

Screening for Undetected Mental Disorders in High Utilizers of Primary Care Services

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OBJECTIVE: To define the prevalence and detection rates of mental disorders among high utilizers as compared with typical utilizers, and to examine the effect of case-mix adjustment on these parameters.

DESIGN: Cross-sectional study.

SETTING: General internal medicine outpatient clinic associated with an urban, academic medical center.

PATIENTS: From patients attending a general medicine clinic, 304 were selected randomly in three utilization groups, defined by number of clinic visits: (1) high utilizers; (2) case-mix adjusted high utilizers; and (3) typical utilizers (control patients).

INTERVENTIONS: None.

MEASUREMENTS AND MAIN RESULTS: The presence of any mental disorder was ascertained by the PRIME-MD screening instrument. Chart review on all patients was performed to ascertain mental disorders detected by primary care physicians. The prevalence of mood disorders was markedly higher in high utilizers (29%) than in adjusted high utilizers (15%) or controls (10%) ($p < .001$). Anxiety disorders were slightly, but not statistically, more prevalent in the group adjusted for case mix (16%) than in other high utilizers (12%) or controls (9%). Alcoholism was significantly more prevalent in controls (12%) than in adjusted (6%) or other high utilizers (3%) ($p < .03$). The discrepancy in detection rates between PRIME-MD and chart review for any mental disorder was less for high utilizers (37% vs 31%) as compared with adjusted high utilizers (31% vs 11%) or controls (24% vs 8%).

CONCLUSIONS: Mood disorders are associated with a high overall burden of illness, while anxiety disorders are more predominant among outliers after case-mix adjustment. Detection rates differ substantially by utilization pattern. Screening efforts can be more appropriately targeted with knowledge of these patterns.

KEY WORDS: mental disorders; high utilizers; depression; anxiety; case-mix adjustment; PRIME-MD.

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Among primary care outpatients, mental disorders are common but, unfortunately, inadequately diagnosed and treated.^{1,2} The impact of undetected mental disorders in primary care has become an important research priority. Because of the high prevalence of these disorders and their burden of disability, there is a great potential to improve the health and quality of life for millions of patients. In addition, the potential for cost savings, in terms of reduced medical expenditures,^{3,4} makes this area particularly ripe for study in this cost-conscious era.

Over the last decade, newer screening instruments have been developed that are specifically intended to diagnose mental disorders in primary care. These instruments offer simpler, more efficient, and validated methods for identifying mental disorders. Two such instruments, the SDDS-PC⁵ and PRIME-MD,⁶ have been successfully utilized in screening primary care patients who present for medical care. Initial studies with such instruments have yielded prevalence rates of 20% to 35% for any mental health disorder in unselected patients presenting for primary care.^{5,6}

A small body of literature supports the theory that the prevalence of mental disorders is substantially higher in high utilizers of medical services, up to 50% or higher.⁷⁻⁹ However, these studies of prevalence have not examined, for the most part, how often mental disorders had been previously recognized or treated. In addition, this research has been limited by the lack of adequate methods for case-mix adjustment. Although a number of studies suggest that mental illness is associated with higher primary care costs, the possibility of confounding by burden of illness and severity of illness has obscured the precise relation between these factors.¹⁰⁻¹⁹

Even more so than in the inpatient setting, outpatient care is characterized by wide variability in the types of problems seen, in the total burden of illness among patients, and in the utilization of diagnostic and therapeutic procedures. This creates special challenges for case-mix adjustment in the ambulatory setting. The ambulatory care group (ACG) system is one established method of case-mix adjustment for the ambulatory setting.^{20,21} This method was developed by classifying each ambulatory diagnosis (using *International Classification of Diseases, Ninth Revision*, codes) into 34 distinct ambulatory diagnostic groups. Using recursive partitioning, the combinations of these diagnostic groups were then used to derive 51 ACGs, based on expected utilization of medical services over time. Each patient is thus classified into one of these 51 mutually exclusive ACGs, which can best be described as representing the total burden of illness present.

