ORIGINAL INVESTIGATION

A Longitudinal Study of the Correlates of Persistent Smoking Among Sexual Minority Women

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ABSTRACT

Introduction: We conducted a longitudinal evaluation of factors associated with persistent smoking behaviors among sexual minority women (SMW; lesbians and bisexual women).

Methods: Structured interview data were collected as part of a larger longitudinal study of SMW's health: the Chicago Health and Life Experiences of Women study. We conducted multivariate analyses to evaluate the influence of 4 groups of predictor variables on smoking: (a) demographic, (b) childhood victimization, (c) other substance use, and (d) health variables.

Results: At Wave 1, 30.9% ($n = 138$) of participants reported current smoking, with substance-use and demographic factors having the strongest relationships to smoking status. The majority (84.9%) of Wave 1 smokers were also smoking at Wave 2. Among demographic variables, level of education was inversely associated with continued smoking. With respect to substance use, hazardous drinking and cocaine/heroin use were significantly associated with continued smoking. None of the victimization or health variables predicted smoking status.

Conclusions: Consistent with previous studies, smoking rates in this sample of SMW were elevated. Despite intensive efforts to reduce smoking in the general population, 84% of SMW smokers continued smoking from Wave 1 to Wave 2. Findings suggest that the majority of SMW will continue to smoke over time. Additional research is needed to increase motivation and access to smoking cessation resources.

INTRODUCTION

Tobacco use continues to be the leading cause of preventable morbidity and premature mortality in the United States (Bartecchi, MacKenzie, & Schrier, 1994; Centers for Disease Control and Prevention, 2008). Over the past two decades, smoking rates among women have decreased substantially. However, smoking rates among sexual minority women (SMW; lesbians and bisexual women) far exceed those of their heterosexual counterparts (King, Dube, & Tynan, 2012; Lee, Griffin, & Melvin, 2009). For example, in a recent systematic review of tobacco use among lesbian, gay, and bisexual persons, the odds for smoking among SMW were 1.5–2.0 times greater than for heterosexual women (Lee, Griffin, & Melvin, 2009). These basic smoking prevalence rates among SMW have been reported in numerous probability and nonprobability samples (e.g., Gruskin, Greenwood, Matevia, Pollack, & Bye, 2007; Lee, Griffin, & Melvin, 2009; Pizacani et al., 2009). Furthermore, SMW have higher than expected prevalence of risk factors (e.g., obesity) for diseases associated

with or exacerbated by smoking (e.g., heart disease; Institute of Medicine, 2011). Consequently, tobacco prevention and control among sexual minority populations has emerged as an important research priority (Institute of Medicine, 2011). Specifically, additional research is needed to understand the risk factors for smoking among SMW and the relationships between these risk factors and persistence in smoking over time. Empirical evidence of this nature can improve our understanding of smoking prevalence rates in this population and lead to advances in prevention and cessation interventions.

Factors Contributing to Smoking Among SMW

A range of factors have been shown to be associated with the smoking behaviors of women. Smith, Colwell, Ahn, and Ory (2012) reported that compared to smokers, never-smokers and past smokers were significantly more likely to be older, more educated, of better general health, and report past year physician visits and fewer depressive symptoms. These same factors likely influence the smoking behaviors of SMW. In

