Journal of Gerontology: MEDICAL SCIENCES
1998, Vol. 53A, No. 2, M92–M101

Clinical Detection of Depression Among Community-Based Elderly People With Self-Reported Symptoms of Depression

Judith Garrard,[1] Sharon Judith Rolnick,[2] Nicole M. Nitz,[1] Lori Luepke,[1] Jody Jackson,[2] Lucy Rose Fischer,[2] Cynthia Leibson,[3] Patricia C. Bland,[1] Richard Heinrich,[4] and Lance A. Waller[5]

[1]Institute of Health Services Research, and [5]Division of Biostatistics, School of Public Health, University of Minnesota, Minneapolis.

[2]Group Health Foundation, and [4]Department of Mental Health Services, HealthPartners, Inc., Minneapolis.

[3]Department of Health Services Research and Epidemiology, Mayo Foundation, Rochester.

Background. Depression is under-diagnosed and under-treated in the primary care sector. The purpose of this study was to determine the association between self-reported indications of depression by community-dwelling elderly enrollees in a managed care organization and clinical detection of depression by primary care clinicians.

Methods. This was a 2-year cohort study of elderly people (n = 3410) who responded to the Geriatric Depression Scale (GDS) at the midpoint of the study period. A broad measure of clinical detection was used consisting of one or more of three indicators: diagnosis of depression, visit to a mental health specialist, or antidepressant medication treatment.

Results. Approximately half of the community-based elderly people with self-reported indications of depression (GDS ≥ 11) did not have documentation of clinical detection of depression by health providers. Physician recognition of depression tended to increase with the severity of enrollees' self-reported feelings of depression. Men 65–74 years old and those ≥85 years old were at highest risk for under-detection of depression by primary care providers.

Conclusions. Clinical detection of depression of elderly people living in the community continues to be a problem. The implications of failure to recognize the possibility of depression among elderly White men suggest a serious public health problem.

OVER the past two decades, clinical depression among adults has been reported to be underdiagnosed or undertreated in the primary care sector (1–8). Of those who are diagnosed and/or treated for minor or major depression, at least half are managed only by primary care physicians (9–13).

Variations of the condition include major depression (which often requires suicide watch or hospitalization), dysthymia (which extends over 2 or more years), and depressive symptoms (which include some, but not all, of the symptoms of major depression such as insomnia, loss of interest or pleasure in usual activities, fatigue, feelings of worthlessness, self reproach, or excessive inappropriate guilt) (14). In the research literature, synonyms for depressive symptoms include minor depression, subthreshold depression, and subclinical depression.

The consequences of this condition can be severe. Depression has been associated with increased mortality (15,16) and comorbidity (17), decreased quality of life (18), and increased health services utilization (19), and health care costs (20).

Among elderly outpatients, depression is of serious concern because of its prevalence, which varies between 17% and 37% in the primary care sector, and the complexity of the differential diagnosis (21–25). Social and demographic risk factors for depression in elderly people are similar to those in younger populations: female, single, family history of depression, comorbidity, financial strain, and lack of a social support network (22). Most of the research about detection or recognition of depression in the primary care sector has been of working age adults, although some studies have included a substantial subset of people who were 65 years or older (19,20).

Regardless of the patient's age, diagnosis and management of depression can be difficult. The symptoms of depression can mimic those of other diseases, patients may be unable or unwilling to describe their feelings or accept clinical intervention, or the primary care provider may not recognize the disease. Previous research has shown that in the primary care sector, the rate of underdetection of depression among people living in the community ranges between 35% to 50% (26–28).

A variety of measures have been used to track clinical detection of depression, the most common of which include diagnosis, visit to a mental health specialist, or pharmacologic treatment (5–8). Used separately, these indicators may underestimate the rate of physician recognition of the condition.

What is lacking in the literature is research that estimates the rates of provider detection of depression among nonin-

stitutionalized elderly people living in the community in which the measure of detection was defined as broadly as possible. The purpose of this study was to address that need with the use of a comprehensive measure of physician detection of depression to examine the following three research questions: (*i*) Provider detection of depression: Of elderly people living in the community with self-reported indications of depression, what was the rate of clinical detection by primary care providers during the year before or the year after screening? (*ii*) Variation in provider detection by severity of indication: Did the rates of clinical detection of depression in the primary care sector vary by severity of self-reported indications by patients? (*iii*) Factors associated with detection: What patient characteristics were associated with clinical detection of depression by the primary care provider?

METHODS

Methodological Design

This was a descriptive, 24-month study of enrollees (n = 3410) in the Seniors Plus Program of a staff model health maintenance organization located in the Minneapolis and St. Paul metropolitan area. The study consisted of an assessment of self-reported feelings of depression by all enrollees based on the Geriatric Depression Scale (GDS) that was administered at the midpoint in the 2-year study period. Self-reported indication of depression by the enrollee was operationally defined by a GDS score of 11 or greater (29).

Enrollees were mailed a copy of the GDS by project staff in 1993 and invited to participate in the research project. The records of enrollees were reviewed for the 24-month period, 1992–1994. The study period included the 12 months prior to the mailing in order to capture information about enrollees who might have been identified and successfully treated prior to the GDS mailing.

Study Site

Group Health, Inc. (GHI) is a managed care delivery system that is nonprofit and member-governed; the name was changed to HealthPartners in a 1992 merger. From 1985 to 1994, one of the plans within GHI/HealthPartners was the Seniors Plus Program, a capitated Medicare package that combined comprehensive hospital and medical services with expanded community-based long-term care benefits for people 65 years of age or older. Enrollees had unrestricted access to specialists, including staff psychiatrists and psychologists, within the GHI/HealthPartners system. Access to specialists outside of the system required a referral. Because Seniors Plus was a managed care program, the population of all enrollees was known for each year, whether or not the individuals used any of the health care or pharmaceutical services.

One of the major advantages of this plan was a prescription drug benefit in which enrollees were charged a co-pay of $10.00 per initial prescription or refill. This benefit did not apply to prescription drugs obtained outside of the HealthPartners pharmacy. Except for hospitalized patients and those in short-term rehabilitation, prescription drug benefits are generally not available under Medicare. The HealthPartners pharmacy claims files capture virtually all of the prescription drugs obtained by enrollees. Medications are made available for multi-month periods for those who travel or live outside of the service area. The pharmacy records consist of an historical database that is more inclusive than a claims file system because the details of all prescriptions are recorded, whether the cost of the prescription is more or less than the co-pay.

