January 2023

Racism-Related Stress And Health Behaviors And Outcomes Among Emerging Adult Sexual Minority Men Of Asian Heritage

Lauren Li-Min Chin
laurenlmchin@gmail.com

Racism-Related Stress and Health Behaviors and Outcomes Among Emerging Adult Sexual Minority Men of Asian Heritage

Lauren Li-Min Chin

Yale School of Public Health, Social and Behavioral Sciences
Primary Thesis Adviser: Dr. S. Raquel Ramos, PhD, MBA, MSN, FNP, FNYAM, FAHA
Secondary Thesis Adviser: Dr. Trace Kershaw, PhD

A Thesis submitted in partial fulfillment for the Degree of Master of Public Health at Yale University

May 1, 2023
Year of Awarded Degree: 2023

Abstract

Rationale: Acts of racial discrimination impart racism-related stress on the individual and have been linked to decreased psychological well-being and physical health. While there are numerous studies of other groups of sexual minority (SM) men of color in this area, little research has focused on HIV-negative, Asian-identifying SM men. **Objectives:** This study investigates whether racism-related stress is associated with substance use, general and oral health outcomes, and attitudes towards PrEP in a sample of emerging adult Asian SM men. The study also evaluates whether these behaviors affect the relationships between racism-related stress and the other outcomes. **Methods:** This secondary data analysis included 70 SM men, 18-34 years of age, who identified as Asian from the HIV Oral Self-Testing Infographic Experiment. Multivariable regression models were used to assess the relationships between Asian American Racism-Related Stress Inventory (AARRSI) score and oral and general health, substance use, and attitudes towards PrEP. Models were adjusted for sociodemographic characteristics. Moderator analysis evaluated existing effect modification between outcome measures. **Results:** Alcohol consumption had a significant positive association with AARRSI score ($R=0.37$, $p=0.060$). AARRSI scores had weak positive associations with e-cigarette use ($R=0.25$, $p=0.050$), teeth removal ($R=0.09$, $p=0.484$), and PrEP familiarity ($R=0.12$, $p=0.343$) and use ($R=0.03$, $p=0.810$). Alcohol consumption moderated AARRSI's relationship with cigarette use ($p<0.001$) and teeth removal ($p<0.001$). Cigarette use also moderated the effect that AARRSI score had on oral health ($p=0.001$). **Conclusion:** These findings suggest that racism-related stress may be an important factor to consider in designing interventions for the prevention of HIV and the management of substance use and oral health within this population.

Acknowledgements

This work could not have been made possible without the support of my department faculty, colleagues, friends, and family. I am extremely grateful to my advisors, Dr. Raquel Ramos and Dr. Trace Kershaw, for their expertise and encouragement throughout this process and for their willingness to share their academic expertise to support not just the development of the research methodology, but also my growth as a writer, scholar, and public health researcher. Thank you to Dr. Ramos for contributing her data, knowledge in the field, and her endless patience, support, and feedback on this thesis. Thank you to Dr. Kershaw for his feedback and support on crafting the analysis plan and management of the data.

This thesis was made possible with the use of data from the Ramos Lab, to which I am very appreciative. I would like to thank the Ramos Lab for the numerous research experiences I have participated in and for their encouragement of my thesis project over the past year. Thank you also to Dr. Raul Hernandez-Ramirez for his guidance on data analysis techniques. I also thank Eiman Abdoalsadig for being a sounding board for my initial coding and analysis approaches. I also thank the community of Monterey Park that raised me and gave me a strong foundation for exploring the identity, health, and social experiences of Asian Americans.

Finally, I would like to thank my friends and family for their never-ending unconditional love, support, wisdom, and encouragement during my time at the Yale School of Public Health and especially during the creation of this thesis. I would not have gotten this far in my academic journey without you, and I will continue to go far because of you.

Table of Contents

Introduction

Discrimination against Asian Americans on the basis of race has presented itself since the first major Asian immigration waves in the mid-nineteenth century due to fears of economic and political threat.[1] These acts of discrimination have manifested on the individual level, such as interpersonal violence against Asian Americans, and on the institutional level, such as the Internment of Japanese Americans during World War II. The terms, "Asian" and "Asian American" are used interchangeably within the United States under a shared definition given by the National Institutes of Health (NIH) as "a person whose origins are in any of the original populations of the Far East, Southeast Asia, or the Indian subcontinent."[1] Those of Asian heritage are also identified as people of color, which the NIH defines as people who are not White or of European origin, a definition which "emphasizes the common experiences of systemic racism." [2,3] Consequences of racial discrimination can manifest in the individual through racism-related stress that is defined as the "psychological response specifically from direct or indirect exposure to racism," and have been linked to decreased psychological well-being and physical health.[4,5] Much literature currently exists to connect the effect of racism and detrimental health effects, such as poorer oral health outcomes amongst people of color who perceived racial discrimination as compared to white individuals, but these studies have not looked at the effect of this type of discrimination in those who identify as Asian specifically.[9]

In addition to having Asian heritage, other interactions that have led to discrimination include identifying as a sexual minority. The National Institutes of Health Sexual & Gender Minority Research Office defines sexual and gender minority populations such as "individuals who identify as lesbian, gay, bisexual, asexual, transgender, Two-Spirit, queer, and/or intersex," in addition to "individuals with same-sex or -gender attractions or behaviors and those with a

difference in sex development."[6] Regardless of race, sexual minority populations (SM) have a history of societal discrimination and stigma, the latter of which has been connected to a historically high prevalence of HIV infection as compared to heterosexual populations. Discrimination on the basis of sexual identity is well-documented and associated with poor mental health outcomes, and clinical symptoms of physical illness can also manifest through continued stress from adverse experiences and internalized stigma.[7] SM are at especially high risk of HIV and account for 67% of all new HIV infections.[8] This elevated risk of HIV contrasts with hesitancy present among Asian SM men to use PrEP.[9] PrEP's connection with sexual minority identity, sexual relations, and HIV, topics which are stigmatized in the Asian community, may cause some Asian SM men to forgo taking PrEP so that they do not reveal their sexual identity. Greater racism-related stress may be negatively correlated with PrEP uptake among Asian SM men as greater perceived stress may indicate a stronger identity with their Asian culture.

The aforementioned negative health outcomes as a result of discrimination and discrimination-related stress can be explained through the Minority Stress Model, which posits that additional exposures to stress in the social environment due to minority status, such as sexual identity or race, in excess of usual everyday stress may contribute to risky health behaviors that result in adverse health outcomes such as substance use and unprotected sex.[10] Intersecting sexual and racial identities can synergistically result in worse HIV and general health outcomes as individuals experience discrimination from others based on their sexuality as well as their race. This mechanism is especially pertinent during the period when individuals emerge into adulthood as they attempt to process their personal identities and health behaviors that can be altered by the context of their social environments.

Even within their in-groups of sexual identity and Asian heritage, Asian SM can experience interpersonal discrimination due to racism and heterosexism, respectively, and it has been documented that these types of adverse experiences are associated with greater substance use in SM of color.[7] Sociological phenomena, such as cis-genderism and toxic masculinity, have also been reported to spur tobacco and alcohol use among sexual minority men as attempts to conform with cis-gender and masculine norms.[11,12] Behaviors, such as smoking, e-cigarette use, and alcohol consumption, may be used to cope with the stress of discrimination on the basis of race and sexuality and have been linked to heightened HIV risk by increasing the probability of missed PrEP doses and increasing risky sex.[13] Threats to physical health, such as increased risk of oral cancers, have also been linked to substance use in this population. Current research centered around drug use in gay and bisexual men largely focuses on how such behavior increases the risk for HIV infection through sexual practices, with less literature focusing on other health outcomes that come about as a result of substance use.[14] Current literature on substance use in Asian SM is also lacking, but there has been an observed increase in substance use among Asian American adults as compared to White Americans over the past couple years.[15] Compared to heterosexual, non-Hispanic white adults, SM adults of color in general experience increased risk for substance use and disorders.[16] These increases in substance use can be attributed in part to the COVID-19 pandemic as hostile sentiment towards Asians in the United States in the form of harassment and discrimination peaked due to the origination of the first COVID-19 outbreak in China.[10] High-profile media coverage of mass shootings with Asian victims, such as the 2021 Atlanta shootings and the 2022 Monterey Park and Half-Moon Bay shootings have also heightened stress among the Asian American community.

While there are numerous studies on substance use and sexual minority discrimination in Black and Latino men, there is a dearth of literature focusing specifically on HIV-negative, Asian-identifying sexual minority men, providing an opportunity to examine associations between social factors, behaviors, and health outcomes in this group.[17,18] The cumulative effects of COVID-19 on Asian discrimination, isolation, and increased substance and their connection to elevated HIV risk in Asian SM men prompt the exploration of these social determinants of health. In addition, both the complexity of the Minority Stress Theory as it applies to Asian SM men who hold multiple overlapping identities and the lack of literature in a community that has been especially affected by current events in the United States. This warrants a look into health behaviors associated with racially-motivated discriminatory events against members of this group in the United States, specifically.

