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Laurie A. Drabble
San Jose State University, laurie.drabble@sjsu.edu

L T. Midanik
Alcohol Research Group

K Trocki
Alcohol Research Group

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Reports of Alcohol Consumption and Alcohol-Related Problems among Homosexual, Bisexual and Heterosexual Respondents: Results from the 2000 National Alcohol Survey*

LAURIE DRABBLE, PH.D.,[†] LORRAINE T. MIDANIK, PH.D.,[†] AND KAREN TROCKI, PH.D.

Alcohol Research Group, Public Health Institute, Berkeley, California

ABSTRACT. Objective: Few population-based studies have explored differences in alcohol consumption by sexual orientation. This study examined the prevalence of abstinence, drinking, heavier drinking, alcohol-related problems, alcohol dependence and help-seeking among homosexual and bisexual women and men compared with heterosexuals. **Method:** Data are from the 2000 National Alcohol Survey, a national population-based survey of adults ($N = 7,612$), a Random Digit Dialing telephone survey of all 50 states of the United States and Washington, DC. Four categories of sexual orientation were created using questions on both sexual orientation self-identification and behavior: homosexual identified, bisexual identified, heterosexual identified with same sex partners and exclusively heterosexual. Five alcohol measures (past year) were used in the analyses: (1) mean number of drinks, (2) days consuming five or more drinks on a single occasion, (3) drunken-

ness, (4) negative social consequences (2 or more) and (5) Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition, alcohol dependence. A lifetime measure of help-seeking for an alcohol problem was also analyzed. **Results:** Few significant differences were found among men by sexual orientation. By contrast, both lesbians and bisexual women had lower abstinence rates and significantly greater odds of reporting alcohol-related social consequences, alcohol dependence and past help-seeking for an alcohol problem. **Conclusions:** These findings suggest that alcohol dependence and alcohol-related consequences differ by sexual orientation, particularly among women. These findings also emphasize the need for the inclusion of sexual-orientation items in population-based surveys so that prevalence rates within these subgroups can be effectively monitored. (*J. Stud. Alcohol* 66: 111-120, 2005)

IN SPITE OF PROGRESS in research on alcohol use and alcohol-related problems among lesbians, gay men and bisexuals, few national population-based studies have included questions related to sexual orientation (Boehmer, 2002; Sell and Becker, 2001; Sell and Petruccio, 1996). Many studies that examine alcohol consumption and sexual orientation have used convenience or other nonprobability sampling and, consequently, are limited in generalizability to the larger population (Hughes and Eliason, 2002; Sell and Petruccio, 1996). For example, early studies on drinking in the lesbian and gay community, frequently based on convenience samples such as patrons of gay bars, found rates of heavy and problem drinking of approximately 30%

(Fifield et al., 1977; Lewis et al., 1982; Saghir et al., 1970). The high rates of heavy alcohol use found in these studies are in part due to sampling bias (Bux, 1996; Paul et al., 1991).

In the last two decades, studies with stronger non-probability sampling designs have contributed important, though occasionally conflicting, insights into drinking patterns among lesbians and gay men. Findings from several studies using less biased samples recruited from a broader cross-section of lesbian and gay community sources found less dramatic indicators of problem drinking. However, these studies suggested that lesbians and gay men have lower rates of abstinence from alcohol use, higher rates of reported alcohol-related problems and less decrease in alcohol use with age compared with heterosexuals (Bergmark, 1999; Bradford et al., 1994; McKirnan and Peterson, 1989a; Skinner, 1994; Skinner and Otis, 1996). Several lesbian-specific health and mental-health studies also found that lesbians were less likely to be alcohol abstainers and more likely to be heavier drinkers than heterosexual women (Aaron et al., 2001; Gruskin et al., 2001; Roberts and Sorensen, 1999). By contrast, other studies found that lesbians were less likely to consume alcohol but more likely to report being in recovery or having been in treatment for

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[†]Correspondence may be sent to Laurie Drabble, P.O. Box 14085, Berkeley, CA 94712-5085, or via email to: ldrabble@sjsu.edu. Dr. Drabble is also associated with the College of Social Work, San Jose State University, San Jose, CA. Lorraine T. Midanik is with the School of Social Welfare, University of California at Berkeley, Berkeley, CA.

alcohol-related problems (Hughes, 2003; Hughes et al., 2000).