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addition, SMW may also experience unique stressors mentioned previously and beyond those experienced by heterosexual individuals (Hatzenbuehler, 2009; Meyer, 1995, 2003). These unique stressors included experiences of discrimination and victimization due to sexual orientation, gender identity, or gender presentation (Austin, Roberts, Corliss, & Molnar, 2008; Austin et al., 2008; Herek, 2009; Pilkington & D'Augelli, 1995). Experiencing discrimination due to one's sexual orientation has been found to be associated with elevated rates of mood disturbance and engagement in a wide range of health risk behaviors including smoking (Hatzenbuehler, 2009; Jun et al., 2010; Orlando, Ellickson, & Jinnett, 2001; Simpson & Miller, 2002; Widom, Weiler, & Cottler, 1999). SMW are also known to have increased exposure to risk factors for tobacco use, such as childhood victimization and poorer mental health (Austin et al., 2008; Herek, 2009; Jun et al., 2010). These same predictors, however, also increase the probability of reporting both alcohol and other illicit drug use, which often co-occur with smoking behaviors (Downs & Harrison, 1998; Simpson & Miller, 2002). Research has shown that persons who report the use of multiple substances are less likely to successfully quit smoking (Metrik, Spillane, Leventhal, & Kahler, 2011; Stapleton, Keaney, & Sutherland, 2009). Indeed, drinking and drug use may compromise individuals' resolve to quit smoking, particularly while under the influence of alcohol and other drugs, and increase exposure to tobacco. In order to understand smoking behaviors among SMW, therefore, researchers should examine not only psychosocial risk factors (e.g., depression) but also interrelated risk behaviors, such as drug and alcohol use (Singer & Clair, 2003; Storholm, Halkitis, Siconolfi, & Moeller, 2011).

Specific Aims

Over the past four decades, effective health education campaigns, public policy initiatives, and improvements in smoking cessation treatment programs have contributed to a significant decline in smoking prevalence rates (Alamar & Glantz, 2006). Nevertheless, persistent tobacco use in population subgroups raises important questions about the factors influencing them (Centers for Disease Control and Prevention, 2010). To date, much of what is known about the psychosocial and behavioral risk factors associated with smoking among women are derived from heterosexual women. Further, few if any studies have conducted longitudinal analyses to understand the factors associated with persistent smoking over time. Using longitudinal data from the Chicago Health and Life Experiences of Women (CHLEW) study, we sought to explore among a sample of SMW: (a) What risk behavior determinants (demographic characteristics, childhood victimization, substance use, and psychological factors) are associated with smoking among SMW at Wave 1 (baseline) and (b) Controlling for baseline smoking variables, which factors predict persistence in smoking at Wave 2 (over a four-year period)?

METHODS

Participants

Data for this study were collected as part of the first two waves of a larger longitudinal study of the health and life experiences of SMW (The CHLEW, conducted between 2001 and 2004).

A volunteer sample was recruited for the CHLEW study using sampling methods such as ads in local newspapers, flyers posted at community venues, and distributed to individuals and organizations via formal and informal social events and social networks. Eligibility criteria included age 18 or older, English speaking, and residence in Chicago or surrounding suburbs. Consistent with the original study aims (to study drinking and its predictors among lesbians), the initial target population of SMW recruited into the study was lesbians. Over time, the goals of the study were expanded and included more targeted recruitment of bisexual and other nonheterosexual women. In addition, women who initially reported a lesbian sexual orientation went on to later identify as "mostly lesbian" or "bisexual." Consequently, the study sample is best characterized as including women who belong to a range of SMW including lesbian, mostly lesbian, and bisexual women.

In 2001–2002, CHLEW study staff recruited and interviewed 447 women. Approximately four years after baseline data were collected, women in the study were invited to participate in a follow-up interview. Wave 2 follow-up interviews were conducted with 384 women for a response rate of 85.9% (94.6% of the respondents who were still living and eligible to participate). Lost to follow-up were 33 (7.4%) women who could not be located, 10 (2.2%) who were deceased, 10 (2.2%) who refused, and 8 (1.8%) who were located but were unable to participate (e.g., scheduling conflicts). To assess possible bias due to attrition, nonresponse rates (combining refusals and locating failures) were examined in relation to all major drinking variables and demographic variables (e.g., age, race/ethnicity, education). When controlling for both demographic and major drinking variables, the only significant predictor of attrition was having a high school education or less (odds ratio 3.39, confidence interval = 1.12–10.2, $p = .03$). In addition to other demographic factors, education was included as a covariate in subsequent analyses.

Procedures

Data were collected via face-to-face structured interviews by female interviewers. Interviewers received extensive training in interviewing techniques and confidentiality. The interviews averaged 90 min in length. To increase privacy, confidentiality, and comfort with self-disclosure, questions about sexual activity and behaviors were self-administered using a computer-assisted survey instrument. Participants were paid \$35 for completing the Wave 1 and \$45 for the Wave 2 interviews. The study was approved by institutional review board of the University of Illinois at Chicago (for a full description of study methods, see Hughes et al., 2006).