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Using the PRIME-MD screening instrument and the ACG groupings allows us to study the relation between mental disorders and utilization in a new light. First, we attempted to further define the yield of screening for mental disorders in high utilizers of primary care services. We used a novel method for identifying high utilizers, by first classifying patients into their respective ACG and then selecting outliers within each of the individual ACGs. Next, we sought to examine the extent to which prevalence rates of mental disorders differ when high utilization is adjusted for case mix in this fashion. Finally, we reviewed patient charts to investigate whether detection rates of mental disorders vary among high utilizers, high utilizers adjusted for case mix, and typical utilizers.

METHODS

Patient Population

Eligible patients were identified through computerized billing files of a large general internal medicine clinic. This clinic is part of a multispecialty faculty group practice associated with an urban academic medical center. Three groups of patients were selected by utilization patterns from among all 16,015 patients who had visited the general medicine clinic at least once during the previous 12 months. These three groups were as follows.

Group 1: High Utilizers. All patients visiting the clinic in the last year were ordered by total number of visits to the general medicine clinic. Patients with total number of visits more than 2 SD above the mean were eligible for inclusion in this group. A random sample of 200 patients was selected from among this group for final inclusion in the study sample.

Group 2: High Utilizers Adjusted for Case Mix. The ACG system was used for case-mix adjustment. This methodology, designed specifically for use in the outpatient setting, groups each patient into one of 51 mutually exclusive ACGs according to expected ambulatory resource utilization. Patients were placed into their respective ACG by standardized methodology.²⁰ Within each ACG, patients were ordered by total number of visits. Patients who were 2 SD or more above the mean number of visits for their respective ACG were eligible for this group. An overview of this selection process is given in Appendix A, indicating the individual ACGs, the mean visit rate within each ACG, and the threshold visit rate for eligibility into the high utilizer group. (ACGs not represented in Appendix A are primarily pediatric groupings.) From the 845 eligible patients selected in this fashion, 200 were randomly selected for inclusion in the final study population.

Group 3: Typical Utilizers. All patients visiting the clinic in the last year were ordered by total number of visits to the general medicine clinic. Patients who were in the middle 70% of total number of visits (approximately within 1

SD of the mean) were eligible for inclusion in this group; 250 patients randomly selected from among this group were eligible for inclusion in the final study sample. The number of potential patients selected in this group was higher because we anticipated that response rates might be lower among typical utilizers as compared with high utilizers.

Further Exclusion Criteria. The following exclusion criteria also applied: patient deceased, non-English speaking; telephone number in records disconnected or wrong number; patient had moved out of area. In addition, patients who could not be contacted despite mailing and at least three telephone calls were excluded. Following these exclusion criteria, the numbers of eligible patients were as follows: group 1, 135; group 2, 122; and group 3, 149.

Data Collection

A consent form and brief description of the study were mailed to each potential subject. A follow-up telephone call was made if there had been no response to the mailed survey after 2 weeks. Once informed consent was obtained, either a research assistant or a general internal medicine fellow administered PRIME-MD over the telephone. Two more questions were added to the PRIME-MD screen: (1) Have you had the diagnosis of a mental health disorder at any time in the past? and (2) Are you currently being treated for a mental health disorder? Demographic information (age, sex) was obtained from computerized billing files.

Chart review of the outpatient medical record was performed by general medicine fellows on all patients eligible for the study, both those administered PRIME-MD and those not included in the final study sample. All general internal medicine progress notes were reviewed. Charts were abstracted for (1) documented presence of a mental health disorder, which was considered present if the chart indicated a diagnosis of a mental disorder within the last year, or the chart indicated the diagnosis of a mental disorder more than 1 year ago and there was evidence for current treatment of that disorder (medications or psychiatric care); (2) documentation of whether patient is currently being treated for a mental disorder; (3) documentation of any current psychotropic medication; and (4) specific mental diagnoses documented, if any.

The following definitions were used when referring to mental disorders. Any mental disorder refers to a positive result on one or more of the PRIME-MD modules. PRIME-MD is thus used as the "gold standard" for diagnosis of mental disorders. PRIME-MD has been shown to be an acceptable surrogate for the true gold standard, diagnosis by psychiatric interview, with a sensitivity of 83%, a specificity of 88%, and an overall accuracy of 86% for any mental disorder.⁵ Undetected mental disorder refers to a positive result on PRIME-MD when there is no evidence of such a diagnosis on chart review.

