The Impact of Bipolar Disorder on Work Loss

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Abstract and Introduction

Abstract

To evaluate work loss associated with bipolar disorder, workers with bipolar disorder or depression and matched nonpsychiatric controls were identified from an employer health claims database. Mean annual absence hours, short-term disability (STD) payments, and worker compensation payments for the year 2000 were 55, $1231, and $554, respectively, for persons with bipolar; 53, $741, and $518 for those with depression; 21, $131, and $228 for those in the bipolar-matched control group; and 24, $178, and $220 for persons in the depression-matched control group. The bipolar group had greater absence hours and STD payments than the matched control group and greater increase in STD payments than the depression group. Results suggest bipolar disorder is associated with substantial work loss and related indirect costs.

Introduction

Psychiatric disorders are costly in terms of both direct medical costs and indirect costs, such as lost productivity caused by absenteeism and work impairment.[1,2] Bipolar disorder is a chronic mood disorder characterized by recurrent manic or hypomanic episodes that alternate with depressive episodes.[3] Bipolar disorder may be one of the most costly psychiatric disorders.[4-6] One study estimated that total annual costs of bipolar disorder exceeded $45.2 billion (1991 dollars).[4]

Previous research has shown that bipolar disorder is associated with high direct medical costs, exceeding costs for persons with major depressive disorder or for general medical outpatients.[4-6] However, less is known about the indirect costs of bipolar disorder, including costs related to work loss. In an analysis by Goetzel and colleagues[7] of direct medical and indirect work-related costs of psychiatric disorders among 6 large employers, bipolar disorder ranked first among mental health conditions. Depression, which has a well-established economic impact,[8,9] ranked a distant second.

Persons with bipolar disorder are often able to work to some extent, although their work functioning and productivity are likely to be impaired.[4,10,11] Kessler and Frank[1] assessed the prevalence of work loss and work cutback days specifically caused by "emotions, nerves, mental health, or the use of alcohol or drugs" using data from the National Comorbidity Survey. Although bipolar disorder specifically was not addressed in this study, findings indicated that persons who reported experiencing either manic or depressive episodes had significantly more days of work loss and work cutback compared with those without psychiatric disorders.

In another study, respondents in a US community sample who met screening criteria for bipolar disorder reported more difficulties with work-related performance than those who did not meet criteria.[12] In a study by Coryell and colleagues,[13] patients with bipolar disorder reported declines in job status and income over time, compared with a group of matched relatives with no history of affective disorders.

In our study, a database from the same group of large employers used by Goetzel and associates[7] was further analyzed to examine the work loss and indirect costs associated with bipolar disorder. This study differs from the work by Goetzel and colleagues[7] in several ways. First, productivity variables are calculated at the level of the annual average cost and work loss per person with bipolar disorder, in contrast to procedures reported by Goetzel and colleagues,[7] who examined the average cost across all eligible employees in the health plan. Second, the current analysis was based on the average annual work loss of persons meeting criteria for bipolar disorder, whereas Goetzel and colleagues analyzed the cost of bipolar episodes and extrapolated to estimate annual cost. Third, the current study includes analysis of worker compensation payments in addition to absenteeism and short-term disability payments.

Our study was designed to estimate the work loss and related indirect costs of bipolar disorder by comparing persons with bipolar disorder to 2 other groups: persons with a diagnosis of depression and persons without a psychiatric disorder. Depression was chosen as a comparison group because it is the most prevalent psychiatric disorder and has a well-documented impact on work loss.[1,14] The group without psychiatric disorders was included to provide a baseline for comparing the work loss findings for the psychiatric groups.

Methods

This retrospective analysis of the MEDSTAT Group's MarketScan Health and Productivity Management (HPM) database documented health plan expenditures and work loss among approximately 320,000 employees of 6 large US employers during the year 2000. For this analysis, 3 files—health plan enrollment, medical claims, and work loss—were linked by a single identification number for each employee.