The purpose of this thesis is to examine how racism-related stress influences the health of HIV-negative, emerging adult Asian SM, men in the United States through a) determining whether racism-related stress (a product of discrimination) is associated with substance use, health outcomes, and PrEP familiarity and b) evaluating whether certain health behaviors and beliefs affect the relationship between racism-related stress and general health, oral health, other substances used, and PrEP use in the context of the minority stress model. We hypothesize that greater racism-related stress is associated with worse oral and general health outcomes and worse attitudes towards PrEP and that greater racism-related stress is associated with increased substance use. We also hypothesize that these associations may vary based on the frequency of substance use and attitudes towards PrEP.

Methods

Design

This thesis is a secondary analysis of data collected through the HIV Oral Self-Testing Infographic Experiment (HOTIE), a sequential, mixed methods, randomized trial which incorporated participatory design in the creation of a HIV self-testing infographic for emerging adult, sexual minority men of color (N = 322).[19] The goals of the primary study were to develop and test the feasibility, acceptability, and comprehension of an HIV oral-testing infographic. Participants were recruited throughout the United States and Puerto Rico through an online research recruitment service. The sample consisted of men who were 18-32 years of age, self-reported HIV negative or unknown HIV serostatus, same-gender loving, and had a sexual experience with a man in the past year. Participants were all assigned male at birth (cis-gender) and were able to understand and read English which enabled them to complete an online survey from which the data used in this thesis originated from.

This thesis examines a subset of participants who identified as Asian (N=70) and sought to examine the associations between racism-related stress and health behaviors, general health outcomes, and oral health outcomes among HIV-negative SMM of Asian heritage. We hypothesized that racism-related stress is associated with greater substance use and associated with worse general and oral health outcomes, including PrEP usage, among emerging adult MSM individuals of Asian heritage. This hypothesis is informed by the Minority Stress Model that places racial discrimination as a forerunner of harmful substance use that increases the chance of poor health outcomes, such as increased HIV risk.

Measures

The measures described below were used in this secondary data analysis. These included validated measures of general health, oral health, smoking behaviors and substance use, racial discrimination, and attitudes towards PrEP.

Demographic Questionnaire

Self-reported demographic information of participants was collected for ethnic or cultural group background, race, place of birth (within or outside the United States), age, state of residence, highest level of education, type of health insurance, and total personal income in the last year.

Behavioral Risk Factor Surveillance System (BRFSS)

The BRFSS is a 2-part telephone survey developed by the CDC that collects information regarding chronic conditions and health risk behaviors. Selected questions for this thesis surveyed tobacco and e-cigarette use. Example questions included the following: "Have you smoked at least 100 cigarettes in your entire life?" "Do you now use e-cigarettes or other electronic vaping products every day, some days, or not at all?" General health status was assessed using a single question: "Would you say that in general your health is?" Responses were collected through a five-point Likert scale from poor (1) to excellent (5). Oral health status was assessed using two questions, the first of which was, "Including all types of dentists, such as orthodontists, oral surgeons, and all other dental specialists, as well as dental hygienists, how long has it been since you last visited a dentist or a dental clinic for any reason?" Responses ranged from "Within the past year" (1) to "5 or more years ago" (4) and "Never" (5). The second oral health question read as follows: "Not including teeth lost for injury or orthodontics, how many of your permanent teeth have been removed because of tooth decay or gum disease?" Responses ranged from "None" (1) to "All teeth" (4). A study with 57,001 persons of Asian heritage previously used BRFSS to

examine demographic and socioeconomic characteristics in regard to diabetes mellitus prevalence, demonstrating that BRFSS is valid across different Asian American subgroups.[20]

National Survey on Drug Use and Health (NSDUH)

Cigarette, e-cigarette, and alcohol use questions were derived from the National Survey on Drug Use and Health. Cigarette use as a frequency of use was assessed through the question: "Do you now use e-cigarettes or other electronic vaping products every day, some days, or not at all?" Responses were measured using a three-point Likert scale from not at all (1) to every day (3). Consumption of alcohol as a frequency of use during the past 30 days was assessed with the question: "During the past 30 days, how many days per week or per month did you have at least one drink of any alcoholic beverage such as beer, wine, a malt beverage or liquor?" Responses were collected in a phrase-completion format where whole numbers were input by participants. NSDUH was previously used in a study examining substance use and dependence in over 9000 individuals of single and mixed-race Asian heritage, demonstrating prior usage of this questionnaire across multiple Asian ethnic groups.[21]

Short Assessment of Health Literacy-English (SAHL-E)

The SAHL-E is an 18-item measure that assesses an English speaker's ability to read and understand common medical terms. The assessment contains a printed common medical term, a key word (correct response), and a distractor word. Responses were recorded dichotomously as either *false* (0) or *true* (1). Higher scores, up to a maximum score of 18, indicate greater health literacy. Prior studies have found this assessment to have good internal consistency ranging from 0.80 to 0.89.[22]

PrEP Familiarity and Attitudes Questionnaire

PrEP Use, Familiarity, and Attitudes were assessed with three separate multiple-choice questions. PrEP use was assessed with the question: "PrEP is the use of a medication taken before having sex as protection against HIV infection. Are you currently taking PrEP?" Responses were measured dichotomously (0=No, 1=Yes). PrEP familiarity was assessed with the question: "Truvada is a pill that HIV negative people can take to prevent HIV. This is called PrEP or Pre-Exposure Prophylaxis. How familiar are you with Truvada also called PrEP?" Responses were measured with a three-item Likert scale from 1 (not familiar or I do not know about PrEP to 3 (Familiar or I know about PrEP). PrEP attitudes were assessed with the question: "How do you feel about HIV-negative people taking Truvada as PrEP to prevent transmission of HIV?" Responses were measured with a four-point Likert scale from 1 (extremely negative) to 4 (extremely positive).

Asian American Racism-Related Stress Inventory (AARRSI)

Perceived racism was measured through 13 items, including statements such as "You see a TV commercial in which an Asian character speaks bad English and acts subservient to non-Asian characters, "You hear that Asian Americans are not significantly represented in management positions," and "Someone asks you what your real name is." Responses were collected using a 5-point Likert scale from 1 (This has never happened to me or someone I know), 2 (This event happened and I was slightly bothered) to 5 (This event happened and I was extremely upset). When used in a study of 622 Asian-identifying individuals, the AARRSI demonstrated strong consistency ranging from 0.87 to 0.88, and showed good fit across different Asian ethnic groups and across foreign and U.S.-born samples.[23] A follow-up question assessed the perceived reason(s) for the adverse experience: "What do you think is the main reason for these experiences?" Participants

could indicate more than one response out of 12 potential responses such as “Your Ancestry or National Origins,” “Your Height,” and “Your Sexual Orientation,” or they could specify an additional reason through a free response section.

Ethical Considerations

This was a secondary data analysis; therefore, institutional review board approval was not needed. The parent study’s approval can be viewed at PMID: 34831644, NCT: NCT04061915.

Statistical Analysis

Descriptive and multivariable statistical analysis was conducted in SAS. All hypothesis testing used $\alpha = 0.05$ as the threshold to indicate statistical significance. Descriptive statistics were calculated to describe the sociodemographic characteristics of the sample (N=70).

To preliminarily determine whether racism-related stress (a product of perceived discrimination and described by AARRSI) is associated with general and oral health and attitudes towards PrEP, Spearman's correlation coefficient was calculated between racism-related stress and each of the variables of interest. Multivariable regression models were fitted to compare the association of racism-related stress and the variables of interest, with AARRSI score behaving as the independent variable and each of the other variables behaving as the dependent variables. For the purpose of logistic regression fit, variables with small subcategory cell counts had to be reduced in granularity: e-cigarette use, cigarette use, teeth removed, and insurance status were represented as binary categories in addition to income breakdown by federal income bracket categorization: <$10,000; $10,000-$39,999; $40,000-$89,999; and >$90,000. Covariates of interest included health literacy, mixed-race status, income, highest level of education, age, insurance type, U.S. nativity, and attributed cause of discriminatory experiences. Dummy variables were created for variables with multiple strata and, when cell sizes did not permit model fitting due to small cell

size, strata were condensed for dependent variables and covariates. Backwards elimination was utilized to refine the regression models towards parsimony.

Moderator analysis was conducted to evaluate whether use of a substance moderated the relationship between Asian American racism-related stress and general health, oral health, other substances used, and PrEP attitudes. The following potential effect modification relationships were explored by calculating interaction coefficients: the effect of alcohol use on the relationship between racism-related stress and cigarettes, the effect of e-cigarette use on the relationship between racism related stress and cigarettes, the effect of alcohol use on the relationship between racism-related stress and PrEP use, and the effect of the use of any substance in moderating the relationship between racism-related stress and oral health. The effect of PrEP attitude on the relationship between racism-related stress and PrEP usage was also explored via calculation of an interaction coefficient.

