated with antidepressants as the reference group. The first set of columns presents RRRs for being diagnosed only compared to being diagnosed *and* treated with antidepressants. The results show that employment status and prior antidepressant fills evidenced

Table 1 Patient characteristics

Characteristic	
Sample size	3599
Mean age (SD)	61 (12)
%Male	96
%White	80
%Married	55
Education	
% < 12 years	28
%High school	23
%Some college	35
%College or more	14
%Work full time	14
Years of VA care	
% < 1 year	6
%1–2 years	9
%2–5 years	15
%5+ years	70
%With additional use of non VA care	34
%Service-connected disability	60
%Depression history	86
%Antidepressant fill in previous year	47
Seattle Index of Comorbidty (SIC)	4.24 (2.41)
Mean baseline depressive severity[a] (SD)	1.95 (.77)
Depressive symptom severity	
%Mild	13
%Moderate	42
%Severe	45

Note: [a]Hopkins Symptom Checklist-Depression Scale (SCL-20)

Table 2 Depression diagnosis[a] and pharmacological treatment[b] by depressive symptom severity

	Overall (*n*=3599)	Mild (*n*=469)	Moderate (*n*=1506)	Severe (*n*=1624)
%Diagnosed**	32	23	27	40
%Treated**	49	37	44	57
%Diagnosed, not treated	7	7	6	8
%Not diagnosed, treated	23	21	23	24
%Diagnosed and treated**	25	17	21	32
%Neither diagnosed nor treated**	44	56	50	36

Note: *$P < .05$; **$P < .01$

[a]Diagnosed is defined as a patient who has received at least one depression diagnosis

[b]Treated is identified as a patient who filled at least one antidepressant prescription in one year following baseline

significantly greater relative likelihood of receiving a diagnosis only as opposed to the ideal situation of being diagnosed *and* treated. The RRR of being diagnosed only as opposed to being diagnosed and treated is 1.79 ($P < .05$) for patients did not work full-time relative to those who worked full-time, and 19.68 ($P < .01$) for those without prior antidepressant fills relative to those with prior treatment.

The second set of columns in Table 4 present RRRs for receiving treatment only as opposed to receiving a diagnosis *and* treatment. Patients who did not work full-time, were less educated, did not have a depression history, had high medical comorbidity, had moderate or less severe depressive symptoms, or had no prior antidepressant treatment evidenced increased relative risks of receiving antidepressant treatment only as opposed to being diagnosed *and* treated with antidepressants. The final columns in Table 4 present RRRs for being neither diagnosed nor treated with antidepressants. Male patients, unmarried patients, those with care outside the VA system, less education, no prior depression history, and patients with moderate or less severe symptomatology all demonstrated significantly greater relative risks of being undiagnosed and untreated with antidepressants relative to being diagnosed and treated.

Discussion

This study examined diagnosis and pharmacological treatment of depression among primary care patients with depressive symptomatology. We found that significant numbers of patients were undiagnosed and untreated with antidepressants. Overall, only about one third of patients were diagnosed and about half of the patients were treated with antidepressants. Moreover, only a quarter of patients was diagnosed *and* treated with antidepressants, a situation that most likely represents the ideal. Perhaps most strikingly, 44% were neither diagnosed *nor* treated with antidepressants. These patients could have had another primary mental health disorder for which they had been diagnosed or treated. However, we found that only 22% of these patients received other psychotropic medication treatment during the same time period.

In these analyses, prevalence of nondiagnosis reflected the proportion of patients who were not assigned a depression diagnosis from administrative data during the 1-year period. Although the present result regarding nondiagnosis is consistent with previous findings (30–70%) (Coyne et al., 1997; Rost et al., 1998; Simon et al., 1999), the 68% undiagnosed in the present study places in the high range relative to other investigations. We also observed that diagnosis increases with depressive symptom severity. Sixty percent of patients with severe depression symptoms were undiagnosed compared to 77% of those with mild symptoms.

