

Psychiatric comorbidity in older adults with bipolar disorder

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SUMMARY

Introduction Comorbidity patterns and correlates among older adults with bipolar disorder (BPD) are not well understood. The aim of this analysis was to examine the prevalence of comorbid PTSD and other anxiety disorders, substance abuse and dementia in a population of 16,330 geriatric patients with BPD in a Veterans Health Administration administrative database.

Methods Patients were identified from case registry files during Federal Fiscal Year 2001(FY01). Comorbidity groups were compared on selected clinical characteristics, inpatient and outpatient health resource use, and costs of care.

Results Four thousand six hundred and sixty-eight geriatric veterans with BPD were comorbid for either substance abuse, PTSD and other anxiety disorder, or dementia (28.6% of all veterans with BPD age 60 or older). Mean age of all veterans in the four comorbidity groups was 70.0 years (\pm SD 7.2 years). Substance abuse was seen in 1,460 (8.9%) of elderly veterans with BPD, while PTSD was seen in 875 (5.4%), other anxiety disorders in 1592 (9.7%), and dementia in 741 (4.5%) of elderly veterans. Individuals with substance abuse in this elderly bipolar population are more likely to be younger, minority, unmarried and homeless compared to elderly bipolar populations with anxiety disorders or dementia. Inpatient use was greatest among geriatric veterans with BPD and dementia compared to veterans with BPD and other comorbid conditions.

Conclusion Clinical characteristics, health resource use and healthcare costs differ among geriatric patients with BPD and comorbid anxiety, substance abuse or dementia. Additional research is needed to better understand presentation of illness and modifiable factors that may influence outcomes. Copyright © 2006 John Wiley & Sons, Ltd.

KEY WORDS — bipolar disorder; elderly; comorbidity; substance abuse; post-traumatic stress disorder

INTRODUCTION

Currently, in individuals over 65 years of age, prevalence rates of bipolar disorder (BPD) range from 0.1% to 0.4% (Van Gerpen *et al.*, 1999). Although the published literature in the area of geriatric mood disorders is growing, the amount of published information is still relatively sparse, and comorbidity patterns and correlates among older adults with BPD are not well understood. In older adult populations with depression, the presence of comorbid anxiety is associated with more severe depressive symptoms, more chronic medical illness, greater functional impairment and lower quality of life (Hegel *et al.*,

2005). There is also evidence to suggest that substance abuse outcomes may be particularly poor among the elderly (Patterson and Jeste, 1999). Among elderly individuals, dementia is associated with increased general medical costs (Langa *et al.*, 2004). The aim of this analysis was to examine the prevalence of anxiety disorders, substance abuse and dementia in geriatric patients in a large VA data base, and to compare health resource use and costs of care by psychiatric comorbidity. We hypothesized that clinical characteristics, health resource use patterns and health care costs would differ among groups of geriatric patients with BPD and varying types of comorbidity.

METHODS

The database from which study results are derived, the National Psychosis Registry, is an ongoing registry of

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all veterans diagnosed with psychosis who have received VA services from 1988 to the present. Registry patients were identified using data obtained from the VA Patient Treatment File (PTF), census data files, and Outpatient Care Files (OPC), and were included provided that they had at least one qualifying psychosis diagnosis in Federal Fiscal Year 2001(FY01). A full report of the Psychosis Registry may be viewed over the SMITREC web site: <http://www.va.gov/annarbor-hsrdr>.

Diagnoses were obtained from ICD9-CM codes. Bipolar diagnoses included ICD-9 codes 296.0, 296.1, 296.4, 296.5, 296.6, 296.7, and 296.8. Substance abuse diagnoses included ICD codes 303.9, 304.0, 305.0, 304.2, 304.3, 305.6, 305.5, 304.8, 305.2, 304.1, 304.4, 304.5, 304.5, 304.9, 305.3, 305.4, 305.7, 305.8, 305.9, 303.0, 304.7, 291, 292. PTSD diagnoses included ICD code 309.81. Other anxiety diagnoses included ICD codes 300.00, 300.01, 300.02, 300.09, 300.10, 300.20, 300.21, 300.22, 300.23, 300.29, 300.3. Dementia diagnoses included ICD codes 046.1, 046.3, 290.0, 290.10, 290.11, 290.12, 290.13, 290.20, 290.21, 290.3, 290.40, 290.41, 290.42, 290.43, 290.8, 290.9, 291.1, 291.2, 294.0, 2941.0, 294.11, 294.8, 294.9, 310.0, 310.1, 331.0, 331.1, 331.2, 331.3, 331.4, 331.7, 331.89, 331.9, 332.0, 333.0, 333.4, 780.9.