The few population-based studies that have been conducted in recent years contribute to an emerging understanding of alcohol use and alcohol-related problems among gay, lesbian and bisexual populations. Contrary to earlier studies, few differences in alcohol consumption or reports of Diagnostic and Statistical Manual of Mental Disorders (DSM) alcohol-dependence symptoms were found between men with same sex partners compared with men with opposite-sex partners (Cochran et al., 2000; Cochran and Mays, 2000; Gilman et al., 2001; Sandfort et al., 2001; Stall et al., 2001; Stall and Wiley, 1988), although men with same sex partners appear to be more likely to use drugs (Stall et al., 2001; Stall and Wiley, 1988) and to have greater odds of DSM drug abuse or drug dependence than men with opposite sex sexual partners (Gilman et al., 2001). There is more consistent evidence that lesbians and bisexual women are less likely to abstain from alcohol and more likely to report heavier drinking (Cochran et al., 2000; Diamant et al., 2000; Scheer et al., 2003; Valanis et al., 2000) as well as DSM alcohol-dependence symptoms (Cochran and Mays, 2000). For example, studies using data from the 1996 National Household Survey of Drug Abuse found lower rates of alcohol abstention and higher rates of frequent drinking, heavier drinking, and alcohol and drug dependency among homosexually active women compared with heterosexually active women but not among homosexually active men compared with heterosexually active men, while controlling for age and other demographic characteristics (Cochran et al., 2000; Cochran and Mays, 2000). Similarly, results of the National Comorbidity Study, a population-based survey conducted between 1990 and 1992, found elevated but not statistically significant different rates of past-year and lifetime risk for DSM-III-R alcohol abuse and alcohol dependence among women who had sex with other women in the past 5 years compared with women who exclusively had sex with men in the prior 5 years, controlling for age and other demographic variables (Gilman et al., 2001). It also appears that lesbians and bisexual women may also be more likely to identify as recovering alcoholics (Bloomfield, 1993) or to have received treatment for alcohol-related problems (Cochran et al., 2000) than heterosexual women.

Although past studies that used probability sampling provide a valuable contribution to an emerging literature on sexual orientation, alcohol consumption and alcohol problems, they have limitations that warrant discussion. Several of the studies use probability samples in specific urban areas (Bloomfield, 1993; Diamant et al., 2000; Scheer et al., 2003; Stall et al., 2001). Such regional studies, which exclude rural areas, may have limited generalizability to national populations. Studies focused on health risks and sexual orientation among young women (Scheer et al., 2003) or among older women (Valanis et al., 2000) also have lim-

ited generalizability. Several national studies did not include sexual orientation identity questions and used behavioral measures, such as sex of partners in a given time frame, to define sexual orientation (Cochran et al., 2000; Cochran and Mays, 2000; Gilman et al., 2001; Sandfort et al., 2001). Consequently, these studies may fail to identify risks that may be associated with sexual-orientation identity. Sexual orientation is a complex construct that may be measured in relation to identity, behavior and attraction; however, factors associated with identity (such as stress, discrimination, differences in social roles and social contexts of drinking) may be particularly salient to risks for heavier drinking and alcohol-related problems (Hughes and Eliason, 2002).

Although some population-based studies, with both identity and behavior questions, have created combined groupings of respondents that were not exclusively heterosexual in relation to both identity and behavior (Blake et al., 2001; Stall et al., 2001), it may be inaccurate to assume that individuals who identify as bisexual or engage in bisexual behavior would be comparable to those with homosexual identity when examining alcohol consumption and alcohol-related problems (Hughes and Eliason, 2002). There is some evidence that mental-health problems may be more prevalent among bisexual women and men compared with both heterosexuals and homosexuals (Jorm et al., 2002). Only a few population-based surveys on women's health or mental health disaggregated lesbians and bisexuals in analyses of health risk behaviors. In general, these studies indicate that both lesbians and bisexuals may be more likely to consume alcohol or drink more heavily than heterosexual women (Diamant et al., 2000; Scheer et al., 2003; Valanis et al., 2000), and in one study this trend was particularly strong among young bisexual women (Scheer et al., 2003). However, it is notable that measures of alcohol consumption were limited in these studies and that measures of alcohol-related problems were not included.

Furthermore, population-based studies do not examine risks for heavier drinking and alcohol-related problems among individuals who identify as heterosexual and have same sex partners. The social construction of sexual orientation as categorical presumes that various aspects of sexual orientation, including identity, behavior and attraction, are congruent (Rothblum, 2000; Sell, 1997). In reality, sexual behavior and sexual identity are not always congruent (Diamant et al., 1999; Laumann et al., 1994; Scheer et al., 2003), and many individuals with same sex partners do not identify as homosexual or bisexual (Laumann et al., 1994). Respondents who do not identify with commonly used terms to classify sexual orientation, but whose same sex relationships are an important part of their identity and social world, may share similar characteristics in relation to drinking patterns and risks as self-identified lesbians, gay men and bisexuals. For example, there is evidence that women who

have both male and female partners, regardless of heterosexual or bisexual identity, may have similar high risks for alcohol and drug use compared with heterosexual women who have male partners only (Scheer et al., 2003). One of the few studies to date that examined the relationship between different facets of sexual orientation (including identity, behavior and attraction) and alcohol and drug use among adolescents in high school found that students who were consistently heterosexual had the lowest rates of use, students with less consistent homosexual preferences had somewhat elevated use, and students who consistently self-identified as gay or lesbian had the highest rates of use (Orenstein, 2001).