Results

The sociodemographic characteristics of the sample (N=70) are shown in **Table 1**. All participants identified as sexual minority men and were HIV-negative. They ranged in age from 18 to 34 years (M=26.7 years, SD=4.7 years), and the majority of participants identified as Asian only (90%) and born in the United States (77%). About 16% of participants identified as Hispanic or Latinx. Most participants were employed full-time (52.9%), and 20% were students. Educational attainment varied across the sample from high school completion to doctorate degree, with most participants having completed some type of degree (64.3%). Annual income also varied greatly among participants, ranging from less than $10,000 to more than $150,000. Broader income categorization via approximate federal income tax bracket indicated that most participants

earned between $40,000 and $90,000 (40%) and between $10,000 and $40,000 (34%). Most participants had some type of private or public health insurance (78.6%).

The associations of substance use, general and oral health, and attitudes towards PrEP in relation to AARRSI total score are depicted in **Table 2**. AARRSI total scores ranged from a minimum of 13 (score of 1 for each of the 13 items) to a maximum of 65 (score of 5 for each of the 13 items). The average AARRSI total score was 34.7 (SD=11.5). Perceived reasons for discriminatory experiences were largely considered to be a participant's race (n=45) or ancestral heritage or national origin (n=31). Other perceived reasons for discrimination included age (n=7), education or income (n=3), gender (n=9), height (n=7), physical appearance (n=11), religion (n=2), sexual orientation (n=12), skin color (n=16), and weight (n=5). Eight individuals who identified with other ethnicities in addition to Asian primarily identified with another ethnicity and thus did not have AARRSI scores recorded. Consequently, these 8 participants' data was excluded from regression models that incorporated the AARRSI measures. E-cigarette use was weakly associated with AARRSI total score (R=0.25, p=0.050). Eighty-one percent of participants did not use e-cigarettes, and only one participant who did use e-cigarettes used them on a daily basis; the rest only used e-cigarettes on some days. A larger proportion of participants did not use cigarettes (87.1%) though 3 out of the 9 participants who used cigarettes used them on a daily basis. On average, participants had at least one drink of any alcoholic beverage 2.8 days (SD=2.2 days) out of a given week. Most participants described their health as "Excellent" or "Very Good" (62.9%). General health demonstrated a non-statistically significant, weak, positive correlation with AARRSI total score (R=0.17, p=0.187). Oral health was defined individuals' last visit to a dentist and the number of teeth removed from their mouths. Most participants had seen a dentist within the past year (61.4%) and had no teeth removed due to tooth decay or gum disease (87.1%). The

amount of time passed since last dental visit demonstrated a non-statistically significant weak, negative correlation (R=-0.16, p=0.219). In contrast, the number of teeth removed had a non-statistically significant, weak positive correlation (R=-0.09, p=0.484). Although 77.1% of participants were familiar with PrEP and 88.6% of participants approved of HIV-negative people taking PrEP to prevent transmission of HIV, only 11.4% of participants were currently on PrEP.

Multivariable regression models produced with backwards elimination indicated that not all proposed covariates needed to be adjusted for the outcomes of interest (**Table 3)**. Mixed-race status, U.S. nativity, and attributed cause of discriminatory experiences did not result in any significant differences in substance use, oral and general health, nor attitudes toward PrEP in response to AARRSI total score. No adjustments were made for the logistic models of e-cigarette use, cigarette use, teeth removed, or attitudes towards PrEP. Any changes in total AARRSI score would not change the odds of e-cigarette use (OR=1.00, 95% CI: (0.97, 1.05), p=0.034). Any changes in AARRSI score appeared to not affect cigarette use, whether teeth were removed, or attitudes towards PrEP, but these relationships were not statistically significant. The reduced ordinal logistic model for general health only adjusted for AARRSI total score and SAHL-E score (health literacy) and indicated that SAHL-E score was negatively associated with the general health measure. When adjusting for AARRSI score, a participant with a 1 point higher SAHL-E score would have 26% fewer odds of having a 1 unit higher general health measure as compared to someone else in the sample; this relationship was statistically significant (p=0.029). While holding AARRSI score and insurance status constant, participants had 64% greater odds of having a longer time period since their last dentist visit, i.e., the next latest time category, as compared to participants with 1 lower education level (aOR=1.64, 95% CI: (1.10, 2.46), p = 0.016). The same model also implied that when AARRSI and educational level are held constant, a given participant

would have 460% greater odds of having a longer time period since their last dentist visit when insured as compared to an uninsured peer (aOR=5.60, 95% CI: (1.57, 19.94), p = 0.008). The model for familiarity with PrEP implied that when AARRSI total score and insurance status were held constant, a participant had 69% higher odds of being in one higher familiarity category as compared to a peer with one lower education level (aOR=1.69, 95% CI: (1.17, 2.43), p=0.005). Adjusting for AARRSI score and education indicated that a participant had 72% lower odds of being familiar with PrEP if they had health insurance as compared to an uninsured participant (aOR=0.28, 95% CI: (0.08, 0.98), p=0.046). The fitted model for PrEP use suggested that participants had 409% greater odds of using PrEP when their education was 1 level higher, when holding AARRSI score and age constant (aOR=5.09, 95% CI: (1.0, 25.76), p=0.049). The model also appeared to suggest that each additional year in age indicated 51% lower odds of PrEP use, but this measure had borderline significance (aOR=0.49, 95% CI: (0.24, 1.02, p=0.057). The reduced linear model for alcohol consumption suggested that being in one higher federal income tax bracket was associated with an additional 1.16 days in which alcohol was consumed per week when adjusting for AARRSI score; however, this estimate only had borderline statistical significance (β=1.16, SD=0.57, p=0.055).

Moderator analysis found that the effect of AARRSI score on general health was not impacted by any substance use. In contrast, the use of cigarettes and alcohol consumption each modified the effects of AARRSI total score on whether a participant had teeth removed or not (p=0.001 and p<0.001, respectively). Alcohol consumption appeared to modify the effects of AARRSI score on cigarette use (p<0.001). Although alcohol consumption was not an effect modifier for AARRSI's effect on PrEP use, both familiarity with PrEP and attitude towards PrEP impacted the association of PrEP use with AARRSI score (p=0.015 and p=0.007, respectively).

Discussion

The purpose of this MPH thesis was to examine the association of Asian American racism-related stress on health outcomes and health behaviors among HIV-negative, sexual minority men who identified as Asian. The majority of participants reported that the main reasons for any discriminatory experiences they had encountered were due to their race, heritage, or national origin, indicating that a stress scale specific to Asian-American racism was appropriate to quantitatively gauge individuals' feelings of distress. A portion of individuals also cited their sexual orientation, skin color, and age as other sources of discrimination; although stress related to these specific categories were not measured, these results indicated that participants were aware of intersecting parts of their social identity that can contribute to stress in excess of everyday stressors, as suggested by Minority Stress Theory. These experiences may encourage Asian SM to alleviate resultant stress through avenues such as substance use. Although not statistically significant, this secondary analysis found cigarette use to be weakly associated with racism-related stress. Racism-related stress was also weakly associated with the use of e-cigarettes, which aligns with vaping as a previously found mechanism among queer individuals for coping with stress.[24]

Alcohol consumption was moderately associated with racism-related stress and appeared to exert differential effects on AARRSI's association with cigarette use, which may indicate a difference in usage between individuals who use only one substance and others who jointly use both. Although some studies did not find significant interactions between race and experiences of racism in relation to alcohol use, such studies look at a wide variety of ethnic groups across adulthood.[25] This stronger relationship between stress and alcohol, in contrast to the weaker relationship with tobacco, has previously been discussed by Pachankis et al; young SM in particular may use alcohol to cope with perceived rejection before turning to tobacco.[26] Alcohol is

especially a substance of concern among this population since these men are at an age where they commence social drinking at bars and other social gatherings. The data used in this analysis can support only association, not causation, so the impetus to drink may have alternatively stemmed from a socially driven motivation to drink, rather than to use drinking as a coping mechanism, among young SM men.[27] Alcohol did not modify the relationship between AARRSI score and PrEP usage, though studies have shown that alcohol can interfere with regular PrEP regimens unconsciously and consciously in this population that is at high risk for HIV. Individuals with drinking problems were 6 times more likely to be nonadherent to PrEP, likely due to inhibited cognitive function from intoxication, and erroneous beliefs about interactive toxicities between alcohol and PrEP encourage the occasional skipping of doses. [28, 29, 30]

This study looked at oral health and general health as broad health outcomes in relation to racism-related stress and substance us. Higher general health measures correlated with higher indications of racism related stress; this appears to be the inverse of relationships in past studies with much larger, more demographically diverse samples that indicated positive associations between discrimination and poor general health and mental well-being.[31, 32] However, the p-value for the correlation coefficient is nonsignificant, meaning that the production of this positive numerical value could have been due to chance. Similarly, the nonsignificant p-value represents that greater racism-related stress is associated with a more recent trip to the dentist which conflicts with prior reports of higher emotional impact from racial discrimination in healthcare settings being associated with less recent visits to the dentist.[33] The correlation coefficient for the number of teeth removed imply that greater racism-related stress is associated with a greater number of teeth removed; this is consistent with another national cross-sectional analysis in which greater tooth loss occurred among participants who self-reported discrimination at healthcare facilities.[31]

Teeth removal as an oral health outcome of AARRSI total score was modified by cigarette use and alcohol consumption. Prior work with a large sample of sexual minority men of color found that cigarette use was associated with greater tooth loss, and other literature indicates that alcohol dependency results in a higher prevalence of tooth decay, periodontitis, and mucosal lesions.[34,35] Thus, at different levels of alcohol consumption or e-cigarette use, individuals should not have the same expected cigarette use measure even with the same AARRSI scores.

