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Past-year discrimination and cigarette smoking among sexual minority women: Investigating racial/ethnic and sexual identity differences

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Abstract

Objectives: Although findings are mixed, discrimination has been identified as a risk factor for smoking in sexual minority women (SMW; e.g., lesbian and bisexual). We examined associations between past-year discrimination and cigarette smoking among SMW.

Design: Using regression analyses we examined associations of past-year discrimination including count of types of discriminatory experiences and attributions of the main reason for discrimination (i.e., sexual orientation, race/ethnicity, gender) with smoking outcomes (e.g., current smoking, nicotine dependence, smoking more cigarettes now than 12 months ago). We conducted exploratory analyses to examine whether race/ethnicity and sexual identity moderated the associations of past-year discrimination with smoking outcomes.

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Author contributions

All authors contributed to the study conception and design. Data collection was performed by Dr. Tonda Hughes. Dr. Caceres conducted data analyses and wrote the first draft of the manuscript. All authors commented on previous version of the manuscript. All authors read and approved the final manuscript.

Compliance with Ethical Standards

Conflict of interest

The authors declare that they have no conflict of interest to disclose.

Human and animal rights and informed consent

All procedures performed in studies involving human participants were in accordance with ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This study did not include animals. The parent study received ethics approval from the Institute Review Board of University of Illinois at Chicago.

Informed consent

Informed consent was obtained from all participants in the CHLEW study.

Results: The sample included 619 SMW. Most identified as lesbian (74.3%) and non-White (61.1%). SMW who reported a higher count of types of discriminatory experiences (AOR 1.54, 95% CI = 1.12–2.12) and any gender-based discrimination in the past year (AOR 4.79, 95% CI = 1.39–16.45) reported smoking more cigarettes now than 12 months ago. Associations of other past-year discrimination measures with other smoking outcomes were not significant. Compared to White SMW, any discrimination ($B(SD) = 2.56(0.83)$) and a higher count of types of discriminatory experiences in the past year ($B(SD) = 0.88(0.31)$) were associated with higher nicotine dependence scores in Black/African American SMW.

Conclusions: Past-year discrimination are associated with smoking outcomes in SMW. Black/African American race moderated the associations of any past-year discrimination and a higher count of types of discriminatory experiences with nicotine dependence scores in SMW. Targeted interventions to mitigate the influence of discrimination on smoking among SMW are needed.

Keywords

discrimination; health disparities; sexual minority women; tobacco use

Introduction

Despite reductions in prevalence, cigarette smoking remains the leading cause of preventable death among adults in the United States (U.S.), accounting for approximately 1 in 5 deaths every year (Creamer et al., 2019; U.S. Department of Health and Human Services et al., 2014). Therefore, reducing smoking initiation and increasing smoking cessation have been identified as major public health objectives for the U.S. (U.S. Department of Health and Human Services, 2020a).

Smoking prevalence among women is typically lower than men, however, smoking rates among women vary considerably based on a range of sociodemographic and psychosocial risk factors. For example, sociodemographic risk factors associated with smoking among women include younger age, lower socioeconomic status (e.g., education, income), race/ethnicity, and relationship status (female smokers are more likely to be single than nonsmokers) (Riaz et al., 2018; Rim et al., 2013). In addition, analyses of data from the Adult Development Study indicate that women living with a partner who smokes are more likely to initiate or resume smoking (Homish & Leonard, 2005). Psychosocial risk factors for smoking in women include depression (Verplaetse et al., 2016; Weinberger et al., 2013) and childhood trauma (e.g., physical, emotional abuse) (Le et al., 2017; Nemeth et al., 2016). In fact, a literature review of 67 studies found that women who reported a diagnosis of depression or experiences of childhood trauma had a higher likelihood of smoking than women who did not report these (Yang & Hall, 2019). Further, a diagnosis of depression has been associated with higher nicotine dependence in smokers; an association which may be stronger among women smokers in population- and community-based samples (Bainter et al., 2020; Komiyama et al., 2018).

Sexual minority women (SMW; e.g., lesbian, bisexual, and other women who identify as anything other than strictly heterosexual) have 1.5 to 2 times higher odds of smoking than heterosexual women (Caceres et al., 2018; Caceres, Makarem, et al., 2019; Caceres,

Markovic, et al., 2019; Hoffman et al., 2018). Despite consistent findings of higher rates of smoking among SMW than heterosexual women, few studies have examined correlates of smoking in this population (Blosnich et al., 2013; Caceres et al., 2017). However, many of the same sociodemographic and psychosocial factors associated with smoking among heterosexual women are also associated with smoking among SMW (Blosnich et al., 2013; Matthews et al., 2013, 2014; Matthews, Steffen, et al., 2017). For instance, in a community sample of SMW (N = 368) Matthews and colleagues (2013) found that history of childhood physical abuse was positively associated with current smoking. In contrast, previous evidence on the link between depression and current smoking in SMW is conflicting (Blosnich et al., 2013; Matthews et al., 2014). Sexual minority adults are also more likely than their heterosexual counterparts to smoke menthol cigarettes (Fallin et al., 2015). This is particularly concerning as smoking menthol cigarettes has been associated with higher levels of addiction and lower smoking cessation among women smokers (Levy et al., 2011; Smith et al., 2014).

