

Schizophrenia, Substance Use Disorders and Medical Co-morbidity

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Abstract

Objectives: This study compared medical treatment costs of adults with schizophrenia to adults with both substance use disorders and schizophrenia.

Methods: This cross-sectional observational study used a paid claims data base to identify 6884 adults treated for schizophrenia. Twenty percent of these also had substance use disorder. We report the costs and likelihood of hospitalization for eight common medical diseases, and the categories of injuries and poisoning, and ill defined conditions. Multivariate analyses were used to adjust rates of treatment for age and sex differences in the comparison groups.

Results: There were higher rates of treatment for five of the eight medical disorders, higher treatment costs for two of the medical disorders and much higher costs for psychiatric treatment among those with comorbid substance use disorders. Both groups had high rates of treatment in the categories of injury and poisoning and ill defined conditions.

Conclusions: Closer working relationships among mental health and medical professionals are needed to care for those with schizophrenia and substance use disorders: first, greater attention to the treatment of substance use disorders may improve the health status of those with schizophrenia, reduce their costly medical and psychiatric care and stabilize their psychiatric condition, and second, continuity of care among professionals may promote willingness to seek medical attention or alleviate misunderstandings when adults with schizophrenia present with medical problems. Copyright © 2000 John Wiley & Sons, Ltd.

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Introduction

Adults with schizophrenia who have a comorbid substance use disorder (SUD) represent a major public health problem. Co-existing substance use disorder is likely to increase (1) the difficulty of providing effective psychiatric treatment and (2) medical problems that might otherwise not arise or might respond better to treatment. In addition, several studies using paid insurance claims have reported significantly higher psychiatric expenditures for patients with schizophrenia and comorbid substance use disorder.^{1–3} The literature on

schizophrenia, medical and substance use disorder is a patchwork of information that provides intriguing clues, but no clear picture about their association with each other. The findings from studies of schizophrenia patients with medical disorders are difficult to interpret because most studies have used potentially biased sampling frames or have failed to examine the association between substance use disorders and the prevalence rates of medical disorders. To strengthen the methodology used in examining epidemiological questions about medical co-morbidity, we used 1993 and 1994 data from the Massachusetts Division of Medical Assistance (Medicaid) to compare the one-year treated prevalence of selected medical disorders for adults treated for schizophrenia with a comorbid substance use disorder to those without comorbid substance use disorder.

Background

The reported rates of substance use disorder among those with schizophrenia vary depending on the epidemiological framework used. The prevalence of substance use disorder among these individuals has been reported to be as high as 50%.^{4–6} Mueser *et al.*,⁵ using a sample of recently hospitalized patients with schizophrenia, reported lifetime diagnoses of abuse or dependence on the following substances: stimulants 30%, sedatives/hypnotics 6%, cannabis 43%, hallucinogens 20% and opioids 5%. Drake *et al.*⁷ found that 45% of discharged adults with schizophrenia living in the community used alcohol and 22% were currently abusing it. In a study of emergency room visits by people with schizophrenia,⁸ similarly high rates of alcohol-related disorders, and even higher rates (69% of the sample) of other substance use disorders, were found. Because of the special characteristics of those who visit emergency rooms or are admitted to inpatient units, this figure is likely to be higher than the rates for the larger community population of mentally ill individuals. Studies of adults with schizophrenia and substance use disorder based on insurance claim primary and secondary diagnoses report treated rates of substance use disorder in Medicaid beneficiaries that range from 36% to 14%^{1,9} and 3% to >1% in employed health plan beneficiaries.^{10,11} These lower rates may underestimate rates of substance use disorder, however, because the negative effects of stigma influences diagnostic practice.

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Dickey and Azeni¹ reported that adults with major mental illness and comorbid substance use disorder had a greater probability of being hospitalized for psychiatric disorders, and had an increased probability of staying longer when admitted. They also found that medical care expenditures for this group were higher than those without claims diagnoses of SUD, but the differences were less pronounced. Garnick *et al.*,¹¹ using claims data from private insurers, examined charges for medical treatment for people who had both mental health and substance use disorder treatment, and found that average charges were higher than for those with either mental illness or SUD alone. Brady and Lydiard¹² reported that psychiatric patients with comorbid SUD had more relapses and longer recovery periods. Only one study¹³ has demonstrated that for those with major mental illness, length of stay was significantly shorter for patients with SUD comorbidity.