Measures

At both Wave 1 and Wave 2, to assess smoking status, respondents were asked "Do you currently smoke cigarettes?" Answers to this question at Wave 1 and Wave 2 were used to classify participants as nonsmokers (reported not smoking at Wave 1 or Wave 2), continued smokers (reported smoking at both Wave 1 and Wave 2), or quitters (reported smoking at Wave 1 but not at Wave 2; see Table 1). Only 12 participants reported smoking at Wave 2 who did not report smoking at Wave 1 (new smokers) and they were excluded due to sample size.

Demographic variables included race/ethnicity, age, and educational level. Respondents were initially classified as

Table 1. Sample Characteristics

Variables	Wave 1 (N = 447)		Wave 2 (N = 384)	
	Mean	SD		
Demographics				
Age	37.93	11.79		
Education level	<i>n</i>	%		
High school or less	39	10.6		
Some college	108	29.4		
Bachelor's degree	97	26.5		
Graduate/ professional degree	123	33.5		
Race/ethnicity	<i>n</i>	%		
White, non-Hispanic	187	51.0		
African American, non-Hispanic	93	25.3		
Hispanic	69	18.8		
Other	18	14.9		
Health				
Physical	<i>n</i>	%		
Poor	28	7.6		
Fair	61	16.6		
Good	170	46.3		
Excellent	108	29.4		
Mental	<i>n</i>	%		
Depression	205	56.2		
Anxiety	M	SD		
	19.96	5.79		
Childhood victimization	<i>n</i>	%		
Physical	82	22.4		
Sexual	116	31.7		
Substance use	M	SD		
Hazardous drinking	1.41	1.52		
	<i>n</i>	%	<i>n</i>	%
Marijuana use	143	32.0	97	25.4
Illicit drug use	37	8.3	12	3.1
Smoking status				
Never-smokers	261	71.1		
Current smokers	79	21.5		
Quitters	27	7.4		
Cigarette use (current smokers past 12 months)	<i>n</i>	%	<i>n</i>	%
Does not currently smoke	307	68.8	289	75.7
Smoked fewer cigarettes	26	5.8	38	10.0
Smoked same number of cigarettes	60	13.5	36	9.4
Smoked more cigarettes	53	11.8	19	5.0

either (a) White, non-Hispanic, (b) African American, (c) Hispanic, or (d) other. For purposes of analysis, participants were classified as either ethnic minority (African American, Hispanic, Other; coded as 1) or as White (0).

Respondent age at baseline interview was measured in years.

Participants were classified using the following categories: (a) high school or less, (b) some college, (c) bachelor's degree, or (4) graduate or professional degree.

Childhood victimizations were assessed by asking participants about both childhood sexual abuse and childhood physical abuse. In the measure of self-perceived childhood sexual

abuse, participants were asked, "Do you feel that you were sexually abused when you were growing up?" after a series of in-depth questions about childhood sexual experiences based on work by Wyatt (1985) and others (Wilsnack, Vogeltanz, Klassen, & Harris, 1997). For physical abuse, participants were asked the question: "Did you feel physically abused by your parents growing up?"

Substance use was examined by questions about drinking and use of illegal substances. A "hazardous drinking index" was constructed by combining dichotomous responses to each of five past-12-month indicators of hazardous drinking: heavy drinking, heavy episodic drinking, intoxication, adverse drinking consequences, and symptoms of potential alcohol dependence (range = 0–5). Level of drinking was calculated based on estimates of mean ounces of ethanol consumed per day (with a standard drink of beer [12 oz.], wine [5 oz.], or liquor [1.5 oz. of 80-proof spirits] each containing approximately 0.5 ounces of ethanol). Information about drinking frequency, drinking quantity, typical size of drinks, and ethanol content for beer, wine, and liquor consumption in the past 30 days was combined, and this estimate was adjusted to take into account the frequency of heavy episodic drinking (six or more drinks in a day) in the past 12 months. Consumption of less than 1/2 drink per day was classified as light drinking, 1/2 to 1 1/2 drinks per day as moderate drinking, and 2 or more drinks as heavy drinking.

