Published in final edited form as:

Soc Psychiatry Psychiatr Epidemiol. 2017 March ; 52(3): 279–289. doi:10.1007/s00127-016-1329-x.

Gender discrimination, educational attainment, and illicit drug use among U.S. women

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Abstract

Purpose—While gender inequality has been a topic of concern for decades, little is known about the relationship between gender discrimination and illicit drug use. Further, whether this association varies by education level is unknown.

Methods—Among 19,209 women participants in Wave 2 of the National Epidemiologic Survey on Alcohol and Related Conditions (2004–2005), we used logistic regression to test the association between gender discrimination (measured with four items from the Experiences of Discrimination instrument) and three outcomes: past-year illicit drug use, frequent drug use, and drug use disorders. We then tested whether associations differed by education level.

Results—Gender discrimination was reported by 9% of women and was associated with past-year drug use (adjusted odds ratio [aOR]=2.67; 95% confidence interval [CI]=2.17–3.29), frequent drug use (aOR=2.82; CI=1.99–4.00), and past year drug use disorders (aOR=3.15; CI=2.16–4.61). All specific domains of gender discrimination (on the job, in public, with institutions, being called a sexist name) were associated with all drug use outcomes. The association between gender discrimination and past-year drug use was stronger among women with less than a high school education (aOR=6.33; CI=3.38–11.85) compared to those with more education (aOR=2.45; CI=1.97–3.04; $p_{\text{interaction}} < 0.01$).

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Ethical standards

Informed consent was obtained for participation and study procedures were approved by the U.S. Office of Management and Budget. Human subjects research approval for the NESARC study was granted by the U.S. Census Bureau and the U.S. Office of Management and Budget.

Conflict of interest

The authors declare that they have no conflict of interest.

Conclusions—Gender discrimination is consistently and strongly associated with illicit drug use and drug use disorders among U.S. women, with significantly higher odds for drug use among women with less than a high school education. Future research should examine whether explicitly addressing distress from discrimination could benefit women in drug treatment, especially among clients with lower educational attainment.

Keywords

sex discrimination; gender; drug use disorders; psychological stress; educational status

INTRODUCTION

Discrimination has been defined as “a socially structured and sanctioned phenomenon, justified by ideology and expressed in interactions among and between individuals and institutions, that maintains privileges for members of dominant groups at the cost of deprivation for others” [1]. According to a recent national poll, almost two-thirds of U.S. women report that women face at least “some” gender discrimination in contemporary U.S. society [2]. Unequal treatment of women, particularly regarding pay, workplace sexual harassment, and the “glass ceiling” of job advancement, has been a topic of concern for decades [3–7]. However, inequalities and sexism persist in today’s society, often taking subtle forms that are not readily or publicly acknowledged [8]. While in a few cases, women speak out publicly about sexual discrimination and harassment [6, 7, 9], many others may be reluctant to come forward, instead internalizing negative responses to unfair treatment, especially in situations with large power differentials [10, 11]. Such internalizing coping strategies may lead to behaviors that have important health consequences. However, the relationship between gender discrimination and health has received relatively little attention, even though gender discrimination may be a particularly harmful form of stress because it is personal and directed at what is often an important component of an individual’s identity [12, 13].

Many studies have demonstrated associations between discrimination based on race or sexual orientation and health. In recent years, these forms of prejudice have tended to be more newsworthy and more visible to the general public and in the public health literature. A recent review of the public health literature on discrimination found that far fewer studies addressed gender bias and health outcomes [1]. Those that do show that women’s exposure to gender discrimination, sexist events, and sexual harassment is associated with elevated psychological distress, depressive and anxious symptoms, and poorer physical health [14–18]. However, while substance use is a well-established dysfunctional coping behavior for acute and chronic stressors [19–23], little is known about the relationship between gender discrimination and illicit substance use or substance use disorders among U.S. women. A recent review of the literature on discrimination and alcohol use found that of the 97 studies reviewed from the previous 35 years, only 3% focused on gender discrimination (compared 70% on racial/ethnic discrimination and 16% on sexual orientation discrimination) [24]. Studies in local or convenience samples of women show that gender discrimination is associated with substance use or abuse in college students [13], young adults [25], and those seeking family planning services [26]. The same relationship was found in a national sample

of U.S. Latinas [27]. In a U.S. national survey, gender discrimination was associated with alcohol and drug use disorders [28]. Cumulatively, these studies suggest that gender discrimination may play a role in women's illicit drug use and abuse. However, the relationship of gender discrimination to illicit drug use *per se* has not been examined in a large, nationally representative sample. Illicit drug use, even at levels below clinical thresholds for substance use disorders, can have important consequences, including employment problems [29], injury and accidents [30, 31], and later substance use disorders. Therefore, understanding its relationship to gender discrimination could help in addressing the root causes of these public health concerns. Furthermore, diverse forms of discrimination in different settings may have different effects on illicit drug use. This information may be relevant to legal action or policy [1, 32], but is currently lacking.