In addition to Minority Stress Theory, the concept of intersectionality may also explain high levels of stress and hazardous behaviors such as smoking among this group.[18] Microaggressions in relation to race, ethnic identity, and culture, even within the LGBTQ+ community contribute to stress. None of the regression models related to the health behaviors of interest differed across those who identified as multiracial or only Asian, which may indicate that the experiences of emerging adult, queer Asian men may be similar even if they have another racial identity. Asian SM men may also feel a disconnect from their ethnic communities if their cultural community does not tolerate homosexuality; additionally, homophobia in tandem with discrimination is suggested to have an adverse impact on psychosocial and physical health for SM of color.[36] Studies have reported that intersectional minority stress and racism within SM communities has been associated with greater odds of heavy alcohol use and that heterosexism within racial communities has been associated with greater tobacco use. [37] The existence of these experiences may also explain the substance use relationships seen in this study.

Strengths and Limitations

This study has made a unique contribution to the literature by focusing on Asian queer men and deriving trends of racism-related stress and substance use separate from previous research studying aggregate samples of people of color. Prior research has even excluded Asian SM

individuals from statistical analyses due to inadequate, small numbers of participants from this community.[10] This study provided a national sample that may allow this study to be generalized to the larger Asian American population across the United States. Unlike the bulk of SM research that looks at largely adult population over the age of 18, this study focused on emerging adults between the age of 18 and 34. At this age group, individuals have a higher risk of HIV than other age groups and are at a sensitive age at which health habits, social behaviors, and identities are being solidified. This study focuses on men without HIV, which highlights stressors and behaviors that may contribute to HIV risk as compared to other studies that look at these factors and behaviors in HIV-positive individuals which prevents a separation of cause and effect. Thus, the results of this thesis can be incorporated into public health practice to improve HIV risk disparities concerning HIV-negative, emerging adult Asian SM men through preventive health measures.

However, even though the current sample for this secondary data analysis was a subpopulation sourced from a large primary study on emerging adult sexual minority men of color, it was still somewhat limited in the number of participants (N=70), and the analyzed trends may not hold true for all Asian Americans.[34] There were only a small fraction of participants who identified in some categories of interest, such as identifying as multiracial, having military provided insurance, differing numbers of teeth removed, and differing cigarette smoking frequencies. Because of these shortfalls, cell sizes were too small to run stratified analyses so demographic subcategories were merged and consequently offered less granularity during data analysis. Responses were also missing, such as participants having poor recall of substance use and health outcomes and selecting "Don't Know" as responses for several questions. Eight of the individuals did not report AARRSI values because they identified closest with another ethnicity and were prompted with an alternative set of questions in the primary study. Consequently, their

observations for other measures could not be included in the regression analyses that required a participant's AARRSI score; for example, 4 out of the only 8 PrEP users in the entire sample identified closest with an alternate ethnic background. As a result, the logistic regression model for PrEP use had lower power than if these data points were present. These missing responses would also have been valuable in determining whether there are true differences between multiracial and monoracial Asian SM men as well.

Because this study was a secondary data analysis, the survey questions were not developed directly for the research questions of interest, which narrowed the scope of potential exploration of new hypotheses to the existing variables collected in the primary study. Some survey questions were too broad to produce more meaningful analysis. For example, a person who usually consumes 5 drinks once a week and another person who usually consumes a single drink 5 times a week would have the same consumption volume but would be categorized into separate categories in this analysis. Asking participants about the number of days per week that they consume alcoholic beverages does not reveal the total amount that participants drank or provide a metric to estimate intoxication, which has been implicated in risky sexual behaviors and missed PrEP doses.[30] The sample size overall may contribute to insignificant power to detect significant trends in substance use and health outcomes; large confidence intervals for some statistics were reported as a result, and low-power may have biased this study's estimated values. Questions may have been interpreted incorrectly by participants: At least one participant self-reported PrEP use but also indicated that they were "Not familiar at all" with the drug; they may not have considered themselves knowledgeable about the medication and selected this option rather than the option "Somewhat familiar". Additionally, three participants had responded with a number greater than 7 for the number of days they drank per week. This was resolved via winsorizing, but other

participants may have provided inaccurate responses that were not as obvious throughout the administered survey. Apart from accidentally erroneous responses, there is also the possibility that participants of the study may have intentionally underreported responses to the PrEP or literacy questions since these are related to sensitive health-related information.[38] However, online data collection, rather in-person administration methods, should have minimized social desirability bias.

Implications for Public Health

The results of this study can be used to inform the creation of public health policy and public health interventions that target emerging adult Asian SM men to reduce health disparities in HIV. Asian Americans fall under the NIH's classification of minority health populations which include Asian and Native Hawaiian or other Pacific Islander, groups that were included as the focus of this study. Individuals in the study also identified as Latino or Hispanic, an ethnicity also considered by the NIH as a minority ethnic group.[41] Education level was associated with PrEP knowledge and use as well as alcohol consumption, so improving access to higher education among this population of interest is crucial. Although health literacy was not a significant factor in health outcomes and substance use within this analysis, it may be pertinent to introduce health literacy topics at an earlier period in education or alternatively hold health education trainings for those without advanced degrees. This will allow individuals to obtain the knowledge of PrEP in HIV prevention and the detrimental effects of substance use on oral and general health. Even within the health system, providers can be trained to emphasize the role that substance use has on oral and general health such that healthier habits can form in young adulthood and protect queer Asian men later in life from experiencing worse health outcomes even if they do encounter discrimination or otherwise experience some amount of racism-related stress. Mental health

resources should also be produced and expanded to specifically help emerging adult Asian SM in coping with discrimination and racism-related stress in healthier ways than consuming alcohol and using tobacco.

Implications for Policy

This study also suggests that laws that do not directly affect healthcare access or health services can be made to improve the health of queer Asian Americans. The COVID-19 pandemic increased the incidence of hate crimes among Asian Americans such that 1 in 4 individuals experienced some type of racial discrimination in the first year of the pandemic alone.[42] Increases in hate crimes around the United States have been associated with negative mental and physical health, even among individuals who have not personally encountered a discriminatory experience. As this project shows, increases in stress because of racial discrimination are connected to increased substance use and tooth loss. Therefore, laws that protect Asian Americans from discrimination may improve health outcomes for this target population. In addition, there are currently over 400 bills that have been introduced within state legislatures to remove human rights protections and freedoms from LGBTQ+ people in the United States. Even debate about LGBTQ+ rights can function as a structural stressor that increases societal stigma around LGBTQ+ populations and as a stressor for the individual that is associated with increased substance use and worse health outcomes as demonstrated by this work.[43] As seen by the results, only one-tenth of the current sample utilized PrEP which highlights increased risk for HIV infection among this community. Thus, state and federal policies that protect access to preventive health resources such as PrEP or make PrEP more accessible are needed to reduce HIV health disparities in this population on the state and national levels.

Future Directions

Future research should seek to answer more granular questions, such as the number of drinks individuals usually consume each week, rather than just the number of days. Members of the Asian SM men community should also be inquired qualitatively to verify whether their main reasons for substance use are a direct result of racism induced stress. Questions should be posed to explore greater and deeper relationships between Asian SM men's social identities, their health behaviors, and their health outcomes. Individuals in the current study appeared to have unique senses of self in that some multiracial individuals identified more strongly with another ethnicity than Asian while others thought Asian described their identity best. Some Asian only individuals identified as Hispanic/Latino, referring to the idea that Asian SM men may identify culturally as Hispanic/Latino due to their ancestral heritage, as in the case of Filipinos, or due to their cultural heritage and geographic origin from a Hispanic/Latino nation.[39] Prior work has highlighted the need for culturally competent HIV prevention for Black and Hispanic/Latinx populations due to past experiences of racism in healthcare; future research should also seek to understand whether or how racism deters Asian populations from engaging with the American health system as well.[40]

Conclusion

This study sought to target a gap within health literature concerning specific trends of racism-related stress, substance use, general and oral health, and attitudes towards PrEP within the Asian SM community. Overall, racism-related stress is associated with increased substance use and worse oral health outcomes which may decrease general overall health outcomes and contribute to higher HIV risk. Although direct HIV risk could not be inferred from this analysis, a better understanding of the associations between health outcomes, health behaviors, and sociodemographic determinants of health were gained. Quantitative insights surrounding the

effects of discrimination on queer Asian men confirmed qualitatively reported observations from this community and inferences from other racial groups. The findings from this work can prompt further research to explore self-perceptions of Asian identity and cultural norms and how these interact with the perception of discriminatory events, racism-related stress, and sexuality. Understanding the potential mechanisms of racism to deteriorate health will be instrumental in constructing culturally competent interventions to protect mental and physical health and improve HIV prevention among Asian HIV-negative, sexual minority men.