The health plan enrollment file provided demographic information for each covered employee and company characteristics, such as industry sector and census region geographic location. The medical claims file offered documentation of paid claims for prescription medication and other covered medical services, such as physician office visits and inpatient hospital treatment. Each medical service claim included 1 or more *International Classification of Diseases, Ninth Revision, Clinical Modification (ICD-9-CM)* codes characterizing the patient's clinical status. The work-loss file described absences, short-term disability payments, and worker compensation payments and categorized employees as hourly or salaried. A detailed description of the HPM database was previously published.[7]

Overview of Study Design

Using the HPM database from the year 1999, Goetzel and coworkers[7] followed an "episode of care" framework to attribute work loss to single episodes of specific health conditions. For each person, episodes of specific health conditions were identified during the year using proprietary disease grouper software. Work loss during the episode was attributed to that condition. Thus, for a person experiencing several types of illness during a year, work loss would be allocated to each category of illness. Episode values were annualized and then averaged across all eligible employees.

In our study, we used an approach that was based on a case-control design to analyze the HPM database from the year 2000. Cases of bipolar disorder and depression were identified using the

inclusion-exclusion criteria described below. For each case, a matched control was selected, representing a person who showed no signs of having a serious psychiatric disorder. By examining the difference in work loss between cases and controls, it was possible to estimate the effect attributable to the condition of interest.

Selection of Study Cohorts

From the full HPM 2000 database, persons meeting the following criteria were selected: age 18 to 64 years, continuously enrolled for 12 months, and had available work loss data in at least 1 of the 3 categories (absence hours, short-term disability [STD], worker compensation). This first step resulted in an overall sample of 301,955 persons. From that sample, 2 study groups emerged, one with persons who met criteria for diagnosis of bipolar disorder (n = 740) and one who met diagnostic criteria for major depression (n = 6314). Selection criteria for both groups included the presence of at least 2 claims for a medical service on different dates with a primary *ICD-9-CM* code for bipolar disorder or depression.

From the remaining overall sample, matched control groups of people who did not have a major psychiatric disorder were created for the bipolar and depression study groups. The objective was to establish a baseline for work loss in persons without a serious mental health condition. The exclusion criteria included 1 or more claims with an *ICD-9-CM* code for a psychiatric disorder and 1 or more claims for a prescription medication typically associated with treatment of a chronic mental disorder. A random selection procedure was used to match each case in the bipolar and depression groups with a nonpsychiatric control. Matching criteria were age (by 5-year age groups), sex, and job type (hourly, salary, or unknown).

Work Loss Measures

Work loss was measured by absence hours, STD payments, and worker compensation payments. Absence hours are an annual count of the hours an employee is absent from work, calculated from employee time-reporting records. STD payments are the dollar amount of payments to an employee under arrangements that provide temporary income during a period when sick leave has been exhausted. The typical plan pays a percentage of the employee's base salary each week for a maximum of 13 to 26 weeks. Worker compensation payments, by contrast, are available only in the case of work-related injury or illness. Payment amounts are established by state and federal statutes.

Statistical Analysis

The study had 2 analytic objectives. The first was to measure the impact of bipolar disorder and depression on work loss relative to persons without a psychiatric condition. The case and control groups were compared using 3 paired *t* tests for difference in mean work loss with a null hypothesis of no difference. Each *t* test for bipolar disorder and depression corresponded to 1 of the 3 work-loss variables.

The second was to compare the work loss associated with bipolar disorder to the work loss associated with depression. The difference between the bipolar and depression groups was examined using 3 analyses of covariance (ANCOVA) models, 1 for each of the work-loss variables (ie, absence hours, STD payments, and worker's compensation payments). The dependent variable in each model was the difference in work loss between a case and its matched control. The independent variable of interest was the 2-level psychiatric group variable (ie, bipolar vs depression).

Because the bipolar and depression groups were not matched to each other with respect to demographic variables, the models controlled for factors that might be associated with work loss,

such as age, sex, job category (hourly vs salary), industry sector, geographic region, and health plan type (traditional indemnity, HMO, PPO, or point of service).

Results

Characteristics of the bipolar disorder and depression groups and their matched controls are shown in Table 1. The relative size of the bipolar and depression groups is roughly consistent with prevalence rates reported in US epidemiologic research.[14] Before the matching procedure, the bipolar and depression groups had a higher percentage of women (45.9% and 54.4%, respectively) than the nonpsychiatric group (30.5%). Mean age across the 3 groups was nearly identical. Data for job classification that is presented in Table 1 should be interpreted with caution because of the substantial number of unknown values.