Subjects

Subject eligibility criteria included age of 65 years or older on June 21, 1993, and continuous enrollment for 24 months in the Seniors Plus Program between June 21, 1992, and June 20, 1994. The term "enrollee" rather than patient is used throughout this paper because the individual was not required to have a health care encounter in order to be included in the study. Health services utilization for purposes other than a visit to any provider that resulted in a diagnosis of depression, an appointment with a mental health specialist, or a prescription for an antidepressant medication was not known and was beyond the scope of this study.

All Seniors Plus enrollees (n = 6198) were sent the GDS; 3872 (62% response rate) responded, and of those, 3410 had continuous enrollment for the 24-month study period. Potential sample bias due to nonresponse was examined by comparing characteristics of those who did (n = 3872) and did not (n = 2326) respond. There were no statistically significant differences by gender or antidepressant drug use during the year prior to the GDS survey; however, there was a significant inverse relationship between the GDS response rate and age group: 67%, 59%, and 54% for those who were 65–74 years, 75–84 years, and ≥85 years, respectively ($p \leq .0001$).

Of the GDS respondents, 3410 (88%) had 24 months of continuous enrollment in the Seniors Plus Program. There were no statistically significant differences between those with and without continuous enrollment by age group or antidepressant drug use prior to the GDS survey. There was a statistically significant difference in continuity of enrollment by gender ($\chi^2 = 6.84$, df = 1, $p \leq .01$); however, the magnitude of the difference may not be of practical importance (89% of the women had continuous enrollment, compared to 87% of the men).

The resulting cohort of continuously enrolled GDS respondents (n = 3410) had a mean age of 75 years (SD = 5.78), and 62% were women. Complete information about minority status was not available. Comparisons between this group and all Seniors Plus enrollees by age and gender distribution are shown in Table 1.

Additional comparisons between all Seniors Plus and all Minnesota Medicare enrollees (regardless of type of enrollment), and between Minnesota and U.S. Medicare enrollees for July 1992, are also shown in Table 1 (30). In both comparisons, there were age group and gender differences. Seniors Plus enrollees were slightly younger ($\chi^2 = 124.39$, df = 2, $p \leq .0001$) and had proportionately more women ($\chi^2 = 17.65$, df = 1, $p \leq .0001$) than did people ≥65 years old in the Minnesota Medicare enrollee population. Differences

Table 1. Characteristics of Study Subjects, Seniors Plus Enrollees, and 1992 Medicare Enrollees in Minnesota and the United States

Characteristic	Subjects in This Study (%) (n = 3410)	All Seniors Plus Enrollees (%) (n = 6198)	Medicare Enrollees (%)	
			1992 Minnesota (n = 555,893)	1992 U.S. (n = 32,019,000)
Age Distribution				
65–74 years	55	52	52	56
75–84 years	38	39	34	34
85 years	8	9	13	11
Gender: Female	62	62	59	60
Antidepressant Use	16	16	NA	NA

between state and U.S. enrollee populations over 65 years indicated that Minnesota Medicare enrollees were slightly older (χ^2 = 3,984.62, df = 2, $p \leq .00001$) and included 1% fewer females (χ^2 = 33.58, df = 1, $p \leq .0001$).

Self Reported Depression: The GDS

Self-reported indication of depression by elderly enrollees was assessed with the GDS. This is a standardized 30-item survey instrument with a yes/no answer format and a standardized score of 11 or greater as an indication of depression (29). A screening tool, such as the GDS, was needed that was independent of physician diagnosis and the medical record because previous research has consistently reported both underdiagnosis and underdocumentation of depression in the primary care sector (2–8).

A major problem in determining the magnitude of under diagnosis of depression is the lack of a "gold standard" such as a blood test or titer level. Nor has there been a ranking of assessment techniques based on validity of the presence of depression, independent of the primary care physician's diagnosis. Hypothetically, it is possible to envision such a continuum, ranging from most to least valid. Examples of points along such a continuum could include assessment techniques used in previous research: (*i*) diagnosis by a psychiatrist in a one-on-one interview; (*ii*) the Diagnostic Interview Scale (DIS) (31) based on the Diagnostic and Statistical Manual (14) produced by the American Psychiatric Association and administered in a face-to-face interview (31) or by telephone (32); (*iii*) one of several standardized, self-report instruments such as the GDS (29), Centers for Epidemiologic Studies-Depression Scale (CES-D) (33), Beck Depression Inventory (34), or the Zung Self-Rating Depression Scale (35), all of which can be administered in pencil-paper form; or (*iv*) one or two standard questions asked in the course of a brief encounter, e.g., "Do you feel sad or blue?" or "Are you feeling depressed?" (36).

In addition to ranging hypothetically from most to least valid for the true existence of depression, these assessment points also range along a practical continuum from most to least expensive to administer.

In this study, the GDS was chosen to assess the individual's feelings of depression because it was relatively inexpensive, could be used to assess a large number of people, and has been widely used in health care settings as well as in previous research. The GDS is in the public domain, requires less than 10-min response time, and would be a likely choice as a screening tool in a primary care clinic or physician's office.

Psychometric research literature has demonstrated both validity and reliability of the GDS in its use with community-dwelling elderly people (29,37). Content validity of the instrument was established through its administration to previously diagnosed patients and was found to reliably classify subjects as normal, mildly depressed, or severely depressed on the basis of Research Diagnostic Criteria for major affective disorder (37). Split half reliability was .94, and test-retest reliability was .85 ($p \leq .001$) indicating the stability of the instrument over time (of 1 week) (29). The GDS has a sensitivity of 84% and specificity of 95% for community-based elderly people (37). Thus the existence of a true depressive condition is likely to be detected with this instrument in this subset of the population.

The GDS was mailed to all enrollees on June 21, 1993. Dillman's method for improving response rates was used: the initial mailing consisted of a letter of invitation to participate, an informed consent statement, and the GDS, followed approximately 3 weeks later by a reminder postcard sent to all nonrespondents, followed approximately 3 weeks later by another copy of the GDS (38,39). The procedures of this study, content of the letter, and the consent form were approved by human subjects committees at HealthPartners and the University of Minnesota prior to initial contact.