In addition, no studies have explored the association of gender discrimination and illicit drug use by education level, even though scholars have urged a deeper exploration of health disparities at the intersection of multiple disadvantaged statuses within a society [33–35]. Intersectionality theory posits complex health outcomes associated with inhabiting multiple disadvantaged statuses within a society, and highlights the importance of studying the health implications of discrimination at these intersections [33–35]. Specifically, education level may affect the relationship between gender discrimination and drug use in multiple ways. First, education and its outcomes may give women access to material resources in the form of finances, authority, and social networks that enable them to actively respond to discriminatory experiences [36–38]. Second, education may act directly by establishing a historical context for discrimination, connecting women with a wider feminist movement, and giving women the knowledge to access resources to respond to discriminatory experiences [39, 40]. Third, education may affect health behaviors such as drug use in response to stress through psychosocial factors. Higher socioeconomic status, and education in particular, is associated with greater assertiveness [41], feelings of power that enhance the ability to self-regulate health behaviors [42, 43], and greater perceived control which has been linked to more problem-oriented coping strategies, reduced distress, and better overall health [44–47]. Finally, education may serve as a proxy for other forms of social disadvantage throughout the lifecourse which may influence women's stress reactions and coping behaviors [38, 47, 48]. Overall, the access to more modes of active coping strategies associated with educational attainment could diminish the need for detrimental coping in the form of drug use. Exploring whether gender discrimination is differentially associated with illicit drug use outcomes by education level could therefore help in understanding etiologic pathways, or in adapting treatments for drug use disorders among women.

We therefore sought to expand on previous research by addressing three questions. First, we assessed whether self-reported gender discrimination in the past year was related to past-year illicit drug use, frequent drug use, or drug use disorders in a representative sample of U.S. women. Second, we examined whether these associations varied by the type of discrimination reported. Third, we conducted exploratory analyses to determine whether the relationship between gender discrimination and drug use varied by educational attainment.

METHODS

Study Design and Sample

This study analyzed data from participants of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), Wave 2 study. The NESARC Wave 1 study (2001–2002) was a nationally-representative face-to-face survey of the US adult civilian population living in households or group quarters [49]. The NESARC Wave 2 study was a face-to-face re-interview of these participants (N=34,653) conducted in 2004–2005. The cumulative response rate of NESARC Wave 2 sample is 70.2%. Participant data were weighted to account for probability of selection within strata and households, non-response, and oversampling, and then further adjusted so that weighted sociodemographic sample distributions match civilian population distributions as measured by the 2000 census [49, 50]. Informed consent was obtained for participation and study procedures were approved by the U.S. Office of Management and Budget. The present study analyzed data from women in the NESARC Wave 2 sample who were either of Black or White race, or of Hispanic ethnicity (N=19,209).

Measures

Study participants completed the Alcohol Use Disorder and Associated Disabilities Interview Schedule–DSM-IV Version (AUDADIS-IV). The AUDADIS-IV is a fully-structured diagnostic interview administered by trained lay study staff, and has demonstrated good to excellent psychometric properties for all measures utilized in these analyses [51, 52].

Main Exposures

Discrimination Experiences: Experiences of gender discrimination were assessed using four items from the AUDADIS-IV gender discrimination instrument, adapted from the Experiences of Discrimination instrument originally developed and validated by Krieger, et al. [53, 54]. Respondents received the following prompt: “Now I’d like to ask you about sex discrimination that some people experience because they are male or female. I’d like to know about how often you have experienced discrimination, been prevented from doing something, or been hassled or made to feel inferior in any of the following situations because you are (male/female).”

Respondents were asked how often in the past year had they experienced discrimination because they are female in the following settings: 1) in obtaining employment or on the job; 2) in public settings (on the street, in stores, in restaurants); 3) from institutions (e.g., within school or program admissions processes, in the criminal justice system, or while obtaining housing); as well as 4) being called a sexist name. Participants reported whether or not they had experienced these events “never”, “almost never”, “sometimes”, “fairly often”, or “very often” in the past 12 months. Consistent with operationalizations employed in previous studies [28, 55], a binary variable was created with an affirmative response set if a participant reported experiencing that discrimination event at least “sometimes” in the past 12 months. From this, we created a composite binary “any discrimination” variable.