While the evidence of problems caused by SUD in those with major psychiatric disorders is both strong and consistent, studies of co-occurrence of SUD with medical disorders yield mixed findings. It has long been known that alcohol increases the likelihood of many medical disorders, such as liver and central nervous system disease, and exacerbates others, such as diabetes, hypertension and heart disease.¹⁴ Studies of comorbidity have found different prevalence rates of medical disorders, however, and reflect the particular sampling strategies employed by various investigators. Many studies (but not all) have found a high rate of medical and substance use problems among those with schizophrenia, but the evidence is not always compelling and the association between substance use and medical problems has not always been taken into account in the analyses.^{15–25}

When studying 'excess' treatment costs, the relationship between mental and medical illness is complex. In a study reporting higher medical care costs for adults with depression, Simon *et al.*²⁶ suggested several possible reasons for this finding: (1) depression may increase patients' pain and distress, which in turn prompts them to seek help, (2) chronic medical conditions may interact with depression, increasing the need for both psychiatric and medical treatment, or, (3) increased attention from clinicians encourages return visits for treatment. The authors suggest that simply identifying and treating depression does not seem to lower the relatively high medical costs associated with the individuals studied. The study does not, however, consider the potential contribution that comorbid substance use disorder might have on treatment costs. Higher treatment expenditures for medical disorders might mean that individuals have higher rates of medical disorders, or the same rates but greater severity of medical illness, or both. If adults with serious mental illness are no more at risk for medical disorders than the general population, then much higher reported expenditures might mean greater severity of their medical disorders (i.e., more admissions with longer lengths of stay, and higher costs), although longer stays could also reflect difficulties in expediting discharge disposition or physician lack of familiarity with schizophrenia.

Most of the studies reviewed have used a clinical sample

selected at a particular point in time from a specific treatment site, usually on admission to an inpatient unit of a visit to an emergency room. In these studies, the combination of small samples, site of study enrollment and narrow cross-sectional design has probably biased upward the rates of co-morbid medical disorders reported. Furthermore, analyses have rarely been controlled for case-mix differences, especially age. This suggests a need to increase the size of the sample so that there would be adequate power to detect differences in medical disorders occurring with low frequency, to use a larger window of time to identify cases, to sample from cases treated in both inpatient and outpatient settings and to use multivariate analyses to control for case-mix difference. In our study, we have done these in order to better study the relationship between schizophrenia, substance use and medical disorders.

Methods

Design

This is a cross-sectional observational study describing the 12 month utilization patterns of selected medical disorders in a population of psychiatrically disabled Medicaid enrollees with schizophrenia.

Setting

All the study subjects are enrolled in a managed care carve-out program in the commonwealth of Massachusetts. The managed care program administers the mental health benefit through a risk-based contract with the Division of Medical Assistance. Local mental health providers make up a network who are certified to collect fee-for-service reimbursement from the managed care company. Both their inpatient and outpatient treatment were delivered by a network of approved providers and concurrently reviewed by the managed care organization. All other medical treatment is provided through a Primary Care Clinician plan that is not subject to risk-based management.

Population

We included all disabled Medicaid beneficiaries ages 18–64 treated for schizophrenia in fiscal year 1994. This is an opportunistic sample that does not include the elderly, the dually insured (Medicare and Medicaid), those in nursing homes and those enrolled in HMOs, because these data were not available to us. About 2% of Medicaid beneficiaries with schizophrenia were enrolled in HMOs and only 1.4% of non-disabled Medicaid beneficiaries have schizophrenia. Including geriatric cases or older individuals in nursing homes would make the database more complete, but would add considerable noise to the analysis because of the effects of aging and the limited clinical data available on paid claims. As for the dually insured, there are differences in eligibility criteria which make it difficult to determine

whether bias might exist in the incidence of co-existing medical disorders.