This national population-based study examines alcohol consumption and a wide range of alcohol-related problems among lesbian, gay and bisexual populations. In addition, this study disaggregates populations that are often combined, such as self-identified lesbians or gay men, self-identified bisexuals and individuals who report same sex partners yet identify as heterosexual. Specific research questions addressed in this study include the following: What is the prevalence of abstinence, drinking and heavier drinking by sexual orientation among women and men, and how do these estimates compare with heterosexuals? What is the relationship between sexual orientation and alcohol-related problems among drinkers, and how do these variables differ by gender? What is the relationship between sexual orientation and specific types of alcohol-related problems?

Method

The National Alcohol Survey 2000

The data used for this study are from the National Alcohol Survey conducted from November 1999 through June 2001. The Alcohol Research Group in Berkeley undertook a national household computer-assisted telephone interview survey of the adult (18 or older) population in all 50 states of the United States and Washington, DC ($N = 7,612$). Temple University's Institute of Survey Research conducted the fieldwork. Random digit dialing (RDD) was used to develop the sample with list-assisted number generation, automatic detection of nonworking numbers and computer matching against yellow pages to increase the hit rate. A Spanish version (with translation and back translation) was administered to Spanish speakers. Interviews lasted 25-50 minutes.

Considerable pretesting and extensive interviewer training was conducted, and efforts were made to minimize nonresponse with intensive callback and nonresponse conversion efforts. The response rate was 58%; this level of response is common in U.S. telephone surveys given telemarketing and call screening. Since earlier National Alcohol Surveys had been face-to-face surveys, several studies were taken to ensure comparability of data when shifting

modes from in-person to telephone. The results of several articles done on the topic of mode variation (Greenfield et al., 2000; Midanik et al., 1999) suggest that there are few differences in alcohol consumption and alcohol problem estimates by interview mode. However, telephone samples tend to have higher than average socio-economic status, and thus estimates need to be adjusted by income level in order to attain equivalent results. This was done through weighting.

Sampling was done using the last birthday technique to identify respondents in households; analyses reported here use weighting and adjusted standard errors based on the sampling design (e.g., factors such as number of adults in household and number of independent phone numbers) and the use of design effects to take into consideration sample clustering. Three primary samples are involved in the national survey. In addition to the main RDD sample, two ethnic-group oversamples were selected from exchanges with at least a 10% African-American or Hispanic incidence rate. A second oversample involved augmenting 13 low-population states such as North Dakota, Hawaii, Wyoming and Alaska (plus Washington, DC) to achieve at least 50 cases in each (designed to facilitate multilevel state modeling).

Measures

Sexual orientation was primarily based on a self-identity question and secondarily on a sexual-behavior question. The following identity question was asked of all respondents: "Which of the following statements best describes your sexual orientation? Would you say: Heterosexual, that is "straight," or prefer to have sex with people of the opposite sex; Bisexual, that is, prefer to have sex with people of either sex; or Homosexual, that is, gay or lesbian, or prefer to have sex with people of your own sex?" In addition, respondents were asked the following sexual-behavior question: "Thinking of the last 5 years, has the partner or partners in your sexual relationships been: (1) only men, (2) mostly men, (3) almost the same number of men and women, (4) mostly women, (5) only women or (6) never had sexual relationship in last 5 years?"

Using these measures, a four-category sexual-orientation variable was created: homosexual identity, bisexual identity, heterosexual identity with reports of same sex partners and exclusively heterosexual (heterosexual identity with no reports of same sex partners). Respondents in the full sample ($N = 7,612$) who did not categorize themselves in response to the identity question (refused, did not know or did not provide a response) were eliminated from this analysis (4.8%; $n = 364$). Among respondents who answered the sexual-orientation identity question, 95.5% ($n = 6924$) were classified as exclusively heterosexual (heterosexual identity reporting no same sex partners), 2.0% ($n = 154$)

identified as heterosexual while reporting same sex partners, 1.1% ($n = 77$) identified as bisexual and 1.2% ($n = 93$) identified as homosexual.

