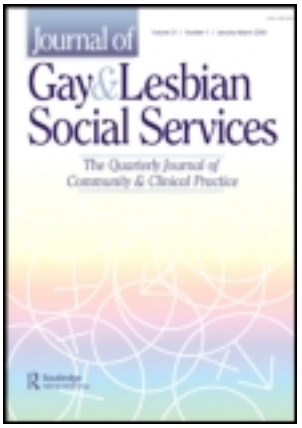

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Social and Health Service Use and Treatment Outcomes for Sexual Minorities in a National Sample of Substance Abuse Treatment Programs

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Social and Health Service Use and Treatment Outcomes for Sexual Minorities in a National Sample of Substance Abuse Treatment Programs

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This study examines substance use severity, levels of social and health service utilization, and the impact of service utilization on treatment outcomes for sexual minorities versus non-minorities. The sample included 3,094 clients from the National Treatment Improvement Evaluation Study (NTIES). Substance use severity among sexual minorities and non-sexual minorities was similar at treatment entry and at 12 months post-discharge. Differences in social and health service utilization were significant for substance abuse counseling and health services. Significant interactions between sexuality and access services and sexuality and mental health services were also found. Practice and research implications are discussed.

KEYWORDS substance abuse treatment, sexual minorities, LGBT, ancillary services, treatment outcomes

INTRODUCTION

Research dating back to the 1970s has documented elevated rates of substance use, abuse, and dependence within the sexual minority community (Cochran, Peavy, & Robohm, 2007; Fifield, Latham, & Phillips, 1977). Though early studies were limited methodologically by problematic data collection and flawed analytic strategies, population-based studies have generally confirmed a lesser-magnitude link between sexual minority status and elevated rates of substance use (Cochran, Keenan, Schober, & Mays, 2000; Cochran &

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Cauce, 2006; Corliss, Grella, Mays, & Cochran, 2006; Hughes & Eliason, 2002; Marshall et al., 2008; Scheer et al., 2002; Skinner, 1994; Wilsnack et al., 2008; Ziyadeh et al., 2007). Indeed, substance abuse researchers have continued to expand on early studies by identifying variables correlated with substance use among sexual minorities (SMs) and investigating etiological links between sexuality and addiction (Bux, 1996; Greenwood et al., 2001; Heffernan, 1998; Hughes, 2003; Stall et al., 2001). The notion that sexual minorities represent an "at-risk" population is also acknowledged within the substance abuse treatment community (Bux, 1996). In 1993, the Substance Abuse and Mental Health Services Administration (SAMHSA) convened a working group to improve knowledge about the lesbian, gay, bisexual, and transgendered (LGBT) community and to improve access to treatment. Among their policy and service recommendations, SAMHSA called for more rigorous epidemiological studies of alcohol and drug abuse in the LGBT community. Yet few studies to date have actually examined service utilization and treatment outcomes for sexual minorities who enroll in substance abuse treatment programs. SAMHSA has described the state of research knowledge on substance abuse among sexual minorities as "inconsistent and incomplete" (Craft & Mulvey, 2001). In light of substantial gaps in knowledge, this study will examine the relationship between substance use severity and levels of social and health service use, and assess the impact of social and health services on posttreatment drug use among SMs and their non-minority counterparts (non-SMs).

Etiological Frames Guiding Substance Use Research on SMs

Both the trend of elevated substance use among sexual minorities and the hypotheses offered to explain it suggest that the pathway to substance abuse and dependence and the treatment trajectory of sexual minorities may be unique (Anderson, 2009). Researchers have proposed two related hypotheses to explain high population rates of substance use among SMs (Bux, 1996; Eliason & Hughes, 2004; Senreich, 2009). The self-medication explanation suggests that sexual minority individuals experience stigma and social isolation, as well as psychological distress. Consequently, they drink alcohol or use drugs to cope. The subculture explanation posits that the sexual minority community, as a consequence of collective stigmatization, was pushed "underground," resulting in a social scene dominated by bars and nightclubs (Anderson, 2009; Corliss et al., 2006; Senreich, 2009). Though compelling as hypotheses, no studies have established causal links between sexuality and the development of substance abuse problems. Moreover, research has yet to determine what impact if any high population rates of substance *use* have on substance *abuse* treatment (Bux, 1996).

Group-specific demographic trends are important to identify, but it is also critical to make a distinction between those who use drugs and alcohol

and those who develop problems severe enough to warrant substance abuse treatment. Social and cultural pressures may lead to a higher prevalence of drug and alcohol use within the sexual minority population—and there is certainly a body of literature in support of this claim—but this does not necessarily imply that SMs are more likely to manifest substance use and abuse disorders or that their disorders will be more severe. In the analytic gap between research on the prevalence of substance use and research investigating its etiological correlates, many questions are left unanswered.