The diagnosis of schizophrenia is coded on claims using the ICD-9 code 295, which includes all of the schizophrenia and schizoaffective disorders. A total of 6884 disabled adults met our criteria for inclusion. We identified 20.8% of these individuals who had a diagnosis of SUD during the preceding year, using an algorithm described below. Of these about 60% had an alcohol-related diagnosis. Disability was determined by receipt of Social Security income as indicated in the membership files of Medicaid. About one in four of these adults had at least one psychiatric admission to either a general hospital or the psychiatric state hospital during 1994. **Table 1** provides a summary of socio-demographic and clinical characteristics of the sample.

Reliability of Diagnostic Data on Insurance Claims

Although mental health professionals have been known historically to shield their patients from stigma and shame by using more benign diagnoses (e.g., adjustment disorder) when providing treatment for serious mental illness (e.g., major depression), this practice has changed in recent years. Although the stigma of mental illness remains, the advent of external utilization review, especially for hospitalization, has forced physicians to defend their diagnostic evaluations to managed care companies, which, in turn, has led to paid claim diagnoses more consistent with clinical evaluations.

With changing payment systems favoring care for the more seriously ill, we hypothesized that insurance claim diagnoses are becoming more consistent with clinical diagnoses in medical records. To test this hypothesis, we selected 3000 inpatient and outpatient paid claims from our database from one health system with computerized clinical chart information. We had the claim diagnoses compared to the diagnostic codes listed in the internal clinical data base. We found the following discrepancies: in 1.7% of the cases, there was no match between chart diagnoses and paid claims diagnoses. In 3.6% of the cases one out of two listed diagnoses matched, and in 94.7% of the cases, all listed diagnoses matched. Although we cannot be certain that all

diagnoses in our database meet this same high standard, we have increased confidence in the diagnostic reliability of the paid claims.

Data Sources

The data used were administrative data obtained from Massachusetts Medicaid and the Department of Mental Health with information regarding patient socio-demographic and disability status, inpatient and outpatient care, discharge diagnoses, dates of services and payment. We selected enrollees with at least one inpatient admission or two outpatient visits with a primary diagnosis of schizophrenia or schizoaffective disorder (ICD-9-CM 295). We then extracted *all* their paid claims during the study period, including claims for all psychiatric and substance use disorder treatment (claims with a primary diagnostic code ICD-9-CM 290–314), and claims for the treatment of medical disorders (claims with any primary diagnostic code *excluding* ICD-9 codes 290–314).

Next, for each person identified as treated for schizophrenia or schizoaffective disorder, we constructed patient-level longitudinal files from the episode-level claims. We categorized enrollees as having a substance use disorder if they had any claim in 1993 on which the primary or other diagnosis was any substance use disorder. We chose to identify substance use disorder in the preceding year to reduce the likelihood that the substance use disorder developed subsequent to the medical disorders reported. To adequately assess differences in the use of mental health services, we included data from the Department of Mental Health on forensic admissions (DMH state hospitals) and community support services used by enrollees.

Analyses

We describe the 12 month point prevalence treatment rate of eight common medical disorders co-existing with schizophrenia and summarize the frequency and severity of those with and those without comorbid SUD. These disorders are diabetes, hypertension, heart disease (ischemic heart disease, heart rhythm disorders and other heart disorders), asthma, diseases of the esophagus, stomach and duodenum, infections of the skin and subcutaneous tissue, malignant neoplasms and acute respiratory disorders (including pneumonia and influenza). We selected these disorders because they represented major health problems to the general population (CDC, 1994), are commonly associated with SUD and were likely to produce a sufficient number of cases for analyses.

In addition to these eight common medical disorders, we included the two Medical Diagnostic Categories (MDCs) with the most claims for subjects in the study: symptoms, signs and ill defined conditions (MDC 16) and injuries and poisoning (MDC 17). To provide a benchmark against which information on rates of hospitalization and cost of treatment of comorbid disorders could be compared, we also report

Table 1. Description of the sample

	SUD comorbidity N = 968	No SUD comorbidity N = 5916
Mean age (SD)	36 (9)	41 (11)
% females	33%	48%
% ethnic distribution		
African American	15.5%	9.3%
American Indian	0.1%	—
Asian American	0.1%	0.3%
Hispanic	0.8%	1.3%
White	79.3%	87.0%
Missing	4.1%	2.1%

the total volume and cost of the psychiatric and substance use disorder treatment (MDC 5).