A significant proportion of patients with depressive symptomatology (51%) were untreated with antidepressants during the study period, as measured by receipt of at least one antidepressant fill. As with the diagnostic finding, the proportion of pharmacologically treated patients increased with symptom severity. Although this severity-dependent treatment increase is promising, suggesting that a greater proportion of patients with more severe illness are treated with antidepressants, the treatment definition for this study was set at a relatively low threshold. For instance, we measured *any* antidepressant treatment, not *adequate* treatment, which would have necessitated adequate dosage and treatment duration. If our analyses had explored adequate treatment instead of our minimal treatment definition, the observed proportion of pharmacologically untreated patients, including inadequate treatment, would almost certainly increase. Indeed, a recent study of depression care quality among a sample of diagnosed and treated VA patients found that only 45% received antidepressant treatment of adequate duration (Charboneau et al., 2003). Moreover, the authors observed that receiving depression treatment exclusively in primary care was associated with increased likelihood of poor antidepressant medication management.

Our results indicated that a significant portion of patients with depression experienced comorbid anxiety and a

Table 3 Characteristics of patients with and without depression diagnosis

Characteristic	With a depression diagnosis	Without a depression diagnosis
Sample size	2438	1161
Mean age (SD)	60 (12)	62 (12)
Gender (%)		
Male	32	68
Female	43	57
Race (%)**		
White	34	66
Non-white	28	72
Marital status		
Married	32	68
Not married	33	67
Education**		
% < 12 years	25	75
%High school	31	69
%Some college	36	64
%College or more	40	60
Work full time		
Yes	35	65
No	32	68
Years of VA care*		
% < 1 year	33	67
%1–2 years	33	67
%2–5 years	39	61
%5+ years	31	69
Patients with additional use of non VA Care**		
Yes	28	72
No	35	65
Service-connected disability**		
Yes	34	66
No	29	71
Depression history**		
Yes	36	64
No	12	88
Antidepressant fill in previous year**		
Yes	51	49
No	16	84
Seattle Index of Comorbidity (SIC)	4.29 (2.43)	4.13 (2.35)
Mean baseline depressive severity (SD) †**	2.12 (.77)	1.87 (.75)
Depression symptom severity**		
Mild	23	77
Moderate	27	73
Severe	40	60

Note: † Hopkins Symptom Checklist-Depression Scale (SCL-20); *$P < .05$; **$P < .01$

smaller group had other comorbid psychiatric disorders. Relative to general populations, these comorbidities are especially likely in the VA population (Hankin et al., 1999; Kazis et al., 1999; Randall et al., 1987). Although presence or absence of comorbidities did not affect the primary findings, their presence raises the possibility that appropriate depression treatment and management might be particularly critical for these patients because of their complex presentation.

It is important to note that the data from this study were extracted from administrative databases during 1997–1998. Since that time, VA has identified depression treatment improvement as a priority, mandating primary care based screening and instituting systems-level depression performance measures (Office of Quality & Performance, 2005). Because the present results predate concerted efforts to improve VA depression treatment, they present a potential benchmark against which subsequent improvements might be compared.

Our results also have potential implications for the use of depression prevalence estimates and quality indicators of depression management (National Committee for Quality Assurance, 2003; Office of Quality & Performance, 2005), which identify patients using administrative databases. First, our results indicated that only 32% of patients with significant depressive symptomatology were detected via encounter code-based diagnoses in administrative databases. This relatively low result suggests that current administrative data-based estimates of depression prevalence might be inaccurately low. Second, we observed an inconsistency between diagnostic coding practices and antidepressant treatment. Seven percent of patients received a diagnosis but were untreated with antidepressants, while almost a quarter of patients were treated with antidepressants but not diagnosed. There are several possibilities that might account for each of these scenarios. For instance, a diagnosed patient might simply refuse depression treatment, resulting in an identified but untreated case. Also, VA policy did not require each prescribed medication to be linked to a specific diagnosis during the study period. Thus, an undiagnosed but treated case of depression might result if, in light of competing demands, a provider prescribed an antidepressant without noting its indication on the encounter form. Regardless of their sources, inconsistencies such as these raise concern that indicators monitoring depression management might be inaccurate. Because patient identification relies on diagnoses from administrative databases, for example, providers could circumvent performance measures by avoiding antidepressant treatment and/or diagnosis.

