

Mental Health Disorders and Sexually Transmitted Diseases in a Privately Insured Population

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Objectives: To consider whether patients who use mental health services in privately insured settings are also more likely to have received sexually transmitted disease (STD) or human immunodeficiency virus (HIV) diagnoses and whether this relationship extends to patients with milder mental health disorders.

Methods: Using frequency tables stratified by age and sex, a logistic regression model, and difference of means tests, we examined the relationship between mental health claims and STDs in a sample of 289 604 privately insured people across the United States.

Results: Patients with mental health claims were more than twice as likely as other patients to have an STD claim in the same year after controlling for confounding factors (odds ratio, 2.33; 95% confidence interval, 2.11-2.58). This relationship held for severe and milder mental health diagnoses, for male and female patients, and in each age category from 15 to 44 years. Among women, patients aged 20 to 24 years with a mental health claim had the highest predicted probability of STD diagnoses (3.0%); among men, patients aged 25 to 29 years with a mental health claim had the highest predicted probability of STD diagnoses (1.2%).

Conclusions: In this population, patients with mental health claims were more likely to also have claims with diagnoses for STDs than patients without mental health claims, and this relationship applied to severe and milder mental health disorders. This suggests that people with mental health disorders in privately insured populations may benefit from routine STD risk assessments to identify high-risk patients for referral to cost-effective preventive services.

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The relationship between mental illness and sexually transmitted diseases (STDs) is a potentially important research focus with implications for prevention programs. A relationship between mental health conditions and STDs may exist because patients with complex and varied social and sexual interactions may experience higher needs for both types of services. Alternatively, patients with mental health disorders might exert less conscious control over their sexual interactions because of feelings of worthlessness, restlessness, boredom, or anxiety.¹

Considerable attention has been directed at understanding this relationship within specific subgroups (adolescents, the indigent, and institutionalized populations) whose members are at increased risk for acquir-

ing STDs, including human immunodeficiency virus (HIV).²⁻⁵ Previous studies of publicly insured, institutionalized, or indigent populations have found a relationship between severe mental health disorders (such as schizophrenia, bipolar condition, and episodes of psychosis) and STDs, including HIV infections. Several studies^{1,6-8} have suggested that patients with a range of behavioral control disorders may be at greater risk for STDs. A recent study⁹ that evaluated a sample of STD clinic patients in Baltimore found that STD clinic patients with more severe antisocial personality disorders were at greater risk of STD infection, while those with comparatively less severe mood and substance abuse disorders were not. Rates of STDs may also be higher in privately insured patients who use mental health services, and the relationship between mental health and STDs may extend to milder mental health conditions in addition to severe ones.

A significant amount of STD morbidity occurs in patients who seek care from private sources. In 2002, 78% of chlamydia cases and 65% of gonorrhea cases were reported by private clinicians,¹⁰ and 62% of patients who needed STD care sought it from their private clinicians.¹¹ If an association is found between the use of STD services and mental health services, this information could be used to target more efficient STD prevention services to those patients seeking mental health treatment. More efficient targeting is important because significant barriers impede the identification and proper treatment of STDs in private settings. These barriers include limited STD knowledge among many

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private-setting practitioners, low priority given to STD detection and prevention in many private-sector settings, low patient demand for STD screening and risk assessment, reimbursement policy-driven financial disincentives for routine sexual risk assessment and STD screening of asymptomatic patients, and difficulties in offering care to sex partners who are not enrolled in the same health plan as the infected index patient.^{12,13}

National survey data demonstrate that private primary care providers miss many opportunities to provide STD, HIV, and pregnancy prevention counseling to high-risk patients.¹⁴ Still, many private providers do not believe that STDs are a major issue for the patients they treat.¹⁵ Some physicians (as opposed to nurse practitioners and physician assistants) may be reluctant to offer STD preventive services because they doubt the cost effectiveness of the intervention.¹⁶ Information that better pinpoints which patients are most likely to need STD preventive services may make providers more willing to offer such services, particularly if it alters their beliefs that these services are important and can improve the cost effectiveness of delivery.