The predominant explanation for health disparities among sexual minority adults is minority stress (Brooks, 1981; Meyer, 2003). The minority stress model postulates that sexual minority individuals experience minority stress, defined as chronic stress exposure (e.g., interpersonal discrimination, bias-motivated violence) that is additive to general life stressors (e.g., childhood trauma, financial or relationship stress, job strain). Minority stress is hypothesized to contribute to negative health outcomes over and above the contribution of general life stressors. Evidence of the association of one key form of minority stress—sexual orientation-based discrimination—on smoking outcomes among sexual minority adults is mixed. For instance, using data from Wave 3 of the National Epidemiologic Survey of Alcohol and Related Conditions (NESARC), McCabe and colleagues found that sexual minority adults who reported greater frequency of past-year sexual orientation-based discrimination had higher odds of smoking (McCabe et al., 2019). Similarly, in an online sample of sexual minority college students, Ylloja and colleagues (2018) found that reports of past-year sexual orientation-based microaggressions were common among current smokers. In contrast, a recent national study using a probability sample found discrimination due to sexual orientation and gender identity were not associated with smoking among sexual minority adults (Lee et al., 2020). Overall, previous work on the link between discrimination and smoking outcomes in sexual minorities has largely focused on discrimination alone to the exclusion of other potentially important psychosocial factors, such as depression and childhood trauma. Similarly, investigators have focused on current smoking with limited examination of other smoking outcomes that are associated with higher mortality and lower rates of smoking cessation in adults, such as nicotine dependence (Kunze et al., 2007; Rojewski et al., 2018).

Evidence on the link between discrimination and smoking in sexual minority populations has primarily focused on discrimination attributed to sexual orientation with less attention to other common reasons for discrimination that may influence smoking risk, such as race/ethnicity and gender (McCabe et al., 2019; Ylloja et al., 2018). Further, the lack of data on racial/ethnic and sexual identity differences in smoking outcomes limits the ability to determine which groups of SMW may be at highest risk for smoking due to discrimination.

These gaps limit the development of tailored interventions to mitigate the influence of discrimination on smoking outcomes in SMW.

Findings on racial/ethnic differences in current smoking rates among SMW are inconsistent. Analyses using nationally representative samples found no differences in smoking between SMW of color and White SMW (McCabe et al., 2018). In contrast, in a multisite study of lesbian and heterosexual women, investigators found current smoking was higher among Black/African American lesbian women (35%) relative to both Black/African American heterosexual (17%) and White lesbian (15%) women (Hughes et al., 2008). Using data from a large convenience sample of sexual minority adults, investigators found Black/African American SMW had a lower likelihood of current smoking than White SMW, but rates of smoking among Latina SMW were similar to those of White SMW (Ortiz et al., 2015).

In studies that examine sexual identity differences, bisexual women typically report higher rates of current smoking than heterosexual and lesbian women. In a study of more than 3000 sexual and gender minority adults living in Toronto Canada, Clarke and Coughlin found higher rates of daily smoking among bisexual women (34.0%) than lesbian women (24.0%; Clarke & Coughlin, 2012). Similarly, analyses of NESARC data found 44.9% of bisexual and 35.3% of lesbian women reported past-year cigarette smoking. Also, more bisexual (36.3%) than lesbian (27.3%) women met criteria for a DSM-5 tobacco use disorder, though this difference was not statistically significant (McCabe et al., 2018).

To address existing gaps in the literature and informed by the minority stress model, we conducted the present study to gain greater understanding of the associations of past-year discrimination (e.g., count of types of discriminatory experiences) and the main attributions or reasons for discrimination (i.e., sexual orientation, race/ethnicity, and gender) with smoking outcomes in SMW. Drawing on relevant literature we hypothesized that greater exposure to past-year discrimination would be associated with worse smoking outcomes in SMW beyond the contribution of established sociodemographic and psychosocial risk factors for smoking. We also conducted exploratory analyses to test potential moderating influences of race/ethnicity and sexual identity on the associations between past-year discrimination and smoking in SMW.

Materials and Methods

Sample

The Chicago Health and Life Experiences of Women (CHLEW) study is a 21-year, five-wave longitudinal study of SMW's alcohol use, health, and well-being that began collecting data in 2000. CHLEW Wave 1 included a convenience sample of 447 English-speaking, lesbian-identified women ages 18 years or older recruited from the Chicago metropolitan area. The Wave 1 sample and recruitment methods have been previously described (Hughes et al., 2006). In Wave 2 (2004–2005), 384 (86%) women of the original sample were re-interviewed. CHLEW Wave 3 (2010–2012) retained 353 women (79%) from the original sample and added a supplemental sample of younger SMW (18–25 years), bisexual women and SMW of color (n=373). We used data from CHLEW Wave 3 because it includes the largest and most racially/ethnically diverse sample (N = 722).

Sample selection.—We included all participants with complete data on discrimination and smoking outcomes. We excluded 26 participants who identified their sexual identity as: mostly heterosexual (n = 8), heterosexual (n = 6), or other (n = 12). Another 54 participants were excluded because they had no coded responses for relationship status, childhood trauma, discrimination, or smoking. Due to small numbers, we excluded participants who identified their race/ethnicity as Asian/Pacific Islander, American Indian/Alaska Native, or other race (n = 23).