Current drinker status was determined by an overall alcohol-frequency question asked of all respondents and a more specific follow-up question that was asked of those respondents who drank infrequently or who answered "don't know" or "refused" to determine if they drank any alcohol in the last year. Based on these questions, 4,482 respondents were categorized as current drinkers. In addition, five alcohol measures were also used in the analyses: (1) mean number of drinks in the last year based on a graduated frequency measure (Clark and Hilton, 1991; Hilton, 1989), (2) mean number of days drank five or more drinks also based on the graduated frequency measure (Greenfield, 2000), (3) drunkenness (drunk 2 times or more versus <2) in the past year (Lown et al., 2002; Midanik, 1999), (4) social consequences (2 or more versus <2) based on 15 items in five problem areas: legal/accidents, health, work, fight and relationship problems (Midanik and Clark, 1995) and (5) proportion of respondents who were positive for DSM alcohol dependence based on the criteria reported in the DSM-IV (American Psychiatric Association, 1994). Respondents who reported three or more of the seven criteria in the last 12 months were considered positive for DSM-IV alcohol dependence (Caetano et al., 1997). Respondents were categorized as having sought help for an alcohol-related problem if they responded affirmatively to a question about whether they had "ever gone to anyone—a physician, AA [Alcoholics Anonymous], a treatment agency, anyone at all—for a problem related your drinking" (Greenfield et al., 1998).

The following five demographic variables were used as control variables in the multivariate analyses, which were conducted separately for men and women: age (18-29, 30-49 or ≥ 50 years old), ethnicity (black, white, Hispanic, other), relationship status (partnered or not partnered), educational level (\leq high school or $>$ high school) and median income (\leq \$30,000 or $>$ \$30,000). Respondents who refused to answer a 10-category income question (approximately 12%) were asked follow-up questions that allowed them to identify whether their income was above or below the national median of \$30,000. The dichotomous variable described above was constructed to include in multivariate analyses respondents who refused to answer the initial income question but responded to follow-up questions. Using this construction, approximately 43.2% of the sample was at or above the national median income, and 56.8% was below the median income.

Description of study sample

Among women in the full sample, 96% ($n = 3,723$) identified as heterosexual and reported exclusively opposite sex

partners in the past 5 years, 1.8% ($n = 71$) identified as heterosexual while reporting having had same sex partners, 1.3% ($n = 50$) were bisexual, and 0.9% ($n = 36$) were lesbian. Among men in the full sample, 95% ($n = 3201$) identified as heterosexual and reported exclusively opposite sex partners in the past 5 years, 2.5% ($n = 83$) identified as heterosexual while reporting same sex partners, 0.8% ($n = 27$) were bisexual, and 1.7% ($n = 57$) were homosexual.

Some differences in demographics between sexual-orientation groups were significant (analyses not shown). Among women, bisexuals were less likely to be in a partnered relationship than exclusively heterosexual women (40.0% vs 50.3%, $p < .01$) and were significantly younger (mean [SD] of 30.2 [11.3] years, $p < .01$) than exclusively heterosexual women (45.3 [17.1] years) or heterosexually identified women reporting same sex partners (42.5 [16.2] years). The mean age for lesbians (39.5 [14.2] years) was somewhat lower than that of exclusively heterosexual women and approached but did not reach significance. Similarly, in the categorical age variable used for logistic regressions, bisexual identified women were significantly more likely to be in the youngest age group (18-29 years) compared with exclusively heterosexual women ($p < .001$), heterosexual women reporting same sex partners ($p < .01$), and lesbians ($p < .01$), and they were less likely to be represented in the 50 and over age group ($p < .001$). Among women in the full sample, approximately 22% were 18 to 29 years, 42% were 30-49 years, and 36% were ≥ 50 years.

Men who identify as bisexual and men who identify as heterosexual but report same sex partners were also less likely than exclusively heterosexual men to report being in a partnered relationship (33.3% and 57.1%, respectively, compared with 70.6%, $p < .001$). Gay men were also more likely to report having more than a high school education (87.8%) compared with both exclusively heterosexual men (55.5%, $p < .001$) and heterosexually identified men reporting same sex partners (48.6%, $p < .001$). Compared with exclusively heterosexual men, men who identified as heterosexual but reported same sex partners were less likely to identify as white (73.5% vs 55.1%, $p < .01$) and more likely to identify as black (10.5% vs 21.7%, $p < .05$).

Analysis

The data are weighted with standard errors adjustment based on the sampling design (e.g., factors such as number of adults in household and number of independent telephone numbers) using Stata (Stata Corp., 2001). Respondents classified into the four sexual-orientation categories were compared in relation to drinker status, times drunk in the past year, negative social consequences, DSM-IV alcohol dependence and past help-seeking for alcohol problems

by demographic variables using chi-square tests. Tests for between-group differences among respondents reporting same sex, opposite sex or both male and female partners were conducted using pairwise tests and Bonferroni adjustments for multiple comparisons. Tests for differences among the four groups for continuous alcohol-use variables (past year mean number of drinks and mean days consuming five or more drinks) were conducted using analysis of variance and linear regression. Logistic regression modeling was used to test whether sexual orientation was significantly related to dichotomous outcome measures while simultaneously controlling for demographic variables.