Participants were asked whether they had used marijuana, cocaine, or heroin in the past 12 months (yes/no).

Physical and mental health were also assessed. Women in the study were asked to rate their overall physical health during the past year using the following categories: poor (1); fair (2); good (3); or excellent (4).

Depression was assessed using questions from the Diagnostic Interview Schedule (Robins, Helzer, Croughan, & Ratcliff, 1981) based on *DSM-IV* criteria. The *DSM* criteria require at least four symptoms to occur simultaneously for two weeks or longer (e.g., decreased appetite, unexplained weight loss or gain, sleeping problems, thoughts of death). Participants who reported that four or more of these symptoms had lasted for two weeks or longer and were feeling sad, blue, or depressed or had lost interest or pleasure in things usually cared about were classified as having depression. However, we did not include the impairment item generally required thus our version provides an approximation for clinical depression. KR-20 reliability coefficients for these nine indicators were 0.83 (at Wave 1) and 0.87 (at Wave 2).

An anxiety measure consisted of seven items using a 5-point Likert-type response format. Six items were obtained from Eysenck Personality Questionnaire (Eysenck & Eysenck, 1991) neuroticism scale (e.g., worries a lot). The last item was a Diagnostic Interview Schedule anxiety item (Robins et al., 1981) which asked, "During your lifetime how much has nervousness interfered with your everyday life or activities?" A sum was calculated (range 0–35) with higher scores indicating more anxiety (those greater than overall sample mean). Cronbach alpha reliability coefficient for these seven items was .80.

Analysis

We tested a series of hierarchical logistic regression models to predict smoking behavior or change in smoking behavior between Waves 1 to Waves 2 based on the following Wave 1 predictors: (a) demographic characteristics, (b) childhood victimization, (c) substance use, and (d) psychological factors (i.e.,

depression and anxiety). These four sets of predictors were entered into each model sequentially; first entering control variables (demographics), then historical risk factors (childhood victimization and past year substance use) and finally current risk factors (depression and anxiety). Likelihood ratio chi-square tests were performed to determine if each set of predictors added to the model resulted in significant improvement in prediction of smoking status. Only participants with data on all of the independent variables in the full model were included in the analysis. This was done to ensure that the sample remained the same across all stages of the analysis (i.e., participants included in the initial step of the analysis were not dropped in a subsequent steps due to missing data). The first model predicted smoking status at Wave 1. The second model involved a multinomial logistic regression analysis of change in smoking status from Wave 1 to Wave 2. Respondents were classified as either nonsmokers (i.e., reported not smoking at either Wave 1 or Wave 2), continued smokers (reported smoking at both timepoints), or as quitters (reported smoking at Wave 1 but reported not smoking at Wave 2). Nonsmokers served as the reference group in this phase of the analysis. New smokers (those smokers did not report smoking at Wave 1 but did at Wave 2) were excluded from multivariate analyses. Logistic regression analyses were performed using Stata version 11.0 (Stata Corp).

RESULTS

Participants

Table 1 summarizes the descriptive data for the study variables. With the exception of current smoking status, all variables are measured at Wave 1. Mean age was 37.93 years ($SD = 11.79$). Slightly over half of women in the study were White and had completed college or a graduate or professional degree. Nearly one fourth of women in the study reported being physically abused by their parents and more than 30% reported being sexually abused as a child. The majority of women reported at least some alcohol for illicit drug use during the past year. Approximately three fourths of women in the sample rated their health as good or excellent. However, over half of women (55.2%) reported symptoms consistent with depression. The mean for anxiety was 19.96 ($SD = 5.79$) with 43.4% reporting high levels of anxiety.