The test-retest reliability intra-class coefficient (ICC) for the full six-item past-year gender discrimination scale was good in the NESARC sample [52]. However, in the present sample, internal consistency of the four gender discrimination items ($\alpha=0.56$) was below the level generally accepted as adequate, 0.70 [56], suggesting that the four gender discrimination items did not constitute a scaled measure of an underlying discriminatory environment. Therefore, we examined the different discriminatory experiences as separate exposures, or as a composite “any discrimination” exposure.

Main Outcomes

Illicit Drug Use: Illicit drug use was defined as use of any illegal drug in the past year. Illicit drugs included marijuana, cocaine, hallucinogens, stimulants, heroin, inhalants and prescription drugs used without a doctor’s recommendation or differently than as prescribed. Prescription drugs included amphetamines, opioids, tranquilizers, and sedatives. We created binary variables for any illicit drug use and for frequent illicit drug use. Frequent illicit drug use was defined as using illicit drugs at least once per week in the past year. Within the NESARC Wave 2 sample, test-retest reliability as measured by intra-class correlation ranged from fair to excellent for past 12 month use of major illicit substances (ICC range: 0.50–0.86) [51].

DSM-IV substance use disorders: DSM-IV drug use disorders were measured with the AUDADIS-IV. The AUDADIS-IV demonstrated excellent test-retest reliability for any drug use disorder in a general population sample (Kappa [S.E.] = 0.79 [0.10]) [51]. Participants who met criteria for either DSM-IV drug abuse or dependence were classified as having a past-year drug use disorder.

Effect Modifier

Educational Attainment: No previous studies existed to guide how education level might affect the association between gender discrimination and drug use. We therefore explored these relationships using various categories of educational attainment. This produced results indicating a threshold effect to the risk estimates, whereby women with less than a high school education were at notably higher risk for drug use outcomes related to experiencing gender discrimination, consistent with prior studies showing that the functional form of educational degrees on health and other outcomes is discontinuous rather than linear [38, 48, 57, 58]. Noting the strong and consistently measured relationship between high school dropout and substance use [59], we therefore dichotomized educational attainment as having a high school degree or its equivalent versus having less than a high school degree, with higher educational attainment serving as the reference category.

Control Variables—Several control covariates were hypothesized as potential confounders of the relationship between gender discrimination and drug use outcomes, and thus were included in analyses: age in years (18–34; 35–49; 50–64; 65+); race/ethnicity (Black, non-Hispanic; White, non-Hispanic; Hispanic); marital status (married or living as if married; widowed, divorced, or separated; never married); annual personal income (< \$20,000; \$20,000–\$34,999; \$35,000–\$49,999; >\$50,000); educational attainment (<high school; high school or more); urbanicity (urban vs. rural); and region (Northwest, Midwest,

West, South, Northeast). Urbanicity and region variables were based on US census definitions and participant's location of current residence. Non-Hispanic American Indian, Alaska Native, Asian, Native Hawaiian, and other Pacific Islander women (n=542) were excluded from analyses due to model convergence issues when including them in a separate race/ethnicity category.

Statistical Analysis

We first estimated the associations between the different gender discrimination experiences, as well as any gender discrimination, and drug use outcomes using logistic regression. These models controlled for age, race/ethnicity, marital status, urbanicity, and region, as well as education and personal income. We present covariate-adjusted odds ratios (aORs) and 95% percent confidence intervals (CI) for drug use outcomes, comparing those exposed to those unexposed to gender discrimination experiences. We also present covariate-adjusted predicted marginal prevalences and their standard errors for the drug use outcomes among those exposed and unexposed to gender discrimination experiences [60, 61]. These estimated prevalences reflect the probability that a U.S. adult woman would be measured as having a given drug use outcome had the US adult female population been balanced on the confounders included in the multivariable logistic regression model.

We then evaluated whether educational attainment modified the association between gender discrimination and drug use outcomes using logistic regression. These interaction models controlled for age, race/ethnicity, marital status, urbanicity, and region, as well as the main effect of educational attainment, and its multiplicative interaction term with "any gender discrimination." We present the covariate-adjusted ORs for drug use outcomes comparing those exposed to those unexposed to gender discrimination experiences, at different levels of educational attainment, and their 95% percent confidence intervals. Stratum-specific ORs were estimated by the interaction models. We also present p-values for the multiplicative interaction terms.