Results

Prevalence of alcohol use by sexual orientation

Three categories of drinking in the past year were examined by sexual orientation: nondrinkers, drinkers who did not engage in heavier drinking and heavier drinking (defined as drinking five or more drinks on a single occasion). Alcohol abstinence was significantly higher among heterosexual women who reported exclusively opposite sex partners (44.4% [49.7]) compared with heterosexually identified women who reported same sex partners (24.6% [43.3], $p < .01$) and bisexuals (24.4% [43.4], $p < .05$). Lesbians also had lower rates of abstinence (25.0% [43.9]) than exclusively heterosexual women, but this difference did not reach significance. The percentages of women who were drinkers but did not engage in heavier drinking did not differ by sexual orientation. However, exclusively hetero-

sexual women were substantially less likely to be heavier drinkers (12.7% [33.6]) compared with bisexuals (45.5% [50.3], $p < .001$), lesbians (41.8% [49.9], $p < .001$) and heterosexually identified women who reported same sex partners (32.8% [47.2], $p < .001$). Neither alcohol abstinence nor heavier drinking was significantly different among lesbians, bisexuals and heterosexually identified women who reported same sex partners. Only one significant association was found for men: homosexual men were significantly less likely to be alcohol abstainers (14.4% [35.6]) compared with exclusively heterosexual men (34.3% [47.5], $p < .05$).

Sexual orientation, alcohol use and alcohol-related problems

Bivariate relationships. Table 1 presents the bivariate relationships between the alcohol consumption and alcohol-related problem variables by gender for each of the four categories of sexual orientation. For men, only reports of drunkenness were significantly greater among homosexual respondents as compared with exclusively heterosexual men. For women, all six alcohol variables were significant. Bisexual women had significantly higher alcohol consumption (mean drinks/year, mean days drinking five or more drinks on a single day and percentage drunk twice or more in the past year), reported more alcohol-related problems (negative social consequences and alcohol dependence), and reported more past help-seeking for alcohol-related problems compared with exclusively heterosexual women. Lesbians also reported significantly greater alcohol-related problems (negative social

TABLE 1. Bivariate comparisons of alcohol variables among heterosexual, homosexual and bisexual current drinkers by gender, weighted data ($N = 4,456$)

	Women				Men			
	Heterosexual (no same sex) ($n = 2,080$)	Heterosexual (same sex) ($n = 53$)	Bisexual ($n = 37$)	Lesbian ($n = 28$)	Heterosexual (no same sex) ($n = 2,141$)	Heterosexual (same sex) ($n = 53$)	Bisexual ($n = 17$)	Homosexual ($n = 47$)
Mean no. drinks/yr (SE)	146.2 (400.3)	321.8 ^c (521.0)	466.4 ^{a,l} (888.4)	336.4 (715.4)	440.6 (816.1)	598.2 (1,027.3)	410.3 (597.4)	448.5 (676.0)
Mean days 5+ drunk ≥ 2 times past yr	7.2 (36.7)	18.9 (60.1)	44.2 ^{a,l} (106.8)	25.2 (73.7)	31.2 (78.7)	47.3 (100.3)	27.8 (58.47)	27.82 (68.0)
≥ 2 social conseq.	24.5%	35.4%	55.6% ^a	42.6%	42.0%	51.1%	39.3%	67.2% ^f
DSM-IV alcohol dep.	2.7%	2.0%	23.7% ^a	20.2% ^b	8.2%	14.5%	3.8%	11.8%
ever sought help	2.3%	4.2%	16.7% ^{a,c}	11.5% ^b	5.6%	10.8%	5.6%	10.4%
	1.6%	4.1%	10.0% ^a	15.0% ^{b,d}	4.4%	4.0%	3.3%	6.6%

Notes: Conseq. = consequences; dep. = dependence. ^a $p < .001$, bisexual compared with heterosexual, no same sex partners. ^b $p < .001$, lesbian compared with heterosexual, no same sex partners. ^c $p < .01$, bisexual compared with heterosexuals reporting same sex partners. ^d $p < .001$, lesbian compared with heterosexual reporting same sex partners. ^e $p < .01$ heterosexual identified women reporting same sex partners compared with heterosexual identified women reporting no same sex sexual behavior. ^f $p < .05$, homosexual compared with heterosexual, no same sex partners. ^lNot significant in separate multivariate analysis controlling for demographic variables.

consequences and alcohol dependence) and past help-seeking for alcohol-related problems compared with heterosexual women.

Multivariate relationships. Both linear and logistic regression analyses using simultaneous entry of predictor variables were used to determine if sexual orientation would continue to be significantly related to alcohol consumption measures when demographic variables were controlled (data not shown). In the multivariate models for mean drinks per year, only the higher overall volume of drinking among heterosexually identified women with same sex partners remained significant ($t = 2.0, p < .05$) compared with exclusively heterosexual women. Mean number of heavy drinking days was not significantly different by sexual orientation among women or men.