Cost data are from the VA Allocation Resource Center (ARC)'s estimates. ARC cost estimates encompass direct and indirect costs, excluding capital expenses. Costs per patient (calculated among patients with any hospital use or outpatient care during the year) were evaluated in the following categories: total costs, hospital costs, outpatient costs, psychiatric costs and pharmacy costs.

Patients were characterized based on their hospital utilization during the two years following their index BPD diagnosis in FY01. For patients who had a BPD diagnosis prior to the comorbid diagnosis, the index date is when they had the first diagnosis of substance abuse, anxiety/PTSD or dementia. For patients who had a comorbid diagnosis, the index date is when they had the first diagnosis of BPD. Diagnoses were assigned during clinical visits by treating clinicians. Patients with triple diagnoses (e.g. BPD with PTSD and substance abuse) and patients with psychiatric comorbidities other than PTSD, anxiety, dementia, or substance abuse are not included in the analyses ($N = 1398$, 8.6% of geriatric patients with BPD).

Multinomial multivariate logistic regression models were estimated to analyze the effects of the clinical characteristics on the comorbidity groups, controlling for other covariates in the model. Statistical sig-

nificance for differences between the comorbidity categories for the continuous measures presented in this study such as hospitalization, outpatient care, and costs were tested using the nonparametric Kruskal-Wallis test.

RESULTS

Clinical characteristics and comorbidity

Table 1 demonstrates clinical characteristics of geriatric veterans with BPD and comorbid PTSD, substance abuse, other anxiety disorder or dementia in FY01. There were 4,668 individuals with BPD who were comorbid for either substance abuse, PTSD and other anxiety disorder or dementia (28.6% of all veterans with BPD age 60 or older). Among older veterans with BPD, comorbid substance abuse was seen in 1,460 patients (8.9%), comorbid PTSD was seen in 875 (5.4%), other comorbid anxiety disorders in 1592 (9.8%), and comorbid dementia in 741 (4.5%). Controlling for other covariates in the multinomial logistic regression model, individuals with comorbid dementia were the oldest of the five groups, while individuals with comorbid substance abuse were the youngest (Wald $\chi^2 = 632.33$, $df = 4$, $p < 0.0001$). Only approximately one-third of veterans with comorbid substance abuse were married, compared to proportion of married individuals in the order of 55–65% in the other groups (Wald $\chi^2 = 198.82$, $df = 8$, $p < 0.0001$). Homelessness was also much more common among individuals with comorbid substance abuse, with 13.2% of these individuals ($n = 193$), being homeless compared to 2% or less in the other groups (Wald $\chi^2 = 286.68$, $df = 4$, $p < 0.0001$).

Inpatient and outpatient care

Table 2 demonstrates use of inpatient and outpatient care among geriatric veterans with BPD by psychiatric comorbidity. Compared to bipolar patients with comorbid PTSD, substance abuse, anxiety or dementia, bipolar patients without these comorbidities had fewer hospitalization stays (Wald $\chi^2 = 56.23$, $df = 4$, $p < 0.0001$), and less use of outpatient visits ($\chi^2 = 530.68$, $df = 4$, $p < 0.0001$). Among the comorbidity groups, inpatient use was highest among individuals with comorbid dementia. With respect to outpatient services, geriatric patients with comorbid PTSD had the greatest overall use of outpatient services, while geriatric patients with comorbid dementia had the least overall use of outpatient services ($\chi^2 = 144.23$, $df = 3$, $p < 0.0001$). Among

Table 1. Clinical characteristics of patients with bipolar disorder age 60 and older by psychiatric comorbidity, FY01