To determine whether administrative data might be used to target STD risk assessments to mental health patients, we examined rates of STD diagnoses for patients who sought mental health services relative to those who did not, using medical claims data drawn from a large national set of private commercial health plans. We also considered whether higher rates of STD diagnoses exist in privately insured populations with mental health service utilization for disorders of milder character (specifically, adjustment disorders), and we look at differences in these associations by age and sex.

METHODS

We analyzed a subset of 289 604 patients from the 1995 MarketScan¹⁷ database, a national commercial database of the private insurance claims of more than 5 million people in 1995. The MarketScan database, although not a probabilistic sample, is drawn from insurance markets across the United States and has been used in previously published studies^{18,19} of STD care. To compile the MarketScan database, the Medstat group purchases health insurance claims and enrollment records from corporations, not-for-profit organizations, and municipal employers across the United States; strips personal identifying information (including information about patient ethnicity) from the records; cleans the records for inconsistencies; and combines them into data files for research use. Each of the plans in this file used a preferred provider or indem-

nity fee-for-service reimbursement system. Health maintenance organizations that did not collect encounter-level claims information were not included in the data.

We restricted our analyses to enrollees aged 15 to 44 years because this age group has the highest risk of STDs.^{2,3} Additional inclusion criteria included an identified health plan and reported prescription drug coverage information.

In this database, a claim represents a request by a provider to the patient's insurer for payment for a specific service rendered. Each claim is coded with information describing the type of service or procedure rendered by the physician and the diagnosis code indicating the reason this service was required. We identified patients with mental health diagnoses using psychiatric diagnosis claims or psychoactive drug prescriptions (*International Classification of Diseases, Ninth Revision, Clinical Modification* codes used to define mental health conditions and STDs are available as an appendix from the author). Psychiatric claims for tobacco addiction, autism, or mental retardation were not considered mental health diagnoses for this analysis.²⁰ Any patient with at least 1 mental health claim was classified as having used mental health services. We classified claims for adjustment disorders as evidence of a mild mental health condition. Claims for mental health diagnoses are an imperfect measure of services rendered because some providers are uncertain of the diagnosis without further evaluation or testing, providers may intentionally miscode to protect patient confidentiality, and services paid by the patient out of pocket do not generate claims.

We determined cases of STDs by identifying people with 1 or more claims with a primary diagnosis code of a bacterial or viral STD. As with mental health claims, any patient with at least 1 claim coded with a relevant STD diagnosis was considered to have used STD services. A claim only for STD services such as STD laboratory tests (that may yield a negative result) was not sufficient to be classified as an STD diagnosis. In some cases, providers may intentionally not code certain services with an STD diagnosis because they are uncertain of the diagnosis without further evaluation and testing, thereby preventing services from appearing on a medical bill and enhancing confidentiality. For this reason, claims measures of STD services are imperfect measures of actual STD services and demand. Although variations in STD diagnostic codes are likely to be strongly correlated with variations in the underlying rates of STDs,^{18,21} they should not be mistaken for exact measurements of STDs and should instead be interpreted simply as indicators of demand for STD services.

To demonstrate the relationship between having a mental health claim and an STD claim, we first calculated rates of STD diagnosis claims per 100 000 patients, stratified by age group and sex. To test whether this relationship was confounded by other variables, we created a logistic regression model using the GENMOD procedure in SAS (Version 6.12, SAS Institute, Cary, NC), with a dichotomous measure of any STD diagnoses as the dependent variable. We considered that several variables might confound the relationship of STDs and mental health service diagnoses. The variables age, sex, industry of employment, metropolitan statistical area, and subject's health plan were selected as independent variables on the basis of previous research on the determinants of STDs^{10,11,22} and the data available in the analytic file. Industry was used as a proxy variable for socioeconomic status, which was not available. The 8 industries coded in the data are oil and gas extraction; mining; durable goods manufacturing; nondurable goods manufacturing; transportation, communications, and utilities; retail; finance, insurance, and real estate; and government (Table 1). The GENMOD procedure analyzed data represented in a contingency table and fitted linear models to functions of response frequencies.²³ This allowed us to control for the effect of dozens of individual health plans and metropolitan statistical areas, in a way similar to a fixed-effects model. All potentially confounding variables were retained in the model. The model was then used to predict the probability of an STD diagnosis with and without a mental health diagnosis by age and sex, controlling for a patient's health plan, metropolitan statistical area, and industry.