Mean absence hours in the bipolar and depression groups (55 and 53 hours, respectively) are more than double the number of hours recorded for matched controls (21 and 24 hours). Payments for both STD and worker's compensation were substantially greater for the bipolar and depression groups than for the matched controls. The number of observations for the bipolar and depression groups does not necessarily match the number for each of the full study groups or for the control groups because of missing values for the work-loss variables. No systematic pattern of missing data was observed based on comparisons of demographic variables.

Results of the test for equality of work loss in the bipolar and depression groups compared with matched controls are presented in Table 2 and Table 3. Compared with matched controls, the bipolar group had significantly greater numbers of absence hours ($P = .009$) and STD payments ($P < .0001$). Although the number of worker's compensation payments was greater in cases than controls, the difference was not statistically significant ($P = .15$). A similar pattern was observed for the depression group. The number of absence hours ($P < .0001$), STD payments ($P < .0001$), and worker's compensation payments ($P = .0001$) recorded for depressed patients were significantly greater than the numbers for controls.

Results of the ANCOVA models comparing work loss in between the bipolar and depression groups revealed no statistically significant difference between the groups for absence hours ($P = .45$) or worker's compensation payments ($P = .95$) (Table 4). However, a significant difference was observed for STD payments ($P = .004$). None of the covariates (age, sex, job classification, industry, geographic region) had a significant impact on work loss.

Discussion

The results of this study add to limited published findings on the indirect costs of bipolar disorder. In an earlier study, modeling procedures were used to estimate the annual lost productivity ($17 billion) of wage earners with bipolar disorder based on a rating of the financial value of hours spent annually with a mentally ill family member.[15] Indirect costs, defined as lost earnings resulting from bipolar-related work loss, have also been projected based on unemployment and decreased earnings reported in the National Comorbidity Survey.[14] Only the study by Goetzel and colleagues[7] directly examined the actual cost of work loss related to bipolar disorder.

Results of this study are consistent with other findings[7,14,15] in that bipolar disorder was associated with substantial work loss and indirect costs. Our findings suggest that the burden of bipolar disorder is significantly greater than that of depression, although results differ according to the specific measure of work loss. For example, no statistically significant difference between bipolar disorder and depression was detected when work loss was measured by absence hours attributed to sick leave. Sick leave is often limited to a specified number of days per year, which could lead to a ceiling effect in the number of recorded absence hours. If employees with bipolar disorder or depression tended to exhaust their sick leave, values would cluster at the high end,

masking differences between the groups. Evidence for this effect is the nearly identical mean and median values for absence hours.

In contrast, a significant difference between the bipolar and depression groups in STD payments was found. Although these payments are also typically restricted to a specified duration (eg, 13 weeks), a ceiling effect is likely to be less pronounced because those receiving STD payments first need to exceed their sick leave allowance, according to many employers' policies. No difference was observed in worker compensation payments between the bipolar and depression groups. Both groups exhibited a similar level of annual payments relative to controls. In addition, payments were highly variable, making a difference more difficult to detect.

The 3 measures of work loss could theoretically be combined into a single composite measure by applying an hourly wage rate to absence hours and summing this value with STD and worker's compensation payments. One limitation of our study is that this composite analysis was not performed, because only 20% of persons with bipolar disorder had data for all 3 work-loss variables, and the proportion of matched case-control pairs with complete work-loss data was even smaller. This precluded statistically meaningful comparisons. However, a composite measure could be approximated based on the mean values for work loss (see Table 2 and Table 3). For example, assuming a $30 hourly rate for wages and benefits, the annual value of work loss for the bipolar disorder group relative to controls would be $2429; for the depression group, this figure would be $1674. Future research using a data source with more complete information on work loss may be able to create such a composite variable and estimate the overall work-loss cost of bipolar disorder.

Findings of this study undoubtedly understate the impact on productivity, because available variables only document the worst-case consequences, such as absence from work and payment for on-the-job injury. Available data do not capture lost productivity caused by impaired performance at work, a phenomenon sometimes described as presenteeism. This impaired performance is likely a significant part of the overall impact of bipolar disorder on productivity. For example, impaired performance leading to an on-the-job injury might explain the higher worker's compensation payments among persons who have bipolar disorder and depression relative to controls.

Another study limitation is that we relied on diagnoses recorded in health insurance claims data, rather than on medical records, to identify persons with bipolar disorder. While claims data are used extensively for health services research and pharmacoepidemiology, validation studies to assess precision of diagnostic coding are rare. One study assessed the accuracy of claims data for the diagnosis of congestive heart failure through comparison with medical records of 5083 persons hospitalized because of a cardiac condition.[16] A diagnostic algorithm based on a series of *ICD-9-CM* codes had a 77% positive predictive value and an 88% negative predictive value.