For each of the eight diseases and MDCs, we listed the number and proportion of individuals treated and the proportion of those treated who had been hospitalized during the year. We also provide the mean total annual per person expenditures for the treatment of each group of disorders listed and their mean hospital expenditures. The treatment expenditures summarized are for the treatment of the medical illness when that illness is listed as the primary diagnosis. These data are summarized by whether or not the enrollee has comorbid SUD.

Because the age and gender of those with comorbid SUD varies from the distribution of age and gender of those with schizophrenia only, any statistical comparison must take this into account. Two logistic regression analyses were carried out: age and gender-adjusted maximum likelihood estimates of the probability of being treated for each of these medical disorders for adults with comorbid SUD compared to adults with schizophrenia only; age and gender-adjusted maximum likelihood estimates of the probability of higher per person medical treatment costs (above the median costs) for those with comorbid SUD.

Results

Use and Costs of Mental Health and Substance Abuse Treatment

The risk of psychiatric hospitalization is increased by a factor of 3 for those with a co-morbid substance use disorder. Total mean annual mental health treatment expenditures for those with substance use disorder were about 75% higher than for those with schizophrenia alone (see **Table 2**). These higher annual expenditures were primarily due to more frequent psychiatric hospital admissions for those with comorbid SUD. Cost per admission to hospital for this group is lower, on average, because their mean length of stay is lower. These findings are consistent with a study by Bradley and Zarkin,¹³ who found that for those with major mental illness, length of stay was shorter for patients with SUD comorbidity.

Prevalence and Costs of Medical Treatment

The group with comorbid SUD were somewhat more likely to receive any medical treatment (91% versus 81%) and their total annual medical expenditures were slightly higher (\$4702 versus \$4405). In **Table 2**, we summarize the 12 month treated prevalence rates of eight common medical disorders co-existing with schizophrenia, and three Medical Diagnostic Categories, including mental illness. These data are consistent with earlier reports that many medical disorders have a higher prevalence among those with comorbid SUD, especially those disorders often associated with SUD. Aside from mental illness, the most common category of treatment for both groups is symptoms, signs and ill defined conditions

(e.g., chest pain, pelvic symptoms). For those with SUD and schizophrenia, treatment for injury and poisoning was the second most common category of illness. Higher rates of treated prevalence (by a factor of 1.5 or more) among those with comorbid SUD were found in asthma, gastrointestinal diseases, infections of the skin and acute respiratory disease. Comorbid SUD also increased the risk of hospitalization for diabetes, gastro-intestinal disorders, infections of the skin and for the categories of symptoms, signs and ill defined conditions and injury and poisoning.

Age- and Gender-Adjusted Odds Ratios

To determine the odds of being treated for one of eight common medical disorders, given SUD comorbidity, we made age and gender adjustments using the logistic regression method to estimate differences between groups. The results are summarized in **Table 3**. The odds ratios suggest that five of the eight diseases, heart disease, asthma, gastrointestinal disorders, infections of the skin and acute respiratory disease, may be more prevalent among those with comorbid SUD when data are adjusted for case mix. We also found differences in the two MDCs, symptoms and signs and injury and poisoning. We found fewer differences between groups in treatment costs. Only hypertension and GI diseases were significantly more expensive for those with comorbid SUD and the two categories of symptoms and signs and injury and poisoning. Regardless of type of medical illness, the differences in per person expenditures are almost entirely a function of the number of medical hospitalizations.

Discussion

This study confirms earlier work reporting increases in the prevalence of some medical disorders among those with schizophrenia and extends that work by reporting data that have been adjusted for case mix. We found that individuals with schizophrenia and comorbid substance use disorder had much higher psychiatric expenditures when compared to those with schizophrenia only, findings consistent with earlier work by Dickey and Azeni.^{1,10} In addition, we found higher treated prevalence rates for five of the eight medical disorders studied among those with co-existing SUD: heart disease, asthma, infections of the skin, gastro-intestinal disorders and acute respiratory disorders. These disorders are frequently associated with problem drinking. We were not surprised to also find higher treated prevalence of symptoms, signs and ill defined conditions (MDC16) and injury and poisoning (MDC17) among those with comorbid SUD. It is likely that problems immediately related to the use of drugs and alcohol led to physician visits for these problems.