Measures

Dependent Variables

Smoking outcomes. We assessed *current smoking* by asking: “Do you currently smoke cigarettes?” (1 = “Yes;” 0 = “No”). We measured *current cigarette use compared to 12 months ago* by asking: “Compared with 12 months ago, are you now smoking more, the same, or fewer cigarettes?” We dichotomized this variable as 1 = “more cigarettes” and 0 “same number or fewer cigarettes.” *Nicotine dependence* was assessed among current smokers with the Fagerström Test for Nicotine Dependence, a widely used measure of nicotine dependence. Higher scores indicate higher levels of nicotine dependence (range 0–10) (Heatherton et al., 1991). Cronbach’s alpha for the Fagerström Test in the present sample was 0.61, which is consistent with previous work (Heatherton et al., 1991). Current smokers were also asked if they smoked *mentholated cigarettes* (1 = “Yes;” 0 = “No”).

Independent Variables

Perceived discrimination. *Perceived discrimination* was assessed by asking about exposure to six types of discriminatory experiences in the past 12 months: 1) ability to obtain healthcare or healthcare insurance, 2) treatment in healthcare, 3) public settings, 4) called names, 5) harassment (e.g., picked on, pushed, and threatened), and 6) any other situation (e.g., at work or school; Krieger et al., 2005). We created a dichotomous variable to account for *any past-year discrimination* (1 = “Yes;” 0 = “No”). For *count of types of discriminatory experiences*, a score of “1” was assigned for each type of discriminatory experience reported by participants and then summed (range = 0–6). Cronbach’s alpha in the present sample was 0.69, which is consistent with previous work (Krieger et al., 2005).

Participants who reported any past-year discriminatory experiences were also asked what they believed was the *main reason* for each type of discriminatory experience. Responses included: “your race/ethnicity,” “because you were assumed or known to be gay, lesbian, or bisexual,” and “your gender” (referring to biological sex). We used these responses to create three dichotomous variables to account for any past-year sexual orientation-based discrimination, race-based discrimination, and gender-based discrimination depending on the main attribution reported by participants (1 = “Main reason;” 0 = “Not main reason”). For example, if a participant who reported four types of discriminatory experiences in the past year attributed three types of discriminatory experiences to sexual orientation, one to race, and none to gender; this participant would receive a score of “1” for both sexual orientation- and race-based discrimination and a score of “0” for gender-based discrimination.

Covariates

Sociodemographic characteristics.: Sexual identity was assessed with the following question: “Recognizing that sexual identity is only one part of your identity how do you define your sexual identity? Would you say that you are: only lesbian/gay, mostly lesbian/gay, bisexual, mostly heterosexual/straight, only heterosexual/straight?” Given that no differences were found between only lesbian and mostly lesbian participants for smoking outcomes (data not shown), they were combined into one category. We assessed *age* (continuous), *race/ethnicity*, *household income*, *education*, and *relationship status*.

Lifetime depression.: Several studies indicate that depression is associated with a higher prevalence of smoking in women (Verplaetse et al., 2016; Weinberger et al., 2013; Yang & Hall, 2019). Therefore, we assessed *lifetime depression* using established criteria (Robins et al., 1981). Persistence of three or more symptoms (e.g., decreased appetite and problems sleeping) for at least two weeks, accompanied by feeling sad, blue, or depressed or by loss of interest or pleasure in things usually cared about, was defined as a depressive episode (1 = “any depressive episode;” 0 = “no depressive episode”).

Childhood trauma.: Given previous evidence that childhood trauma is associated with worse smoking outcomes among women (Le et al., 2017; Nemeth et al., 2016; Yang & Hall, 2019), we assessed three forms of trauma experienced before age 18: sexual abuse, physical abuse, and parental neglect. A dichotomous childhood sexual abuse variable was created using established criteria with “1” indicating presence and “0” the absence of childhood sexual abuse based on established criteria (Wyatt, 1985). Participants were also asked whether they felt they had been physically abused (1 = “Yes;” 0 = “No”) and if they felt their parents had neglected their basic needs (e.g., food and clothing) (1 = “Yes;” 0 = “No”). A *cumulative childhood trauma* score was created by summing childhood trauma experiences reported by participants (range 0–3).

Statistical Analyses

Main analyses.—Analyses were conducted in Stata version 16. We used independent samples *t*-tests and chi-square tests to examine racial/ethnic and sexual identity differences in continuous and categorical variables, respectively. Bonferroni correction was used to determine the significance level of $p < 0.01$ to account for multiple comparisons.

Approximately 5% of participants had missing data for covariates (i.e., sociodemographic characteristics, lifetime depression, and childhood trauma). We used multiple imputation with chained equations to impute missing values. We ran 20 imputations and assessed imputation diagnostics. We used separate logistic regression models to estimate unadjusted and adjusted odds ratios for the associations of past-year discrimination with smoking outcomes. Any past-year discrimination, count of types of discriminatory experiences, sexual orientation-based discrimination, race-based discrimination, and gender-based discrimination were each included as independent variables in separate regression models predicting each of the smoking outcomes. Model 1 was unadjusted for all smoking outcomes. Given evidence that lifetime depression (Verplaetse et al., 2016; Weinberger et al., 2013; Yang & Hall, 2019) and childhood trauma (Le et al., 2017; Nemeth et al.,

2016; Yang & Hall, 2019) are positively associated with smoking in women, both were included, along with sociodemographic characteristics and sexual identity, as covariates in Model 2 for all smoking outcomes. For analyses with the outcome cigarette use now compared to 12 months ago, Model 2 also adjusted for nicotine dependence scores and use of mentholated cigarettes. We then used multiple linear regression models to examine the associations of discrimination with nicotine dependence. In addition to sociodemographic characteristics, sexual identity, lifetime depression, and childhood trauma, Model 2 for the nicotine dependence outcome was adjusted for use of mentholated cigarettes.