To assess whether STD diagnosis claims are associated with a later increase in mental health claims, for each individual we calculated the number of mental health diagnosis claims filed before and after the first STD diagnosis during 1995 for those patients with claims for both STD and mental health diagnoses. A large increase in the number of mental health service claims following an STD diagnosis claim would suggest that the STD diagnosis may to some extent stimulate demand for the mental health services coded with this diagnosis. However, if the numbers of mental health diagnosis claims before and after an STD diagnosis claim were roughly equal, this would suggest that an STD diagnosis claim was not the sole stimulus for the subsequent use of services associated with mental health diagnoses. Because the monthly timing of indi-

Table 1. Population Characteristics Used as Control Variables

Control Variable	%
Sex	
Male	48
Female	52
Age group, y	
15-19	20
20-24	19
25-29	15
30-34	12
35-39	14
40-44	19
Industry	
Durable goods manufacturing	6
Nondurable goods manufacturing	20
Transportation, communications, and utilities	4
Retail	49
Finance, insurance, and real estate	19
Other	< 2

vidual STD diagnoses was likely to be randomly distributed across the 12 months of 1995, we assumed that the timing of individual STD diagnoses was not likely to affect the mean number of claims before and after an STD diagnosis found at the group level. We tested the difference in the overall mean number of claims before and after the first STD diagnosis, using an F test from an analysis of variance.

Specifically, our methods test the following 3 hypotheses: (1) The rates of STD diagnoses per 100 000 patients differ significantly between those with and without mental health claims, before adjusting for potentially confounding variables. (2) Controlling for potentially confounding variables, people with different mental health diagnoses experience statistically higher probabilities of also having an STD diagnosis. (3) The mean number of mental health claims does not differ before and after an STD diagnostic claim among patients with both STD and mental health diagnostic claims.

RESULTS

A total of 36 032 patients (12.4%) had at least 1 claim for a mental health diagnosis. The most prevalent men-

Table 2. Rates per 100 000 of Any Sexually Transmitted Disease (STD) Diagnosis Claims for Patients With and Without Any Mental Health Diagnosis Claims by Age Group and Sex*

No. of Mental Health Diagnosis Claims	Age Group, y						
	15-19	20-24	25-29	30-34	35-39	40-44	All Ages
0							
Women	1138	1212	997	1197	354	818	853
Men	222	295	213	231	261	169	233
≥ 1							
Women	2509	3397	2629	1847	1898	1438	2110
Men	313	756	1401	839	1128	809	786

*International Classification of Diseases, Ninth Revision, Clinical Modification codes used to define mental health conditions and STDs are available as an appendix from the author. χ^2 Tests indicate a significant difference ($P < .01$) in the rate of STD diagnoses between those with and without a mental health diagnosis claim for each pair except men aged 15 to 19.

tal health diagnosis claims were related to adjustment disorders and prescriptions for antidepressant medications. A total of 1969 patients (0.7%) had at least 1 claim for an STD diagnosis. The most commonly diagnosed STDs were genital herpes, human papillomavirus (genital warts), genital lice, pelvic inflammatory disease (in women), gonorrhea, nongonococcal urethritis (in men), and HIV/AIDS (in men because there were no instances of HIV/AIDS diagnoses in women in this sample). Five hundred ninety-seven patients had both mental health and STD diagnosis claims. In terms of population-based use of medical services, 680 per 100 000 privately insured patients in the overall sample had a claim for an STD diagnosis, compared with 1657 per 100 000 privately insured patients who received at least 1 claim for a mental health diagnosis.

Substantial differences in rates of diagnosis claims existed between age groups and sexes (Table 1). Overall, women with a mental health diagnosis claim were the most likely to have claims with STD diagnoses, followed by women without a mental health diagnosis claim, men with such a claim, and men without such a claim. Significant variation in rates of claims with STD diagnoses existed by age, generally with younger women (15-29 years) and older men (25-39 years) exhibiting higher rates of such claims.