If similar patterns hold for bipolar disorder, our diagnostic approach likely underestimated the number of persons with this condition, and comparisons between work loss associated with bipolar disorder and work loss associated with depression could be affected. For example, it is possible that persons with bipolar II disorder (hypomania rather than mania) could receive a misdiagnosis of depression. This misdiagnosis pattern would lead to an overestimation of work loss associated with depression and an underestimation of work loss associated with bipolar disorder.

Conclusion

The results indicate that bipolar disorder has a substantial impact on work loss as measured by absence hours, STD payments, and worker's compensation payments. Findings suggest that remaining in the work force is a struggle for many persons with bipolar disorder, as indicated by

the proportion of workers who exhaust their sick leave and are forced into STD status at reduced pay. It is hoped that future research will identify strategies for minimizing costs of bipolar disorder for patients and employers.

Tables

Table 1. Characteristics of the Bipolar Group, Depression Group, and Matched Control Groups

Table 2. Differences in Work Loss: Bipolar Cases Versus Matched Controls

Table 3. Differences in Work Loss: Depression Cases Versus Matched Controls

Table 4. Adjusted Mean Short-Term Disability Payments in the Bipolar and Depression Groups Based on ANCOVA Model*

References

1. Kessler RC, Frank RG. The impact of psychiatric disorders on work loss days. Psychol Med. 1997; 27:861-873.
2. Rice DP, Miller LS. The economic burden of affective disorders. Br J Psychiatry Suppl. 1995;27: 34-42.
3. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 4th ed. Text Revision. Washington, DC: American Psychiatric Press; 2000.
4. Kleinman L, Lowin A, Flood E, et al. Costs of bipolar disorder. Pharmacoeconomics. 2003;21:601-622.
5. Simon GE, Unutzer J. Health care utilization and costs among patients treated for bipolar disorder in an insured population. Psychiatr Serv. 1999;50: 1303-1308.
6. Stender M, Bryant-Comstock L, Phillips S. Medical resource use among patients treated for bipolar disorder: a retrospective, cross-sectional, descriptive analysis. Clin Ther. 2002;24:1668-1676.
7. Goetzel RZ, Hawkins K, Ozminkowski RJ, Wang S. The health and productivity cost burden of the "top 10" physical and mental health conditions affecting six large US employers in 1999. J Occup Environ Med. 2003;45:5-14.
8. Frank L, Revicki DA, Sorensen SV, Shih YC. The economics of selective serotonin reuptake inhibitors in depression: a critical review. CNS Drugs. 2001;15:59-83.
9. Greenberg PE, Stiglin LE, Finkelstein SN, Berndt ER. The economic burden of depression in 1990. J Clin Psychiatry. 1993;54:405-418.
10. Dion GL, Tohen M, Anthony WA, Waternaux CS. Symptoms and functioning of patients with bipolar disorder six months after hospitalization. Hosp Community Psychiatry. 1988;39:652-657.

11. Verdoux H, Bourgeois M. [Comparative study on the occupational levels of unipolar and bipolar probands and relatives]. Ann Med Psychol (Paris). 1995;153:67-70.
12. Calabrese JR, Hirschfeld RM, Reed M, et al. Impact of bipolar disorder on a US community sample. J Clin Psychiatry. 2003;64:425-432.
13. Coryell W, Scheftner W, Keller M, et al. The enduring psychosocial consequences of mania and depression. Am J Psychiatry. 1993;150:720-727.
14. Kessler RC, McGonagle KA, Zhao S, et al. Lifetime and 12-month prevalence of DSM-III-R psychiatric disorders in the United States: results from the National Comorbidity Survey. Arch Gen Psychiatry. 1994;51:8-19.
15. Wyatt RJ, Henter I, Leary MC, Taylor E. An economic evaluation of schizophrenia—1991. Soc Psychiatry Psychiatr Epidemiol. 1995;30:196-205.
16. Goff DC, Pandey DK, Chan FA, et al. Congestive heart failure in the United States: is there more than meets the I(CD code)? The Corpus Christi Heart Project. Arch Intern Med. 2000;160:197-202.

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