Finally, sensitivity analyses assessed whether results were similar for marijuana use compared to other drug use, and when stratified by race/ethnicity. All models were implemented using SUDAAN version 11.0.1[62], included sample weights, and accounted for the complex survey design of the NESARC Wave 2 study.

RESULTS

Among U.S. women in 2004–05, 14.79% (SE=0.55) had less than a high school education or its equivalent (Table 1). Overall, 8.89% (SE=0.28) reported experiencing discrimination on the job, in public settings, from institutions, or being called a sexist name at least "sometimes" in the year prior to interview. More than one in twenty (5.16%, SE=0.21) reported using an illicit substance at least once in the 12 months prior to the interview, less than one in fifty (1.70%, SE=0.12) reported using at least once a week in the prior 12 months prior, and 1.54 % (SE=0.13) met criteria for a DSM-IV drug use disorder during the prior 12 months.

Women with at least a high school education were more likely to be younger, married or living as married, White, to be from a region other than the Midwest, and to have higher personal income than women who did not complete high school. Women with at least a high school education reported significantly more discrimination (any of the four types considered) than women who did not complete high school education (9.64% [SE=0.30] vs. 4.19% [SE=0.43]). Women with at least high school education also reported more past-year illicit drug use (5.39% [SE=0.23] vs. 3.73% [SE=0.44]), and were more likely to meet criteria for DSM-IV Drug Use Disorder (1.10% [SE=0.11] vs. 0.52% [SE=0.17]).

Discrimination and Substance Use

Gender discrimination experiences were significantly associated with all drug use outcomes in adjusted logistic regression models (Table 2). Women who reported any past-year discrimination had higher odds for illicit drug use (aOR = 2.67; CI: 2.17–3.29), frequent illicit drug use (aOR = 2.82; CI: 1.99–4.00), and any drug use disorder (aOR = 3.15; CI: 2.16–4.61), compared to women not reporting discrimination.

All specific domains of gender discrimination were significantly associated with all drug use outcomes in regression models (Table 2). Women reporting gender discrimination on the job, in public, from institutions, and from being called a sexist name had higher odds for any past year drug use (aORs 1.80–3.46), frequent drug use (aORs 1.68–3.52), and drug use disorders (aORs 1.98–4.39), compared to women who did not report discrimination. The highest odds were for drug use disorders associated with being called a sexist name and for frequent drug use associated with discrimination from institutions.

Effect Modification by Educational Attainment

Odds ratios for all drug use outcomes associated with experiencing gender discrimination were higher for women with less than a high school education, relative to women with at least a high school education (Table 3). However, these differences were only significant for any past year illicit drug use (aOR_{interaction}=2.59; CI: 1.34–4.99; p_{interaction}=0.0053). Among women with less than a high school degree, the adjusted odds ratio for illicit drug use was 6.33 (CI: 3.38–11.85), compared to an odds ratio of 2.45 (CI: 1.97–3.04) among women with at least a high school degree.

Sensitivity Analyses

Sensitivity analyses assessed whether race/ethnicity moderated the association between gender discrimination and educational attainment on past-year drug use. First, we tested the 2-way interaction between race/ethnicity and gender discrimination. Interaction terms were not significant for any outcomes (p=0.92 for any drug use, p=0.32 for frequent drug use, and p=0.17 for drug use disorders). Unfortunately, 3-way interaction terms could not be calculated due to cell sizes of less than n=5 for all of the relatively rare drug use outcomes assessed.

We also assessed whether results differed for use of marijuana compared to use of other drugs. Effect sizes for the association between any past year gender discrimination and drug use were similar and all significant for marijuana compared to other drugs, though adjusted

odds ratios were greater for other drug use for all outcomes assessed. Stratified by education level, effect sizes for the association between past-year gender discrimination and drug use were consistently larger for women with less than a high school education compared to their more educated counterparts. These differences were statistically significant for past year other drug use (aOR = 7.13; CI: 3.40–14.96 for less educated; aOR = 2.45; CI: 1.97–3.27 for more educated; $p=0.01$) and other drug use disorders (aOR = 13.73; CI: 3.51–53.70; aOR = 2.97; CI: 1.79–4.91, respectively; $p=0.04$). Among less educated women, adjusted odds ratios for exposure to discrimination were also consistently larger for other drug use compared to marijuana use outcomes. The same was not true for women with at least a high school education, possibly indicating that gender discrimination is more strongly associated with drug use other than marijuana only among women with less than a high school education. However, cell sizes were very small for these outcomes, so results should be interpreted with caution.