Exploratory analyses.—We ran the regression models described above with interaction terms to identify potential moderation by race/ethnicity and sexual identity (i.e., discrimination*race/ethnicity; discrimination*sexual identity). For models examining race/ethnicity as a moderator, White SMW (the largest group) served as the reference group. For models examining sexual identity as a moderator, lesbian women (the largest group) served as the reference group). These models were adjusted in the same manner described for main analyses.

Results

Main Analyses

Table 1 summarizes sociodemographic and psychosocial variables by race/ethnicity and sexual identity. The sample included 619 SMW of whom 38.9% were White, 37.2% Black/African American, and 23.9% Latina. Approximately 74% of women identified as lesbian and 25% as bisexual. Compared to White SMW, Black/African American and Latina SMW were younger, had lower educational attainment, and were more likely to report having experienced at least one form of childhood trauma. Black/African American SMW had lower household incomes and were more likely to be single than White SMW. Black/African American SMW were also less likely than White SMW to report lifetime depression. Bisexual women were younger, more likely to be single, and to have lower educational attainment and lower household incomes than lesbian women.

Table 2 presents past-year discrimination and smoking outcomes by race/ethnicity and sexual identity. Nearly one-half (47.3%) of the study sample reported past-year discrimination: 26.3% reported sexual orientation-based discrimination, 11.3% reported race-based discrimination, and 7.8% reported gender-based discrimination. No racial/ethnic or sexual identity differences were observed in the count of types of discriminatory experiences. However, reports of main reasons for experiencing discrimination differed. Black/African American and Latina SMW were more likely than White SMW to report race-based discrimination. No differences in past-year discrimination were observed between lesbian and bisexual women. Approximately 28.0% of SMW reported current smoking. Black/African American and Latina SMW had higher rates of current smoking and smoking mentholated cigarettes than White SMW. Bisexual women were more likely than lesbian women to be current smokers.

Table 3 presents results of logistic regression models examining associations of past-year discrimination and smoking outcomes. Reporting past-year sexual orientation-based

discrimination was associated with higher odds of current smoking (AOR 1.64, 95% CI = 1.03–2.62, $p = 0.04$), but this was not statistically significant. Current smokers were more likely to report smoking more cigarettes now than 12 months ago if they had a higher count of types of discriminatory experiences (AOR 1.55, 95% CI = 1.12–2.13, $p < 0.01$) and any gender-based discrimination (AOR 4.79, 95% CI = 1.39–16.45, $p < 0.01$) in the past year. None of the past-year discrimination measures were associated with current smoking (Table 3). Similarly, past-year discrimination was not associated with nicotine dependence scores in adjusted models (Table 4).

Exploratory Analyses

We then used linear and logistic regression models to examine race/ethnicity and sexual identity as potential moderators of the associations between past-year discrimination and smoking outcomes. We found no significant racial/ethnic or sexual identity differences for current smoking or cigarette use now compared to 12 months ago (Supplemental Tables 1–2). However, significant differences were observed in models examining racial/ethnic differences in nicotine dependence scores. Black/African American SMW who reported any discrimination ($B(SD) = 2.56 [0.83]$, $p < 0.01$) and a higher count of types of discriminatory experiences ($B(SD) = 0.88 [0.31]$, $p < 0.01$) in the past year had higher nicotine dependence scores relative to White SMW who reported these experiences (Supplemental Table 3). Differences remained after controlling for smoking mentholated cigarettes—which is associated with higher nicotine dependence scores. We found no differences in nicotine dependence scores between Latina and White SMW and no significant differences in the associations of past-year discrimination with nicotine dependence between these groups.

Discussion

This study is among the few to examine associations between past-year discrimination and smoking among SMW. We found that some measures of past-year discrimination were associated with worse smoking outcomes among SMW and identified several associations not previously described in the literature. SMW who were current smokers and who reported experiencing a greater number of types of discriminatory experiences or who reported gender-based discrimination also reported smoking more in the past year than before. Overall, study findings suggest that past-year discrimination is independently associated with smoking more cigarettes now compared to 12 months ago in SMW, even after adjusting for established risk factors. Future research is needed to determine if these findings can be replicated in other samples of SMW.

In contrast to previous studies that found SMW who reported sexual orientation-based discrimination were more likely to be current smokers (McCabe et al., 2019; Ylloja et al., 2018), we found no significant association between experiencing any sexual orientation-based discrimination in the past year with current smoking. There are several possible reasons for these conflicting findings. First, our measure of past-year sexual orientation-based discrimination was dichotomous, whereas previous studies have used continuous measures to assess frequency of sexual orientation-based discrimination (McCabe et al., 2019; Ylloja et al., 2018). Further, the CHLEW sample is older and includes only SMW,

which differs from participants in previous studies of discrimination and smoking among sexual minority adults (Lee et al., 2020; McCabe et al., 2019; Ylloja et al., 2018). Although no previous study has examined potential sex differences in the associations of discrimination and smoking outcomes among sexual minority adults, this is an important area for future research that may identify sex-specific risk factors for smoking within this population. The conflicting evidence on the link between sexual orientation-based discrimination and smoking in sexual minority adults warrants further investigation.