Finally, this study suggests that performance measures that focus exclusively on treatment management of newly diagnosed patients, such as HEDIS, will only include a portion of patients with significant depressive symptoms. Collectively, these results raise a degree of concern about the accuracy of prevalence estimates that employ diagnoses from administrative databases, and they imply that performance measures using administrative databases might not accurately reflect the quality of depression treatment delivered within health care systems.

Several factors demonstrated significant associations with receiving depression diagnosis and/or treatment. For

Table 4 Relative risk ratios (RRR) of patient characteristics

	Diagnosed only			Treated only			Neither diagnosed nor treated		
		95% CI			95% CI			95% CI	
	RRR	Lower	Upper	RRR	Lower	Upper	RRR	Lower	Upper
Intervention group	.96	.68	1.35	1.03	.83	1.28	1.05	.82	1.35
Male	1.01	.51	2.04	1.00	.64	1.58	2.33**	1.32	4.10
Age	1.00	.98	1.01	.99	.98	1.00	1.01	1.00	1.11
White	1.42	.90	2.24	.99	.74	1.32	.81	.59	1.12
Not married	1.22	.88	1.70	.94	.76	1.16	1.31*	1.03	1.91
Not working fulltime	1.79*	1.08	2.96	1.71**	1.23	2.38	1.39	1.00	1.95
Additional use of non VA care	.94	.70	1.33	1.17	.94	1.45	1.34*	1.04	1.72
Education (reference: college or more)									
Less than high school	.95	.55	1.63	1.48*	1.03	2.14	1.68*	1.11	2.55
High school	.87	.52	1.45	1.47*	1.04	2.10	1.10	.74	1.64
Some college	.88	.56	1.38	1.20	.87	1.67	1.09	.76	1.58
Years in the VA (reference: <1 year)									
≥ 1 and <2	1.62	.73	3.61	1.42	.79	2.56	1.26	.69	2.32
≥ 2 and <5	.81	.38	1.74	1.06	.62	1.81	.76	.43	1.32
≥ 5	1.16	.60	2.28	1.62	.98	2.66	1.06	.64	1.76
Service connected disability (yes)	1.08	.76	1.53	.99	.80	1.23	.93	.72	1.19
No depression history	.99	.53	1.85	2.91**	1.94	4.36	3.01**	1.93	4.70
Seattle Index of Comorbidity score	.98	.91	1.05	1.06**	1.02	1.11	.98	.93	1.03
Depressive symptom severity (reference: severe)									
Mild	1.30	.75	2.26	2.35**	1.64	3.37	3.07**	2.06	4.57
Moderate	.99	.70	1.41	1.62**	1.30	2.02	1.78**	1.38	2.31
No prior antidepressant fill	19.68**	13.66	28.35	1.42*	1.08	1.88	47.80**	36.62	62.36

Note: $*P<.05$; $**P<.01$

Reference group: patients received both a depression diagnosis and an antidepressant fill $N = 3369$; Wald $\chi^2(72) = 1454.33$; Prob$>\chi^2 = .0000$; Log pseudo-likelihood = −3042.684; Pseudo $R^2 = .2706$.

example, patients with mild or moderate symptoms and those without prior antidepressant fills or a depression history were at increased risk of being undiagnosed, untreated with antidepressants or both. In light of these increased risks, provider education might focus on improving detection and antidepressant treatment among treatment naïve, first episode patients and those with mild or moderate symptoms. Additionally, lower levels of patient education were associated with increased risk of nondiagnosis or nontreatment with antidepressants. As part of comprehensive multi-component depression treatment packages, patient education regarding depressive illness and its treatment would likely result in improved depression management.

Patients who used non-VA health care also demonstrated a significant increased risk of being undiagnosed and untreated with antidepressants. Given the fact that they received care from multiple sources, it is possible that depression among these patients was treated outside the VA system. In order to improve depression care, this result highlights a potential need for improved communication and coordination between VA providers and those outside the system.