Prediction of Smoking at Baseline

At Wave 1, 30.9% ($n = 138$) of participants reported being a current smoker. Table 2 presents the results of the hierarchical logistic regression analysis predicting smoking at baseline. Among demographic factors, only level of education was found to be significantly associated with current smoking ($p < .01$), with higher level of education associated with a lower likelihood of smoking. The relationship between smoking and education was statistically significant even after victimization, substance use, and health predictors were entered into the model. Hazardous drinking and use of cocaine or heroin (but not marijuana) use were positively associated with smoking and remained significant after health-related predictors were entered into the model. General health was found to be inversely associated with smoking behavior. Overall, the full model had a pseudo R^2 of 0.16, with substance-use

and demographic factors having the strongest relationships to smoking as evidenced by the likelihood ratio chi-square tests.

Prediction of Smoking Status Over Time

At Wave 1, 138 (30.9%) of participants reported smoking, whereas 93 (24.4%) reported smoking at Wave 2. Among the 367 participants who provided information about their smoking behavior at Wave 1 and Wave 2, 261 (71.1%) reported not smoking at either wave, 79 (21.5%) being continued smokers, and 27 (7.4%) reported smoking at Wave 1 but not Wave 2 (quitters). When participants were asked at Wave 2 to rate their level of smoking relative to 12 months ago, 307 (68.8%) reported that they were nonsmokers, 26 (5.8%) reported smoking fewer cigarettes, 60 (13.5%) reported smoking the same number of cigarettes, and 53 (11.8%) indicated that they smoked more.

Table 3 presents the results of the hierarchical multinomial logistic regression analysis to predict change in smoking status from Wave 1 to Wave 2, with nonsmokers serving as the reference group. Data were available on all model variables from 362 participants including those who started smoking subsequent to Wave 1 interview. Among demographic variables, level of education was inversely associated with continued smoking. Age was inversely associated with stopping smoking, though this relationship was no longer statistically significant after controlling for substance use. Ethnic minority status was not significantly associated with smoking status. Further, neither of the childhood victimization variables significantly predicted smoking status. With respect to substance use, hazardous drinking and cocaine/heroin use were significantly associated with continued smoking. Hazardous drinking was also found to be significantly related to stopping smoking. In contrast, marijuana use was not associated with change in smoking over time. None of the health-related predictors (general health, depression, anxiety) were significantly associated with smoking status. Likelihood ratio chi-square tests (see bottom of Table 3) revealed that demographic variables significantly added to the efficacy of the model (relative to an intercept-only model: $\chi^2[3] = 42.70, p < .01$). Substance use variables were also found to significantly add to the model relative to demographic and victimization predictors only ($\chi^2[2] = 31.49, p < .01$). The pseudo R^2 for the full model was 0.15.

DISCUSSION

In this study, 30% of study participants reported current smoking at Wave 1 and 24% reported smoking at Wave 2. Among women who smoked at Wave 1, 85% were still smoking approximately four years later. Although the majority of smokers in this study continued smoking, some positive movements toward cessation were noted with more than 20% of smokers making a quit attempt and another 35% reported smoking fewer cigarettes at Wave 2 compared to Wave 1. These findings are consistent with a recent study suggesting that despite having higher smoking prevalence rates, the number of recent quit attempts and motivation to quit smoking were high among SMW (Matthews, Hotton, DuBois, Fingerhut, & Kuhns, 2011). High smoking rates despite recent quit attempts raise important questions and suggest opportunities for intervention. For example, little is known about the use of evidence-based smoking cessation treatments by SMW smokers or the overall level of

Table 2. Hierarchical Logistic Regression Analysis Predicting Smoking Status at Baseline (*N* = 437)

Predictor	<i>OR</i>			
	Stage 1	Stage 2	Stage 3	Stage 4
Demographic variables				
Age	0.99	0.99	1.00	1.00
Ethnic minority	1.18	1.15	1.08	0.95
Education level	0.57***	0.57***	0.57***	0.57***
Childhood victimization				
Physically abused		1.24	1.36	1.39
Sexually abused		1.00	0.93	0.94
Past year substance use				
Hazardous drinking			1.39***	1.41***
Marijuana			1.21	1.19
Cocaine or heroin			4.36***	4.33***
Health				
General health				0.76**
Depression				0.77
Anxiety				0.97
Pseudo <i>R</i> ²	0.07	0.07	0.15	0.16
Likelihood ratio chi-square ^a	35.55***	4.25	39.99***	3.49

Note. *OR* = odds ratio.