We believe that the finding of very high rates of psychiatric hospitalizations among those with comorbid substance use disorder is an important, if not a new finding. With continuing concern about the cost of treatment, managed behavioral health companies should be actively identifying,

Table 2. Comparison of medical disorders and treatment costs for adults with and without co-morbid substance use disorders

Disease	User	% ^a	Mean \$ ^b	std (\$)	User hospital	% ^c	Hospital mean \$ ^d	std (\$)
Without substance abuse disorders (<i>N</i> = 5916)								
Diabetes	271	4.58	607	2152	15	5.54	6121	6197
Hypertension	479	8.10	482	6738	4	0.84	39337	71512
Heart disease	381	6.44	496	2884	37	9.71	7925	9246
Asthma	185	3.13	830	2910	17	9.19	6319	6312
GI disease	411	6.95	438	1936	15	3.65	5647	7306
Infections of the skin	359	6.07	249	761	11	3.06	3615	1911
Malignant neoplasms	97	1.64	2855	8683	16	16.49	11450	16656
Acute respiratory disease	1168	19.74	668	3751	74	6.34	7575	11897
Symptoms, signs and ill defined conditions (MDC 16)	1926	32.56	408	1209	68	3.53	4903	3166
Injury and poisoning (MDC 17)	950	16.06	642	2414	79	8.32	5017	6331
Mental disorders (MDC 5)	5916	100	13059	31637	1327	22.43	42904	54198
With substance abuse disorders (<i>N</i> = 968)								
Diabetes	37	3.82	1196	2969	5	13.51	6919	4354
Hypertension	69	7.13	215	223	0	0.00	0	0
Heart disease	87	8.99	658	3427	8	9.20	8098	8075
Asthma	51	5.27	802	2508	5	9.80	5773	4572
GI disease	105	10.85	601	1422	10	9.52	4296	2031
Infections of the skin	102	10.54	504	1413	9	8.82	4204	2431
Malignant neoplasms	21	2.17	1533	2728	3	14.29	2565	756
Acute respiratory disease	271	28.00	550	2356	16	5.90	6317	7156
Symptoms, signs and ill defined conditions (MDC 16)	497	51.34	702	2857	27	5.43	6980	8698
Injury and poisoning (MDC 17)	361	37.29	1176	3351	49	13.57	5956	5906
Mental disorders (MDC 5)	968	100	22249	32768	591	61.05	32339	38142

^aNumber of treated people (percent of all treated adults with schizophrenia).

^bMean cost as a function of the total dollars paid on claims for this disorder, divided by the number of users.

^cNumber of people hospitalized (percentage of those hospitalized calculated as the number divided by the total number of those treated for this disorder).

^dMean cost as a function of the total dollars paid on hospital claims for this disorder, divided by the number of people hospitalized.

Table 3. Logit analyses: the age- and sex-adjusted probability of being treated for a medical disorder for adults and the probability of having higher treatment costs for adults with schizophrenia and substance use disorder, compared to adults with schizophrenia only

Disease	12 month prevalence			Higher treatment expenditures		
	Odds ratio	Parameter estimate (se)	95% C.I.	Odds ratio	Parameter estimate (se)	95% C.I.
Diabetes	0.95	-.40 (.09)	-.21-.13	0.98	-.02 (.17)	-.35-.31
Hypertension	0.93	-.06 (.06)	-.17-.05	1.33	.29 (.13)	.04-.54
Heart disease	1.24	.22 (.06)	.10-.33	0.96	.04 (.19)	-.33-.41
Asthma	1.26	.23 (.08)	.07-.38	0.96	.07 (.15)	-.24-.38
GI disease	1.18	.16 (.05)	.06-.25	1.24	.22 (.11)	.01-.43
Infection of the skin	1.12	.19 (.06)	.07-.30	1.11	.11 (.11)	-.10-.33
Malignant neoplasms	1.22	.20 (.12)	-.03-.43	1.09	.09 (.23)	-.36-.54
Acute respiratory disorders	1.16	.15 (.04)	.07-.22	1.04	.04 (.06)	-.03-.11
Symptoms, signs and ill defined conditions	1.38	.32 (.04)	.24-.39	1.20	.19 (.05)	.10-.28
Injury and poisoning	1.59	.47 (.04)	.39-.54	1.50	.41 (.06)	.03-.52