After controlling for potentially confounding variables in the logistic model, we found that patients with at least 1 mental health diagnosis claim were more than twice as likely as patients without such claims to have had an STD diagnosis claim in the same year (Table 2) (odds ratio [OR], 2.33; 95% confidence interval [CI], 2.11-2.58). Patients prescribed antidepressant medica-

tions were more than twice as likely to have STD diagnosis claims as patients without these drug claims (OR, 2.21; 95% CI, 1.92-2.55). Compared with other teens aged 15 to 19 years, teen patients who had mental health diagnosis claims were nearly twice as likely also to have had STD diagnosis claims (OR, 1.98; 95% CI, 1.50-2.63).

Patients with claims for antipsychotic medications, bipolar condition, and substance

abuse problems had the highest risk of STD diagnosis claims, but those with milder conditions also had higher rates of STD diagnosis claims than those without these mental health diagnosis claims (Table 3). Patients diagnosed as having adjustment disorders were nearly twice as likely to have an STD diagnosis as patients without adjustment disorders (OR, 1.93; 95% CI, 1.64-2.28).

These differences in odds translated into higher absolute probabilities of STD diagnoses for patients with mental health conditions. No age group of men without mental health diagnoses had a population prevalence of STD diagnoses that exceeded 0.3%, and no age group of women without mental health diagnoses had a population prevalence of STD diagnoses that exceeded 1.0%. In contrast, men with mental health claims had a predicted population prevalence of STD diagnoses between 0.3% and 1.2%, and women with mental health claims had a predicted prevalence between 1.2% and 3.0% (Table 4). The association between STD diagnosis claims and mental health diagnosis claims was stronger among women than among men but did not vary appreciably by age. For persons with both mental health and STD diagnosis claims in the same year, no significant difference was found between the number of claims for mental health diagnoses and drugs before (mean, 3.24) and after (mean, 3.31) a diagnosis of an STD.

DISCUSSION

Our results show a significant relationship between claims for STD diagnoses and mental health diagnoses.

This was observed in women and men and in all age groups within the 15- to 44-year age range. Our study is consistent with other investigations²⁴ in showing that the occurrence of an STD diagnosis claim was not associated with a later increase in mental health diagnosis claims. Furthermore, we found an association for patients with severe mental health disorders and prescriptions, such as bipolar condition and antipsychotic medications, as well as for patients with milder conditions and prescriptions, such as adjustment disorders and antidepressant medications.

This association translated into substantially increased absolute probabilities of STD diagnoses for patients with mental health diagnoses compared with patients without such diagnoses. Furthermore, diagnosed STDs likely indicate a substantial amount of undiagnosed disease in the community. A population-based study²⁵ of Baltimore, Md, households found that the number of prevalent undiagnosed gonococcal and chlamydia infections in adults aged 18 to 35 years approached or exceeded the number of infections that were diagnosed and treated annually.

The low prevalence of diagnosed STDs in those without mental health claims is unlikely to attract the attention of most plan managers. However, the 1% to 3% prevalence in enrollees with mental health claims greatly exceeds the yearly rate of new diagnoses for breast cancer and prostate cancer (approximately 0.3%²⁶ and 0.2%,²⁷ respectively, of the over age 40 female and male populations), both of which are routinely screened for in private settings. Routine chlamydia screening of sexually active women 26 and younger was ranked as a better prevention value than mammography in a recent ranking of preventive services based on burden of disease prevented and cost-effectiveness of the service.²⁸

This study may be limited by possible miscoding of STDs and mental health claims that was unintentional or intentional (eg, because the diagnosis was uncertain or to protect patient confidentiality). In addition, the association between mental health and STD claims may be confounded by other variables, specifically race, for which data were not available. In addition, because the timing of STD diagnoses was not retained in the data analysis file, we assumed that STD diagnoses were normally distributed throughout the year. Conclusions drawn from the difference in the mean number of claims before and after a mental health diagnosis rely on the validity of this assumption.