Clinical characteristic	Psychiatric comorbidity group					Test of significance between comorbidity groups (controlling for other covariates)
	BPD only	BPD and PTSD	BPD and other anxiety	BPD and dementia	BPD and substance abuse	
No. of individuals	10,264	875	1,592	741	1,460	
Mean age: year \pm SD	70.4 \pm 6.9	69.8 \pm 7.1	70.1 \pm 6.9	75.8 \pm 6.9	66.8 \pm 5.8	Wald $\chi^2 = 632.33$, df = 4, $p < 0.0001^*$
Gender						
Male	9,766 (95.2%)	841 (96.1%)	1,496 (94.0%)	708 (95.6%)	1,435 (98.3%)	Wald $\chi^2 = 45.25$, df = 4, $p = 0.0001^*$
Female	498 (4.9%)	34 (3.9%)	96 (6.0%)	33 (4.4%)	25 (1.7%)	
Ethnicity						
Caucasian	7,570 (73.8%)	703(80.3%)	1,254(78.8%)	571(77.1%)	1,174 (80.4%)	Wald $\chi^2 = 180.47$, df = 12, $p < 0.0001^*$
African Amer	449 (4.4%)	41 (4.7%)	55 (3.4%)	58 (7.8%)	110 (7.5%)	
Hispanic/Amer	326 (3.2%)	30 (3.4%)	54 (3.4%)	38 (5.1%)	65 (4.4%)	
Indian/Asian						
Unknown	1,919 (18.7%)	101 (11.5%)	229 (14.4%)	74 (10.0%)	111 (7.6%)	
Marital status						
Married	5,783 (56.3%)	568 (64.9%)	917 (57.6%)	469 (63.3%)	498 (34.1%)	Wald $\chi^2 = 198.82$, df = 8, $p < 0.0001^*$
Never married	974 (9.5%)	46 (5.3%)	146 (9.2%)	47 (6.3%)	166 (11.4%)	
Divorced/separated/ widowed/unknown	3,507 (34.2%)	261 (29.8%)	529 (33.2%)	225 (30.4%)	796 (54.5%)	
Homelessness						
Yes	145 (1.4%)	10 (1.1%)	30 (1.9%)	7 (0.9%)	193 (13.2%)	Wald $\chi^2 = 286.68$, df = 4, $p < 0.0001^*$
No	10,119 (98.6%)	865 (98.9%)	1,562 (98.1%)	734 (99.1%)	1,267 (86.8%)	

* $p < 0.01$.

geriatric patients with comorbid PTSD, 24.2% ($n = 212$) actually used outpatient PTSD services over the two-year prospective evaluation period, while among geriatric patients with comorbid substance abuse, 30.7% ($n = 448$) actually used substance abuse treatment services. Among all comorbidity groups, use of non-psychiatric outpatient services was high.

Costs of care

Table 3 demonstrates costs of care for geriatric veterans with BPD. Annual costs for veterans with comorbid PTSD, substance abuse, other anxiety dementia were higher (\$15,143, \$19,618, \$13,415, \$30,157, respectively) compared to veterans without these conditions (\$13413) ($\chi^2 = 820.6$, df = 4, $p < 0.0001$). Among the four comorbidity groups, annual costs for veterans with comorbid other anxiety were nearly equal to geriatric bipolar veterans without comorbidity—at \$13,415 per patient, while annual costs for veterans with comorbid dementia were over twice as much, at \$30,157 ($\chi^2 = 136.58$, df = 3, $p < 0.0001$). Hospital costs represented a larger cost

expenditure per patient in relation to other types of services. In contrast, pharmacy costs represented the smallest expenditure per patient in relation to other types of services.

DISCUSSION

Our results demonstrate that among geriatric patients with BPD, comorbid PTSD, substance abuse, other anxiety or dementia occur in nearly 29% of individuals, and that clinical characteristics, health resource use patterns and health care costs differ depending on the type of comorbidity. Findings from mixed age bipolar populations demonstrate that 36% of individuals with BPD have an additional Axis I disorder, with alcohol abuse being the most common one, followed by anxiety disorders. Comorbidity in younger populations with BPD is associated with greater functional impairment, higher health care costs and generally worse health outcomes (Kleinman *et al.*, 2003; Tondo and Ghiani, 2003; Singh *et al.*, 2005). The 28.6% comorbidity proportion in our older adult bipolar population likely represents a lower boundary

Table 2. Inpatient and outpatient care over a prospective two-year period among patients with bipolar disorder age 60 and over