Note: when these results are adjusted for multiplicity of tests on the same data set, none of the differences are significantly different. (*p* value for significance is set at .003.)

treating and closely monitoring the care of the dually diagnosed.

The finding of higher rates of certain medical disorders in this same dually diagnosed population is useful, but

tempered by limitations in the data. Future research will have to compare rates of medical disorders in a population of adults who are poor but without schizophrenia to answer the question of whether or not there is something about

schizophrenia, as a disorder, that creates vulnerabilities to certain medical disorders. Simple observation of these findings, however, suggests that the higher rates of certain medical disorders in this group are those more often associated with heavy alcohol use. It may be that what others have suggested are 'excess' medical disorders among those with schizophrenia are actually problems linked to drinking or poverty. Future research that seeks more direct causal links between schizophrenia and medical disorders will have to take into account different forms of substance use preference as well. A majority, but not all, of our sample has alcohol dependence or abuse diagnoses.

The value of large administrative data sets in exploring questions of incidence and prevalence of disease is offset by lack of independent confirmation of diagnoses. Nevertheless, utilization review associated with managed care has greatly improved the consistency of diagnostic practice, at least with respect to concordance between charts and claims. It has also reduced the variance in hospitalization rates, but Massachusetts, despite managed care, has continued to have higher than average hospitalization rates, which cloud our ability to equate 'expensive' with 'serious'. Rates of hospitalization in other states may be lower for individuals with the same clinical condition.

Another limitation is the possibility of increased risk of detection for medical disorders among those who seek mental health treatment more often, especially those with higher hospitalization rates. This study advances the field by detecting patterns of medical disorders that might shape more focused, clinically based research. These data do not provide information on whether the quality and quantity of medical treatment has been appropriate, but they raise concern about whether adequate medical attention to these problems has been paid and whether appropriate treatment for substance use disorder is available and accessible. For adults with schizophrenia, neither can be assumed.

In debates over the relative merits of 'carving in' or 'carving out' mental health services from health plans, clinicians must remember that many mentally ill individuals are reported to receive inadequate medical care.¹⁴ The presumed importance of keeping behavioral health care services in, rather than out of health plans is that this permits greater continuity of care and coordination of different treatments. It may also facilitate identification and treatment of medical and substance use problems. People with mental illness are sometimes unwilling to seek medical help or may have difficulty in describing their problems to a physician. A number of clinically related reasons might contribute to this phenomenon: for example, people with schizophrenia tend to have greater tolerance for pain²⁷ and therefore may be less likely to report pain as a symptom. Moreover, psychotic symptoms may interfere with a patient's ability to answer questions about the medical problem that brings her or him to the physician.²⁸ All of these potential problems argue for closer working relationships between mental health and medical professionals and greater attention to the identification and treatment of substance use disorders in the psychiatrically ill.²⁹

It was beyond the scope of this study to compare our data with data from other populations, but future research should explore the extent to which people with schizophrenia have medical disorders in excess of epidemiological prevalence rates of the general population or of other mentally ill adults. Another important question is which substances are associated with increased medical risk. Finally, despite the large number of people in this study, it was not possible to explore certain disorders that rarely occur. Data from more individuals might allow examination of disorders that are rare or that have been reported to occur less often in those with schizophrenia. If particular medical disorders had lower than expected age- and gender-adjusted rates, this would be of particular interest because these rates may point biomedical research in certain directions not currently being pursued. Even without this additional research, this study has provided strong evidence that serious medical problems are common, and careful screening for these problems should be a routine part of the care of adults with schizophrenia.

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