References

1. Gee, G. C., Ro, A., Shariff-Marco, S., & Chae, D. (2009). Racial Discrimination and Health Among Asian Americans: Evidence, Assessment, and Directions for Future Research. *Epidemiologic Reviews*, *31*, 130–151. https://doi.org/10.1093/epirev/mxp009

2. *Race and National Origin*. (2022, August 11). National Institutes of Health (NIH). https://www.nih.gov/nih-style-guide/race-national-origin

3. McLeod, J. (2021). *Understanding Racial Terms and Differences | Office of Equity, Diversity, and Inclusion*. Retrieved April 4, 2023, from https://www.edi.nih.gov/blog/communities/understanding-racial-terms-and-differences

4. Liang, C. T. H., Li, L. C., & Kim, B. S. K. (2004). The Asian American Racism-Related Stress Inventory: Development, Factor Analysis, Reliability, and Validity. Journal of Counseling Psychology, 51, 103–114. https://doi.org/10.1037/0022-0167.51.1.103

5. Miller, M. J., Kim, J., Chen, G. A., & Alvarez, A. N. (2012). Exploratory and Confirmatory Factor Analyses of the Asian American Racism-Related Stress Inventory. Assessment, 19(1), 53–64. https://doi.org/10.1177/1073191110392497

6. Sex, Gender, and Sexuality. (2022, August 11). National Institutes of Health (NIH). https://www.nih.gov/nih-style-guide/sex-gender-sexuality

7. Sex, Gender, and Sexuality. (2022, August 11). National Institutes of Health (NIH). https://www.nih.gov/nih-style-guide/sex-gender-sexuality

8. Feinstein, B. A., & Newcomb, M. E. (2017). Event-Level Associations Among Drinking Motives, Alcohol Consumption, and Condomless Anal Sex in a Sample of Young Men Who Have Sex With Men. *AIDS and Behavior*, *21*(7), 1904–1913. https://doi.org/10.1007/s10461-017-1734-5

9. Pérez-Figueroa, R. E., Kapadia, F., Barton, S. C., Eddy, J. A., & Halkitis, P. N. (2015). ACCEPTABILITY OF PrEP UPTAKE AMONG RACIALLY/ETHNICALLY DIVERSE YOUNG MEN WHO HAVE SEX WITH MEN: THE P18 STUDY. AIDS Education and Prevention : Official Publication of the International Society for AIDS Education, 27(2), 112–125. https://doi.org/10.1521/aeap.2015.27.2.112

10. Kcomt, L., Evans-Polce, R. J., Engstrom, C. W., West, B. T., & McCabe, S. E. (2021). Discrimination, Sexual Orientation Discrimination, and Severity of Tobacco Use Disorder in the United States: Results From the National Epidemiologic Survey on Alcohol and Related Conditions-III. *Nicotine & Tobacco Research: Official Journal of the Society for Research on Nicotine and Tobacco*, *23*(6), 920–930. https://doi.org/10.1093/ntr/ntaa197

11. Pachankis, J. E. , Westmaas, J. L. & Dougherty, L. R. (2011). The Influence of Sexual Orientation and Masculinity on Young Men's Tobacco Smoking. *Journal of Consulting and Clinical Psychology*, *79* (2), 142-152. doi: 10.1037/a0022917.

12. Wilkinson, S., & Wilkinson, C. (2020). Young men's alcohol consumption experiences and performances of masculinity. *International Journal of Drug Policy*, *81*, 102550. https://doi.org/10.1016/j.drugpo.2019.08.007

13. Flentje, A., Sunder, G., Dilley, J. W., Neilands, T. B., Lisha, N. E., Katuzny, K. E., & Carrico, A. W. (2022). AWARENESS: A cognitive behavioral intervention to reduce intersectional minority stress among sexual minority men living with HIV who use substances. Drug and Alcohol Dependence Reports, 3, 100059. https://doi.org/10.1016/j.dadr.2022.100059

14. Fazio, A., Hunt, G., & Moloney, M. (2011). "It's One of the Better Drugs to Use": Perceptions of Cocaine Use Among Gay and Bisexual Asian American Men. Qualitative Health Research, 21(5), 625–641. https://doi.org/10.1177/1049732310385825

15. Substance Use Among Asian American Adults in 2016–2020: A Difference-in-Difference Analysis of a National Survey on Drug Use and Health Data. (n.d.). https://doi.org/10.2105/AJPH.2023.307256

16. Freitag, T. M., Chen-Sankey, J. C., Duarte, D. A., Ramsey, M. W., & Choi, K. (2021). Variations in Substance Use and Disorders Among Sexual Minorities by Race/Ethnicity. Substance Use & Misuse, 56(7), 921–928. https://doi.org/10.1080/10826084.2021.1899225

17. Kcomt, L., Evans-Polce, R. J., Engstrom, C. W., West, B. T., & McCabe, S. E. (2021). Discrimination, Sexual Orientation Discrimination, and Severity of Tobacco Use Disorder in the United States: Results From the National Epidemiologic Survey on Alcohol and Related Conditions-III. *Nicotine & Tobacco Research: Official Journal of the Society for Research on Nicotine and Tobacco*, *23*(6), 920–930. https://doi.org/10.1093/ntr/ntaa197

18. Jannat-Khah, D. P., Dill, L. J., Reynolds, S. A., & Joseph, M. A. (2018). Stress, Socializing, and Other Motivations for Smoking Among the Lesbian, Gay, Bisexual, Transgender, and Queer Community in New York City. *American Journal of Health Promotion*, *32*(5), 1178–1186. https://doi.org/10.1177/0890117117694449

19. Ramos, S. R., Lardier, D. T., Bond, K. T., Boyd, D. T., O'Hare, O. M., Nelson, L. E., Guthrie, B. J., & Kershaw, T. (2021). Participatory Design of a Web-Based HIV Oral Self-Testing Infographic Experiment (HOTIE) for Emerging Adult Sexual Minority Men of Color: A Mixed Methods Randomized Control Trial. International Journal of Environmental Research and Public Health, 18(22), 11881. https://doi.org/10.3390/ijerph182211881

20. Shah, N. S., Luncheon, C., Kandula, N. R., Cho, P., Loustalot, F., & Fang, J. (2022). Self-Reported Diabetes Prevalence in Asian American Subgroups: Behavioral Risk Factor Surveillance System, 2013–2019. *Journal of General Internal Medicine*, *37*(8), 1902–1909. https://doi.org/10.1007/s11606-021-06909-z

21. Sakai, J. T., Wang, C., & Price, R. K. (2010). Substance Use and Dependence among Native Hawaiians, Other Pacific Islanders and Asian Ethnic Groups in the United States: Contrasting Multiple- and Single-Race Prevalence Rates from a National Survey. *Journal of Ethnicity in Substance Abuse*, *9*(3), 173–185. https://doi.org/10.1080/15332640.2010.500582

22. Lee, S.-Y. D., Stucky, B. D., Lee, J. Y., Rozier, R. G., & Bender, D. E. (2010). Short Assessment of Health Literacy—Spanish and English: A Comparable Test of Health Literacy for Spanish and English Speakers. *Health Services Research*, *45*(4), 1105–1120. https://doi.org/10.1111/j.1475-6773.2010.01119.x

23. Sakai, J. T., Wang, C., & Price, R. K. (2010). Substance Use and Dependence among Native Hawaiians, Other Pacific Islanders and Asian Ethnic Groups in the United States: Contrasting Multiple- and Single-Race Prevalence Rates from a National Survey. *Journal of Ethnicity in Substance Abuse*, *9*(3), 173–185. https://doi.org/10.1080/15332640.2010.500582

24. Valera, P., Owens, M., Malarkey, S., & Acuna, N. (2021). Exploring Tobacco and E-Cigarette Use among Queer Adults during the Early Days of the COVID-19 Pandemic. *International Journal of Environmental Research and Public Health*, *18*(24), 12919. https://doi.org/10.3390/ijerph182412919

25. Souleymanov, R., Brennan, D. J., George, C., Utama, R., & Ceranto, A. (2020). Experiences of racism, sexual objectification and alcohol use among gay and bisexual men of colour. *Ethnicity & Health*, *25*(4), 525–541. https://doi.org/10.1080/13557858.2018.1439895

26. Pachankis, J. E., Hatzenbuehler, M. L., & Starks, T. J. (2014). The influence of structural stigma and rejection sensitivity on young sexual minority men's daily tobacco and alcohol use. *Social Science & Medicine (1982)*, *103*, 67–75. https://doi.org/10.1016/j.socscimed.2013.10.005