Type of care variable	Psychiatric Comorbidity Group					Test of significance between comorbidity groups
	BPD only (n = 10,264)	BPD and PTSD (n = 875)	BPD and other anxiety (n = 1,592)	BPD and dementia (n = 741)	BPD and substance abuse (n = 1,460)	
Patients with hospitalization						
N (%)	3181 (31.0%)	305 (34.9%)	578 (36.3%)	436 (58.8%)	837 (57.3%)	
Number of inpatient stays						
Mean ± SD	4.5 ± 3.9	4.6 ± 3.6	4.8 ± 4.6	5.5 ± 4.4	5.5 ± 5.0	Kruskall-Wallis $\chi^2 = 56.23$, df = 4, $p < 0.0001^*$
Median	4	4	4	4	4	
Number of inpatient days						
Mean ± SD	57.3 ± 100.7	41.5 ± 76.1	45.2 ± 83.0	79.7 ± 111.6	62.0 ± 100.8	Kruskall-Wallis $\chi^2 = 84.62$, df = 4, $p < 0.0001^*$
Median	19	16	16	35	22	
All outpatient visits						
Patients with OP visits						Kruskall-Wallis $\chi^2 = 530.68$, df = 4, $p < 0.0001^*$
N (%)	10036 (97.8%)	870 (99.4%)	1588 (99.7%)	697 (94.1%)	1435 (98.3%)	
Mean ± SD	51.4 ± 70.9	84.0 ± 92.2	68.0 ± 76.1	57.1 ± 100.8	82.1 ± 108.9	
Median	35	57	46	34	51	
Mental health care visits						
Patients w/MH visits						Kruskall-Wallis $\chi^2 = 472.48$, df = 4, $p < 0.0001^*$
N (%)	8737 (85.1%)	849 (97.0%)	1491 (93.7%)	587 (79.2%)	1351 (92.5%)	
Mean ± SD	17.0 ± 49.1	33.1 ± 62.2	22.0 ± 47.8	22.7 ± 84.6	38.6 ± 81.4	
Median	8	14	9	7	12	
Non-psychiatric health care						
Patients w/Non-psych visits						Kruskall-Wallis $\chi^2 = 266.55$, df = 4, $p < 0.0001^*$
N (%)	9779 (95.3%)	857 (97.9%)	1572 (98.7%)	684 (92.3%)	1412 (96.7%)	
Mean ± SD	37.6 ± 42.7	52.5 ± 51.2	47.8 ± 48.5	38.7 ± 45.1	46.5 ± 52.6	
Median	27	39	34	25.5	33	

* $p < 0.01$.

for prevalence of these conditions. This may have been, at least in part, because individuals with triple diagnosis and other comorbidities were not included in the analysis. We also suspect the reported rates are an underestimate of true prevalence of comorbidity for the following reasons: (1) underreporting of comorbid diagnoses in patients with a serious mental disorder diagnosis; (2) limited diagnostic precision in the sample by the case registry methodology; and (3) the fact that many providers might not code sub-syndromal symptoms thought to be secondary to a primary mood disorder.

Among geriatric veterans with BPD, the overall rate for anxiety disorders was 15.2%—PTSD was seen in 5.4% of individuals and other anxiety disorders were seen in 9.8% of individuals. Simon and colleagues (2004) reported that comorbid anxiety disorders are common in mixed age bipolar samples, with over one-half of patients experiencing lifetime comorbid anxiety and 30.5% experiencing current anxiety disorder. Rates of PTSD in this veteran population are within the rates of 0.9–6.4% seen in civilian

bipolar samples (Simon *et al.*, 2004). In the older bipolar sample presented here, individuals with PTSD had the highest overall use of outpatient services compared to other comorbidity groups.