This was not an intervention study; therefore, results of the GDS screening were not given to clinicians in HealthPartners, nor were the GDS scores recorded in the medical charts. In the interest of protection of human subjects, a protocol was established prior to data collection in which the pharmacy and medical records of enrollees with a severe indication of depression based on a GDS score of ≥20 would be examined independently by project staff. Of the 14 enrollees for whom there was no documentation of clinical detection of depression in the pharmacy or medical records, the psychiatrist on the study team contacted each and offered to see them individually. None accepted.

Clinical Detection of Depression

Clinical detection of depression was defined as the presence of one or more of three indicators: a diagnosis of depression in the patient encounter form, one or more visits to a mental health specialist, or a prescription for one or more antidepressant medications. Clinical detection was

coded as a dichotomous variable for the entire 24-month study period. The three indicators were identified as follows.

(*i*) Diagnosis of depression in patient encounter form. HealthPartners requires that diagnoses be recorded for each inpatient and outpatient encounter using ICD-9 codes (40). This information is available in electronic form with no limit on the number of diagnosis codes that can be recorded. One or more of the ICD-9 codes, listed in Appendix A, operationally defined the presence of a diagnosis of depression in this study. Only information about patient encounters in which there was a diagnosis of depression and/or there was a visit to a mental health specialist was available in this data file. No information was available about patient encounters with primary care physicians or specialists, other than mental health professionals, in which there was no diagnosis of depression.

(*ii*) Visit to mental health provider. HealthPartners maintains an electronic record of the specialty of each provider in the HealthPartners system. Mental health specialists include psychiatrists, psychologists, social workers, psychiatric nurses, or other licensed mental health specialists. For purposes of this study, indication was defined as one or more visits to one or more of these mental health specialists.

(*iii*) Antidepressant treatment. For each enrollee, determination was made of antidepressant medication treatment based on HealthPartners pharmacy records for the 24-month period. Presence of antidepressant therapy was operationally defined as one or more prescriptions of any antidepressant drug obtained by the subject during the study period.

During the 24 months of this study, the HealthPartners drug formulary included agents in all four classes of antidepressants that were available on the market, i.e., tricyclic antidepressants, selective serotonin reuptake inhibitors, monoamine oxidase inhibitors, and heterocyclics. A fifth class of antidepressants, the combined serotonin and norepinephrine reuptake inhibitors, had not been introduced on the market when these data were collected.

Medical Chart Review: A Substudy of Criteria

The criteria used in this study as markers for clinical detection required actions taken either solely by the physician (in recording an ICD-9 diagnosis on an encounter form) or jointly by a physician and patient (either a visit to a mental health specialist or the acquisition of a prescription for an antidepressant medication). The possibility that these actions did not fully reflect clinical detection of the patient's self-reported indication of depression was considered. We therefore conducted a substudy in which we compared the three criteria used in this study with notation of depression in the medical chart.

In consideration of statistical power, there was deliberate oversampling of subjects with an independent indication of depression and antidepressant use. The resulting sample of 579 enrollees included those with a GDS score of 11 or greater who did (n = 151) or did not (n = 173) have an antidepressant prescription. The sample also included a group with the medication but a GDS score of less than 11 (n = 115) and a random sample of enrollees with no medication and no indication of depression (n = 140). For each subject, the medical chart was reviewed for a 12-month period beginning March 1, 1993. Antidepressant use, based on pharmacy claims files, was assessed for the same time period.

In the review, all words in the chart that included the term, depression, or diagnostic equivalents based on the DSM IV (14) were recorded. The following eight words were recorded in one or more of this sample of charts: depression (n = 165 charts), dysthymia (n = 4), chronic depression (n = 20), history of depression (n = 59), bipolar depression (n = 1), major depression (n = 3), affective disorder (n = 1), and suicidal ideation (n = 5).

As shown in Table 2, 288 subjects were identified as having an indication of depression using the three criteria for clinical detection, of which 45% (n = 130) were not identified in the medical chart. Alternatively, 178 of the same sample of subjects had one or more of the eight terms for depression in the medical chart, of which 11% (n = 20) were not identified with the clinical detection criteria. Of those 20, two had a notation in the chart of "history of depression" and 19 had the term "depression." There were no differences by gender or age group associated with failure to identify patients in the chart compared to the three-criteria definition.

We interpreted these findings as indicating that the three-criteria definition used in this study was more sensitive than a chart review, although not perfect. A note of "depression" in the chart does not necessarily connote a diagnosis nor is such a note necessarily a basis for action on the provider's part (such as recording a diagnosis on the encounter form or prescribing an antidepressant or referring the patient to a mental health specialist). For these reasons, the physician's actions, reflected in the three criteria used in this study, rather than a note in the medical chart were used as the measure of clinical detection of the possibility of depression.

Statistical Analysis

The analysis was performed for all GDS respondents (n = 3410) and then separately for those respondents who had an indication of depression on the GDS (n = 559). Multivariate logistic regression was used to examine associations between covariates and the dichotomous outcome variable represent-

Table 2. Number of Subjects With Indication of Depression in Medical Charts and by Clinical Detection Criteria

	Medical Chart		
Clinical Detection Criteria	No	Yes	Total
No Indication of Depression	271	20	291
Indication of Depression	130	158	288
Total	401	178	579

Note: Clinical detection criteria included one or more of three indications, ICD-9 code for depression in the computerized patient encounter form, or antidepressant medication, or a mental health specialist visit.

ing the presence/absence of clinical detection of depression. Standard methods (41) were used to calculate estimated odds ratios and related 95% confidence intervals. The estimates and intervals determine the magnitude and significance of individual covariate and interaction effects (42).

Results

Subject Profile

Of the 3410 subjects, 16% (n = 559) had an indication of depression based on the standardized GDS cut-off score of 11 or greater. As shown in Table 3, 14% (n = 475) of the enrollees had a depression diagnosis during either year. (Of this subset, over three fourths were diagnosed by a primary care physician; less than one fifth by a mental health specialist only; and the remainder by physicians with specialties in other areas or specialty unknown.) Nine percent of the cohort of 3410 elderly people had one or more visits with a mental health specialist during the 24-month study period, and 22% of the total cohort received antidepressant medications during the same time period.