DISCUSSION

Among U.S. women, we found that self-reported experiences of gender discrimination measured with items from a widely-used index were associated with 2 to 4 times higher odds for illicit drug use and drug use disorders. To our knowledge, this is the first study to report on the association between gender discrimination and illicit drug use in any nationally representative sample. These findings contribute to a growing body of empirical evidence for an association between gender discrimination and adverse mental and physical health outcomes [14–18]. Findings are consistent with a theoretical understanding of gender discrimination as a psychosocial stressor that can cause a cascade of physiological and behavioral stress responses [63], including psychological distress and dysfunctional coping behaviors such as illicit drug use. In addition, our findings regarding the links between discrimination—even non-violent discrimination—and drug use have potential implications for public health interventions. For example, drug treatment programs could consider discrimination as a possible trigger for drug use, and help women develop more adaptive coping behaviors to respond to discriminatory treatment.

Previous research has focused on single domains of gender discrimination, such as employment discrimination [64], or on aggregated experiences of sexist treatment [14]. In this study, we examined multiple distinct domains, including discrimination on the job, in public, from institutions, and being called a sexist name. Our findings show that all forms of gender discrimination were associated with significantly higher odds for past year illicit drug use, frequent illicit drug use, and drug use disorders. The highest odds were associated with being called a sexist name and with discrimination from institutions. This raises important questions about how the context in which gender discrimination occurs may be differentially linked to stress response and drug use. For example, are “acute” stressors (e.g., being called a sexist name, discrimination in obtaining housing) more strongly associated with illicit drug use, compared to “chronic” forms of discrimination? Are some forms of gender discrimination (e.g., in housing or the criminal justice system) more likely to be appraised as exceeding an individual’s capacity to cope, thus triggering a stress response and increasing risk of coping-related drug use? These questions engage longstanding debates in the stress literature including those regarding the role of “acute” versus “chronic” stressors in health

and the role of appraisal in triggering stress responses outcomes [65]. However, little is known about the effects of acute or chronic gender discrimination or the role of gender discrimination appraisal in relation to drug use [66]. Future research should explore potential pathways between specific discrimination domains, appraisal and perception of stress, emotional response, and behavioral coping response.

Women with less than a high school education had a lower prevalence of past year illicit drug use and drug use disorders, as well as a lower prevalence of reported gender discrimination, than women with at least a high school education. A significant interaction between gender discrimination and educational level was observed, such that women with less than a high school education were at significantly higher risk for past-year illicit drug use associated with discrimination compared to women with more than a high school education. Results for frequent illicit drug use and drug use disorders were similar in direction and magnitude, although the interaction terms did not reach statistical significance. In sensitivity analyses, gender discrimination appeared to particularly increase risk for use of drugs other than marijuana among less educated women. Notably, higher risk for drug use remained significant in both groups of women exposed to discrimination, relative to their counterparts who did not report discriminatory experiences.

There have long been calls to elucidate the varied relationships between socioeconomic position (SEP), gender inequality, and health [1, 67, 68]. Intersectionality theory is a framework first proposed in Black feminist scholarship in reaction to second-wave feminism, with its White middle-class orientation, and racial discrimination activism, with its predominantly male orientation [69, 70]. Intersectionality has become a framework for understanding and explaining the complex effects of inhabiting multiple (disadvantaged) social identities simultaneously. Particularly for studies of discrimination and health, it is important to examine the effects of varied systems of privilege and oppression by identifying intersecting population sub-groups who may show distinct patterns of exposures and health outcomes [1, 16, 33].

As predicted by intersectionality theory, our findings support the premise that, in a U.S. context, being a woman and having low educational attainment—both relegated social statuses—would increase one's vulnerability to the adverse health effects of discrimination experiences [55, 71, 72]. Interestingly, these results contrast to our previous findings [73] that among Blacks, racial discrimination was associated with higher odds for frequent illicit drug use only among those with *higher* SEP. The contrast of the findings on these two important social statuses highlights the complexity of how multiple social identities interact in different groups to influence health conditions. Researchers should continue to examine the effects of discrimination and social subordination in varied multiply-disadvantaged subgroups, such as those defined by gender, race, ethnicity, class, sexual orientation, and disability. Specifically, more research is needed on the contribution of multiple forms of discrimination (e.g. based on gender, race, ethnicity, sexual orientation, etc.) on health outcomes, and how individuals inhabiting multiple subjugated social statuses attribute unfair treatment and respond to it.