Substance Use Among SMs at Treatment Entry

Only a few studies have looked at sexual minority clients in substance abuse treatment. In a study of publicly funded substance abuse treatment centers in Washington, Cochran and Cauce (2006) found that sexual minority clients were less likely to use alcohol but more likely to use methamphetamine, cocaine, and crack than heterosexual clients. Moreover, sexual minorities used their primary substance more frequently at treatment entry than heterosexual clients; levels of secondary substance use did not differ between the two groups (Cochran & Cauce, 2006). Similarly, a study of former substance abuse clients in the New York Metropolitan area found that gay and bisexual respondents used more types of substances than heterosexual respondents, though there were no significant differences in the use of alcohol or cocaine (Senreich, 2009). The analysis presented here aims to expand upon these findings by measuring substance use severity at treatment entry and one year after treatment discharge in a national sample drawn from treatment centers across the United States.

Social and Health Service Utilization Among SMs

Grella, Greenwell, Mays, and Cochran (2009) also documented differences in treatment utilization between SMs and non-SMs. Among individuals without any diagnosable mental health disorder, lesbians, gay men, and bisexual men and women were more likely to have received treatment. Among those with only a mental health disorder, sexual minorities were also more likely to have received treatment than their heterosexual counterparts. Differences in treatment utilization were not found among sexual minorities who had only substance abuse disorders *or* among those with comorbid substance abuse and mental health disorders. Similarly, in the study by Cochran and Cauce (2006) just discussed, sexual minorities were more likely to have sought medical services and to report past or present use of mental health services than heterosexual clients, though some treatment differences among sexual minorities were gender dependent. In these studies, it seems that

many sexual minorities are accessing treatment despite any barriers that exist. However, Grella and colleagues' study is based on a sample population from California, which they note has a "therapy culture," a factor that may limit the generalizability of their findings (2009).

Providers' Capacities for Treating SMs

The sparse research that looks at providers' capacities for working with sexual minority clients paints a grim picture. The 1993 SAMHSA work group on LGBT issues determined that sexual minorities often went without treatment or were forced to receive substance abuse treatment from culturally incompetent, and sometimes hostile and homophobic, providers (Craft & Mulvey, 2001). In a 2003–2004 survey, only 11.8% of SAMHSA-listed substance abuse treatment providers reported offering specialized services for sexual minorities. Among those that reported offering specialized services, the overwhelming majority of programs did not offer services that were different from those offered to the general population (Cochran, Peavy, & Robohm, 2007). More recently, the National Survey of Substance Abuse Treatment services found that only 6% of programs offer specialized programs for LGBT clients. Specialized services are more likely to be found in private, for-profit facilities and facilities that focus on both substance abuse and mental health (Office of Applied Studies [OAS], 2010). Moreover, a study of substance abuse treatment counselors' attitudes toward LGBT clients found that nearly half had negative or ambivalent attitudes toward these clients, and many lacked adequate knowledge about legal and social issues relevant to the population (Eliason, 2000). A later study by Eliason and Hughes found similar attitudes among rural and urban substance abuse treatment providers, despite the latter group's greater exposure to diverse treatment populations (2004).[1] Similarly, in a study of treatment experiences based on a convenience sample of LGBT and heterosexual clients from the New York Metropolitan area, a majority of gay and bisexual respondents reported that sexuality adversely affected their treatment; gay and bisexual men in this study also reported lower rates of abstinence at the end of treatment than heterosexual men and gay/bisexual women (Senreich, 2009). There is reason to suspect that ill-equipped treatment facilities will lead to poorer treatment outcomes for SMs, yet no recent empirical studies have examined treatment outcomes for this group.

Given the relative dearth of specialized substance abuse programs for LGBT clients, it is not surprising to find that the research literature is devoid of studies that rigorously compare outcomes for specialized treatment for LGBT clients with treatment-as-usual outcomes. In fact, few studies are able to make comparisons between LGBT and heterosexual groups, even in nonspecialized treatment, because national probability surveys have traditionally excluded questions about sexual orientation (Cochran, 2001; Senreich, 2009).

While survey questions about sexuality in nationally funded surveys have a politically thorny history (Laumann, Gagnon, Michael, & Michaels, 2000), the HIV epidemic made clear that sexuality is intimately linked to public health. Thus the 1990s witnessed the inclusion of questions related to sexual behavior on some major substance abuse surveys (Senreich, 2009). The National Treatment Improvement Evaluation Study (NTIES), a national probability sample of publicly funded substance abuse treatment programs, is one such study.

Though NTIES does not include questions capturing sexual orientation in terms of personal identity, it does provide the opportunity to compare substance abuse treatment outcomes for people who engage in same-gender sexual behavior versus those who do not. As such, NTIES provides a rare opportunity to look at substance abuse treatment among sexual minorities in a national probability sample. This analysis will use NTIES to investigate the relationship between sexuality and substance abuse treatment by comparing pre- and post-treatment substance use severity and levels of social and health service utilization during treatment, and by analyzing the relationship between social and health service receipt and post-treatment substance use severity for SMs versus non-SMs.

METHODS

Data Sample and Study Design

Data analyzed in this study were collected as part of NTIES, a national longitudinal panel study of publicly funded substance abuse treatment programs conducted between 1992 and 1997. NTIES employed a pre-/post-longitudinal data collection strategy and can therefore be used to assess treatment implementation and treatment outcomes. Data were collected in major metropolitan areas across the United States and include variables at both the organizational level and individual level. Details on survey design and sampling methods are available in previous publications (Gerstein et al., 1997; Marsh, Cao, & D'Aunno, 2004). For the purposes of this study, it is important to note that NTIES overrepresents underserved populations, including racial/ethnic minorities, pregnant women, youths, public housing residents and welfare recipients, and those involved in the criminal justice system. Nonetheless, NTIES is one of the most extensive data sets available for examining substance abuse treatment. Aside from over-representing Blacks and Hispanics, it is comparatively similar to prior large-scale treatment follow-up studies (Gerstein et al., 1997; Gerstein & Johnson, 2000).

