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SURVEY ARTICLE

COVID-Related Mental Health and Smoking in Sexual Minority Women

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ABSTRACT

Sexual minority women face a range of health disparities, including high rates of mental health issues, alcohol and tobacco use, obesity, stroke, and general poorer health compared to heterosexual women. The minority stress model describes how members of a minority group, including sexual minorities, face unique stressors related to a stigmatized social status. Research has shown that sexual minorities who face increased discrimination, as described in the minority stress model, tend to have increased smoking rates. The present study sought to examine how increased mental health-related stress associated with the COVID-19 pandemic impacted the smoking behaviors of sexual minority women. Data from the 2021 National Survey on Drug Use and Health were used to build OLS regression and mediation models determining how female sexual minority status moderated the relation between COVID-19-related impacts on mental health and smoking. Results found that sexual minority women with the highest levels of negative impacts on mental health as a result of COVID-19 smoked the fewest cigarettes as compared to heterosexual women. The finding that high levels of mental health distress are related to a reduction in smoking among sexual minority women warrants further research to examine if this effect is COVID-19-specific, or a more generalized pattern of stress and mental health impacts on smoking behavior.

Keywords: COVID-19, sexual minorities, heterosexual

1 Introduction

Chronic stress has long been associated with higher rates of smoking (Ansell *et al.*, 2012), chronic disease (Yaribeygi *et al.*, 2017) , and mental health disorders (Marin *et al.*, 2011) in adult populations. Among sexual minority adults, including those who identify as lesbian, gay or bisexual (LBG), rates of chronic stress are uniquely high, and these populations tend to smoke cigarettes and suffer from mental health disorders at significantly higher rates than heterosexual individuals (Cornelius *et al.*, 2020; Meyer, 2003). The minority stress model suggests that high levels of stress experienced by minority groups, including LGB populations, are related to discrimination, conflicts, social isolation, and lack of social support (Mays *et al.*, 2018; Meyer, 2003). These stressors lead to an increased risk of suicide, PTSD, and a range of negative health outcomes among sexual minority populations (Juster *et al.*, 2017; Mays *et al.*, 2018).

In addition to the unique psychosocial stressors found in LGB populations, the COVID-19 pandemic presented additional stressors, including additional discrimination, negative encounters with healthcare providers, financial stressors, and increased social isolation (Dawson *et al.*, 2021). Data indicate that LGB populations were more likely than heterosexual peers to quit employment related to COVID-19, to take time off work for illness or to care for family, and had more difficulty accessing mental health care (Dawson *et al.*, 2021). Some of these disparities may be especially pronounced for sexual minority women (SMW; defined in this study as women who identify as lesbian or bisexual); research has demonstrated that

SMW experienced more depression, anxiety, and a greater lack of mental health care during the COVID-19 pandemic than heterosexual women (Deal *et al.*, 2022). Furthermore, SMW have consistently been found to smoke cigarettes at higher rates than heterosexual women (Matthews *et al.*, 2014). Given the strong association between stress, mental health, and smoking, and the high rates of smoking among LGB populations pre-pandemic, it could be expected that pandemic-related stress and its negative impact on mental health may result in higher smoking rates in this population. However, research has found mixed results regarding a link between COVID-19-related stress and smoking, with some populations increasing the rate of smoking and other populations decreasing use (Bommele *et al.*, 2020). The present study sought to examine how COVID-19-related stress and perceived mental health related to smoking behaviors among sexual minority women.

2 Methods

2.1 Participants

Data for the present study come from the 2021 National Survey on Drug Use and Health (NSDUH). The NSDUH is an annual, nationally representative survey assessing a range of substance use and mental health issues among adolescents and adults above the age of 12 years. Details on the sampling methodology and data collection are available from the Substance Abuse and Mental Health Services Administration (Center for Behavioral Health Statistics and Quality, 2022).

2.2 Measures

2.2.1 Demographics

For the present study, data were used regarding participant's age, gender (with response options of "male" or "female"), and sexual orientation (with response options of heterosexual, lesbian/gay, or bisexual).

2.2.2 Smoking behavior

Data were collected on the number of days in the last 30 on which the participant smoked cigarettes, the number of cigarettes smoked per day in the last 30 days, and, the time to the first cigarette of the day after waking, a well-validated measure of nicotine addiction (Branstetter *et al.*, 2020).

2.2.3 COVID-19 impact on mental health

Participants responded to the item "Since the beginning of the COVID-19 pandemic, how much, if at all, has COVID-19 negatively affected your emotional or mental health?" with response options ranging from 1= not at all to 5=a lot.

2.3 Data analysis

Standard descriptive, independent samples *t*-tests, Chi-Square and ANOVA tests were conducted using SPSS Software, Version 27 (IBM, 2020) and included the sample weights calculated and provided by the Substance Abuse and Mental Health Services Administration for the 2021 National Survey on Drug Abuse and Health survey (Center for Behavioral Health Statistics and Quality, 2022). Logistic and ordinary least squares regression path models and interactions were conducted using the PROCESS modeling tool (Hayes, 2013).