Individuals with substance abuse in this elderly bipolar population are more likely to be younger, minority, unmarried and homeless compared to elderly bipolar populations with anxiety disorders or dementia. Other investigators have documented that comorbid substance abuse is associated with fewer psychosocial resources among mixed age populations of individuals with serious mental illness (Nolen *et al.*, 2004; Folsom *et al.*, 2005). Use of specialty substance abuse treatment was quite low in this population (about 30% of elderly individuals with BPD and substance abuse). Reasons for the low use are not clear. Because diagnoses were assigned during clinical visits by treating clinicians it is not possible to determine the acuity or severity of the comorbid conditions. While it is likely that these were conditions that received at least some treatment focus, it can not be concluded that these were active or acute treatment

Table 3. Costs for care of patients with bipolar disorder age 60 and older by psychiatric comorbidity, FY01^a

Variable	Psychiatric comorbidity group					Test of significance between comorbidity groups
	BPD only (<i>n</i> = 10,264)	BPD and PTSD (<i>n</i> = 875)	BPD and other anxiety (<i>n</i> = 1,592)	BPD and dementia (<i>n</i> = 741)	BPD and substance abuse (<i>n</i> = 1,460)	
Annual costs per patient	13,413	15,143	13,415	30,157	19,618	Kruskall–Wallis $\chi^2 = 820.6$, df = 4, $p < 0.0001^*$
Outpatient ^b costs per patient	5,446	8,997	7,563	7,084	7,654	Kruskall–Wallis $\chi^2 = 626.81$, df = 4, $p < 0.0001^*$
Hospital ^c costs per patient	21,663	19,339	15,364	22,980	18,823	Kruskall–Wallis $\chi^2 = 20.13$, df = 4, $p = 0.0005^*$
Psychiatric care costs per patient	2,739	3,526	3,047	6,767	7,366	Kruskall–Wallis $\chi^2 = 1027.12$, df = 4, $p < 0.0001^*$
Pharmacy costs per patient	1,436	2,224	1,852	1,605	1,450	Kruskall–Wallis $\chi^2 = 295.80$, df = 4, $p < 0.0001^*$

^aAll costs in US dollars.

^bIncludes medical and psychiatric visits for individuals that had outpatient care.

^cIncludes medical and psychiatric admissions for individuals that had inpatient care.

* $p < 0.01$.

problems and this could also account for the low use of substance abuse and PTSD services. Alternatively, it is possible that individuals with dual diagnoses may have more difficulty accessing substance abuse services. Verduin *et al.* (2005) recently noted that in a mixed age VA sample, patients with comorbid bipolar and substance use disorders were significantly less likely than those with substance use disorder alone to be referred for intensive substance abuse treatment. In an elderly population, presence of medical disease may both make access to outpatient specialty more difficult (e.g. reduced ability to drive to appointments), and yet at the same time more essential (ongoing substance abuse is likely to greatly complicate the management of medical illness such as diabetes or cardiovascular disease).

Dementia was present in 4.5% of geriatric veterans with BPD. Bipolar patients with dementia were significantly older than groups with other types of comorbidity, and had the most extensive use of inpatient services. Overall costs of annual care were over twice that of elderly veterans with BPD without comorbidity. Unfortunately, this case registry format did not permit an evaluation of type of dementia and whether dementia was related to etiology of BPD (e.g. secondary mania). It is not clear if these were individuals who had long-standing BPD who eventually became demented or if these were individuals who developed BPD as a result of new-onset neurological pathology/illness. Gildengers and colleagues (2004) recently reported that a significant proportion of older bipolar patient exhibit neuropsychological deficits, and Kessing (2004) noted that

the risk of dementia seems to increase with the number of episodes in individuals with BPD. The clinical implications of these findings are especially important for geriatric bipolar patients with additional comorbidity—if comorbidity is untreated or under treated, e.g. comorbid substance abuse and anxiety, this is likely to lead to bipolar relapse and potentially increased rates of dementia over time.

Finally, interpretation of this analysis is limited by methodology, the treatment setting and characteristics of the patients. The case registry format may predispose to some impreciseness in diagnosis for both bipolar and comorbid diagnoses. Because this was a VA sample, the population was predominantly male, and thus comorbidity presentations might differ from a more gender-balanced population. Combat-related PTSD would be expected to be uncommon in general bipolar populations, and combat-related vs non-combat related PTSD are known to have potentially different courses and outcomes. Finally, since cases of substance abuse and anxiety were identified from clinical settings alone, it might be expected that substance abuse and anxiety were under-detected, and true rates are actually higher than those reported here.

CONCLUSIONS

Comorbid substance abuse, anxiety or dementia are seen in at least 29% of geriatric veterans with BPD. Additional research is needed to better understand presentation of illness and modifiable factors that may influence outcomes.

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