Organizational-level data were obtained via interviews with program administrators, which were conducted twice during a 12-month time period. Client-level and service data were collected at treatment intake, treatment exit, and 12 months post-discharge. The entire NTIES sample includes 4,526

clients who completed all intake, discharge, and posttreatment follow-up interviews. For the current study, clients from correctional facilities (N = 1,384) and clients with missing data on items related to sexuality (N = 48) were excluded to comprise a sample of 3,094 clients from 59 service delivery units.[2]

Three data analytic steps were employed in this study. First, the sample was divided into two groups—SM and non-SM. The groups were then compared, using t-tests and chi-square tests, to determine whether they differed in terms of pretreatment and posttreatment substance use, change in substance use after treatment, and levels of health and social service use. Missing data were dropped from these analyses. In the second step, missing data were imputed. Finally, a generalized linear mixed model was used to examine the relationship between social and health service receipt and posttreatment substance use. All variables and data analytic steps are described in detail in the next section.

Measures

Sexuality Grouping Variable

Self-reported behavioral measures were used to group respondents into one of two categories—sexual minority or non-sexual minority. Respondents were asked 2 questions about same-gender sexual behavior at treatment entry and at 12 months post-discharge for a total of 4 questions. Any person who responded affirmatively to any of the four questions was included in the sexual minority group. Those who had missing data on all questions were excluded from the sample (N = 48). The sexual minority category includes women who have sex with women (WSW) *and* men who have sex with men (MSM). The SM category also includes individuals who have sex with men and women. The authors note that sexuality is not a monolithic concept and that behavior is but one component of sexuality. A more satisfactory measure of sexuality would include dimensions such as attraction, identity, and romantic feelings. As previously noted, the political contentiousness of sexuality has limited questions in prior national surveys.[3] Language and identity labels are also controversial in the LGBT community. Thus, the authors wish to make clear that *sexual minority*, as the label is used in this study, refers to individuals whose history of same-gender sexual partners place them in a statistical minority group. Behaviorally defined groups may differ somewhat from identity-based groups. The relatively small sample size of SMs and the limited questions about sexuality in NTIES prevented the authors from separately analyzing the subgroup that reported bisexual behavior. Limitations aside, NTIES provides a valuable opportunity to study the impact of sexuality on substance abuse treatment. Since NTIES data was released in 1997, there have not been any prospective, national probability samples of

substance abuse treatment that include data on sexual behavior. Moreover, the researchers were unable to find *any* published studies that investigate the link between sexuality and substance abuse treatment in a national probability sample. In total, the analytic sample included 234 sexual minorities and 2,860 non-sexual minorities. Non-SM was the reference category in the linear mixed model. The procedure in SAS for mixed linear modeling provided unbiased estimates by adjusting the degrees of freedom for unbalanced data.

Dependent Variable

Posttreatment substance use was the dependent variable in the generalized linear mixed model. At 12 months post-discharge, respondents were asked to report the number of days out of the past 30 days in which they used 5 of the most commonly used licit and illicit substances: alcohol, marijuana, crack, cocaine powder, and heroin. The overall measure of post-treatment substance use was the sum of the total number of days respondents used any of these five drugs. Since approximately half of the NTIES respondents indicated that they had used more than one drug in the past 30 days, the combined measure was developed to reflect the high levels of polydrug use found in this sample (Marsh et al., 2004). The minimum possible post-treatment substance use score was 0 (those who did not report using any substances in the past 30 days), and the maximum possible score was 150 (respondents who used *each* of the 5 drugs every day for the past 30 days).

Social and Health Service Variables

This analysis examined levels of service utilization and the impact of services on post-treatment substance use across the following six service categories:

1. access (transportation and child care),
2. concrete services (school, job skills, housing, assistance collecting benefits, assistance collecting alimony/child support, and English-as-a-second-language training),
3. family and life skills counseling (parenting training, domestic violence counseling, family services, assertiveness training, life skills training, family planning, and non-medical pregnancy services),
4. health services (medical services, HIV/AIDS prevention services, and medical pregnancy services),
5. mental health services (mental health counseling/treatment), and
6. substance abuse counseling services (drug/alcohol counseling, 12-step meetings, and prescriptions for drug/alcohol problems).

At discharge, respondents were asked to report whether they had received any of the services included in each of these six service categories. All services were coded dichotomously. The score for a given category was the sum of the total number of services (within that category) respondents received during treatment.[4]

Control Variables

Control variables were measured at the organizational and individual level. Data for organizational-level variables were collected via administrative interviews and included accreditation, service modality, ownership, on-site services, and frequency of counseling offered.