Previous studies indicate that barriers in several areas affect depression detection and adequate management within primary care (Goldman, Nielsen, & Champion, 1999). For example, busy clinic schedules necessitate short encounters that might preclude attention to depression, and some providers might lack adequate knowledge about the illness or miss cases that present with somatic symptomatology (Docherty, 1997; Goldman et al., 1999). It is quite possible that each of these factors contributed to the diagnostic and pharmacological treatment prevalence observed in the present study. Recent work in the area of primary care-based depression treatment has attempted to address these problems. Based on the Chronic Care Model (Bodenheimer, Wagner, & Grumbach, 2002), for example, collaborative care interventions integrate specialty mental health resources in primary care settings. These interventions also include depression education for clinicians and patients and provide ongoing care management via regularly-scheduled telephone-based depression care manager contact (Hedrick et al., 2003; Katon et al., 1995; Schulberg et al., 1996; Simon et al., 2000; Unutzer et al., 2001; Unutzer, Katon, Callahan, Williams, Hunkele, Harpole et al., 2002; Wells, Sherbourne, Schoenbaum, Duan, Meredith, Unutzer et al., 2000). These studies also show that collaborative care models improve depression treatment, in part, by reducing barriers to care.

This study has limitations that warrant mention. First, although the SCL-20 provided an indicator of depressive symptom severity, patients did not necessarily meet criteria for clinical depression diagnoses. Despite this potential limitation, it is important to note that depression is most often diagnosed and treated in the primary care setting by non-specialist clinicians. It is also probable that the depressive symptomatology (i.e., minor depression) experienced by some VA primary care patients might negatively impact patients' abilities to self-manage co-morbid chronic illnesses (i.e., diabetes, hypertension, etc.). Furthermore, other authors (McQuaid et al., 1999) have advocated for the treatment of less severely depressed primary care patients, making the argument that these patients might be more likely to benefit from less intensive interventions. Given the impact of depressive symptomatology on comorbid conditions and the likely treatment benefit of less severe depressive illness, we believe that our results have relevance despite the fact that our measure of symptom severity was not based on ‚gold standard' psychiatric evaluation or Research Diagnostic Criteria.

Second, the present results might not generalize to the entire VA primary care patient population or to other populations due to potential response bias. For instance, the ACQUIP trial only recruited participants from 7 VAMC primary care clinics, and 38% of approached patients failed to respond to original screening. Furthermore, roughly 40% of depression screen positive (i.e., positive MHI-5) patients failed to complete the SCL-20. There was no significant difference in the MHI-5 score between patients who completed the SCL-20 and those who failed. Nonetheless, the present sample comprises a large cohort of primary care patients with depressive symptomatology when compared to previous investigations.

Third, the present analyses examined only depression diagnoses and antidepressant treatment that occurred within the VA system. Non-VA care and psychotherapeutic treatment were not examined. The focus on care provided within the system is consistent with HEDIS and VA performance measures that assess depression management within a particular health plan or the VA system while not including out-of-plan treatment utilization. Similarly, whereas structured psychotherapies are effective for depression (Jarrett & Rush, 1994), this study did not account for psychotherapeutic treatment. Although this exclusion raises the possibility that this study underestimated treatment, we suspect that relatively few patients who were untreated with antidepressants received structured psychotherapy, which is a scarce resource in primary care settings.

In summary, this study provides insights into depression diagnosis and pharmacological treatment among primary care patients with depressive symptomatology. Overall, a sizeable proportion of patients with significant symptomatology were undiagnosed or untreated with antidepressants, including more than one third of those with severe symptoms. Results support ongoing efforts to implement multifaceted interventions to improve depression recognition and treatment of patients in general and specifically among those without prior antidepressant use, no depression history, and those with mild or moderate symptoms. Finally, this study suggests that depression management performance measures based on administrative databases may only monitor depression management for a portion of patients with significant depressive symptoms.

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