Differences by sexual orientation among women remained significant in multivariate logistic analysis of all four categorical drinking variables: times drunk in the past year, social consequences, alcohol dependence and past help-seeking for alcohol-related problems (see Table 2). Although age was the strongest predictor of being drunk, experiencing social consequences and scoring positive for DSM-IV alcohol dependence, sexual orientation remained significant even when controlling for age. Among current drinkers, lesbians were approximately 7 times more likely and bisexual women nearly 6.5 times more likely to be classified as positive for alcohol dependence based on DSM-IV criteria than exclusively heterosexual women. Odds for reporting two or more negative social consequences related to drinking were approximately 11 times greater among lesbians and 8 times greater among bisexual women compared with heterosexual women. Lesbians and bisexual women were also 2.5 times as likely to report being drunk at least

two or more times in the past compared with heterosexual women. In addition, past efforts to seek treatment or other types of help for an alcohol problem were 8 times greater among lesbians and 4 times greater among bisexual women than exclusively heterosexual women. This relationship between sexual orientation and reports of being drunk in the past year among men remained significant (data not shown); gay men were nearly 3 times as likely to report having been drunk twice or more in the past year (odds ratio: 3.1, confidence interval: 1.8-5.4, $p < .001$) than exclusively heterosexual men.

Sexual orientation and specific types of alcohol-related problems

The 15 items of the social consequences index were examined for differences by sexual orientation among women who reported being current drinkers. Based on the multivariate analysis described above, which found no differences in social consequences between categories of heterosexually identified women but found substantially greater odds of reporting multiple (2 or more) alcohol-related problems among lesbians and bisexual women, and because of the small numbers of respondents represented in the specific problem areas, this analysis compared all heterosexually identified respondents regardless of past 5 years' sexual partners to a combined category of lesbian/bisexual respondents. Of the 15 items, 6 were significantly associated with sexual orientation among women, and none were significant among men. Specifically, lesbian and bisexual women were significantly more likely than heterosexual women to report experiencing the following alcohol-related problems: fights (15.7% vs 1.3%,

TABLE 2. Multiple logistic regression of drunkenness, negative social consequences and alcohol dependence among women, current drinkers and past help-seeking, all women

	Drunk ≥ 2 times past yr ($n = 2,198$) OR (95% CI)	≥ 2 social consequences ($n = 2,198$) OR (95% CI)	DSM-IV alcohol dependence ($n = 2,198$) OR (95% CI)	Ever sought help ($n = 3,880$) OR (95% CI)
Sexual orientation ^a				
Heterosexual (reporting same sex partners)	2.1 (0.98-4.4)	0.77 (0.17-3.6)	2.2 (0.60-7.8)	2.2 (0.65-7.3)
Bisexual	2.5 (1.3-5.0) [†]	8.1 (3.0-22.2) [‡]	6.4 (2.0-20.1) [†]	4.3 (1.1-17.2) [*]
Lesbian	2.5 (1.1-5.7) [*]	10.9 (3.2-37.4) [‡]	7.1 (1.8-27.6) [†]	8.1 (2.6-25.5) [‡]
Age ^b				
18-29	24.5 (15.2-39.5) [‡]	21.1 (5.8-77.4) [‡]	17.5 (5.0-60.7) [‡]	2.8 (1.1-7.0) [*]
30-49	9.7 (6.0-15.6) [‡]	6.7 (1.8-26.1) [†]	7.3 (2.2-24.4) [†]	4.4 (2.0-9.7) [‡]
Ethnicity ^c				
Black	0.38 (0.26-0.54) [‡]	0.43 (0.19-0.98) [*]	0.73 (0.34-1.6)	0.19 (0.06-0.57) [†]
Latina	0.32 (0.22-0.47) [‡]	0.49 (0.19-1.2)	1.2 (0.54-2.7)	0.59 (0.25-1.4)
Other	0.37 (0.21-0.63) [‡]	0.36 (0.12-1.2)	0.58 (0.20-1.7)	1.1 (0.48-2.6)
Not partnered	1.6 (1.3-2.1)	1.6 (0.93-3.0)	1.9 (1.1-3.6) [*]	2.5 (1.4-4.4) [†]
≤High school	1.3 (1.0-1.7) [*]	0.50 (0.27-0.92) [*]	0.74 (0.40-1.4)	1.2 (0.69-2.1)

Notes: ^aReference group: heterosexual identity and no same sex partners. ^bReference group: age 50 and older.

^cReference group: white ethnicity. OR = odds ratio; CI = confidence interval.

* $p < .05$; [†] $p < .01$; [‡] $p < .001$.