27. Ristuccia, A., LoSchiavo, C., Kapadia, F., & Halkitis, P. N. (2019). Motivations for alcohol use to intoxication among young adult gay, bisexual, and other MSM in New York City: The P18 Cohort Study. *Addictive Behaviors*, *89*, 44–50. https://doi.org/10.1016/j.addbeh.2018.09.014

28. Sheinfil, A. Z., Foley, J. D., Moskal, D., Dalton, M. R., Firkey, M., Ramos, J., Maisto, S. A., & Woolf-King, S. E. (2022). Daily Associations Between Alcohol Consumption and Antiretroviral Therapy (ART) Adherence Among HIV-Positive Men Who Have Sex With Men. *AIDS and Behavior*, *26*(10), 3153–3163. https://doi.org/10.1007/s10461-022-03657-x

29. Shuper, P. A., Joharchi, N., Bogoch, I. I., Loutfy, M., Crouzat, F., El-Helou, P., Knox, D. C., Woodward, K., & Rehm, J. (2020). Alcohol consumption, substance use, and depression in relation to HIV Pre-Exposure Prophylaxis (PrEP) nonadherence among gay, bisexual, and other men-who-have-sex-with-men. *BMC Public Health*, *20*(1), 1782. https://doi.org/10.1186/s12889-020-09883-z

30. Shuper, P. A., Varatharajan, T., Kinitz, D. J., Gesink, D., Joharchi, N., Bogoch, I. I., Loutfy, M., & Rehm, J. (2022). Perceived influence of alcohol consumption, substance use, and mental health on PrEP adherence and condom use among PrEP-prescribed gay, bisexual, and other men-who-have-sex-with-men: A qualitative investigation. *BMC Public Health*, *22*, 1875. https://doi.org/10.1186/s12889-022-14279-2

31. Muralikrishnan, M., & Sabbah, W. (2021). Is Racial Discrimination Associated with Number of Missing Teeth Among American Adults? *Journal of Racial and Ethnic Health Disparities*, *8*(5), 1293–1299. https://doi.org/10.1007/s40615-020-00891-8

32. Williams, D. R., Lawrence, J. A., Davis, B. A., & Vu, C. (2019). Understanding how discrimination can affect health. *Health services research*, *54 Suppl 2*(Suppl 2), 1374–1388. https://doi.org/10.1111/1475-6773.13222

33. Sabbah, W., Gireesh, A., Chari, M., Delgado-Angulo, E. K., & Bernabé, E. (2019). Racial Discrimination and Uptake of Dental Services among American Adults. *International journal of environmental research and public health*, *16*(9), 1558. https://doi.org/10.3390/ijerph16091558

34. Ramos, S.R.; Lardier, D.T., Jr.; Warren, R.C.; Cherian, M.; Siddiqui, S.; Kershaw, T. Substance Use, General Health and Health Literacy as Predictors of Oral Health in Emerging Adult Sexual Minority Men of Color: A Secondary Data Analysis. *Int. J. Environ. Res. Public Health* **2021**, *18*, 1987. https://doi.org/10.3390/ijerph18041987

35. Priyanka, K., Sudhir, K. M., Reddy, V. C. S., Kumar, R. K., & Srinivasulu, G. (2017). Impact of Alcohol Dependency on Oral Health - A Cross-sectional Comparative Study. *Journal of clinical and diagnostic research : JCDR*, *11*(6), ZC43–ZC46. https://doi.org/10.7860/JCDR/2017/26380.10058

36. Ramos, S. R., Lardier, D. T., Jr, Opara, I., Turpin, R. E., Boyd, D. T., Gutierrez, J. I., Jr, Williams, C. N., Nelson, L. E., & Kershaw, T. (2021). Intersectional Effects of Sexual Orientation Concealment, Internalized Homophobia, and Gender Expression on Sexual Identity and HIV Risk Among Sexual Minority Men of Color: A Path Analysis. *The Journal of the Association of Nurses in AIDS Care : JANAC*, *32*(4), 495–511. https://doi.org/10.1097/JNC.0000000000000274

37. Mereish, E. H., Fish, J. N., & Watson, R. J. (2023). Intersectional Minority Stress and Alcohol, Tobacco, and Cannabis Use Among Sexual and Gender Minority Adolescents of Color: Moderating Role of Family Support. *LGBT health*, *10*(1), 18–25. https://doi.org/10.1089/lgbt.2021.0430

38. Ramos, S.R.; Lardier, D.T., Jr.; Bond, K.T.; Boyd, D.T.; O'Hare, O.M.; Nelson, L.E.; Guthrie, B.J.; Kershaw, T. Participatory Design of a Web-Based HIV Oral Self-Testing Infographic Experiment (HOTIE) for Emerging Adult Sexual Minority Men of Color: A Mixed Methods Randomized Control Trial. *Int. J. Environ. Res. Public Health* **2021**, *18*, 11881. https://doi.org/10.3390/ijerph182211881

39. Ramos, S. R., Nelson, L. E., Jones, S. G., Ni, Z., Turpin, R. E., & Portillo, C. J. (2021). A State of the Science on HIV Prevention Over 40 Years Among Black and

Hispanic/Latinx Communities. *The Journal of the Association of Nurses in AIDS Care : JANAC*, *32*(3), 253–263. https://doi.org/10.1097/JNC.0000000000000266

40. Adia, A. C., Restar, A. J., Nazareno, J., Cayanan, J., Magante, K. A., Operario, D., & Ponce, N. A. (2022). Asian, Latinx, or Multiracial? Assessing Filipinxs' Health Conditions and Outcomes by Aggregate Ethnic Category. *Journal of racial and ethnic health disparities*, *9*(2), 406–412. https://doi.org/10.1007/s40615-021-00971-3
41. *Minority Health and Health Disparities: Definitions and Parameters*. (n.d.). NIMHD. Retrieved April 28, 2023, from https://www.nimhd.nih.gov/about/strategic-plan/nih-strategic-plan-definitions-and-parameters.html
42. McGarity-Palmer, R., Saw, A., Tsoh, J. Y., & Yellow Horse, A. J. (2023). Trends in Racial Discrimination Experiences for Asian Americans During the COVID-19 Pandemic. *Journal of Racial and Ethnic Health Disparities*, 1–16. https://doi.org/10.1007/s40615-022-01508-y
43. Schlehofer, M. M., Wagner, K., & Bramande, E. (2023). "Things Will Get Worse Before They Get Better": LGBTQ + People's Reactions to the 2020 US Presidential Election. *Sexuality Research & Social Policy*, 1–15. https://doi.org/10.1007/s13178-023-00802-6

Tables

Table 1. Sociodemographic Characteristics of Participants (n=70).

	n	**%** [a]
Race		
Asian Only	63	90.0
Bi-/Multi-Racial	7	10.0
Ethnicity		
Hispanic/Latinx	11	15.7
Place of Birth		
United States	54	77.1
Outside of United States	16	22.9
Highest educational level		
High school	9	12.9
Some college	16	22.9
2-year degree	5	7.1
4-year degree	24	34.3
Professional degree	14	20.0
Doctorate	2	2.9
Employment		
Student	14	20.0
Employed, part-time	10	14.3
Employed, full-time	37	52.9
Self-employed	5	7.1
Unemployed, looking for work	3	4.3
Unemployed, not looking for work	1	1.4
Annual Income		
Less than $10,000	10	14.3
$10,000 - $19,999	7	10.0
$20,000 - $29,999	10	14.3
$30,000 - $39,999	7	10.0
$40,000 - $49,999	5	7.1
$50,000 - $59,999	6	8.6
$60,000 - $69,999	8	11.4
$70,000 - $79,999	9	12.9
$90,000 - $99,999	2	2.9
$100,000 - $149,999	3	4.3
More than $150,000	3	4.3
Insurance Status		
Insured	55	78.6
Parents' plan	12	17.1
Medicaid	7	10.0
Military health care	1	1.4
State-sponsored health plan	6	8.6
Private health insurance	29	41.4
Uninsured	15	21.4
	Mean (Std. dev.)	
Age (years)	26.7 ± 4.7	

[a] Percentages may not sum to 100% due to rounding.

Table 2. Association of Asian American Racism-Related Stress Inventory (AARRSI) Scores with Health Behaviors and Health Outcomes (n=70).