Data Analysis

Omnibus univariate comparisons of baseline characteristics of the three patient groups were performed via χ^2 for categorical variables and one-way analysis of variance for continuous variables. For effects that met the experimentwise criterion for statistical significance, all possible comparisons (involving t tests for age and χ^2 for categorical variables) between pairs of patient groups were tested in order to ascertain the precise nature of the intergroup differences. Prevalence and detection rates of mental health disorders were compared among utilization groups via χ^2 : power analysis indicated that 100 patients in each group would be sufficient to detect a twofold difference in prevalence rates between the typical utilizers versus high utilizers with $p < .05$ and $\beta = 0.20$. The experimentwise type I error rate was ensured at $p < .05$, using a two-step, sequentially rejective, Sidak Bonferroni-type multiple comparisons procedure. First, the 22 univariate analyses reported in the tables were evaluated for statistical significance using experimentwise $p < .025$. Next, the 21 univariate comparisons used to decompose omnibus effects were evaluated for statistical significance using experimentwise $p < .025$. Effects meeting the experimentwise criterion were considered statistically significant, and effects failing the experimentwise criterion but having a generalized ("per-comparison") type I error rate of $p < .05$ were considered statistically marginal.

Reliability Analysis

Dual review of a subset of patient charts was performed to assess the reliability of chart review for determining whether a mental disorder had been detected by the primary care physician. A random 10% sample of all eligible patients ($n = 406$) was selected for reliability analysis. Reliability was assessed for the presence of mental

health diagnoses by percentage of agreement and by the κ statistic. For all mental health diagnoses, the percentage of agreement was 94%, and the κ statistic was 0.71. For the categories of mood disorders and anxiety disorders, the percentage of agreement was 93%, and the κ statistic was 0.74. These results indicate relatively strong inter-rater agreement.

RESULTS

Out of a total of 406 eligible patients, 304 agreed to participate in the study, for an overall response rate of 75%. Response rates by group are shown in Table 1, with no significant differences in response rates by utilization group. A comparison of respondents versus nonrespondents on age, gender, and the presence of mental health disorders by chart review was performed. There were no differences in the rates of documented mental disorders among respondents and nonrespondents. In the control group, nonrespondents were significantly older than respondents (45 ± 15.6 years vs 37.7 ± 12.0 years, $p < .003$). There were no differences in age among the other groups, and no differences in sex among groups.

Patient characteristics are reported by patient group in Table 1. Compared with patients in the adjusted high utilizer group and with those in the typical utilizer group (control patients), patients in the high utilizer group had significantly more documented medical comorbidity, worse perceived health status, and received psychiatric treatment more frequently (all $p < .001$). Compared with control patients, patients in the adjusted high utilizer group had marginally more documented medical comorbidity ($p < .029$) and significantly worse perceived health status ($p < .001$). Finally, paired comparisons revealed that patients in the high utilizer group had marginally greater mean age than patients in either the control group ($p < .038$) or adjusted high utilizer group ($p < .006$).

Table 1. Patient Characteristics

Characteristic	Typical Utilizers	Adjusted High Utilizers*	High Utilizers	p Value
Total patients identified, n	250	200	200	
Not evaluable				
Deceased, non-English speaking, no telephone, moved out of area	76	63	22	
Not able to be contacted despite multiple attempts	39	15	29	
Evaluable	135	122	149	
Total patients enrolled, n (% of evaluable patients)	101 (75)	100 (82)	103 (69)	.13
Age (mean \pm SD), years	38 (± 17)	40 (± 17)	54 (± 16)	.001
Female, %	59	73	69	.10
Presence of comorbidities, %	49	59	91	<.001
Perceived health, %				
Excellent/very good/good	93	83	61	<.001
Fair/poor	7	17	39	
Current psychiatric treatment (self report), %	5	10	19	.007

*Adjusted for case mix by the ambulatory care group (ACG) system.