$\chi^2 = 47.6$, 1 df, $p < .001$), arguments (23.5% vs 4.6%, $\chi^2 = 27.3$, 1 df, $p < .001$), a spouse being angry because of drinking (8.8% vs 1.8%, $\chi^2 = 12.1$, 1 df, $p < .001$), a physician suggesting reduction in drinking (8.9% vs 1.2%, $\chi^2 = 15.8$, 1 df, $p < .001$), lost time at work (3.1% vs 0.6%, $\chi^2 = 6.4$, 1 df, $p < .05$) and trouble with the law about drinking when driving was not involved (2.2% vs 0.4%, $\chi^2 = 4.5$, 1 df, $p < .05$).

Discussion

The purpose of this study was to examine alcohol consumption and alcohol-related problems in a national, population-based sample of lesbian, bisexual and homosexual adults. The prevalence of combined bisexual and homosexual identity was approximately 2.5% ($n = 84$) for men and 2.2% ($n = 86$) for women. The percentage of women reporting bisexual or homosexual identity is somewhat larger in comparison to a national study of sexuality that found 2.8% of men and 1.4% of women reported homosexual or bisexual identity (Laumann et al., 1994). The relatively high prevalence of same sex behavior or identity among women is unusual but has been found in at least one other study (Jorm et al., 2002).

Our findings are also consistent with other population-based surveys that have found lower abstinence rates and elevated or significantly greater odds for alcohol abuse and/or dependence based on DSM-III-R criteria among women who have sex with women compared with heterosexual women but with little or no difference among men (Cochran et al., 2000; Gilman et al., 2001; Sandfort et al., 2001; Stall et al., 2001; Stall and Wiley, 1988). Our findings are also consistent with studies that indicate homosexual women may be more likely than heterosexuals to report past treatment or being recovering alcoholics (Bloomfield, 1993; Cochran et al., 2000; Hughes et al., 2000).

In our study, both lesbians and bisexual women had greater odds of reporting two or more negative consequences compared with heterosexual women, and no differences were found among men by sexual orientation. This differed somewhat from nonprobability studies of lesbians and gay men that examined alcohol-related problems. McKirnan and Peterson (1989a) found that the odds of reporting two or more alcohol-related consequences were greater among both homosexual men and women compared with heterosexuals in a national sample. Hughes et al. (2000) found no significant difference in reported alcohol problems between lesbians and heterosexuals. These differences may correspond to differences in study design as well as problem definitions.

Several factors may correspond to our finding of no differences in alcohol consumption and alcohol-related problems among men except for greater odds of reporting being drunk twice or more in the past year compared with exclu-

sively heterosexual women. First, it is possible that alcohol-related problems have decreased among gay and bisexual men. For example, some researchers postulate that problem alcohol and drug use in gay male communities has declined in the context of the HIV/AIDS epidemic (Paul et al., 1991), and a more recent study of gay men who were either HIV-seropositive or seronegative found a significant decline in substance use and problems associated with use, motivated in part by fears about HIV/AIDS as well as changes in attitudes in the gay community (Crosby et al., 1998). It is also possible that gay and bisexual men respond to similar individual stressors and environmental influences in ways that differ from their female counterparts. Studies that have found greater indication of drug (but not alcohol) use and drug dependence among gay and bisexual men (Gilman et al., 2001; Stall et al., 2001; Stall and Wiley, 1988) may reflect differences in drugs of choice by gender.

A number of factors may explain higher rates of heavier drinking and alcohol-related problems among lesbian and bisexual women. Factors that are generally considered protective against substance misuse among heterosexual women may differ for both bisexual women and lesbians. Because alcohol-related problems may occur at even fairly low levels of consumption (Midanik et al., 1996), the higher level of alcohol-related problems found in this study may be partly associated with less abstinence and more social drinking in these populations. Hughes and Wilsnack (1997) suggest that lesbians may be disproportionately affected by risk factors that are known to correlate with alcohol consumption among women, including underemployment, job discrimination and stressors related to multiple roles and family conflict. Bisexual women were significantly younger and less likely to be partnered than heterosexual women, although differences in alcohol consumption and alcohol-related problems remained significant when controlling for these factors. Other individual risk factors associated with alcohol problems and alcohol dependence may be particularly salient for bisexuals. For example, a population-based study of mental-health outcomes and sexual orientation found that bisexual respondents reported a higher level of several risk factors such as childhood adversity, adverse life events and limited family support than heterosexuals, which, in turn, was associated with poorer mental-health outcomes (Jorm et al., 2002). Alcohol misuse was not statistically significant as a mental-health outcome in this study, perhaps because men and women were grouped together in the analysis and possible gender differences (that were prominent in our study) may have been lost. Our own data suggest that, rather than being underemployed, lesbian and bisexual women may be somewhat more likely to be employed full time than heterosexual women. Preliminary exploration of our data also suggests that reports of childhood sexual abuse may vary by sexual orientation; however, the numbers of respondents

reporting both alcohol-related problems and childhood sexual abuse are too small to provide valid analysis for our study.