Clinical Detection of Self-Reported Depression

Over a 2-year period, approximately half of the elderly people who had self-reported feelings of depression were identified by their health care providers as possibly depressed based on a diagnosis of depression, one or more visits to a mental health specialist, or treatment with antidepressant medications. As shown in Figure 1, 48% of this group with self-reported indications of depression did not have documentation that might constitute clinical detection of depression.

Variation in Clinical Detection by Severity of Indication

The possibility of a relationship between clinical detection and severity of indication was examined for enrollees whose GDS scores were at or above the cut-off of 11. Increasing levels of severity were defined by four GDS score groups, ranging from 11–14 as the least severe to 26–30 as the most severe. As shown in Table 4, clinical detection of depression increased from 43% for people with the least severe level of self-reported depression to 76% of elderly people at the extreme end of the continuum. Thus one-fourth of the elderly enrollees with the most severe indication of depression based on self report had none of the indicators that constituted clinical detection of depression in this study.

Factors Associated with Clinical Detection of Self-Reported Depression

Patient factors associated with clinical detection.—Variables likely to be associated with clinical detection of depression were examined in a multivariate analysis that included gender (male/female), age group (65–74, 75–84, ≥85 years), and GDS score (0–5, 6–10, 11–15, 16–20, 21–25, 26–30). Clinical detection (yes/no) was the outcome

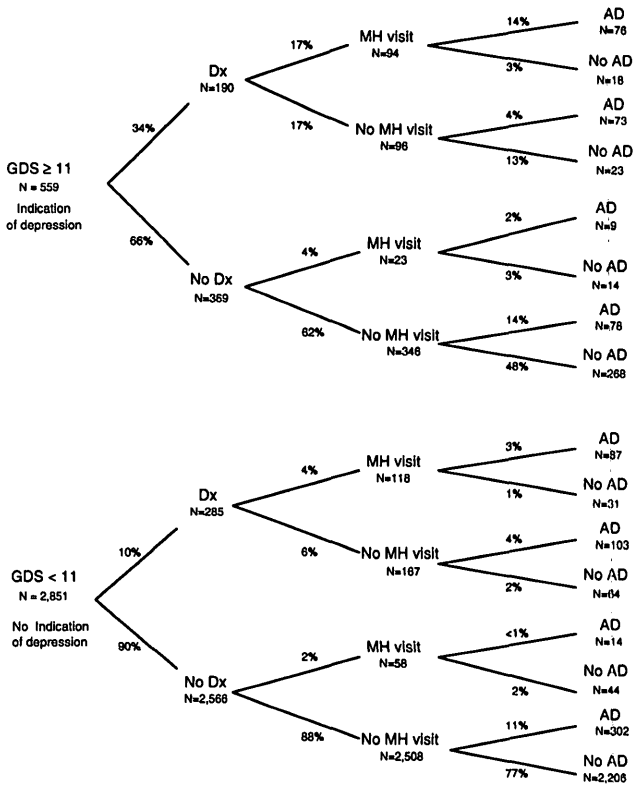

Figure 1. Percent of elderly people with/without self-reported indication of depression based on the GDS who had diagnosis of depression (Dx), mental health visit (MH), or antidepressant treatment (AD) over a 24-month study period. Note that all percentages are within the appropriate GDS category.

Table 3. Percent of 3410 Subjects Reporting Indicators of Detection During Years 1 or 2, Either Year, or Both Years

Indicators of Detection	Year 1 (%)	Year 2 (%)	Either Year (%)	Both Years 1 and 2 (%)
Documented Diagnosis of Depression	9	10	14	5
Visit to Mental Health Specialist	5	6	9	3
Antidepressant Treatment	16	17	22	11
Comprehensive Measure (one or more of first three indicators)	19	20	26	13

Table 4. Clinical Detection of Depression by Severity of Indication of Self-Reported Depression Among 559 Enrollees With a GDS Score ≥11

	GDS Score Range				
	11–15	16–20	21–25	26–30	Total
Number of Subjects	314	144	80	21	559
% of Subgroup With Clinical Detection	43	62	65	76	

Note: GDS score equal to or greater than 11 is considered to be an indication of depression.

variable. The regression model was statistically significant at the .0001 level (χ^2 = 333.37, df = 10). The parameter estimates in Appendix B permit comparisons of other age-gender-GDS subgroups. Odds ratios for selected variables are shown in Tables 5 and 6.

The variable most closely associated with clinical detection of depression was the GDS score ($p \leq .0001$, df = 5). As shown in Table 5, the relative odds of a provider recognizing a depressive condition ranged from 1.89 for individuals with a GDS score of 6–10 (which is below the standardized cut-off of 11) to 13.91 for those with the highest (most severe) indication (GDS score = 26–30). The comparison group consisted of individuals with GDS scores in the range of 0–5.

Because of a gender-age group interaction, selected odds ratios are shown separately in Table 6 for women compared to men stratified by age group, then for each gender compared to their own youngest age group (65–74 years).

Compared to men 65–74 years old, the odds of clinical detection for women in the same age range were over 2.5 times higher. Of women 75–84 years, the odds of clinical detection are approximately 1.5 times higher than for men in their age group. Both of these comparisons were statistically significant. The odds of clinical detection for women ≥85 years were 1.5 times greater than for men in the same age group of being recognized as depressed by their providers. This particular gender difference did not reach statistical significance, possibly due to the smaller sample size in the oldest age group.

Of the men only, those who were 75–84 years old had 49% greater odds of recognition as clinically depressed by their providers than men who were 65–74 years old; this difference was statistically significant. The odds for men in the oldest age group (n = 81) did not differ statistically from those for men who were 65–74 years (n = 761), again perhaps due to the smaller sample size in the oldest group.

Within the group of women, there were no statistically significant differences between each of the two older age groups compared to the group in the 65- to 74-year-old age range.

Table 5. Odds of Clinical Detection of Depression Stratified by GDS Scores Among 3410 Elderly People

GDS Score	Odds Ratio	95% Confidence Interval
0–5	1.00	—
6–10	1.89*	(1.56, 2.29)
11–15	3.06*	(2.38, 3.95)
16–20	6.77*	(4.72, 9.70)
21–25	8.52*	(5.26, 13.80)
26–30	13.91*	(4.29, 38.73)

*$p \leq .05$.