Despite evidence that lifetime depression and childhood trauma are associated with smoking in the general population and among SMW (Matthews et al., 2013, 2014; Matthews, Cesario, et al., 2017; Matthews, Steffen, et al., 2017), neither was associated with smoking in the current study. Previous research not specific to SMW has found that psychosocial factors (e.g., depressive symptoms and anger) mediate the associations between discrimination and smoking in stigmatized adults (Gibbons et al., 2018). Although we assessed lifetime depression and childhood trauma, it is likely that recent/current depression or more proximal exposure to interpersonal trauma (e.g., intimate partner violence) have a greater influence on current smoking. Further, given that we used cross-sectional data, we were unable to examine psychosocial factors that potentially mediate the association between past-year discrimination and smoking in SMW. Assessing mediating factors may help identify treatment targets for behavioral interventions to reduce smoking among SMW.

Overall, our findings highlight the need for research that examines how race/ethnicity and sexual identity influence the associations between discrimination and smoking in SMW. To our knowledge, this is one of the first studies to examine race/ethnicity and sexual identity as moderators of the associations between discrimination and smoking outcomes in SMW. Current smokers who were Black/African American SMW and reported any past-year discrimination and a greater number of types of discriminatory experiences had higher nicotine dependence scores than their White counterparts who reported these experiences. Limited research has examined the associations between discrimination and nicotine dependence in SMW. This gap should be addressed in future work as nicotine dependence is associated with increased mortality and lower rates of smoking cessation among adults (Rojewski et al., 2018). Previous research on the association of discrimination and smoking in SMW has focused mostly on sexual orientation-based discrimination with no examination of racial/ethnic differences (McCabe et al., 2019; Ylloja et al., 2018). Specific to nicotine dependence, analyses of NESARC data found no association between lifetime discrimination and nicotine dependence in SMW (Lee et al., 2016). However, investigators did not examine racial/ethnic differences or attributions of discrimination based on race/ethnicity and gender.

We found no differences in the association of past-year discrimination with smoking outcomes between Latina and White SMW. Among Latinos/as in the U.S., race-based discrimination is associated with higher rates of current smoking, with stronger associations observed among Latino men (Molina et al., 2016) and individuals with higher acculturation (Nguyen et al., 2012). Based on previous evidence from Matthews and colleagues (2014) it appears that greater acculturation is associated with higher prevalence of substance use

(e.g., current smoking and heavy drinking) in Latina SMW, and this association is partially mediated by discrimination (e.g., due to sexual orientation, race/ethnicity, or gender). Future research should investigate in greater depth these factors in relation to smoking outcomes. The lack of differences between White and Latina SMW in the present study might be explained by differences in how acculturation and other sociocultural factors influence smoking in Latina SMW. The small sample of Latina SMW in the CHLEW study who currently smoke may have limited statistical power to detect differences in comparisons of the associations of discrimination and nicotine dependence between Latina and White SMW.

Racial/ethnic differences in nicotine dependence scores that we found have not been previously described. Research on racial/ethnic differences in nicotine dependence among women in the general population is limited and findings are mixed. Previous work has found that Black/African American adults have greater nicotine dependence scores than their White peers (Hooper et al., 2014; St Helen et al., 2013), but analyses of pooled data from three nationally representative surveys found no racial/ethnic or sex differences in nicotine dependence in adults (Rose et al., 2018). However, none of these studies examined discrimination as a predictor of nicotine dependence or included sexual orientation measures. Our findings suggest that past-year discrimination may be an important contributor to nicotine dependence in Black/African American SMW. This highlights the need for future work that examines the differential effect of discrimination on nicotine dependence in high-risk subgroups of SMW.

Previous research suggests bisexual women may smoke at higher rates than either lesbian or heterosexual women (Clarke & Coughlin, 2012; McCabe et al., 2018). We found no differences in reports of past-year discrimination or the associations of past-year discrimination with smoking outcomes in our regression analyses. We are unaware of previous work that has examined differences between lesbian and bisexual women in these associations. Given prior evidence that bisexual women experience worse health outcomes than lesbian women, such as mood disorders and substance use, investigating sexual identity differences in the influence of discrimination on smoking outcomes is an important area for future work (Bostwick et al., 2010; Lewis et al., 2019; Talley et al., 2016).

Recent studies have highlighted the importance of accounting for intersectionality when examining smoking outcomes among sexual minority adults (Amroussia et al., 2019, 2020). Intersectionality is a theoretical framework grounded in feminist theory that has gained recognition in health research as an approach that can more fully address health inequities (Bauer, 2014; Crenshaw, 1989; Jackson & VanderWeele, 2019; Richman & Zucker, 2019). It explicates how a person's social position is shaped by intersecting systems of power that produce social inequities (Bauer, 2014). Future research on smoking among SMW should take an intersectional approach to investigate how intersecting identities as well as social processes (e.g., sexual orientation-based discrimination, socioeconomic disadvantage) impact the health and wellbeing of this population.