Table 2 shows the results of PRIME-MD screening among the three groups. The 24% rate of any mental disorder in the typical utilizer group is within the range observed in studies screening unselected primary care patients.^{8,9} The high utilizer group had an approximately 50% higher prevalence of mental disorders than the typical utilizers. Although this difference did not reach statistical significance, the mean number of diagnoses made by PRIME-MD per patient was significantly greater in the high utilizer group than in the other two groups (both $p < .001$). Patterns of mental illness differed among groups. Mood disorders were approximately threefold more prevalent in high utilizers than in typical utilizers ($p < .001$) and twofold higher than in the adjusted high utilizers ($p < .001$). Adjusted high utilizers had marginally more mood disorders than the control patients ($p < .028$). The highest prevalence of anxiety disorders was found in the adjusted high utilizer group, but this difference was not statistically significant. Alcoholism was significantly more prevalent among the typical utilizers than among either high utilizer group (p 's $< .003$), and was marginally greater among adjusted high utilizers versus high utilizers ($p < .032$).

Table 3 shows the overall prevalence rate of any mental health disorder by PRIME-MD as compared with chart review. The prevalence rates by PRIME-MD exceeded those of chart review in each group, but the discrepancy in prevalence rates varied by group. Mental health disorders were diagnosed far more frequently among the high utilizer group, with prevalence rates on chart review approaching those by PRIME-MD. The difference in prevalence rates was statistically marginal for the adjusted high utilizer group ($p < .006$), and for the typical utilizer group ($p < .06$).

Table 4 illustrates the rates of undetected mood disorders and anxiety disorders among utilization groups. Because a relatively strict definition of detection was used in this analysis, that is, requiring a concurrent diagnosis of the same class of mental disorder in the chart as compared with PRIME-MD, these may represent the lower bounds of actual detection rates by primary care physicians. The overall detection rates were very low, ranging from 0% to 38%. Mood disorders were more commonly detected than anxiety disorders, especially among the

high utilizer group. Anxiety disorders were poorly detected across all groups, but particularly in the adjusted high utilizer group, in which there was a 0% detection rate.

DISCUSSION

This study replicates and corroborates the finding that mental disorders are more common among high utilizers of medical services and offers new insights into the relation between mental disorders and utilization patterns. It introduces case-mix adjustment as a method of assessing both the likelihood that different categories of mental disorder are present and the likelihood that these disorders are undetected in primary care patients. The selection methodology used offers a simple method for distinguishing patients who utilize the greatest amount of resources from those who are utilization outliers, and also allows comparisons to be made between these groups. The findings, if confirmed, could have implications regarding the value of selective screening of primary care patients for mental disorders based on utilization patterns.

The overall prevalence of mental disorders was greatest among high utilizers, lowest for typical utilizers, and intermediate for high utilizers adjusted for case mix. Patterns of mental illness varied among groups. Mood disorders, primarily representing depression, were strongly associated with the high utilizer group. Trends toward higher rates of anxiety were seen in the adjusted high utilizer group, but generally did not reach significance. Alcoholism was significantly more prevalent in the typical utilizer group.

These patterns suggest, although do not conclusively prove, the following assertions. Mood disorders are associated with a high burden of illness. Causation is unclear, as medical illness may lead to depression, or illness and depression may promote one another, and either the medical illnesses or the mental disorders associated with them can lead to increased utilization rates. In our population, the high utilizer group had the highest detection rate when the presence of any mental disorder was assessed by comparing chart notations with PRIME-MD diagnoses (Table 3), although the accuracy of these diagnoses as reflected in chart notation showed room for

Table 2. Prevalence of Mental Disorders by PRIME-MD

Disorder	Typical Utilizers	Adjusted High Utilizers*	High Utilizers	p Value
Any mental disorder, %	24	32	37	.12
Number of disorders/pt, mean \pm SD	0.45 \pm 1.03	0.57 \pm 0.98	0.90 \pm 1.44	.018
Mood disorder, %	10	15	29	.001
Anxiety disorder, %	9	16	12	.30
Somatoform disorder, %	7	8	17	.14
Eating disorder, %	2	1	5	.20
Alcoholism, %	12	6	3	.03

*Adjusted for case mix by the ambulatory care group (ACG) system.