^a The likelihood chi-square test for model 1 compares the model to an intercept-only model. For all other models, the likelihood ratio chi-square represents the effect of the added predictors in the model.

p* < .05. *p* < .01.

Table 3. Hierarchical Multinomial Logistic Regression Analysis^a Predicting Change in Smoking Status Relative to Nonsmokers (*N* = 362)

Predictor	Stage 1		Stage 2		Stage 3		Stage 4	
	Continued smoke <i>OR</i> ^b	Stopped <i>OR</i>	Continued smoke <i>OR</i>	Stopped <i>OR</i>	Continued smoke <i>OR</i>	Stopped <i>OR</i>	Continued smoke <i>OR</i>	Stopped <i>OR</i>
Demographic variables								
Age	1.00	0.95**	1.00	0.95**	1.01	0.97	1.01	0.97
Ethnic minority	1.36	0.78	1.29	0.69	1.32	0.75	1.16	0.72
Education level	0.48***	1.02	0.49***	1.06	0.51***	1.00	0.50***	1.10
Childhood victimization								
Physically abused			1.40	1.65	1.31	1.64	1.37*	1.56
Sexually abused			1.15	1.92	1.19	1.79	1.19	1.64
Past year substance use								
Hazardous drinking					1.30**	1.51**	1.31**	1.49**
Marijuana					1.18	1.29	1.19	1.31
Cocaine or heroin use					6.23***	0.94	6.28***	0.89
Health								
General health							0.80	0.66
Depression							0.88	1.15
Anxiety							0.96	0.99
Pseudo <i>R</i> ²	0.08		0.09		0.14		0.15	
Likelihood ratio chi-square ^b	42.70***		5.60		31.49***		5.48	

Note. *OR* = odds ratio.

^a Nonsmokers served as reference group.

^b The likelihood chi-square test for model 1 compares the model to an intercept-only model. For all other models, the likelihood ratio chi-square represents the effect of the added predictors in the model.

p* < .05. *p* < .01.

effectiveness of these treatments among SMW. Although we did not measure information regarding quit attempts in this study, [Levinson, Hood, Mahajan, and Russ \(2012\)](#) reported that compared to gay men, SMW were less likely to have used nicotine replacement therapies in a previous quit attempt and

were less likely to report intending to use nicotine replacement therapy for a future quit attempt. In addition, a large minority (25%) of both sexual minority men and women reported being unlikely to seek smoking cessation assistance through their health care providers. Further, scant research is available

on outcomes of SMW participating in stop smoking treatment programs. To date, the majority of studies has focused on sexual minority men, but these studies have shown some benefits (Eliason, Dibble, Gordon, & Soliz, 2012; Harding, Bensley, & Corrigan, 2004; Walls & Wisneski, 2011). Given the known disparities in smoking prevalence rates among SMW, health care providers working with this population should routinely assess for and provide support for smoking cessation. Future research should focus on increasing access to and uptake of evidence-based treatment programs among SMW.

The predictors of continued smoking were consistent with those of women in the general population. Self-reported health status was a significant predictor of smoking at baseline such that individuals with the highest levels of self-reported health were least likely to smoke. However, general health status did not predict smoking at Wave 2. Consistent with studies in the general population, level of education was a statistically significant predictor of smoking among SMW in our study. That is, women with the lowest levels of education were significantly more likely to be smoking at baseline and at Wave 2. These findings suggest the importance of increased outreach to SMW smokers, with a particular emphasis on those women with lower levels of formal education. Apart from educational level, hazardous drinking and illicit drug (cocaine or heroin) use were the strongest predictors of current smoking at Wave 1; odds of smoking were 41% higher among hazardous drinkers and more than 400% higher among those who reported cocaine or heroin use. Furthermore, controlling for all demographic characteristics, hazardous drinking, and illicit drug use remained positively and significantly associated with an increased likelihood of smoking at follow-up (Wave 2). In the general population, the relationship between nicotine and other substance use is well established (Falk, Yi, & Hiller-Sturmhofel, 2006; Grant, Hasin, Chou, Stinson, & Dawson, 2004; Kahler et al., 2008; McKee, Krishnan-Sarin, Shi, Mase, & O'Malley, 2006). For example, results from the 1997 National Household Survey on Drug abuse showed that 71% of recent illicit drug users smoked cigarettes at least once in the past month (adjusted odds of being a smoker were much greater than for the general population). In addition, quit rate for users was half that of nonusers (23% vs. 56%; Richter, Ahluwalia, Mosier, Nazir, & Ahluwalia, 2002).