Our results can be understood within a stress, coping and health framework [20, 21, 65, 74], particularly Gallo & Matthews' reserve capacity model, which emphasizes the ways that low socioeconomic status, including low educational attainment, introduces cumulative stressors that reduce individuals' capacity to manage stress, thereby increasing vulnerability to negative emotions and subsequent maladaptive coping behaviors [75, 76]. For example, less education and the associated lack of economic opportunities throughout the lifecourse may act as a form of stress sensitization [77–80], making women more vulnerable or predisposed to negative consequences of more proximally experienced stress, such as past-year discrimination. In addition, less educated women may lack material (e.g., legal recourse against discrimination) or psychosocial (e.g., social support, optimism) resources to respond to discrimination [38]. Educational attainment may also be an indicator of childhood socioeconomic position, which has been strongly linked with problems in the enlistment of coping resources such as social mastery, and self-esteem [81]. Diminished access to active coping methods and lower self-efficacy in positive coping strategies, in conjunction with greater exposure to general life stress, may lead to an exhausting of a woman's psychological resources (reserve capacity), and a resultant higher risk for adopting maladaptive coping behaviors such as drug use [19, 22, 23].

Limitations

Limitations of the study are noted. The Experiences of Discrimination (EOD) items are widely used measures of individual experiences of discrimination, but they do not capture socio-culturally entrenched forms of structural discrimination such as professional advancement, inequalities in domestic obligations, and other social norms. Future work is merited that addresses the relationships of such forms of discrimination to substance abuse, which would complement individual-level studies such as this one.

The checklist measurement used in the EOD does not capture the “dose” of each discrimination exposure type. Discrimination may be subject to reporting bias by women of different education levels, leading to differential misclassification into the discrimination exposure group, by education level. Girls may not be exposed to ideas of feminism and concepts such as gender discrimination prior to college, so they may be less likely to attribute unfair treatment to their gender than more educated women. Consequently, the gender discrimination experienced by women in the lower education stratum may actually be stronger and more injurious than gender discrimination experienced by women with more education, which would increase their risk of engaging in maladaptive coping behaviors such as drug use.

Furthermore, disadvantaged individuals may be less likely to admit personal victimization from discrimination [11], but we are unable to determine from the current study whether this would bias results towards or away from the null. Future research should both quantitatively and qualitatively assess women's experiences and reporting of discrimination, and explore how education level may affect the relationship between reported discrimination and health outcomes. Also, questions remain among discrimination researchers about how conscious versus sub-conscious appraisal and attribution of discrimination experiences become embodied and affect stress response and coping behaviors [21, 82, 83], so identifying

differential reactions by education level could help in developing substance use treatments as well as in empowering women to act against discrimination experienced in various domains.

Gender discrimination could also be affected by age, period, and cohort effects, which could influence the experiencing of, reporting of, and response to these experiences [1, 83]. These effects could limit the generalizability of these findings to current or future cohorts of women and girls, and to other societies. Future research should more fully examine age, period, and cohort effects on the relationship of gender discrimination to health outcomes, including drug use, and how these may vary given social change, attitude shifts, and increased economic opportunities for women. We adjust our statistical models for age in the current study, but future research should more thoroughly explore cohort effects in the association between education, discrimination, and substance use.

Finally, reverse causation is also a potential explanation for our results. Women engaging in illicit drug use may be more likely to encounter certain forms of gender discrimination than others, such as being treated unfairly within institutions (e.g., the criminal justice system). The interplay between educational attainment, substance use, and exposure to gender discrimination is complex, and longitudinal studies are needed to examine these relationships more thoroughly.

CONCLUSIONS

As workplace sexual harassment, internet sexual harassment, and overt discrimination against women in power continue to make headlines in the U.S. news, it is important to document the possible behavioral and health effects of such gender discrimination. Our results show that gender discrimination is strongly and consistently associated with illicit drug use among U.S. women. Women with less than a high school education are at higher risk than other women, but among all, discrimination was associated with higher odds for all forms of past-year drug use assessed. This is the first study to examine these associations in a national sample and provide population estimates that can allow future researchers to assess any changes over time or to compare the U.S. findings to those from other countries. This research adds to the growing intersectionality literature assessing health effects and social consequences of occupying more than one disadvantaged status in a society. In the current study, we present evidence of an excess burden of gender discrimination among less-educated women with respect to illicit drug use. Future research should examine how other disadvantaged statuses such as race, ethnicity, sexual orientation, occupation, and income may modify the association between discrimination and drug use, whether results are consistent for different types of drug use, and whether explicitly addressing the stress caused by discrimination could benefit women in drug treatment programs.