This study has several limitations. First, questions about reasons for discrimination asked about gender rather than biologic sex. Given that SMW are less likely than heterosexual women to adhere to traditional gender roles and gender expression, they may be more

likely to experience discrimination based on non-traditional gender roles or expression. They may also be more likely to interpret the question about gender to be about their gender expression than about their biological sex. Second, participants were asked to remember past-year experiences of discrimination, which is susceptible to recall bias and potential underreporting. Third, study participants may have experienced multiple episodes of discrimination throughout their lives and the cumulative impact of such experiences over multiple years may pose greater risk of smoking than past-year discrimination. However, analyses of recent nationally representative data suggest that past-year sexual orientation-based discrimination had a greater effect on current tobacco use than prior-to-past-year experiences (McCabe et al., 2019). Fourth, given that only 173 women in the CHLEW study were current smokers, we were unable to examine the intersection of race/ethnicity and sexual identity on smoking outcomes (e.g., compare Latina bisexual women to White lesbian women). Future research is needed that includes larger samples of current smokers, particularly women of color and bisexual women, to more fully understand racial/ethnic and sexual identity differences in associations of past-year discrimination and smoking. Further, we did not assess resilience (e.g., coping responses to discrimination)—a factor that may moderate the association of discrimination and smoking. Among Black/African American men somatic responses (e.g., headache and upset stomach) to past experiences of discrimination were associated with higher odds of cigarette smoking (Parker et al., 2017). Future studies should assess how responses to discrimination influence smoking behaviors in SMW, particularly Black/African American women. Another important area of future research is more in-depth examination of the extent to which experiences of discrimination account for the smoking disparities observed between SMW and heterosexual women. Last, due to sample size constraints we excluded participants who did not identify as Black/African American, Latina or White (e.g., Asian or American Indian women). Future work is needed to examine the association of discrimination and smoking in these understudied groups of SMW.

Despite these limitations, our findings provide evidence that can be used to inform clinical practice and policy. It is imperative that clinicians and public health professionals be educated about factors that influence smoking in SMW. This is particularly important for Black/African American SMW, given their higher prevalence of smoking-related conditions, such as obesity (Caceres, Ancheta, et al., 2020; Caceres, Streed, et al., 2020; Caceres, Veldhuis, et al., 2019), hypertension (Caceres, Ancheta, et al., 2020; Caceres, Veldhuis, et al., 2019), and diabetes (Caceres, Ancheta, et al., 2020; Caceres, Veldhuis, et al., 2019), relative to White SMW. Our findings suggest there is a need for targeted interventions to mitigate the influence of discrimination on smoking and its long-term health effects among SMW. A qualitative study of 31 sexual and gender minority adults who were current smokers identified several barriers to accessing smoking cessation treatment (e.g., cost of treatments and inadequate of healthcare providers in accessing these services) (Matthews, Cesario, et al., 2017). Further, racial/ethnic disparities in access and use of smoking cessation have been described in the general population. For instance, smokers who are Latino are less likely than White smokers to receive tobacco treatment counseling (Tan et al., 2018). Compared to their White peers, Black/African American, Latino, and Asian American/Pacific Islander smokers are less likely to use nicotine replacement therapy on

their last quit attempt (U.S. Department of Health and Human Services, 2020b). Healthcare providers should systematically assess smoking behaviors and offer smoking cessation treatment as appropriate to high-risk groups of SMW. Smoking prevention and cessation efforts should also seek to enhance resilience (e.g., positive coping and social support) among SMW to buffer the negative health effects of discrimination and other sexual minority stressors.

Although scant research has focused on structural discrimination or stigma (i.e., societal-level policies and practices that restrict the rights, opportunities, and wellbeing of stigmatized people) (Hatzenbuehler & Link, 2014), it is clear that this form of discrimination may have important health impacts on SMW. Studies that have found associations between structural stigma and smoking among sexual minority people have focused on adolescents and young adult sexual minority men and have not examined sex/gender or racial/ethnic differences in smoking outcomes (Hatzenbuehler et al., 2014; Pachankis et al., 2014). Policies that provide sexual minority adults with protections from interpersonal and structural forms of discrimination can potentially reduce negative health outcomes, such as smoking, in these individuals. Research examining links between structural discrimination with smoking outcomes in diverse samples of SMW could increase understanding of contributors to smoking disparities in SMW.

Conclusions

This study has important implications for future research examining the link between discrimination and smoking in SMW. Our findings support the need for targeted interventions to reduce smoking in SMW, especially those who have experienced past-year discrimination. Exploratory analyses found that Black/African American SMW who reported past-year discrimination and a higher count of types of discriminatory experiences evidenced greater nicotine dependence than their White counterparts, respectively. Additional research examining the differential effect of discrimination on smoking in high-risk subgroups of SMW is needed.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Table 1. Sociodemographic characteristics and psychosocial factors by race/ethnicity and sexual identity (N = 619).