Substance abuse may play a larger role in driving the relationship between mental health and STD diagnoses than is apparent from these claims data. Like STDs, substance abuse disorders may not be coded at all or

Table 3. Association Between Claims for Mental Health Diagnoses and Claims for Sexually Transmitted Disease (STD) Diagnoses by Type of Mental Health Diagnosis Claim*

Claim Type	Odds Ratio (95% Confidence Interval)
Any mental health diagnosis or prescription	2.33 (2.11-2.58)
Bipolar condition	2.62 (2.14-3.21)
Substance abuse	2.60 (1.78-3.80)
Personality disorder	2.09 (1.78-2.47)
Adjustment disorder	1.93 (1.64-2.28)
Schizophrenia	0.88 (0.28-4.56)
Psychiatric service in teenst	1.98 (1.50-2.63)
Antipsychotic medication	2.90 (2.24-3.76)
Antianxiety medication	2.42 (2.07-2.82)
Antidepressant medication	2.21 (1.92-2.55)

*Adjusted for age, sex, industry of employment, metropolitan statistical area, and subject's health plan. The reference group is patients without a given mental health diagnosis claim. *International Classification of Diseases, Ninth Revision, Clinical Modification* codes used to define mental health conditions and STDs are available as an appendix from the author.

[†]Among teens aged 15 to 19 years (n = 47 621).

may be intentionally miscoded as milder mental health conditions such as adjustment disorders to protect patient confidentiality. Clinical follow-up studies of this work should attempt to collect information on substance use behaviors to separate (to the extent possible) the disinhibiting effect of inebriation on the behaviors that lead to STDs from the effect of mental health disorders alone. In these data, patients with diagnosed substance abuse problems were not driving the relationship between mental health and STD diagnoses. First, only 2.9% of the group with mental health diagnoses had claims only for substance abuse problems with no other mental health condition diagnosed. Second, patients with mental health diagnoses other than substance abuse also experienced higher rates of STD diagnoses (Table 2).

Our findings may not be generalizable to populations that tend to be less affluent or experience a higher incidence of bacterial and viral STDs.^{9,29} In addition, the 1995 data used in this study may not be representative of populations today because of different clinical and claims-coding practices for mental health and STD services. Future research should be conducted to verify these results using more recent data. This research should use a longitudinal design to better address issues of causality between STDs and mental health disorders

Table 4. Predicted Percent With Any Sexually Transmitted Disease (STD) Diagnosis Claims for Patients With and Without Any Mental Health Diagnosis Claims by Age Group and Sex*

No. of Mental Health Diagnosis Claims	Age Group, y						
	15-19	20-24	25-29	30-34	35-39	40-44	All Ages
0							
Women	0.9	1.0	0.8	0.9	0.8	0.6	0.9
Men	0.3	0.3	0.2	0.3	0.2	0.2	0.2
≥ 1							
Women	2.2	3.0	2.2	1.8	1.7	1.2	2.1
Men	0.3	0.6	1.2	0.7	0.6	0.6	0.6

*Adjusted for age, sex, industry of employment, metropolitan statistical area, and subject's health plan. International Classification of Diseases, Ninth Revision, Clinical Modification codes used to define mental health conditions and STDs are available as an appendix from the author.

and should assess the cost effectiveness of targeting STD/HIV risk assessments to privately insured people who use mental health services.

However, although additional studies on this subject using newer data are needed, the theory that mental health disorders may contribute to behaviors that result in STDs is still valid. Furthermore, our findings are consistent with more recent nonclaims data showing a similar relationship in an STD clinic setting.⁹ Our ability to observe this relationship may be even stronger today than in 1995 for several reasons. If the enactment of the Mental Health Parity Act of 1996 resulted in greater private insurance coverage of mental health services, it may have increased the number of people with mental health disorders who can be identified using inexpensive, targeted STD risk assessment. Second, the delivery of STD services in private settings has likely increased since 1995 because of the expansion of Medicaid managed care, the advent of the State Child Health Insurance Program, and the elimination of many publicly funded STD clinics; this last reason has likely pushed more people to seek care from private providers. These changes have likely increased the number of patients at high risk for STDs seen in private settings, thus increasing the need for and the potential effectiveness of STD risk assessments in private settings as well. Although ideally this research should be replicated with more recent data, the core findings seem unlikely to change.

Many private-sector providers still believe that routine sexual risk assessment is a low priority for their patients or avoid conducting risk assessments because they believe their patients have a low prevalence of STDs (a belief that may not be supported by data^{10,11}) because face-to-face risk assessment makes some

providers or patients feel uncomfortable or because some insurers do not reimburse adequately for risk assessments.