Sexual minorities and members of other marginalized social groups experience substantial stress (Cochran and Mays, 1994; D'Augelli and Grossman, 2001; Herek, 1991; Savin-Williams, 1994). Lesbians and bisexuals may face higher levels of stress related to social marginalization (Hughes and Eliason, 2002), and bisexuals may face negative attitudes from lesbians and gay men as well as heterosexuals, although there is little research in this area to date (Ault, 1996; Fox, 1996). Evidence linking stress with alcohol consumption among sexual minorities is somewhat inconsistent, but some studies suggest possible correlates between stress and drinking (McKirnan and Peterson, 1989b; Nawyn et al., 1999). The National Alcohol Survey data indicated that mean scores associated with perception of unfair treatment were nearly the same for heterosexual women and men, higher among lesbian and bisexual women compared with heterosexual women and men, and lower among gay and bisexual men compared with heterosexuals. This would appear to parallel the finding of greater alcohol-related problems among lesbians and bisexual women in this study; however, exploration of this area will require additional data collection.

Although a number of alcohol-consumption variables were higher for heterosexually identified women who reported same sex partners compared with exclusively heterosexual women, there were no comparable differences in reports of alcohol-related problems, alcohol dependence or past help-seeking for alcohol problems. One possible explanation is that sexual-orientation identity may be associated with greater involvement in gay or lesbian communities and social networks in which alcohol and other drugs may be available and perceived as attractive (Orenstein, 2001). For example, some authors have suggested that drinking, and even heavier drinking, may be associated with a positive process of entrée and involvement in lesbian communities (Heffernan, 1998; Parks, 1999). It is also possible that lesbians are more attentive to the possibility of alcohol problems individually and as a community (Hughes, 2003; Welch, 1998) and, consequently, more likely to report problems. Future research, both epidemiological and ethnographic, would be helpful in exploring possible differences in norms and meanings attached to drinking and reporting alcohol-related problems among lesbian and bisexual women.

One of the study limitations was the small number of respondents who were categorized as bisexual, lesbian or gay. Although the percentages of respondents who provided information on sexual-behavior and/or sexual-orientation identity questions were comparable to or better than other surveys, the number of respondents reporting homosexual or bisexual behavior or identity in a national population-

based survey such as the National Alcohol Survey is inevitably small. It is possible that some of the alcohol-problem variables that approached significance for men might have been significant if we had greater power to detect differences. A related limitation of this study is insufficient data to provide conclusive explanations about our study findings; useful data would include more detailed information about childhood sexual abuse, heavy-drinking friends or partners, stress or the meanings respondents attach to various drinking contexts.

Another study limitation was that not all respondents were asked about their sexual behavior. All respondents were asked the sexual-orientation identity question but were not asked the question about past 5-year sexual partners if their answer to an earlier question, "In the last 5 years, how many people have you had sexual intercourse with?" was zero. Consequently, it is possible that some individuals were incorrectly classified as not having had sex in the past 5 years if they did not associate the term "intercourse" with their own sexual practices.

In spite of these limitations, this study was based on a large, representative cross-section of the U.S. population. Consequently, it avoids some of the potential bias of purposive or regional samples. By adding specific sexual-orientation questions that measure both identity and behavior, we avoid possible bias described in studies that rely solely on behavioral proxy variables (Cochran et al., 2000; Cochran and Mays, 2000; Gilman et al., 2001). This study contributes to an emerging literature on differences in alcohol consumption as it relates to sexual orientation and offers a unique contribution to the literature in relation to providing separate analyses of bisexual and homosexual populations.

Findings from this study underscore the importance of advancing population-based research that is inclusive of sexual orientation. First, measures of sexual orientation should be included in other national alcohol, drug, health and mental-health surveys. Our experience with the National Alcohol Survey demonstrates that it is possible to integrate successfully these questions into a national population-based survey. Second, cognitive testing and other evaluation of questions for measuring various dimensions of sexual orientation should be conducted to determine which questions are best and to facilitate consistency of questions across studies. Third, researchers conducting population-based surveys should consider oversampling sexual-minority populations. Oversampling of specific race and ethnic groups has often been used with the National Alcohol Survey and other population-based surveys to obtain sufficient power for meaningful analysis of differences (Santos, 1991; Stall et al., 2001).

Additional research is also needed to examine possible differences in correlates and consequences of drinking among bisexual and homosexual women and men. In a

review of research on substance misuse in lesbian, gay, bisexual and transgender populations, Hughes and Eliason (2002) note, "Few substance abuse studies have included sufficient numbers of bisexual women to permit separate analyses, and no studies to date have focused exclusively on this subset of the population" (p. 269). Findings from our study highlight the importance of expanding research in this area, including research on contexts and meaning of drinking for bisexual women. In addition, methodological studies are needed to examine when it may be appropriate to combine groups with same sex partners and when disaggregated analysis might be more meaningful.

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