	Mean (SD)		
AARRSI Total Score (n=62) [a]	34.7 (11.5)		
	n	**%** [b]	**Spearman R (p-value)**
E-cigarette use			0.25 (p=0.050)
Not at all	57	81.4	
Some days	12	17.1	
Every day	1	1.4	
Cigarette use			0.18 (p=0.171)
Not at all	61	87.1	
Some days	6	8.6	
Every day	3	4.3	
General Health			0.17 (p=0.187)
Excellent	16	22.9	
Very Good	28	40.0	
Good	17	24.3	
Fair	6	8.6	
Poor	3	4.3	
Time Since Last Dentist Visit			-0.16 (p=0.219)
Less than 12 months	43	61.4	
1 year up to 2 years	9	12.9	
2 years up to 5 years	6	8.6	
5 or more years ago	7	10.0	
Never gone to dentist	3	4.3	
Teeth Removed			0.09 (p=0.484)
None	61	87.1	
1 to 5	6	8.6	
All teeth	2	2.9	
Familiarity with PrEP			0.12 (p=0.343)
Familiar	21	30.0	
Somewhat familiar	33	47.1	
Not familiar at all	16	22.9	
Attitude towards PrEP use			-0.13 (p=0.329)
Extremely positive	30	42.9	
Somewhat positive	32	45.7	
Neither positive nor negative	6	8.6	
Extremely negative	2	2.9	
PrEP Usage			0.03 (p=0.810)
Yes	8	11.4	
No	62	88.6	
Alcohol Consumption (n=30) [c]	**Mean (SD)**		
Consumption days per week	2.8 (2.2)		0.37 (p=0.060)

[a] 8 participants did not have AARRSI scores recorded.
[b] Percentages may not sum to 100% due to rounding.
[c] 40 participants did not report alcohol consumption.

Table 3. Regression coefficients for reduced models of characteristics associated with AARRSI total score among sexual minority men of Asian heritage.

	Logistic Model for E-cigarette Use (N=62)*			Logistic Model for Cigarette Use (N=62)*			Logistic Model for General Health (N=62)			Logistic Model for Time Since Last Dentist Visit (N=60)			Logistic Model for Teeth Removed (N=61)*		
Characteristic	**Beta (SE)**	**OR (95% CI)**	**p**	**Beta (SE)**	**OR (95% CI)**	**p**	**Beta (SE)**	**aOR (95% CI)**	**p**	**Beta (SE)**	**aOR (95% CI)**	**p**	**Beta (SE)**	**OR (95% CI)**	**p**
AARRSI score	-0.066 (0.03)	1.00 (0.97, 1.05)	.034	0.07 (0.04)	1.07 (1.00, 1.16)	.061	0.03 (0.02)	1.03 (0.99, 1.08)	.118	0.04 (0.03)	1.04 (0.99, 1.09)	.121	-0.02 (0.04)	0.98 (0.90, 1.05)	.538
Age															
SAHL-E score							-0.30 (0.14)	0.74 (0.56, 0.97)	.029						
Education level										0.50 (0.21)	1.64 (1.10, 2.46)	.016			
Income															
Insurance status										1.72 (0.65)	5.60 (1.57, 19.94)	.008			

	Logistic Model for Familiarity with PrEP (N=62)			Logistic Model for Attitudes Towards PrEP (N=62)			Logistic Model for PrEP Use (N=62)			Linear Model for Alcohol Consumption (N=26)	
Characteristic	**Beta (SE)**	**aOR (95% CI)**	**p**	**Beta (SE)**	**OR (95% CI)**	**p**	**Beta (SE)**	**aOR (95% CI)**	**p**	**Beta (SE)**	**p**
AARRSI score	0.01 (0.02)	1.00 (0.97, 1.05)	.734	-0.01 (0.02)	0.99 (0.95, 1.03)	.708	-0.04 (0.07)	0.96 (0.84,1.09)	.515	0.10 (0.04)	.016
Age							-0.71 (0.37)	0.49 (0.24, 1.02)	.057		
SAHL-E score											
Education level	0.52 (0.19)	1.69 (1.17, 2.43)	.005				1.63 (0.83)	5.09 (1.0, 25.76)	.049		
Income										1.16 (0.57)	.055
Insurance status	-1.28 (0.64)	0.28 (0.08, 0.98)	.046								

Legend
OR = odds ratio
aOR = adjusted odds ratio
CI = Confidence interval
E-cigarette and cigarette use: Binary categorization was used: use and nonuse. Reference: nonuse.
Income: Ordinal categorization was used based on approximated federal income bracket (<$10,000; $10,000-$39,999; $40,000-$89,999; >$90,000). Reference: <$10,000.
Insurance Status: Binary categorization was used: Insured and uninsured. Reference: uninsured.

Table 4. Interaction coefficients of AARRSI total scores and moderators of interest for substance use, oral and general health, and attitudes towards PrEP.

Outcome	Outcome	Potential Modifier	Interaction Term	p-value
Cigarette Use	Cigarette use (n=26)	Alcohol consumption	**0.25**	**<0.001**
	Cigarette use (n=62)	E-cigarette use	0.56	0.019
Oral Health	Time since last dentist visit (n=25)	E-cigarette use	0.90	0.920
	Time since last dentist visit (n=60)	Cigarette use	0.13	0.785
	Time since last dentist visit (n=25)	Alcohol consumption	0.25	0.699
	Teeth removed (n=61)	E-cigarette use	0.23	0.367
	Teeth removed (n=61)	Cigarette use	**0.83**	**0.001**
	Teeth removed (n=26)	Alcohol consumption	**0.25**	**<0.001**
General Health	General health (n=26)	Alcohol consumption	0.25	0.782
	General health (n=62)	E-cigarette use	8.42	0.070
	General health (n=62)	Cigarette use	2.71	0.357
PrEP Use	PrEP use (n=62)	Familiarity with PrEP	**1.89**	**0.015**
	PrEP use (n=62)	Attitude towards PrEP	**1.59**	**0.007**
	PrEP use (n=26)	Alcohol consumption	0	N/A

Legend
Bold indicates significant p-value at $\alpha = 0.05$ level.
E-cigarette use: yes/no
Cigarette use: yes/no
Alcohol consumption: >2 days / 2 days or less

Appendix A

To ensure rigor, we followed the scoping review methodology as outlined in the Joanna Briggs Institute Manual for Evidence Synthesis to conduct a structured, unbiased, and robust review of the available literature. In January 2022, we searched the PubMed database due to its open access and breadth of content in the topic area of social and behavioral sciences. The search strategy for PubMed can be found in **Figure 1.** The articles of interest are summarized in **Table 1**.

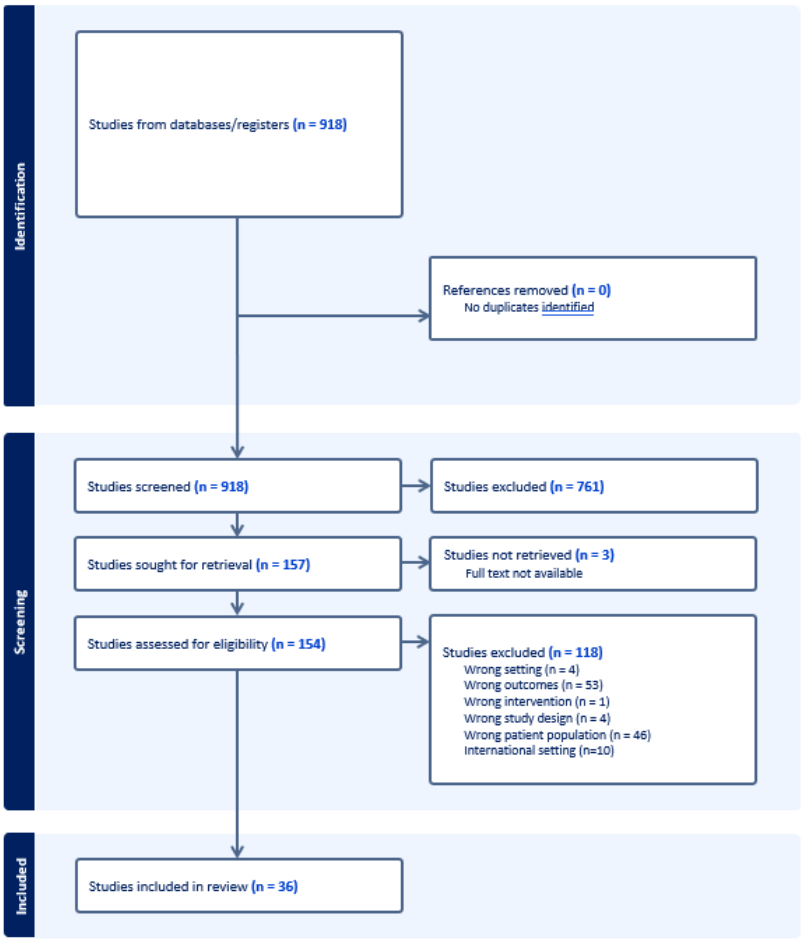

Figure 1. PRISMA flow diagram of preliminary literature search.

Table 1. Characteristics of Articles From Literature Review (n=36).