	Race/ethnicity					Sexual identity			
	Total Sample (N = 619)	White (n = 241)	Black/ African American (n = 230)	White vs. Black/ African American p-value	Latina (n = 148)	White vs. Latina p-value	Lesbian (n = 460)	Bisexual (n = 159)	Lesbian vs. Bisexual p-value
Sociodemographic characteristics and psychosocial factors		Mean (SD)/N (%)		p-value	Mean (SD)/N (%)		Mean (SD)/N (%)		p-value
Age (mean)	40.2 (14.3)	43.6 (16.1)	39.7 (13.1)	<0.01	35.3 (11.1)	<0.001	42.3 (14.3)	34.3 (12.6)	<0.001
Sexual identity									
Lesbian	460 (74.3)	184 (76.4)	168 (73.0)	0.41	108 (73.0)	0.45	-	-	-
Bisexual	159 (25.7)	57 (23.6)	62 (27.0)		40 (27.0)				
Race/ethnicity									
White	241 (38.9)	-	-	-	-	-	184 (40.0)	57 (35.9)	0.65
Black/African American	230 (37.2)						168 (36.5)	62 (39.0)	
Latina	148 (23.9)						108 (23.5)	40 (25.1)	
Education									
Less than high school	50 (8.0)	2 (0.8)	32 (13.8)	<0.001	16 (10.8)	<0.001	28 (6.1)	22 (13.8)	<0.001
High school/GED	80 (13.0)	8 (3.3)	51 (22.2)		21 (14.2)		52 (11.3)	28 (17.6)	
Some college	190 (30.7)	53 (22.0)	88 (38.3)		49 (33.1)		140 (30.4)	50 (31.5)	
College	128 (20.7)	67 (27.8)	33 (14.4)		28 (18.9)		102 (22.2)	26 (16.4)	
Graduate school	171 (27.6)	111 (46.1)	26 (11.3)		34 (23.0)		138 (30.0)	33 (20.7)	
Household income									
<\$20,000	190 (30.7)	47 (19.5)	108 (46.9)	<0.001	35 (23.7)	0.03	114 (24.7)	76 (47.8)	<0.001
\$20,000–\$39,999	118 (19.0)	50 (20.8)	45 (19.6)		23 (15.5)		83 (18.0)	35 (22.0)	
\$40,000–\$74,999	138 (22.3)	51 (21.1)	43 (18.9)		44 (29.7)		113 (24.6)	25 (15.7)	
75,000	144 (23.3)	86 (35.7)	21 (9.1)		37 (25.0)		130 (28.3)	14 (8.8)	
Missing	29 (4.7)	7 (2.9)	13 (5.6)		9 (6.1)		20 (4.4)	9 (5.7)	

	Race/ethnicity					Sexual identity			
	Total Sample (N = 619)	White (n = 241)	Black/ African American (n = 230)	White vs. Black/ African American	Latina (n = 148)	White vs. Latina	Lesbian (n = 460)	Bisexual (n = 159)	Lesbian vs. Bisexual
Sociodemographic characteristics and psychosocial factors	Mean (SD)/N (%)		p-value	Mean (SD)/N (%)	p-value	Mean (SD)/N (%)	p-value		
Relationship status									
Committed, cohabitating	241 (38.9)	123 (51.0)	65 (28.3)	<0.001	53 (35.8)	0.02	204 (44.4)	37 (23.3)	<0.001
Committed, not cohabitating	140 (22.7)	39 (16.2)	63 (27.4)		38 (25.7)		98 (21.3)	42 (26.4)	
Single	236 (38.1)	78 (32.4)	101 (43.9)		57 (38.5)		158 (34.3)	78 (49.1)	
Missing	2 (0.3)	1 (0.4)	1 (0.4)		0 (0.0)		0 (0.0)	2 (1.2)	
Lifetime depression									
Yes	359 (58.0)	166 (68.9)	106 (46.1)	<0.001	87 (58.8)	0.05	274 (59.6)	85 (53.5)	0.34
No	255 (41.2)	73 (30.3)	121 (52.6)		61 (41.2)		183 (39.8)	72 (45.3)	
Missing	5 (0.8)	2 (0.8)	3 (1.3)		0 (0.0)		3 (0.6)	2 (1.2)	
Childhood trauma									
0	128 (20.7%)	75 (31.1%)	23 (10.0%)	<0.001	30 (20.3%)	<0.001	91 (19.7%)	37 (23.4%)	0.13
1	228 (36.8%)	87 (36.1%)	85 (37.0%)		56 (37.8%)		168 (36.4%)	60 (38.0%)	
2	206 (33.3%)	51 (21.2%)	105 (45.7%)		50 (33.8%)		156 (33.8%)	40 (31.7%)	
3	46 (7.4%)	22 (9.1%)	14 (6.0%)		10 (6.7%)		40 (8.6%)	6 (3.8%)	
Missing	11 (1.8%)	6 (2.5%)	3 (1.3%)		2 (1.4%)		6 (1.3%)	5 (3.1%)	

Note. Boldface denotes statistical significance $p < 0.01$.

Table 2. Past-year discrimination and smoking outcomes by race/ethnicity and sexual identity (N = 619).