Acknowledgments

The National Epidemiologic Survey on Alcohol and Related Conditions was funded by the National Institute on Alcohol Abuse and Alcoholism (NIAAA) with supplemental support from the National Institute on Drug Abuse (NIDA). This study was supported in part by NIDA Grant #T32DA031099 (HC; PI: DSH), New York State Psychiatric Institute, and the Columbia University Mailman School of Public Health Department of Epidemiology (DSH).

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Demographic characteristics, and past-year discrimination experiences and substance use among women in the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC, 2004–2005)*

Table 1

	Total Sample (n = 19,209)		Less than High School Education (n = 3,112)		High School Education or Greater (n = 16,097)	
	Number	% (SE)	Number	% (SE)	Number	% (SE)
Age (years)						
18–34	4429	24.22 (0.45)	544	17.76 (0.95)	3885	25.25 (0.49)
35–49	5994	30.36 (0.44)	665	21.87 (1.14)	5329	31.72 (0.48)
50–64	4499	23.72 (0.37)	641	20.91 (0.95)	3858	24.17 (0.41)
65+	4287	21.70 (0.41)	1262	39.46 (1.60)	3025	18.86 (0.39)
Region						
Northwest	3373	17.88 (1.19)	496	16.50 (1.62)	2877	18.10 (1.20)
Midwest	3611	18.33 (1.13)	675	21.37 (1.63)	2936	17.85 (1.11)
South	7300	38.32 (1.65)	1168	37.72 (2.19)	6132	38.41 (1.63)
West	4925	25.47 (0.99)	773	24.42 (1.23)	4152	25.64 (1.05)
Marital Status						
Married/living as if married	9557	60.07 (0.64)	1266	49.24 (1.42)	8291	61.80 (0.71)
Widowed/divorced/separated	6250	24.85 (0.42)	1440	39.45 (1.22)	4810	22.51 (0.43)
Never married	3402	15.08 (0.49)	406	11.31 (0.80)	2996	15.69 (0.55)
Urbanicity (Urban)	16070	83.45 (0.60)	2591	83.32 (1.21)	13479	83.47 (0.60)
Race/ethnicity						
Black, non-Hispanic	4261	12.77 (0.77)	779	15.20 (1.28)	3482	12.39 (1.26)
White, non-Hispanic	11308	75.54 (1.50)	1181	56.34 (2.92)	10127	78.61 (0.77)
Hispanic	3640	11.68 (1.27)	1152	28.46 (3.43)	2488	9.00 (0.90)
Personal Income						
Less than \$20,000	10448	55.04 (0.67)	2651	84.00 (0.96)	7797	50.41 (0.68)
\$20,000 – \$34,999	4351	22.18 (0.41)	388	13.66 (0.88)	3963	23.54 (0.46)
\$35,000 – \$49,000	2190	11.30 (0.30)	50	1.61 (0.29)	2140	12.85 (0.33)
Greater than \$50,000	2220	11.49 (0.50)	23	0.74 (0.21)	2197	13.21 (0.58)
Experienced Discrimination (PY) ^a	1785	8.89 (0.28)	133	4.19 (0.43)	1652	9.64 (0.30)
On the job	746	3.67 (0.18)	55	1.71 (0.28)	691	3.99 (0.21)

	Total Sample (n = 19,209)		Less than High School Education (n = 3,112)		High School Education or Greater (n = 16,097)	
	Number	% (SE)	Number	% (SE)	Number	% (SE)
Public settings ^b	629	3.04 (0.16)	43	1.40 (0.27)	586	3.31 (0.18)
From institutions ^c	249	1.15 (0.09)	22	0.78 (0.22)	227	1.22 (0.10)
Called a sexist name	907	4.51 (0.21)	68	2.13 (0.36)	839	4.89 (0.21)
Used an illicit drug (PY)	951	5.16 (0.21)	104	3.73 (0.44)	847	5.39 (0.23)
Used an illicit drug at least once/week (PY)	313	1.70 (0.12)	47	1.71 (0.34)	266	1.70 (0.13)
DSM-IV Drug Use Disorder (PY)						
Abuse	180	1.02 (0.09)	14	0.52 (0.17)	166	1.10 (0.11)
Dependence	94	0.60 (0.08)	14	0.56 (0.18)	80	0.61 (0.10)
Any	262	1.54 (0.13)	26	0.93 (0.21)	236	1.64 (0.15)

Note. Excludes non-Hispanic Asian, American Indian, Alaska Native, Native Hawaiian, and Other Pacific Island women.