Table 6. Odds of Clinical Detection of Depression Among 3410 Enrollees

Factor	Odds Ratio	Confidence Interval
Women Compared to Men, Stratified by Age Group		
65–74	2.74*	(2.14, 3.50)
75–84	1.52*	(1.16, 2.00)
≥85	1.52	(0.69, 3.31)
Men Only Compared to Men in the Youngest Age Group		
65–74	1.00	—
75–84	1.49*	(1.10, 2.01)
≥85	1.38	(0.78, 2.43)
Women Only Compared to Women in the Youngest Age Group		
65–74	1.00	—
75–84	0.87	(0.71, 1.07)
≥85	0.81	(0.57, 1.14)

*$p \leq .05$.

Percent of elderly people with clinical detection.—The predicted percent of elderly people likely to be recognized as depressed by their providers was computed based on statistically significant beta weights from the logistic regression model (Appendix B). The formula used to compute predicted percents for each age, gender, and GDS score combination is also presented in Appendix B. Such predictions are useful because they summarize the combination of all the variables in a multivariate analysis.

There were three major findings when all variables were taken into account: (*i*) providers were consistently more likely to recognize women as possibly depressed than men, regardless of age or self-reported indication of depression based on the GDS score; (*ii*) there was a positive relationship between clinical detection of depression and GDS score, i.e., the worse (higher) the score, the more likely they were to have clinical detection of depression; and (*iii*) men in two age ranges, 65–74 and ≥85, were least likely to have clinical detection of depression at all GDS score levels. For example, among individuals with GDS scores at the highest level (GDS = 26–30), 64–73% of the men compared to 80–82% of the women would be expected to have provider detection of depression. These differences are shown in Figure 2.

Enrollees with self-reported depression.—The possibility that the variables associated with clinical detection differed when the study group was restricted to individuals (n = 559) with a GDS score of 11 or greater was examined in a separate logistic regression analysis (data not shown). Using the same variables included in Appendix B, the results showed statistically significant differences by gender (women : OR = 1.70, $p \leq .01$, df = 1) and GDS score ($p \leq .0001$, df = 3). Severity of GDS score was positively associated with provider detection of depression. Compared to GDS scores of 11–15, the odds ratios were 2.23 ($p \leq .0001$, df = 1), 2.69 ($p \leq .001$, df = 1), and 4.39 ($p \leq .01$, df = 1), for GDS scores of 16–20, 21–25, and 26–30, respectively. These findings are consistent with the regression analysis based on all enrollees (n = 3410). Unlike the previous analysis, however, neither age group nor the gender by age group interaction was statistically significant.

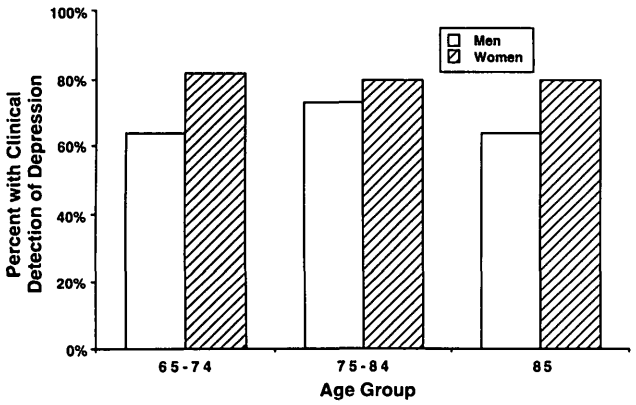

Figure 2. Predicted percent of elderly people in the highest GDS score range (26–30) with clinical detection of depression.

DISCUSSION

Summary

The goal of this study was to examine the clinical detection of depression in community-based elderly people who had independently reported indications of depressive feelings. This was descriptive research, not an intervention study; therefore, providers were not told which patients had self-reported indications of depression.

A broad measure of clinical detection was used consisting of the presence of one or more of three of the most salient indicators of a physician's detection of this condition, diagnostic code for depression in the patient encounter form, visit to a mental health specialist, or antidepressant treatment. The study period was also broadly defined as 24 months in order to capture information about managed care enrollees who might have been identified and successfully treated prior to screening for depression.

The results of this study suggest that health care providers in the primary care sector detect the possibility of depression among women in greater proportion than men, taking into account age and severity of indication of self reported depression.

Specific findings of this study included the following: (*i*) Approximately half of the community-based elderly people with self-reported feelings of depression were not detected as possibly depressed by their health providers based on documentation in the health care records; (*ii*) physician detection of depression appears to increase with the severity of patients' self-reported indications of depression; (*iii*) elderly women in all three age groups tended to have higher rates of clinical detection of depression than men; (*iv*) the two groups at highest risk for under-detection of depression were men between the ages of 65–74, and men 85 years and older; and (*v*) despite the increasing rates of clinical detection of depression by severity of the GDS score, approximately one fifth of the women and over a third of the men with the most severe indications of self-reported depression were not recognized as possibly depressed by their physicians.

Some of these findings are consistent with previous research over the past 20 years (1–8) that has reported underdiagnosis of depression in the primary care sector and a higher rate of diagnosis and treatment of women. An age–gender interaction has not been reported in the context of studies that take into account both diagnosis and treatment.

One of the strengths of this study was a large data set of enrollees in a managed care organization. Thus inclusion of subjects did not depend on their having accessed the health care system at any time during the study period. Another strength of the study was the use of all prescription claims files. With the exception of special populations such as Medicaid recipients, availability of information about pharmaceutical treatment for large groups of elderly people outside of institutional facilities is incomplete except in managed care organizations. Other strengths included the use of a standardized instrument for assessing self-reported indications of depression and the definition of clinical detection of depression based on three salient indicators of physician behavior, i.e., diagnosis, specialist visit, and antidepressant treatment.

The advantage of using a comprehensive measure of clinical detection of depression over a single indicator can be seen in Figure 1. For example, 34% of the elderly people with self-reported depression would have been estimated to have been clinically recognized as depressed based on diagnosis in the patient encounter form alone, compared to 21% on the basis of a visit to a mental health professional or 42% with antidepressant treatment; whereas 52% of the same group had clinical detection based on a comprehensive measure of one or more of these indicators.