Individual-level control variables included the following demographic characteristics: race (non-Hispanic Black, Hispanic, and non-Hispanic non-Black), age (years from birth), education (years in school), and parenting status (whether or not one is currently parenting a minor). Individual health and psychosocial control variables included health status (whether health limits labor force participation), current pregnancy, history of victimization via domestic violence, HIV status, and mental health status (number of overnight psychiatric visits in the past year). Payment source—private insurance, public insurance, and no insurance—was also included. Finally, previous alcohol or drug treatment, pretreatment substance use, and treatment duration were controlled. Similar to the dependent variable, pretreatment substance use was constructed as a polydrug use variable; however, respondents reported the number of days they used the 5 most commonly used substances in the past 30 days *before* entering treatment. Treatment duration measured the number of weeks that elapsed between the first and last day of treatment.

STATISTICAL ANALYSIS

Missing Data Imputation

The complete NTIES data set included variables with missing data for some observations. Table 1lists the number of missing observations for each variable for SMs and non-SMs. To avoid the pitfalls of deleting missing cases—including biased estimates if missing cases are systematically different from complete cases and larger standard errors due to a smaller sample size, a multiple imputation was used to fill in values for these missing data (Rubin, 1987). Multiple imputation models uncertainty about the correct value to fill in for missing observations and avoids the pitfalls of single imputation, including the tendency to overestimate sample size and to underestimate standard errors (Marsh et al., 2004). The Markov chain Monte Carlo method was used to replace missing values with five plausible values, assuming the

data were missing at random (Little & Rubin, 1987; Schafer, 1997). Data for individual and organizational variables were imputed separately then merged into a single data set. Descriptive comparisons on individual-level variables were computed before data was imputed. Cases with missing data on individual variables were dropped in these analyses. For organizational variables, ownership and accreditation, one of the five imputed data files was used to make simple comparisons between SMs and non-SMs. Each imputed data set was subject to separate linear mixed modeling, then the estimates obtained from these analyses and their associated standard errors were combined. The final estimates and standard errors accounted for the missing rate; therefore, the higher the missing rate, the larger the standard error for a given variable (Rubin, 1987).

SM/Non-SM Group Comparisons

Comparisons of individual characteristics, organizational variables, service utilization, and outcome variables between SMs and non-SMs were made using *t*-tests for continuous variables and chi-square tests for categorical variables. To account for unequal sample sizes and the possibility of unequal variances between the samples, the Satterthwaite approximation of the standard errors was used for *t*-tests. This approximation uses the weighted average of the sample standard errors, rather than the arithmetic mean of the groups' standard errors. A Bonferroni-type correction (α/N, where N = the number of tests conducted) was used to establish the significance level for these tests. This conservative method for determining statistical significance helps to control Type I error when making multiple comparisons (Benjamini & Hochberg, 1995). A total of 27 comparisons were made in this analysis, so a significance level of 0.002 (.05/27) was used.

Linear Mixed Model

In order to account for the nested nature of the data and shared variance within treatment programs, this analysis used random intercept models—a subtype of linear mixed models. The outcome variable was posttreatment substance use, which was a measure of the number of days a respondent reported using five commonly used substances. Posttreatment substance use was measured as count data, so a Poisson link function was used in the model.

The model examined the impact of each of the six social and health service categories on posttreatment substance use. Sexuality was also analyzed as a main effect and as an interaction effect. A significant main effect for sexuality would mean that, when all individual, organizational, and social and

service variables are held constant, SMs and non-SMs have different posttreatment outcomes. A significant interaction term between sexuality and any of the service variables would suggest that the relationship between a given service variable and posttreatment substance use is different, depending upon whether or not one is a SM. The model also included all organizational and individual-level control variables described previously. In light of studies documenting gender differences in substance use among sexual minorities (Bux, 1996; Burgard, 2005; Cochran & Cauce, 2006; Cochran et al., 2000; Marshal et al., 2008; Senreich, 2009; Ziyadeh et al., 2007), a separate model was also run with an interaction term for sexuality and gender. Interaction effects were not centered because all interactions were between continuous and categorical variables.

In a previous paper that used the same service variables to compare treatment by gender (Marsh et al., 2004), the authors evaluated multicollinearity for all variables, giving special attention to the fact that individual-level service variables may be correlated with organizational-level variables. Because services must be available at the level of the organization in order to be provided to individuals receiving services within that organization, we ran a model with and without the on-site services variable (this variable is the measurement of the number of services provided at a given site). The relationship between service receipt at the individual level and individual outcome was the same with and without the organizational-level variable, indicating that multicollinearity is not a problem in the model.

RESULTS

Differences in Individual and Organizational Attributes by Sexuality Category

Sexual minorities comprised approximately 7.6% of the entire sample ($N = 234$) (see Table 1). This percentage is within the expected range of 2% to 11%,[5] the percentage of people reporting same-gender sexual partners in the National Health and Social Life Survey (Laumann et al., 2000). SMs were largely comparable to non-SMs on individual-level variables with a few exceptions. Table 1 shows how SMs and non-SMs compare on individual, organizational, and service characteristics. Sexual minorities were more likely to be women (63.25% versus 33.18%, $p < .001$), African-American (68.80% versus 57.03%, $p = 0.002$), HIV positive (11.97% versus 2.87%, $p < .001$), and were more likely to report having been beaten by an intimate partner (36.64% versus 21.27%, $p < .001$). There were also minor differences between the two groups on organizational-level variables. SMs were overrepresented in short-term inpatient (26.50% versus 25.31%) and long-term inpatient programs