3 Results

3.1 Participant descriptive

A total of 24,873 adults over the age of 18 who had ever smoked a cigarette were included in the sample. The sample was comprised of 47.6% (11,836) males; 10,058 identified as heterosexual, 390 identified as gay, and 495 identified as bisexual. The sample consisted of 52.4% (13, 037) females; 9946

identified as heterosexual, 373 identified as lesbian, and 1710 identified as bisexual. Just under one-third of the sample (29.3%) were between the ages of 19 and 30 years old; over half (57.5%) of the sample was between the ages of 30 and 65 years old, and 13.2% of the sample was over the age of 65. A total of 37.4% (1545) smoked more than one pack of cigarettes per day, with over half (51.9%) of the sampling reporting smoking more than 6 cigarettes per day. Overall, 18.6% of the sample reported that COVID-19 had affected their mental health either "quite a bit" or "a lot," and 81.4% reported that COVID-19 impact their mental health either "some," "a little" or "not at all."

3.2 Smoking frequency, COVID impact on mental health, and sexual orientation

Sexual minority women smoked significantly fewer cigarettes (M=3.51, SD=1.37) than heterosexual females (M=3.81, SD=1.34), t (41339165) = 356.11, p < .001 and reported that COVID-19 had negatively impacted their mental health (M=2.87, SD=1.33) at significantly higher rates, t (13501375) = -1524.21, p < .001. Regression moderation models using the PROCESS method (Hayes, 2013), see conceptual model Figure 1, were significant, F (3, 6695) = 21.70 p < .001, and demonstrated that COVID-19 impacts on mental health significantly predicted smoking frequency, b= -.05, t(6695) = -3.40, p < .001. There was an interaction between being a sexual minority female and COVID-19 impacts on mental health on smoking frequency, b = -.11, t (6695) = -2.71, p < .001, see Figure 2.