The GDS is a screening tool that is useful in suggesting the possibility of depressive feelings, but it is not a diagnostic tool. The GDS does not distinguish between depressive feelings due to bereavement or to nonclinical conditions; nor does this instrument differentiate among different types of diagnoses, e.g., major depression, dysthymia, or depressive symptoms. Thus patients who exceed the GDS cut-off score may not necessarily be clinically depressed or need a diagnosis, a visit to a mental health professional, or pharmaceutical treatment. One of the outcomes of this study, however, was the finding of a positive relationship between GDS score and clinical detection of the possibility of depression.

The potential for bias in the distribution of subjects by age group in the sample used in this study cannot be ruled out, although they appear to approximate the same gender distribution as other Medicare recipients. Generalization of these findings to the Medicare population is also limited by the choice of enrollees in a managed care organization in an urban setting. Approximately 6% of all Medicare recipients throughout the United States were enrolled in such a health care plan in 1992 (30). Alternatively, the sample in this study might be considered a "best case" possibility because the goal of a managed care system is to maintain the health of all enrollees, and variations in the ability to pay for physician visits or prescription drugs were ruled out.

The outcome variable was limited to three indications of clinical detection of depression, albeit three of the most significant markers of physician behavior. Some of the issues related to the individual factors that made up this dependent variable include the following.

1. Diagnosis of depression. Using diagnosis as a measure of physician recognition of depression may be problematic for several reasons: the DSM (14) vocabulary describing signs and symptoms of depression may not reflect the primary care patient's presenting complaints (43), specificity of some symptoms may be decreased in elderly people and more ambiguous in the medically ill older adults (44), and diminished cognitive functioning may be a confounding factor (45). Alternatively, the provider may not have inquired sufficiently about the patient's feelings to detect a depressive condition.

   Incomplete documentation of all current diagnoses and conditions may also result in an underestimate of physician detection of depression. Although the records protocol in this managed care organization requires documentation of one or more diagnoses for every patient encounter, and an unlimited number of diagnoses can be recorded in the database, there is the possibility that a diagnosis other than the primary diagnosis was not consistently recorded.

   Rarely has the literature on under-diagnosis of depression in the primary sector suggested the possibility that detection and treatment of depression may be a joint provider-patient problem. Two possible scenarios reflecting this problem may be: (*a*) the enrollee did not see a primary care provider during the 24-month study period or (*b*) the patient who was seen did not report symptomology that could be associated with depression. We examined the first possibility with data from the chart review in which we found that less than 1% (2 of 579 enrollees) had not had a visit to a provider during the 1-year period. With respect to the second scenario, research has shown that there is an inverse relationship between patient's age and self-reported depressive symptoms, i.e., elderly patients under-report feelings of depression (46).

   Even when there is a diagnosis of depression, previous research has shown that primary care physicians tend to underreport such a condition because of the possibility of a stigma of mental illness (47). A better understanding is needed of how physicians and patients interact in their joint decision to undertake a treatment regimen for depression once the diagnosis is made; however, this was beyond the scope of this study.
2. Visit to mental health specialist. More detailed information about the purpose of visits to mental health professionals, whether for assessment, psychotherapy, or other kinds of therapeutic treatment, was not known. Nor was there any measure of therapeutic activities or methods of intervention outside of this health care system, e.g., through religious or self-help groups. In this study, a visit to a mental health specialist was considered an important marker because this provided an opportunity for the elderly person to be assessed for depression by a specialist, regardless of the diagnosis or treatment that resulted. In general, however, using a visit to a mental health specialist as an indicator of physician recognition of depression may be inadequate because of patient resistance to accept a referral (22).
3. Antidepressant medication. Not all patients with an indication of clinical depression can or should be treated with antidepressant medications, nor is pharmacologic treatment the only effective treatment option. Alternatively, antidepressant drugs are prescribed for conditions other than depression, e.g., chronic pain, sleeplessness. Finally, use of antidepressant treatment as an indicator may also under detect physician recognition because this measure only captures information about patients who obtain a prescription.

Although any one of these three indicators could have been used as the outcome variable, they were used in combination in order to provide a broad measure of provider detection of a problem defined by the patient through the use of the GDS. This was not a validity study of a screening instrument, but rather an examination of provider documentation or treatment among elderly outpatients.

Conclusions

The results of a study that relates a broad definition of clinical detection of depression with self-reported indications of depression by a population of community-based elderly people has not been reported previously. This, we believe, has been one of the main contributions of this study. Our results suggest that clinical detection of depression of elderly people living in the community continues to be a problem. Men between the ages of 65 and 74 and those 85 and older appear to be at greatest risk for underdetection of depression in the primary care sector. The implications of failure to recognize the possibility of depression in this group of patients are serious: previous research has found that elderly White men are at the highest risk for completed suicide and three fourths of all elderly suicide victims had visited a primary care physician within the month before their death (22).

One solution to the problem of underdetection of depression might be periodic screening for depression of all patients, or preferably all enrollees, in a health care practice with clinical follow-up for patients with scores above the cut-off. Although previous research based on decision analysis has suggested that such screening is not effective for elderly inpatients unless the intent is to administer a therapy other than pharmaceutical treatment (48), we argue that the use of an instrument, such as the GDS, is likely to be a cost-effective approach to screening elderly outpatients. Perhaps by routinely asking elderly people about their feelings of depression with standardized instruments and following up with clinical evaluations, physicians can more fully address the twin goals of reducing health care costs and improving quality of life for the patient population.

ACKNOWLEDGMENTS

This research was supported by AHCPR grant R01 1BS0772, Judith Garrard, Principal Investigator. Dr. Garrard's work in Year 1 was supported, in part, by Special Emphasis Career Research Award # K01-AG 000434 from NIA.