TABLE 1 Client, Organizational, and Service Characteristics by Sexuality Category

Variable	SM	Missing	Non-SM	Missing	*p*-value
Sexual minority (48 missing)	234		2,860		
Individual					
Gender—% women	63.25%	0	33.18%	0	<.001
Race/ethnicity					
African-American	68.80%		57.03%		
Latino	10.26%		15.87%		
White	20.94%	0	27.10%	0	0.002
Age	31.41	0	32.35	0	0.029
Education	11.63	0	11.23	0	0.005
Health	32.62%	1	32.98%	1	0.909
HIV+	11.97%	0	2.87%	0	<.001
Pregnancy	5.58%	1	2.83%	0	0.019
Prior treatment	1.86	0	1.55	0	0.018
Ever beaten	36.64%	2	21.27%	204	<.001
Pretreatment substance use	15.74	1	15.66	30	0.950
Lived with minor child	32.48%	0	38.95%	0	0.050
Foreign-born	3.42	0	3.95	1	0.686
Insurance					
Private/self/family	19.40%		26.30%		0.021
Public insurance	73.71%		67.97%		0.071
Uninsured	8.19%	2	7.91%	103	0.878
Duration	13.91	0	15.95	1	0.034
Organizational					
Modality (0)					
methadone	5.13%		13.85%		
outpatient	29.06%		38.95%		
short-term inpatient	26.50%		25.31%		
long-term inpatient	39.32%	0	21.82%	0	<.001
Accreditation	20.94%	n/a	20.21%	n/a	0.789
Private ownership	88.46%	n/a	79.27%	n/a	0.001
On-site services	2.04	30	2.19	263	0.097
Frequency	2.11	30	2.11	263	0.967
Social and health services					
Access Services	0.50	0	0.45	2	0.127
Substance Abuse Services	1.57	0	1.32	3	<.001
Family Counseling	1.54	0	1.24	3	0.004
Health Services	1.50	0	1.32	5	<.001
Mental Health Counseling	0.27	0	0.25	1	0.613
Concrete Services	0.81	2	0.64	5	0.007
Outcome					
Posttreatment drug use	7.65	17	8.49	156	0.360
Drug use change	8.21	18	7.19	184	0.460

Notes. Mean values are given for continuous variables, proportions for categorical variables. The missing data column represents the number of missing observations for each variable according to sexuality. Missing data values are not applicable for ownership and accreditation, since tests were conducted after missing data was imputed.

(39.32% versus 21.89%) and underrepresented in methadone-only (5.13% versus 13.85%) and outpatient treatment programs (29.06% versus 38.95%, $p < .001$). SMs were also overrepresented in private versus public facilities (88.46% versus 79.27%, $p = 0.001$).

SM/Non-SM Comparison of Pretreatment and Posttreatment Substance Use

Though SMs entered treatment with a higher mean substance use level (15.74 versus 15.66), this difference was not significant ($p = 0.950$). Posttreatment substance use was also similar between the two groups (7.65 for SM versus 8.49 for non-SM, $p = 0.360$). SMs had a greater mean reduction in substance use than non-SMs (8.21 versus 7.19), but the difference was not statistically significant ($p = 0.460$). Thus, SMs and non-SMs in this study had similar levels of substance use *and* demonstrated similar treatment outcomes.

SM/Non-SM Comparison of Service Utilization Rates

In each service category, SMs reported using a higher mean number of services than their non-SM counterparts. For two services—substance abuse counseling services (1.57 versus 1.32, $p < .001$) and health services (1.50 versus 1.32, $p < 0.001$)—this difference was statistically significant.

Relationship Between Social and Health Service Receipt and Posttreatment Outcomes for SMs and Non-SMs

There were significant interactions for SMs by access services ($\beta = 0.191$, $p = 0.002$) and SMs by mental health counseling ($\beta = -0.179$, $p = 0.018$) (see Table 2). Interaction effects indicate that the relationship between access service receipt and treatment outcome, as well as mental health service receipt and treatment outcome, is different for SMs versus non-SMs. Relative to non-SMs, access services were associated with poorer treatment outcomes (positive coefficient on the interaction term), and mental health services were associated with better treatment outcomes (negative coefficient on the interaction term) for SMs. There were also main effects for several of the social and health service variables. Receipt of and concrete services ($\beta = -0.159$, $p < .001$), family counseling ($\beta = -0.073$, $p < .001$), and health services ($\beta = -0.044$, $p = 0.003$) were associated with lower levels of posttreatment substance use. Mental health counseling was associated with higher levels of posttreatment substance use ($\beta = 0.075$, $p = .004$) for non-SMs.

To test model fit, we compared maximum likelihoods between the full model and a trimmed model (excluding the SM main effect and all interaction terms) for each of the five imputations. The trimmed model had seven fewer parameters. The X^2 test based on 2 times the difference in the maximum likelihoods (*d.f.* = 7) was significant ($p < .001$) for each imputation. This suggests that the model with the SM effects provides a significantly better fit to the data.