However, our data suggest that, for patients with mental health conditions, STD risk assessment is warranted, and health systems and providers should attempt to identify methods to implement it routinely. Improvements in primary care STD/HIV risk assessment can be achieved in outpatient settings using inexpensive interventions³⁰ such

as patient self-assessment forms, nonphysician counselors, education pamphlets, or videos. Examples of patient self-assessment tools can be accessed on the Internet.^{31,32}

Routine risk-assessment questions can be integrated into existing patient forms and questionnaires at negligible cost to the provider or the insurer. Based on studies of other interventions to prevent STDs, targeted low-cost risk assessments are likely to be cost effective for the provider, given the proven cost effectiveness of targeted STD preventive services.

For example, research has found that screening for asymptomatic *Chlamydia trachomatis* with a nucleic acid amplification-based test is cost-effective in female populations with prevalences as low as 1.1%.³³ Other research has shown that most cost savings associated with treating asymptomatic chlamydial infections likely accrue within the same year.³⁴ In women, undiagnosed low-cost bacterial infections may develop into acute cases of pelvic inflammatory disease with costs between \$1060 and \$1410 per case.³⁵ In the population of roughly 23 000 women with mental health diagnoses observed in these data, 244 cases of pelvic inflammatory disease were diagnosed, compared with only a combined 44 cases of diagnosed gonorrhea and chlamydia, suggesting that targeted bacterial STD screening based on risk assessments would have likely improved health outcomes and generated savings. Treatment of most STDs detected early in the course of infection is inexpensive, usually involving 1 to 7 days of antibiotic treatment. Treatment of upper genital tract complications of untreated lower genital tract infection such as pelvic inflammatory disease, ectopic pregnancy, and infertility

is more costly; this underscores the potential value of early STD detection through risk assessment and referral to preventive screening and other services of high-risk patients. Even costly diseases such as HIV/AIDS are less costly to manage when identified early. Research has demonstrated that early detection and proper management of HIV prevent many of the high-cost inpatient admissions associated with acute symptomatic AIDS.³⁶

At the insurance plan level, administrative claims information could be used to target STD preventive services to specific high-risk individuals. Insurers could recommend sexual risk assessments and referrals to screening and services for those at risk as elements of their standard mental health care. Mental health claims could also be used to trigger mechanisms (such as confidential personalized communication) that target specific patients for STD/HIV risk assessment based on their use of mental health services. Such policies are ethical and legal under current regulations, provided the information that is already available to the plan's benefit managers and participating providers is being used to enhance patient health and is administered confidentially and with sensitivity. Legally, federal Health Insurance Portability and Accountability Act regulations specifically allow the within-plan use of patient administrative health information to target preventive care (D. Magid, MD, oral communication, 2004).³⁷

Sexually transmitted disease screening interventions have been shown to improve health while saving costs in several clinical and nonclinical settings.^{33,34,36} The 2 primary determinants of the cost effectiveness of these interventions were the disease prevalence and the intervention cost: the higher the STD prevalence and the lower the cost of the intervention, the greater the benefits of the intervention. Anecdotal reports suggest that sexual health issues are not generally a concern for medical groups, psychiatric groups, or hospitals. This is perhaps justified because, before this study, no published literature addressed the question of whether the prevalence of STD diagnoses in privately insured populations would economically justify preventive health interventions. However, this article demonstrates a prevalence of STD diagnoses in the subpopulation of privately insured patients with mental health diagnoses or using psychoactive prescriptions that exceeds the disease prevalence at which other STD interventions were found to be cost effective.^{33,34,36} Furthermore, current STD policy makers argue that mental health systems should implement simple referral systems to facilitate routine STD care and screening.³⁸ Although our data are from 1995, we have reason

to believe the relationship between mental health diagnoses and STDs remains true.^{9-11,14,22}

Given our results, we suggest that patients with mental health disorders between the ages of 15 and 44 years be routinely assessed for STD/HIV risks, particularly in areas of the country where the overall population prevalence of STDs is high. This recommendation is likely to be particularly useful in targeting services toward women, especially those between the ages of 15 and 29. Health systems and providers should consider how confidential use of claims data could facilitate the targeting of patients with mental health diagnoses who may benefit from STD/HIV risk assessment.

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