Address correspondence to Judith Garrard, PhD, Institute of Health Services Research, Box 729 UMHC, University of Minnesota, 420 Delaware Street, SE, Minneapolis, MN 55455. E-mail: jgarrard@maroon.tc.umn.edu

References

1. Ketai R. Family practitioners' knowledge about treatment of depressive illness. *JAMA*. 1976;235:2600–2603.
2. Keller MB, Lerman GL, Lvori PW, Fawcett JA, Coryell W, Endicott J. Treatment received by depressed patients. *JAMA*. 1982;248: 1848–1855.
3. Shapiro S, Skinner EA, Kessler LG. Utilization of health and mental health services; three epidemiologic catchement sites. *Arch Gen Psychiatry*. 1984;41:971–978.
4. Wells KB, Goldberg G, Brook RH, Leake B. Management of patients on psychotropic drugs in primary care clinics. *Med Care*. 1988;26: 645–656.
5. Wells KB, Hays RD, Burnham MA, et al. Detection of depressive disorder for patients receiving prepaid or fee-for-service care. *JAMA*. 1989;262:3298.
6. Katon W, Sullivan M. Depression and chronic medical illness. *J Clin Psychiatry*. 1990;51(Suppl. 6):3.
7. Katon W, Von Korff M, Lin E, Bush T, Ormel J. Adequacy and duration of antidepressant treatment in primary care. *Med Care*. 1992;30: 67–76.
8. Wells KB, Katon W, Rogers B, Camp P. Use of minor tranquilizers and antidepressant medications by depressed outpatients: results from the medical outcomes study. *Am J Psychiatry*. 1994;151:694–700.
9. Wells KB, Stewart A, Hays RD, et al. The functioning and well-being of depressed patients: results from the Medical Outcomes Study. *JAMA*. 1989;262:914–919.
10. Simon GE, Von Korff M. Somatization and psychiatric disorder in the NIMH Epidemiologic Catchment Area Study. *Am J Psychiatry*. 1991; 148:1494–1500.
11. Eisenberg L. Treating depression and anxiety in primary care: closing the gap between knowledge and practice. *N Engl J Med*. 1992;326: 1080–1084.
12. Ormel J, VonKorff M, Van den Brink W, Katon W, Brilman E, Oldehinkel T. Depression, anxiety, and social disability show synchrony of change in primary care patients. *Am J Public Health*. 1993;83: 385–390.
13. Simon GE, Ormel J, Von Korff M, Barlow W. Health care costs associated with depressive and anxiety disorders in primary care. *Am J Psychiatry*. 1995;152:352–357.
14. American Psychiatric Association. *Diagnostic and Statistical Manual of Mental Disorders, 4th ed.* Washington, DC: American Psychiatric Association; 1994.
15. Frasure-Smith N, Lesperance F, Talajic M. Depression following myocardial infarction. Impact on 6-month survival. *JAMA*. 1993;270: 1819–1825.
16. Hendrie HC, Crossett JHW. An overview of depression in the elderly. *Psychiatric Ann*. 1990;20:64–70.
17. Coulehan JL, Schulberg HC, Block MR, Janosky JE, Arena VC. Depressive symptomatology and medical co-morbidity in a primary care clinic. *Int J Psychiatry Med*. 1990;20:335–347.
18. Spitzer RL, Kroenke K, Linzer M, et al. Health-related quality of life in primary care patients with mental disorders: results from the PRIME-MD 1000 Study. *JAMA*. 1995;274:1511–1517.
19. Johnson J, Weissman MM, Klerman GL. Service utilization and social morbidity associated with depressive symptoms in the community. *JAMA*. 1992;267:1478–1483.
20. Broadhead WE, Blazer DG, George LK, Tse CK. Depression, disability days, and days lost from work in a prospective epidemiologic survey. *JAMA*. 1990;264:2524–2528.
21. Rothschild AJ. The diagnosis and treatment of late-life depression. *J Clin Psychiatry*. 1996;57(Suppl.5):5–11.
22. National Institutes of Health. NIH Consensus Development Panel on Depression in late life diagnosis and treatment of depression. *JAMA*. 1992;268:1018–1024.
23. Borson S, Barnes RA, Kukuull WA, et al. Symptomatic depression in elderly medical outpatients. I. Prevalence, demography, and health service utilization. *J Am Geriatr Soc*. 1986;34:341–347.
24. Evans S, Katona C. Epidemiology of depressive symptoms in elderly primary care attendees. *Dementia*. 1993;4:327–333.
25. Callahan CM, Hui SL, Nienaber NA, et al. Longitudinal study of depression and health services use among elderly primary care patients. *J Am Geriatr Soc*. 1994;42:833–838.
26. Strum R, Wells KB. How can care for depression become more cost-effective? *JAMA*. 1995;273:51–58.
27. Mulrow CD, Williams JW, Jr., Gerety MB, Ramirez G, Montiel OM, Kerber C. Case-finding instruments for depression in primary care settings. *Ann Intern Med*. 1995;122:913–921.
28. Olfson M, Broadhead E, Weissman MM, et al. Subthreshold psychiatric symptoms in a primary care group practice. *Arch Gen Pscychiatry*. 1996;53:880–886.
29. Yesavage JA, Brink TL, Rose TL, et al. Development and validation of a geriatric screening scale: a preliminary report. *J Psychiat Res*. 1983;17:37–49.
30. Health Care Financing Administration. *Health Care Financing Review: Medicare and Medicaid Supplement*. Baltimore, MD: U.S. Dept. of Health and Human Services HCFA publication 03348. 1995:156–158.
31. Robins LN, Helzer JE, Croughan J, Ratcliff KS. National Institute of Mental Health Diagnostic Interview Schedule: its history, characteristics, and validity. *Arch Gen Psychiatry*. 1981;38:381–389.
32. Wells KB, Burnam MA, Leake B, Robins LN. Agreement between face-to-face and telephone administered versions of the depression section of the NIMH Diagnostic Interview Schedule. *J Psychiatr Res*. 1988;22:207–220.
33. Radloff LS. The CES-D scale: a self-report depression scale for research in the general population. *Appl Psychol Meas*. 1977:385–401.
34. Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J. An inventory for measuring depression. *Arch Gen Psychiatry*. 1961;4:561–571.
35. Zung WWK. A self-rating depression scale. *Arch Gen Psychiatry*. 1965;12:63–70.
36. Ware JE, Snow KK, Kosinski M, Gandek B. *SF-36 Health Survey Manual and Interpretation Guide*. Boston: New England Medical Center, The Health Institute; 1993.
37. Brink TA, Yesavage JA, Lum O, Heersema P, Adey M, Rose TL. Screening tests for geriatric depression. *Clin Gerontol*. 1982;1:37–44.
38. Dillman DA. *Mail and Telephone Surveys: The Total Design Method*. New York, NY: John Wiley & Sons; 1978.
39. Salant P, Dillman DA. *How to Conduct Your Own Survey*. New York, NY: John Wiley & Sons; 1994.
40. Commission on Professional and Hospital Activities. *The International Classification of Diseases, 9th ed. Clinical Modification (ICD-9-CM) Volume 1. Diseases Tabular List*. Ann Arbor, MI: Commission on Professional and Hospital Activities; 1980.
41. Fleiss JL. *Statistical Methods for Rates and Proportions*. New York, NY: John Wiley & Sons; 1981.
42. Agresti A. *Categorical Data Analysis*. New York, NY: John Wiley & Sons, 1990.
43. Jencks SF. Recognition of mental distress and diagnosis of mental disorder in primary care. *JAMA*. 1985;253:1903–1907.
44. Katz IR, Curlik S, Lesher EL. Use of antidepressants in the frail elderly: when, why, and how. *Clin Geriat Med*. 1988;4:203–222.
45. Feher EP, Larrabee GJ, Crook THI. Factors attenuating the validity of the Geriatric Depression Scale in a dementia population. *J Am Geriatr Soc*. 1992;40:906–909.
46. Lyness JM, Cos C, Curry J, Conwell Y, King DA, Caine ED. Older age and the underreporting of depressive symptoms. *J Am Geriatr Soc*. 1995;43:216–221.
47. Rost K, Smith R, Matthews DB, Guise B. The deliberate misdiagnosis of major depression in primary care. *Arch Family Med*. 1994;3: 333–337.
48. Koenig HG, Ford SM, Blazer DG. Should physicians screen for depression in elderly medical inpatients? results of a decision analysis. *Int J Psychiatry Med*. 1993;23:239–263.
49. Kleinbaum DG, Kupper LL, Morgenstern H. *Epidemiologic Research: Principles and Quantitative Methods*. New York, NY: Van Nostrand Reinhold; 1982.