TABLE 2 Generalized Linear Mixed Model (Poisson Distribution)

Variable	Estimate	S.E.	*p*-value
Intercept	2.453	0.329	.001
Gender	−0.130	0.021	<.001
SM	0.081	0.073	0.275
African-American	0.201	0.021	<.001
Latino	0.166	0.029	<.001
Age	−0.013	0.001	<.001
Education	−0.059	0.004	<.001
Health	0.011	0.016	0.473
Prior treatment	0.039	0.004	<.001
Pretreatment substance use	0.013	<.001	<.001
Ever beaten	0.091	0.023	0.003
Private/self/family	0.153	0.065	0.068
HIV+	−0.232	0.045	<.001
Pregnancy	0.338	0.049	<.001
Lived with minor child	0.005	0.015	0.723
Public insurance	0.322	0.069	0.007
Uninsured	0.492	0.071	0.001
Duration	−0.011	0.001	<.001
Methadone	0.817	0.247	0.003
Short-term inpatient	0.105	0.280	0.712
Long-term inpatient	0.277	0.192	0.167
Accreditation	0.109	0.227	0.640
Ownership	−0.230	0.180	0.213
On-site services	−0.004	0.125	0.984
Frequency	−0.014	0.105	0.910
Access services	−0.005	0.018	0.785
Substance abuse services	−0.003	0.012	0.798
Concrete services	−0.159	0.012	<.001
Family counseling	−0.073	0.007	<.001
Health services	−0.044	0.013	0.003
Mental health counseling	0.075	0.021	0.004
SM× access services	0.191	0.053	0.002
SM× substance abuse services	−0.065	0.042	0.132
SM× concrete services	−0.078	0.038	0.053
SM× family counseling	0.007	0.024	0.773
SM× health services	0.072	0.040	0.090
SM× mental health counseling	−0.179	0.069	0.018
SM× gender	−0.130	0.062	0.053

There was no main effect for sexual minority status ($\beta = 0.081$, $p = 0.275$). Thus, when all other individual, organizational, and social and health service variables were controlled, sexual minorities and non-sexual minorities derived similar benefits from treatment. Consistent with prior evidence that being a sexual minority has a different valence depending upon whether one is a male or female, the model with an interaction term for gender and sexual minority status was marginally significant ($p = .053$). The study was limited by a relatively small sample of SMs, thus decreasing our power to detect gender differences within the SM group even if they do exist.

Nonetheless, we are 94.7% confident that SM women had better treatment outcomes than their SM male counterparts.

DISCUSSION

Overall, this study sheds light on important aspects of substance abuse treatment for SMs—a surprisingly understudied topic, considering the relative abundance of research on population rates of drug and alcohol use among SMs *outside* of formal treatment. In contrast to the body of literature citing higher rates of substance use among SMs in the population at large, this study found levels of pretreatment substance abuse to be comparable for SMs and their non-SM counterparts. What this suggests is that SMs, in general, are more likely to use alcohol and/or drugs—and may be somewhat more likely to develop substance use disorders—but this does not necessarily translate into more severe substance abuse problems among that subset of SMs who meet diagnostic criteria for substance abuse or dependence disorders and enter treatment. Even *if* the path to addiction is qualitatively distinct for SMs, sexual minorities and their non-SM peers in this study were indistinguishable in terms of addiction severity.

The finding that SMs reported using a greater number of services within each of the service categories is consistent with prior studies cited earlier. Similar to Cochran and Cauce (2006), who documented higher rates of health service utilization and mental health service use among SMs, this study documented significantly higher rates of health service use among the SM subgroup. The fact that SMs and non-SMs reported similar levels of mental health counseling in this study, while unexpected, may reflect differences in service category operationalization and measurement across studies. Because this study focused on ancillary health and social services provided as part of alcohol and drug treatment, respondents were asked to report *only* services they received via their substance abuse treatment provider. If respondents received mental health counseling from an outside treatment provider or received services prior to entering substance abuse treatment, these would not be captured by the service categories in this study. Moreover, this study had a separate service construct for family counseling, a category in which SMs also reported significantly higher levels of service use than non-SMs. The family counseling category included a question about the receipt of domestic abuse counseling, a service that may have been reported under the rubric of mental health counseling in prior studies. However, the findings in this analysis are consistent with the 2009 study by Grella and colleagues, which found no differences in use of mental health services for SMs with comorbid mental health and substance abuse disorders. In general, the higher mean levels of service use for SMs across all six service categories indicate that SMs who enter substance abuse treatment are accessing a broad

array of ancillary services. Higher mean levels of comprehensive service use may, in fact, explain why SMs derived similar benefits from treatment. That is, greater levels of service receipt may have buffered the impact of vulnerabilities—such as pre-existing social/cultural stressors, or even vulnerabilities related to stigma experienced *during* treatment—thereby equalizing treatment outcomes. However, no large-scale studies to date have systematically analyzed the relationship between the quality and quantity of ancillary services and treatment outcomes for sexual minorities in substance abuse treatment. It remains to be seen whether treatment quality and/or treatment quantity (and perhaps specialized treatment for sexual minorities) is driving the similar group outcomes observed in this study.