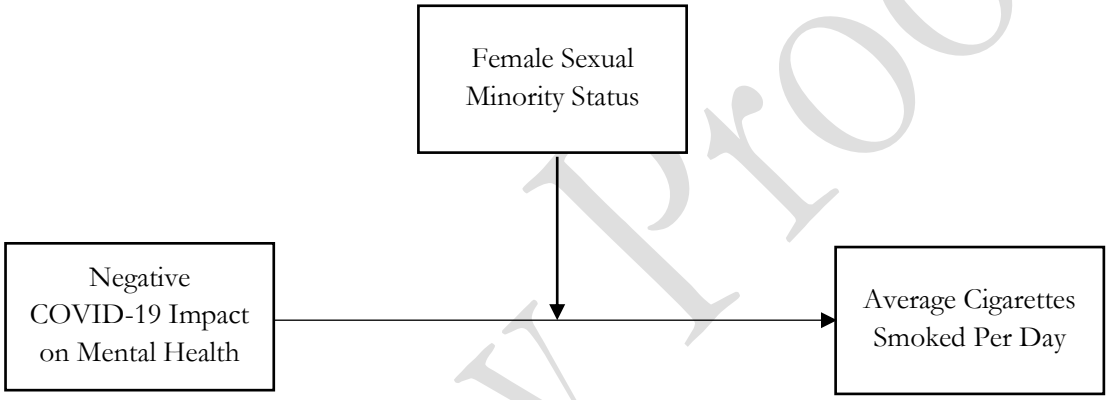

Figure 1: *Mediation Path Model*

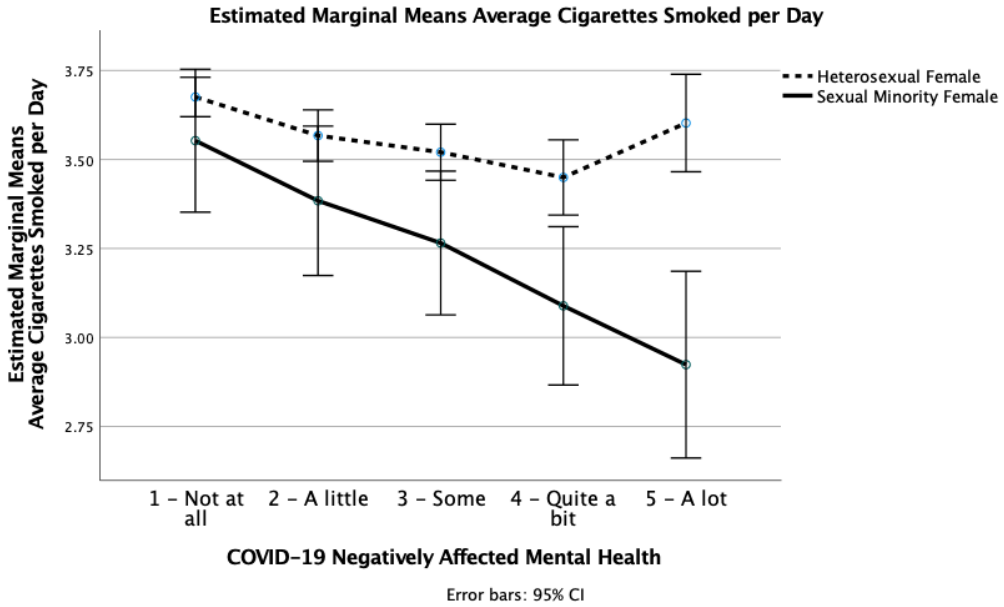

Figure 2: *Interaction Effect of Sexual Minority Status on COVID-19 Impact on Mental Health and Cigarettes per day*

4 Discussion

Whereas several studies have found that sexual minority women tend to smoke cigarettes at higher rates than their heterosexual counterparts (Almeda & Gómez-Gómez, 2022), the present study found that women who identify as lesbian or bisexual reported smoking significantly fewer cigarettes per day on average than those who identified as heterosexual. Although this finding, taken alone, may seem an outlier, the present study's findings suggest a potential mechanism. The majority of previous studies examining disparities in smoking rates among sexual minority women were conducted before the COVID-19 pandemic in 2020. Previous findings suggest that the COVID-19 pandemic had a "complex and uncertain" impact on smoking behaviors, with an overall reduction in cigarette use for many populations (Almeda & Gómez-Gómez, 2022). It is possible that sexual minority women were one of the several populations that reduced overall smoking rates directly related to COVID-19. Increased stress, isolation, or other issues may have led to a reduction in cigarette consumption in this particular cohort.

Research has long found that general stress is higher among populations of sexual minorities and that sexual minorities suffer higher rates of mental health issues than heterosexuals. Similarly, the present study identified specific negative COVID-19-related impacts on mental health that were significantly higher among sexual minority women. Research examining COVID-19 related impacts on smoking behaviors in the general population found that the pandemic affected individuals differently, with some smoking more as a result of COVID-19-related stress and some smoking less (Bommele *et al.*, 2020). In the present study, it was found that negative COVID-19 effects on mental health were associated with smoking fewer cigarettes overall and that there was an interactive effect between negative COVID-19 impacts on mental health and sexual minority women. Specifically, sexual minority women who reported that COVID-19 had negatively impacted their mental health either "quite a bit" or "a lot" were significantly less likely to smoke than heterosexual women who reported the same level of mental health impacts related to COVID-19.

The effect of lower smoking rates among sexual minority women who have suffered negative mental health impacts as a result of COVID-19 may be related to several potential factors, including increased social isolation, increased fears of infection, or that continued smoking may result in more severe outcomes if infected with COVID-19. Additionally, consistent with the minority stress model, sexual minorities suffered not only increased mental health issues but also financial issues, housing issues, job loss, and food insecurity at higher rates than heterosexual peers (Pharr *et al.*, 2022). Taken together, these factors may have combined to reduce cigarette consumption among sexual minority women via several mechanisms that interacted with mental health stressors, including the financial cost of smoking, the significant fear of contracting COVID-19, or that smoking would compound the severity of a COVID-19 illness, fear of potential discrimination in health care access, COVID-19 testing, treatment or vaccination, isolation from social settings where smoking is common, or other factors.

5 Conclusions

Lower smoking frequency among sexual minority women compared to heterosexual women found in the present study is at odds with previous research that has found consistently higher rates of smoking in this population. This finding was found to be associated with higher rates of COVID-19-related impacts on mental health among sexual minority women: those women with the highest levels of negative impacts on mental health as a result of COVID-19 smoked the fewest cigarettes as compared to heterosexual women. The finding that high levels of mental health distress are related to a reduction in smoking among sexual minority women warrants further research to examine if this effect is COVID-19-specific, or a more generalized pattern of smoking behavior.

6 Declarations

6.1 Study limitations

It should be noted that the present study was conducted using cross-sectional data and therefore, cannot make a causal inference. Further, the study did not measure or consider several potential factors that may additionally mediate the relation between COVID-19-related mental health and smoking behaviors among sexual minority women. For example, changes in income, job or housing stability, social support or isolation, or discrimination measures. Future research should continue to investigate the disparities that exist in smoking behaviors among sexual minorities; in particular the interaction between mental health smoking frequency and outcomes.

6.2 Ethical approval

Given that the data used in the present study were from publicly available, de-identified sources, the present study was deemed as exempt by the Internal Review Board of the Pennsylvania State University.

6.3 Competing interests

The author has no competing interests to report.

6.4 Publisher's Note

AIJR remains neutral with regard to jurisdictional claims in institutional affiliations.

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