Received January 29, 1997
Accepted July 3, 1997

Appendix A

ICD-9 codes used to define depression in this study

290.2	Senile Delusion/Depress
290.21	Senile Depressive
290.43	Arterioscler Depressive
293.83	Organic Affective Synd
295.7	Schizoaffective Type
295.70	Schizoaffective-Unspec
296	Affective Psychoses
296.2	Major Depr Singl Episode
296.20	Major Depress Dis-Unspec
296.21	Major Depress Dis-Mild
296.22	Major Depress Dis-Mod
296.23	Major Depress Dis-Severe
296.24	Majr Depress-Sev W Psych
296.25	Majr Depress-Part Remiss
296.26	Majr Depress-Full Remiss
296.3	Mjr Depress-Recur Episod
296.30	Recurr Majr Depress-Unsp
296.31	Recurr Majr Depress-Mild
296.32	Recurr Majr Depress-Mod
296.33	Recur Mjr Depress-Severe
296.34	Rec Mjr Depres-Psychotic
296.35	Recur Mjr Depre-Part Rem
296.36	Recur Mjr Depre-Full Rem
296.4	Bipolar Affective, Manic
296.46	Bipol Aff Manic-Full Rem
296.5	Bipolar Affect, Depress
296.51	Bipolar Affec, Depr-Mild
296.52	Bipolar Affec, Depr-Mod
296.56	Bipol Aff Depr-Full Rem
296.6	Bipolar Affective, Mixed
296.60	Bipol Aff, Mixed-Unspec
296.61	Bipolar Aff, Mixed-Mild
296.62	Bipolar Affec, Mixed-Mod
296.66	Bipol Aff, Mix-Full Rem
296.7	Bipolar Affective NOS
296.70	Bipolar Disorder NOS
296.80	Manic-Depressive NOS
296.82	Atypical Depressive Dis
296.9	Affect Psychoses Nec/NOS
296.90	Affective Psychosis NOS
298.0	React Depress Psychosis
300.4	Neurotic Depression
300.40	Dysthymia
301.13	Cyclothymic Disorder
309.0	Brief Depressive React
309.00	Adj Dis/Depressed Mood
309.1	Prolong Depressive React
309.28	Adj React-Mixed Emotion
311	Depressive Disorder Nec
311.00	Depressive Disorder NOS

Appendix B

Factors Associated with Provider Detection of Depression Among 3410 Elderly People

Factor	Odds Ratio	Beta (β)	*SE*	Beta CI	df
Gender					
Male	1.00	—	—	—	—
Female	2.60	0.95**	0.12	(0.71, 1.19)	1
Age group					
65–74 years	1.00	—	—	—	—
75–84 years	1.49	0.40*	0.15	(0.10, 0.70)	1
≥85 years	1.38	0.32	0.28	(0.23, 0.88)	1
Women by age group interaction					
Women, 65–74	1.00	—	—	—	—
Women, 75–84	0.59	–0.53*	0.18	(–0.89, –0.16)	1
Women, ≥85	0.59	–0.53	0.33	(–1.19, 0.12)	1
GDS score groups					
0–5	1.00	—	—	—	—
6–10	1.90	0.63**	0.09	(0.44, 0.83)	1
11–15	3.07	1.12**	0.12	(0.86, 1.37)	1
16–20	6.78	1.91**	0.18	(1.55, 2.27)	1
21–25	8.52	2.14**	0.24	(1.66, 2.62)	1
26–30	13.91	2.63**	0.52	(1.60, 3.65)	1
Constant		–2.06**	0.10	—	—

Notes: CI = confidence intervals; *SE* = standard error; df = degrees of freedom.

Statistical significance levels: $*p \leq .01$, $**p \leq 0.0001$. We fit a logistic regression model to the data, including independent variables that were statistically significant, either individually or as part of a two-way model (49). The final model, shown here, includes terms for gender, age, GDS score, and an interaction between gender and age. The formula used to compute the predicted percents for each age, gender, and GDS score combination was the following:

$$\text{Predicted \% with clinical detection of depression} = \frac{[e^{(\beta\ \text{constant} + \beta\ \text{age} + \beta\ \text{GDS score} + \beta\ \text{age} \times \text{gender})}]}{[1 + e^{(\beta\ \text{constant} + \beta\ \text{age} + \beta\ \text{GDS score} + \beta\ \text{age} \times \text{gender})}].}$$