Research demonstrates higher rates of hazardous drinking (Drabble, Midanik, & Trocki, 2005; McCabe, Hughes, Bostwick, West, & Boyd, 2009; Wilsnack et al., 2008) and illicit drug use (Corliss, Grella, Mays, & Cochran, 2006; Hillier, De Visser, Kavanagh, & McNair, 2003; Hyde, Comfort, McManus, Brown, & Howat, 2009) among SMW compared to heterosexual women. As such, in health care settings, assessment of smoking status should also include the assessment of alcohol and other illicit drug use. Further, substance use treatment programs should also address nicotine dependency as part of overall substance abuse treatment (Kalman, Kim, DiGirolamo, Smelson, & Ziedonis, 2010). Finally, interventions aimed at reducing hazardous drinking and drug use may serve to reduce health risks related not only to those substances but also tobacco use (Leibel, Lee, Goldstein, & Ranney, 2011; Storholm et al., 2011).

Victimization and poorer mental health have been shown to increase the risk of tobacco, alcohol, and illicit drug use (Downs & Harrison, 1998; Harrison, Fulkerson, & Beebe, 1997; Schuck, 2001; Simpson & Miller, 2002). Studies suggest that SMW report higher rates of victimization (Hughes et al., 2010) and poor mental health (Bostwick, Boyd, Hughes,

& McCabe, 2010) than do heterosexual women. In previous analyses of the CHLEW study (Matthews, Cho, Hughes, Johnson, & Alvy, 2013), we found that childhood physical abuse was associated with earlier age of smoking onset, and that age of smoking onset was associated with current smoker status. However, in this study, neither victimization experiences nor mental health variables (anxiety or depression) were associated with continued smoking at the Wave 2 follow-up. Additional research is needed to better understand the relationships between mental health variables, victimization experiences, and smoking behaviors.

Strengths and Limitations

Study limitations should be noted. Our sample was selected using nonprobability methods. Although probability samples are preferable, they typically over-represent White, middle-class lesbians who are comfortable disclosing their sexual orientation. Another limitation was our reliance on self-reports for smoking status; however, self-report has been established as a fairly reliable indicator of smoking status (Vartiainen, Seppälä, Lillsunde, & Puska, 2002). The data analyzed here were collected as part of a larger study of lesbian health. Although tobacco use behaviors were assessed, these measures did not include standardized measures of nicotine dependency, interest and self-efficacy for quitting, and factors maintaining smoking behaviors. Future studies should include a more extensive measurement of tobacco use behaviors. A relatively small number of women reported not smoking at Wave 2. As such, results of this study need to be replicated in a sample with a larger proportion of smokers reporting quit behaviors. Minority stress is hypothesized to influence a range of risk behaviors among SMW. We did not have a measure of minority specific stress in Wave 1 or Wave 2 data collection. However, data collection for Wave 3 of the study is currently underway and standardized measures of minority stress have been included. Additional research is needed to theorize the factors associated with smoking among SMW and test these models.

CONCLUSIONS

This study is among the first to examine predictors of smoking among SMW over time. Study findings provide valuable information about the characteristics of women who have been least responsive to general antitobacco and smoking cessation messages. Alcohol and other illicit drug use appear to negatively influence the likelihood of a reduction in smoking behavior and should be assessed routinely in primary care settings among SMW who smoke. Future research is needed to examine and to develop population-specific interventions and clinical programs to prevent or address tobacco use in this population group.

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DECLARATION OF INTERESTS

None declared.

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