Table 3. Prevalence of Current Mental Disorders by PRIME-MD and Chart Review

Group	PRIME-MD, %	Chart Review, %	p Value
Typical utilizers	24	8	.06
Adjusted high utilizers*	32	12	.006
High utilizers	37	30	.011

*Adjusted for case mix by the ambulatory care group (ACG) system.

improvement (Table 4). Selective screening for mood disorders in this population could prove useful. The potential utility of screening is reduced by the observation that the physicians often already acknowledged the presence of at least one mental disorder.

Anxiety disorders do not seem to be particularly associated with a high burden of illness but are more prominent when case-mix adjustment is used, which suggests that the presence of anxiety disorders may lead to unusually high utilization relative to that predicted by known medical and mental diagnoses. The extremely poor detection rates for anxiety disorders in our adjusted high utilizers further suggests that these disorders may be mistaken for medical illness, thus triggering overutilization of medical resources and underutilization of psychiatric care. Selective screening for anxiety disorders in adjusted high utilizers might prove especially useful if confirming studies with larger numbers of subjects bear out the trends identified in this study.

The finding of higher rates of alcoholism in the typical utilizers was unexpected. Two potential explanations for this phenomenon are offered. First, the presence of medical comorbidity may lead to reduced alcohol intake and, thus, reduced alcoholism. Second, heavy drinkers may be less likely to seek medical care, owing either to specific avoidance of medical providers, or to some other behavioral effect of heavy alcohol intake. A case could be made for screening for alcohol abuse in patients whose utilization patterns fall into the average range, but this utilization parameter is less practical because it does not sub-

stantially narrow the group of patients who would need screening.

Our study has several important limitations. Our response rate is a source of potential bias, especially as a substantial number of patients could not be contacted after several attempts. If these patients are considered eligible subjects, the reported response rates would be somewhat lower overall (304 of 489, 62%) and for individual groups (58% for high utilizers, 73% for adjusted high utilizers, and 58% for typical utilizers). In reviewing the demographics of respondents versus nonrespondents, the main difference was that the control group nonresponders were older than the control group responders. Other than this difference, respondents were similar to nonrespondents, suggesting that the degree of nonresponse bias is likely small.

The ACG case-mix adjustment system is primarily based on comorbidities and does not include a measure of severity of illness. There is likely to be variability in severity of illness among patients in a particular ACG, and these differences in severity of illness may influence utilization. However, based on previous research examining the incremental contribution of such a measure to the ACG system, the incremental predictive value of severity of illness was small. Therefore, it is unlikely that this potential bias will affect our main findings.

The ACG system includes mental disorders in its categorization system, and this introduces another potential source of bias. Patients whose visit billing includes an ICD-9 code for a psychosocial disorder are predicted by the ACG categorization to have higher utilization rates. The impact of this confounding factor was minimized in our study by the relative rarity ($n = 17$, or 2%, of 845 potentially eligible subjects) of patients whose ICD-9 codes assigned them to ACGs that are defined by the presence of a psychosocial disorder (ACG numbers 13, 14, 25, 35, and 37). However, the bias introduced by this factor would tend to make our results overestimate the detection rate of mental disorders in ACG-adjusted utilization outliers because patients in these few groups would, by definition, have an identified mental diagnosis.

Table 4. Detection Rates for Mood and Anxiety Disorders

Group by Disorder Type	Diagnosed by PRIME-MD	Detected by Primary Care Physician	Detection Rate, %	p Value
Mood disorders				
Typical utilizers	10	3	30	.0001
Adjusted high utilizers*	15	3	20	.0001
High utilizers	30	10	33	.0001
Anxiety disorders				
Typical utilizers	9	1	11	.0001
Adjusted high utilizers*	16	0	0	.0001
High utilizers	12	3	25	.0001

*Adjusted for case mix by the ambulatory care group (ACG) system.

The complex relation between medical illness and mood disorders (primarily depression) could have biased prevalence rates in the opposite direction. Because chronic illness may lead to both increased utilization and increased mood disorders, adjusting for comorbidity before assessing rates of mental disorders may lead to underestimation of the prevalence of mental disorders in high utilizer groups.