	Race/ethnicity						Sexual identity		
	Total Sample (N = 619)	White (n = 241)	Black/ African American (n = 230)	White vs. Black/ African American	Latina (n = 148)	White vs. Latina	Lesbian (n = 460)	Bisexual (n = 159)	Lesbian vs. Bisexual
Past-year discrimination		Mean (SD)/N (%)		p-value	Mean (SD)/N (%)	p-value	Mean (SD)/N (%)		p-value
Any discrimination	293 (47.3)	110 (45.6)	114 (49.6)	0.39	69 (46.3)	0.85	217 (47.2)	76 (47.8)	0.89
Count of types of discriminatory experiences				0.71		0.99			0.87
0	326 (52.7)	131 (54.4)	116 (50.4)		79 (53.4)		243 (52.8)	83 (52.2)	
1	140 (22.6)	52 (21.6)	56 (24.4)		32 (21.6)		106 (23.0)	34 (21.4)	
2	75 (12.1)	31 (12.8)	26 (11.3)		18 (12.2)		55 (12.0)	20 (12.6)	
3	45 (7.3)	15 (6.2)	19 (8.3)		11 (7.4)		33 (7.1)	12 (7.6)	
4	22 (3.5)	9 (3.7)	7 (3.0)		6 (4.1)		14 (3.1)	8 (5.0)	
5	11 (1.8)	3 (1.3)	6 (2.6)		2 (1.3)		9 (2.0)	2 (1.2)	
Any sexual orientation-based discrimination	163 (26.3)	70 (29.1)	56 (24.4)	0.25	37 (25.0)	0.39	131 (28.5)	32 (20.1)	0.04
Any race-based discrimination	70 (11.3)	5 (2.1)	45 (19.6)	<0.001	20 (13.5)	<0.001	49 (10.7)	21 (13.2)	0.38
Any gender-based discrimination	48 (7.8)	26 (10.8)	13 (5.7)	0.04	9 (6.1)	0.12	30 (6.5)	18 (11.3)	0.06
Smoking outcomes									
Current smoker	173 (28.0)	38 (15.8)	92 (40.0)	<0.001	43 (29.1)	<0.01	112 (24.4)	61 (38.4)	<0.01
Cigarettes now compared to 12 months ago among current smokers				0.76		0.58			0.29
Fewer cigarettes	64 (37.0)	13 (34.2)	32 (34.8)		19 (44.2)		39 (34.8)	25 (41.0)	
About the same	72 (41.6)	15 (39.5)	41 (44.6)		16 (37.2)		44 (40.2)	27 (44.3)	

	Race/ethnicity					Sexual identity				
	Total Sample (N = 619)	White (n = 241)	Black/ African American (n = 230)	White vs. Black/ African American	<i>p</i> -value	Latina (n = 148)	White vs. Latina	Lesbian (n = 460)	Bisexual (n = 159)	Lesbian vs. Bisexual
Past-year discrimination										
Mean (SD)/ N (%)										
More cigarettes	37 (21.4)	10 (26.3)	19 (20.6)	8 (18.6)	28 (25.0)	9 (14.7)				
Nicotine dependence among current smokers (range 0–10; mean)	2.5 (2.8)	2.3 (2.0)	3.0 (2.0)	0.05	2.5 (2.7)	0.58	2.8 (2.0)	2.7 (2.5)		0.86
Mentholated cigarette use among current smokers	116 (67.1)	7 (18.4)	77 (83.7)	<0.001	32 (74.4)	<0.001	72 (64.3)	44 (72.1)		0.29

Note. Boldface denotes statistical significance $p < 0.01$.

Table 3.

Results of logistic regression models examining the associations of past-year discrimination with smoking outcomes (N = 619).

Past-year discrimination	Current smoking (n = 619)		Smoke more cigarettes now compared to 12 months ago among current smokers (n = 173)	
	Model 1 OR (95% CI)	Model 2 AOR (95% CI)	Model 1 OR (95% CI)	Model 2 ^a AOR (95% CI)
Any discrimination	1.58 (1.11–2.24)	1.48 (0.96–2.27)	2.62 (1.18–5.83)	2.21 (0.90–5.44)
Count of types of discriminatory experiences	1.17 (1.02–1.34)	1.18 (0.99–1.39)	1.57 (1.20–2.04)	1.55 (1.12–2.13)
Any sexual orientation-based discrimination	1.64 (1.12–2.40)	1.64 (1.03–2.62)	1.96 (0.94–4.14)	1.74 (0.72–4.20)
Any race-based discrimination	0.96 (0.55–1.67)	0.87 (0.45–1.69)	1.83 (0.64–5.20)	1.73 (0.53–5.62)
Any gender-based discrimination	1.07 (0.56–2.04)	0.83 (0.38–1.82)	4.30 (1.40–13.18)	4.79 (1.39–16.45)

Note. OR = odds ratio; AOR = adjusted odds ratio; Model 1 = unadjusted; Model 2 = added age, race/ethnicity, sexual identity, education, household income, relationship status, lifetime depression, and childhood trauma; Data represent results of separate logistic regression models with each measure of past-year discrimination entered as the independent variable across models.

Boldface denotes statistical significance $p < 0.01$.

^aModel 2 added nicotine dependence score and use of mentholated cigarettes.

Results of linear regression models examining the associations of discrimination with nicotine dependence among current smokers (N = 173).

Table 4.

	Nicotine dependence score (B [SE])	
	Model 1	Model 2
Past-year discrimination		
Any discrimination	0.09 (0.34)	0.34 (0.35)
Count of types of discriminatory experiences	-0.16 (0.13)	-0.02 (0.13)
Any sexual orientation-based discrimination	-0.20 (0.35)	-0.15 (0.37)
Any race-based discrimination	-0.26 (0.53)	0.07 (0.54)
Any gender-based discrimination	-0.22 (0.61)	0.08 (0.61)

Note. Model 1 = unadjusted; Model 2 = added age, race/ethnicity, sexual identity, education, household income, relationship status, lifetime depression, childhood trauma, and use of mentholated cigarettes; Data represent results of separate linear regression models with each measure of past-year discrimination entered as the independent variable across models.

Boldface denotes statistical significance $p < 0.01$.