The linear model supports the contention that some services have a different impact on posttreatment outcomes for SMs relative to their non-SM counterparts. While family services, health services, and concrete services were all associated with reduced posttreatment substance abuse for the entire sample, access services seemed to have no impact on non-SMs. Given the nonsignificant main effect, it is difficult to interpret the significant interaction for SM by access. At the least, it suggests that SMs who receive child care and transportation services as part of their substance abuse treatment fare worse outcomes than their non-SM peers. It is unlikely that access services, which are meant to help those with treatment barriers related to transportation and child care attend treatment regularly, would have a harmful impact on treatment outcomes. It is more likely that the difference observed in this analysis is due to an unmeasured variable, such as social support (from family and the community). In addition, the near-significant interaction term for SM by concrete services ($p = .053$) suggests that job skills training, assistance with collecting benefits, housing assistance, and related services may have an even greater benefit for SMs than non-SMs. The mechanism through which these differences manifest is unclear, but the findings further highlight the need to expand research on SMs in substance abuse treatment. In particular, while SMs have a long history of representation in the mental health literature (homosexuality was a diagnosable disorder until *DSM-III*), few studies have examined the impact of family, job skills and economic factors, and parenting on the lives of SMs. Moreover, lower-income SMs—for example, those who receive publicly funded substance abuse treatment services—are rarely subjects in social scientific research. While this study provides few definitive answers about SMs in substance abuse treatment, findings documented here offer several fruitful avenues of inquiry for future research.

Perhaps one of the most notable findings in this study was that mental health services had an opposite impact on treatment outcomes for SMs versus non-SMs. SMs who received mental health services fared better than SMs who did not receive services, while non-SMs who received services fared *worse* than non-SMs who did not receive services. The data in this study do not allow a nuanced causal analysis of the relationship between mental

health services and treatment outcomes. One may hypothesize, however, that SMs who receive mental health services are qualitatively different from non-SMs who receive the same services. For instance, the study done by Grella and colleagues (2009) found that SMs were more likely to have used mental health services in the past than their non-minority counterparts—even if they did not have a diagnosable mental health disorder. Population-based surveys have also documented higher rates of mental health service use among gay men and lesbians relative to heterosexuals, a difference that has sometimes been attributed to gay men's and lesbians' greater propensity to seek services for stress linked to sexual orientation (Cochran, 2001). On the other hand, a few studies have also cited higher rates of affective and anxiety disorders in LGBT populations (Cochran & Mays, 2000; Gilman et al., 2001; Senreich, 2009). The relationship between mental health service receipt and treatment outcomes observed in this study could be explained by numerous factors—quality and duration of mental health treatment prior to and during substance abuse treatment, type of *DSM* diagnosis and illness severity at the time of substance abuse treatment, and the relationship between mental health morbidity and sexuality. In a study conducted by Cochran (2001), differences in mental health morbidity between LGBT and heterosexual clients decreased when history of sexual orientation–related discrimination was controlled. It remains to be determined if and how LGBT substance abuse clients who receive mental health services differ from heterosexual clients. The only way to understand the relationship between mental health status, mental health treatment, and substance abuse treatment outcomes is to undertake more and more rigorous empirical studies of substance abuse treatment within the sexual minority population and across sexuality categories.

Finally, the relatively small analytic sample of SMs in this study, in addition to the number of covariates used to measure the impact of comprehensive services, limited the power of this study to detect gender differences within the SM subgroup. Nonetheless, the gender by SM interaction term was marginally significant. Given a relatively sizable body of research documenting gender differences across the LGBT population (Bux, 1996; Burgard, 2005; Cochran & Cauce, 2006; Cochran et al., 2000; Marshal et al., 2008; Ziyadeh et al., 2007), the authors decided to present the model with the interaction term. In this case, sexual minority women achieved better treatment outcomes than their male peers when other demographic and service variables were held constant.

The analytic power of many studies on SMs is limited by the fact that nonheterosexual sexuality is relatively uncommon in the population. While oversampling SMs in future studies would surely decrease any problems related to poor statistical power, the fact that sexuality is not clearly circumscribed by physical features makes this a tricky endeavor. Researchers and survey designers interested in capturing a large representative sample

of SMs will have to employ creative strategies in creating and administering questionnaires. Moreover, the continued proliferation of diverse sexual identities within the sexual minority population will likely trouble current notions of "representativeness" in this population. Nevertheless, continued social discrimination against sexual minorities, as a group (despite marked intragroup differences), render broad, group-based comparisons useful. It is through such comparisons that systematic differences and inequities can be identified and redressed.