The implications of our findings may be most important in further directing research efforts in this field. Screening efforts can be more appropriately targeted, depending on the type of disorder that is being screened for, and whether the identification of undetected disorders is the goal. The influence of case-mix adjustment on prevalence rates and patterns of mental illness needs to be considered in performing such research. Ideally, case-mix adjustment measures such as the ACG system should be combined with severity-of-illness measures to better define the total burden of medical illness. Studies examining associated costs of mental illness should not use diagnoses by primary care physicians, as is done with administrative databases, because detection rates vary widely by utilization group and diagnosis, thus confounding such an analysis. Because patients who are high utilizers are labeled as having mental disorders more frequently than typical utilizers, a spurious or exaggerated difference between costs of patients with and without mental disorders may arise if the presence or absence of the mental disorders is not independently assessed.

This study highlights the need to better define the relation between utilization patterns and mental disorders in primary care patients. The findings of this pilot study could be applied to larger study samples, which would permit a more detailed multivariate analysis of these relationships.

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APPENDIX A

Selection of Adjusted High Utilizers by Ambulatory Care Group (ACG) Class

ACG	Description	Total, n	Mean Visits \pm SD	Threshold*	Eligible [†] , n
3	Acute minor, age 6+	1,589	1.4 \pm 0.80	3	131
4	Acute major	835	1.4 \pm 0.69	3	63
5	Likely to recur, without allergies	1,006	1.4 \pm 0.80	3	84
6	Likely to recur, with allergies	28	1.3 \pm 0.72	3	2
7	Asthma	64	1.2 \pm 0.58	3	3
8	Chronic medical, unstable	69	1.3 \pm 0.97	4	1
9	Chronic medical, stable	398	1.7 \pm 1.29	5	20
10	Chronic specialty	11	1.2 \pm 0.40	2	2
12	Chronic specialty, unstable	27	1.2 \pm 0.40	2	5
13	Psychosocial, without psychosocial unstable	88	1.3 \pm 0.71	3	7
14	Psychosocial, with psychosocial unstable, w/o psychosocial stable	11	1.1 \pm 0.30	2	1
16	Preventive/administrative	653	1.2 \pm 0.41	3	8
17	Pregnancy	71	1.2 \pm 0.42	3	2
18	Acute minor and acute major	785	2.2 \pm 1.33	5	41
21	Acute minor and likely to recur, age > 5, without allergy	747	2.3 \pm 1.19	5	35
22	Acute minor and likely to recur, age > 5, with allergy	39	2.8 \pm 2.01	5	4
23	Acute minor and chronic medical, stable	268	2.2 \pm 1.34	5	18
25	Acute minor and psychosocial without psychosocial unstable	73	2.1 \pm 1.38	5	4
28	Acute major and likely to recur	510	2.1 \pm 1.08	5	15
32	Acute minor/acute major/likely to recur, age > 5, without allergy	753	3.1 \pm 1.71	7	32
35	Acute minor/likely to recur/psychosocial	56	3.1 \pm 1.55	7	2
36	Acute minor/acute major/likely to recur/eye and dental	501	3.9 \pm 2.28	9	21
37	Acute minor/acute major/likely to recur/psychosocial	91	4.1 \pm 2.02	9	3
39	2-3 other ADG [‡] combinations, males age 17-34	303	1.9 \pm 1.41	5	11
40	2-3 other ADG combinations, females age 17-34	712	2.0 \pm 1.07	5	22
41	2-3 other ADG combinations, age > 34	1,662	2.3 \pm 1.62	6	84
43	4-5 other ADG combinations, age 17-44	1,213	3.0 \pm 1.79	7	51
44	4-5 other ADG combinations, age > 44	1,151	3.5 \pm 2.49	9	54
47	6-9 other ADG combinations, males age 17-34	75	4.1 \pm 2.65	10	3
48	6-9 other ADG combinations, females age 17-34	330	4.6 \pm 2.49	10	16
49	6-9 other ADG combinations, age > 34	1,458	4.7 \pm 2.85	11	69
50	10+ other ADG combinations	289	7.7 \pm 4.17	16	16
51	No diagnosis or only unclassified diagnosis	149	1.11 \pm 0.33	2	15
Total		16,015			845

*Number of visits over the past year representing > 2 SD above the mean visit frequency for individual ACG.

[†]Number of patients in ACG with visit frequency \geq 2 SD above the mean visit frequency for individual ACG.

[‡]ADG, Ambulatory Diagnosis Group.