Percentages are adjusted for complex survey design.

PY = Past-year

^aDiscrimination variables were coded as 1 if the participant reported having experienced discrimination at least “sometimes” in the past 12 months, and 0 if otherwise

^bPublic settings include, for example, on the street, in stores, or in restaurants

^cFor this variable, participants are prompted to consider discrimination experiences in situations like getting admitted to a school or training program, in the criminal justice system, or in obtaining housing

The association between gender discrimination and drug use outcomes among women in the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC, 2004–2005)

Table 2

Discrimination Exposure	Illicit Drug Use (PY)		Illicit Drug Use at Least Once/Week (PY)		Drug Use Disorder (PY)	
	% (SE)	AOR (95% CI)	% (SE)	AOR (95% CI)	% (SE)	AOR (95% CI)
Any Discrimination ^a						
Yes	10.57 (0.87)	2.67 (2.17–3.29)*	3.85 (0.57)	2.82 (1.99–4.00)*	3.65 (0.53)	3.15 (2.16–4.61)*
No (Ref)	4.43 (0.19)	REF	1.42 (0.11)	REF	1.23 (0.13)	REF
On the job						
Yes	8.45 (1.01)	1.80 (1.36–2.37)*	2.73 (0.65)	1.68 (1.02–2.79)*	2.82 (0.62)	1.98 (1.21–3.21)*
No (Ref)	5.01 (0.21)	REF	1.65 (0.12)	REF	1.48 (0.13)	REF
In public ^b						
Yes	12.32 (1.48)	2.90 (2.17–3.88)*	4.48 (1.06)	2.96 (1.75–5.03)*	3.93 (0.92)	2.91 (1.73–4.89)*
No (Ref)	4.88 (0.20)	REF	1.59 (0.12)	REF	2.44 (0.13)	REF
From institutions ^c						
Yes	14.55 (3.14)	3.46 (1.99–6.04)*	5.42 (0.23)	3.52 (1.37–9.01)*	3.31 (1.18)	2.28 (1.05–4.95)*
No (Ref)	5.04 (0.21)	REF	1.65 (0.12)	REF	1.51 (0.13)	REF
Called a sexist name						
Yes	12.37 (1.19)	3.07 (2.41–3.90)*	4.88 (0.75)	3.49 (2.45–4.99)*	5.01 (0.83)	4.39 (2.88–6.71)*
No (Ref)	4.64 (0.20)	REF	1.48 (0.11)	REF	1.24 (0.13)	REF

Note. Excludes non-Hispanic Asian, American Indian, Alaska Native, Native Hawaiian, and Other Pacific Island women. PY = Past-year AOR = adjusted odds ratio; All models adjusted for age, region, urbanicity, marital status, race/ethnicity, personal income, and education; Prevalence estimates of drug use outcomes, and their standard errors, are adjusted predicted marginal means back-transformed from the logistic model. All analyses adjusted for complex survey design.

* p 0.05

^aDiscrimination variables were coded as 1 if the participant reported having experienced discrimination at least “sometimes” in the past 12 months, and 0 if otherwise.

^bPublic settings include, for example, on the street, in stores, or in restaurants.

^cFor this variable, participants are prompted to consider discrimination experiences in situations like getting admitted to a school or training program, in the criminal justice system, or in obtaining housing.

Table 3

Modification of the effect of past-year gender discrimination in at least one domain on past-year drug use outcomes by educational attainment among women in the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC, 2004–2005)

Effect modifier	Illicit Drug Use (PY)			Drug Use Disorder (PY)		
	AOR (95% CI)	P-value		AOR (95% CI)	P-value	P-value
Education						
Less than High School	6.33 (3.38–11.85)	0.0053	5.86 (2.17–15.82)	8.59 (2.91–25.32)	0.1047	0.0593
High School or more	2.45 (1.97–3.04)		2.49 (1.74–3.57)	2.81 (1.89–4.19)		

Note. Excludes non-Hispanic Asian, American Indian, Alaska Native, Native Hawaiian, and Other Pacific Island women.

AOR = adjusted odds ratio; Stratatum-specific AORs are produced from exponentiated contrasts of coefficients estimated by the interaction model; The p-value presented is from a multiplicative interaction term between the effect modifier and the binary “any discrimination” variable. All models adjusted for age, region, urbanicity, marital status, and race/ethnicity. All analyses adjusted for complex survey design.

PY = Past-year