Limitations

It is important to note that the cross-group comparisons between SMs and non-SMs were done using *t*-tests and chi-square tests. Therefore, none of the individual or organizational-level characteristics were held constant in these tests. Since the SM group overrepresented women, the higher rates of service utilization found among this group may be, in part, attributable to gender. In fact, a prior study utilizing the very same comprehensive service constructs found that women were more likely than men to receive comprehensive services (Marsh et al., 2004). Nonetheless, it is notable that SMs in publicly funded substance abuse treatment programs seem to be accessing a comparable or even greater number of social and health services compared to their non-SM peers. Second, the data in this study do not allow a nuanced analysis of the relationship between social and health service implementation and treatment outcomes. Research on how particular social and health services are delivered—how frequently, by whom, according to what standards—is needed to better elucidate the relationship between service receipt and treatment outcomes. Third, the NTIES data set has limitations due to sampling strategy (Andrews, Cao, Marsh, & Shin, 2011; Marsh et al., 2004) and question design. For example, there were no questions about sexual orientation and only a few questions about sexual behavior. In this study, people who reported no sexual partners were, by default, included in the non-SM group, while people with same-gender sexual partners who do not identify as LGBT were included in the SM group. Though there is no reason to expect that self-reported sexual orientation would allow researchers to delineate sexuality groups that are more accurate or "true," the use of a single marker for sexuality is limiting. It prevents researchers from exploring the relationship between sexual behavior versus sexual identity on substance use severity and treatment outcome.[6] Moreover, any distinctions that may exist between these two aspects of sexuality are collapsed into a single construct (Gilman et al., 2001). This is a common problem in survey research on sexual minorities, in part because no standard definition of sexual orientation exists (Hughes & Eliason, 2002; Laumann et al., 2000). Multiple questions about attraction, identity, and behavior should be included in future studies (Dean

et al., 2000). However, results in this study can be compared to other studies that use behavioral measures of sexuality. An additional limitation is the relatively small number of sexual minorities in the NTIES data set. This issue is addressed in the previous discussion. While sexual minorities represent a small proportion of the population, survey research could be improved by oversampling this group. Future studies with larger sample sizes are needed to determine how sexuality and specific patterns of drug and alcohol use matter for substance abuse treatment outcomes. Finally, NTIES respondents may have had better access to social and health services than the average substance abuse treatment client. It is therefore problematic to presume that most substance abuse treatment clients can have special needs met through ancillary services linked to substance abuse treatment programs. This limits the extent to which clinicians can apply the findings of this study to individual clients within the context of their current treatment milieu. Despite these limitations, this study is the first to analyze the impact of social and health service use on substance abuse treatment outcomes among sexual minorities in a national probability sample. As such, it makes a valuable contribution to substance abuse treatment literature.

CONCLUSIONS

Large-scale analyses, such as the one presented here, are removed from the day-to-day happenings at individual substance abuse treatment centers, but findings nonetheless have important implications for researchers *and* clinicians. Most importantly, the results of this study give reason to be more optimistic about treatment experiences and outcomes for SMs in traditional, non-specialized treatment centers. In contrast to relatively high population rates of substance use in the SM community, this study found comparable levels of pretreatment and post-treatment substance abuse among SMs who actually enter treatment. The results also indicate that SMs access social and health services at similar and sometimes even greater levels than their non-SM counterparts. The fact that SMs in this study garnered similar benefits from treatment was surprising, given prior research documenting poor treatment experiences among SMs and less-than-ideal provider capacities, but the higher levels of service receipt by SMs found here may have made up for inequities in standard treatment services. Whether SMs simply entered treatment with greater needs—which were ostensibly met via social and health services—or whether higher levels of service receipt simply make up for a lack of specialized services is unclear. Unraveling the mechanisms through which social and health services operate for SMs will require more, and more rigorous, research. This study points to a few fruitful avenues for future research. More quantitative studies with probability samples and detailed questions about sexuality and treatment experiences, as well as

in-depth qualitative studies, will allow researchers to better explore the way issues of sexuality interface with other aspects of identity (including race, class, and family status) as clients and their treatment providers navigate the path to recovery. Questions about how services are delivered to SMs versus non-SMs, and respective levels of service needs among these groups, are particularly important. For now, the research suggests that mental health treatment is an effective way to reduce posttreatment substance use for SMs. Providers should continue to ensure that SMs are accessing these services, as well as other social and health services, when needed. Continued improvement in substance abuse treatment for sexual minorities will require researchers to bridge the gap between research, treatment centers, and the broad sociocultural context of individual clients' lives.

NOTES

1. A 2007 study by Cochran, Peavy, and Cauce found relatively more positive attitudes among treatment counselors, but this may have been a function of recruitment strategy, as all participants responded to advertisements that described the research as a study of LGBT issues in treatment.

2. Clients from correctional facilities were excluded because incarceration impacts clients' need for social and health services in a systematic way. For example, incarcerated clients are very unlikely to need child care and transportation.

3. Many of the surveys from the 1990s that collected data on mental health among LGBT populations focused on adolescents and teenagers (Cochran, 2001).

4. Some service categories include services only applicable to those pregnant or parenting or only to those for whom English is a second language. Thus, control variables for pregnancy, presence of minor children in the home, and country of birth are included in the linear model.

5. The percent of people reporting same-gender sexual partners in the National Health and Social Life Survey (NHSLS) varied according to demographic factors, such as gender, race, geographic location, income, religion, and education. The NHSLS is the only national probability survey of adult sexual behavior conducted in the United States. The NHSLS data were collected in 1992 (Laumann et al., 2000).

6. Note that those who are less comfortable with same-gender sexual behavior may also be more likely to turn to alcohol and drugs to cope with stress. Thus we might expect to find differences in addiction severity between those with same-gender partners, depending upon whether or not they identify as LGBT. There are also well-documented differences between rates of substance use between those who identify as gay or lesbian versus bisexual or transgender (Marshal et al., 2008; Ziyadeh et al., 2007).

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