Author, Year, and Sample Size	Population (Sexual Orientation, Age, Gender)	Race/ Ethnicity	Country	Design	Intervention/ Variables of Interest	Outcomes	Key Findings Relevant to Thesis
Abrahao et al, 2022	SM	NA	NA	Narrative Review	NA	NA	• Subgroups that compose SM are too diverse in lived experiences, and it is not precise to group them together even though stigma, discrimination, and victimization are common among the subgroups
Boyle et al, 2018 n=307	LGB, 18-63	multiple races	US	Cross-sectional	Perception of peers using alcohol and drugs	Odds of alcohol and drug use	• Odds of alcohol to cope were 15 times greater among participants who perceived LGB peers to likely use alcohol to cope, 9 times greater for drugs • LGB adults may overestimate the degree to which LGB peers use alcohol and other drugs to cope with a commonly experienced SM stressor • Peer coping norms were strongly related to coping-motivated substance use, even after controlling for the stress impact of Pulse
Card et al, 2020, n=7991 7184 HIV-, 669 HIV+	G,B, MSM, 16 years+	Multiple races	Canada	Cross-sectional	HIV status, drug use	ART, PEP, PrEP awareness Viral load, ART adherence	• HIV- men's drug use was associated with elevated awareness and interest in HIV prevention strategies • HIV+ men: substance use patterns not associated with detectable viral loads or treatment awareness
Cioe et al, 2018 n=185	HIV-infected MSM, 20-66	Multiple races	US	Cross-sectional	smoking	ART adherence	• Current smokers were significantly more likely to identify as a man of color, lower education and income, report imperfect ART adherence, significantly higher average number of drinks per week than non-smokers • No significant differences between smoking in HIV viral load, CD4 T-cell count • Adjusting for covariates led to no significant associations between current smoking and ART adherence so these two variables may have similar risk factors, indicating a hierarchy of health priorities
Evans-Polce et al, 2020 n=2375	Heterosexual, L,G,B, 18-50	Multiple races	US	Cross-sectional	Prevalence of sexual orientation discrimination	Age Sexual orientation AUD, TUD, DUD	• Sexual orientation discrimination varied across adulthood: greatest in young adulthood and decreased in 30s, 40s • Sexual orientation discrimination associated with AUD during later young and mid-adulthood' TUD and DUD mid30s to early 40s maybe due to cumulative stress of discrimination experiences across the life course
Feinstein & Newcomb, 2017 n=189	MSM, 16-29	Multiple races	US	Cross-sectional	Alcohol use problems, marijuana use problems, lifetime illicit drug use, drinking motives	Alcohol consumption, alcohol consumption before sex, condomless anal sex	• YMSM drank more on days to cope, enhance pleasure, to be more social
Felner et al, 2021 n=20	HIV(-) MSM, 19-24	60% Latinx, multiple races (mostly POC)	US	Qualitative	NA	NA	• HIV Risk depends on individual and context • Decreasing risk over time due to increase in knowledge about HIV risk and regular testing importance • Alcohol and other substances can increase risk by decreasing inhibitions

Freitag et al, 2021 n=35,981	Any sexuality, 18-65	Multiple races	US	Cross-sectional	racial/ethnic minority status, self-identification as sexual minority	Substance use and abuse	• SM groups more likely to use substances and have SUDs as compared to heterosexual • racial/ethnic SM adults experience increased risk for substance used and disorders as compared to heterosexual, non-Hispanic white
Gilbert et al, 2015 n=9689	Men,<30-60+	Multiple races	US	Cross-sectional	race/ethnicity	Drinking behavior	• Sexual minority men reported equivalent or lower levels of hazardous drinking than heterosexual peers • No interaction between sexual orientation and race/ethnicity for heavy daily drinking • Joint effect for Black and Latino men from sexual orientation & race/ethnicity in opposite directions • May suggest that use of other substances are substitutes
Gilbert et al, 2014 n=190	Male, 18-48, majority gay, minority transgender	Latino, born outside US	US (North Carolina)	Cross-sectional	Migration as an adult, ethnic discrimination, sexual orientation discrimination, internalized negative stereotypes about gay/bisexual men	Alcohol use (from exacerbated stress)	• 61% of current drinkers reported at least 1 heavy drinking episode • Ethnic discrimination positively associated with any drinking and heavy episodic drinking (except for hi social support) • Sexual orientation discrimination wasn't associated with any drinking outcome, may be due to response bias, e.g., machismo • In contrast to previous studies where language barriers are associated with heavy drinking this study found English use positively associated with heavy drinking which may suggest greater exposure of social interaction with non-Latinos and greater experiences of discrimination leads to higher stress or integration into American society and adoption of Anglo-American drinking norms
Halkitis et al, 2015 n=598	MSM, 18-19	Multiple races; US and foreign born	US (New York City)	Prospective cohort	Drug use, unprotected sex Mental health burden	Consistency in these variables over time	• Slight increase over time in drug use and unprotected sexual behaviors as went from emerging into young adulthood over 18-month follow-up • Unprotected sex increase may be due to increasing number of sexual encounters as age
Herrera et al, 2016 n=312 MSM, n=89 TW	MSM and TW, 18-70	NA	Peru	Cross-sectional	AUD	Prevalence of condomless anal intercourse and new infection/recent STI diagnosis	• AUD not independently associated with either outcome • Use of alcohol at last sex significantly associated with screening AUD positive–alcohol at sex may be more common among those with AUD • Potential life stress that may contribute to AUDs and sexual risk behavior—history of prior sexual coercion
Hoenigl et al, 2018 n=394	MSM, TW 18+	Multiple races	US	Prospective cohort	Substance use	PrEP adherence, study completion, STI incidence	• 39% incident STI diagnoses • Substance use not associated with decreased adherence to PrEP as measured by TFV-DP in DBS • Baseline frequent substance use associated with higher likelihood of study completion over 48 weeks • Baseline stimulant use strongly associated with higher rates of incident STIS • Substantial or severe problems with alcohol use associated with lower likelihood of adequate adherence

Jannat-Khah et al, 2017
n=8
	Leadership position in an organization serving the LGBTQ community	Caucasian, Hispanic, African American	US (New York City)	Qualitative	Motivational factors	smoking	• Smoking can be seen as an accessory to building one's image
							  ○ Initiation of smoking as an act of rebellion
							  ○ Use of an electronic cigarette as a status symbol is a unique and novel behavior that might be used to portray a higher social status or affluent
							  ○ Individuals are impressionable and open to smoking in absence of a secure sexual identity

							or healthy role model ○ Desired behavior in a sexual partner ● Smoking acts as a socializing medium ○ Socialization activity for youth ○ Gateway to underage drinking ○ Fear of losing friends prevents cessation ● Smoking is a coping mechanism for stress ○ Racism is nuanced in the NYC LGBTQ community and racism is an issue that everyone sees in the LGBTQ community but it is lost under the greater arc of LGBTQ issues such as marriage equality and health care. Sources of stress influence a person to smoke to alleviate that stress. ○ Stressors include avoidance of past issues, stress of coming out, feeling rejected ○ Disconnect from their ethnic communities by being LGBTQ, especially among non-LGBTQ tolerant cultures ○ Various microaggressions stemming from racism, ethnic identities, culture, religion, families, and communities seem to be associated with smoking as a coping mechanism ● Intersectionality as a paradigm may explain high levels of stress and the association of smoking and stress. among LGBTQs
Kcomt et al, 2021 n=36,309	LGB and heterosexual adults, 18+, male, female	Black, Latino, white	US	Cross-sectional	racial or ethnic discrimination, sexual orientation discrimination	TUD severity	● Greater lifetime racial or ethnic and sexual orientation discrimination was significantly and positively associated with TUD among SM regardless of sexual orientation status ● Experiencing greater lifetime racial or ethnic discrimination increased the odds of having any TUD and of having moderate-to-severe TUD ● Individuals who experienced stressful life events had greater odds of moderate-to-severe TUD, compared with those who had no life stressors. ● Mood and anxiety disorders were significant and positively correlated with moderate-to-severe TUD in both SM and heterosexual populations
Kierkens et al, 2022 n=1311	Male & female, 18-59, LGBT	Black, Latino, white	US	Cross-sectional	everyday discrimination	Alcohol use	● Higher rates of everyday discrimination and discrimination attributed to non-SOGIE among females might be related to the intersection of marginalized identities
Martinez et al, 2016 n=176	MSM	Latino	US (New York City)	Cross-sectional	Age, primary language, education, US nativity, relationship status, high risk alcohol consumption, clinical depression, discrimination, childhood sexual abuse (syndemic factors)	multiple sexual partners, condomless anal intercourse	● Pervasive psychosocial health conditions exist among Latino MSM, which magnifies HIV risk ● Presence of syndemic factors was associated with a greater likelihood of having multiple sexual partners and engaging in condomless anal intercourse ● Intertwining factors such as clinically significant depression, high-risk alcohol consumption, discrimination, and childhood sexual abuse, increase HIV risk in this population
Mbita et al, 2022 n=1,041,343	MSM and male clients of female sex workers, other men in HIV acquisition hot spots, 18+	African	Tanzania	Cross-sectional	circumcision, sexually transmitted infection symptoms, harmful drinking of alcohol before	HIV seropositivity	● Not being circumcised was associated with increased risk of HIV in MSM

					sex		
Mereish et al, 2023 n=3423	SGM adolescents of color, 13-17	Multiple races	US	Cross-sectional	Intersectional minority stress, role of family support	Substance use	• Intersectional minority stress was associated with greater odds of recent and heavy alcohol and recent cannabis use, but not tobacco use • Racism within SGM communities was associated with greater odds of recent and heavy alcohol, and recent cannabis use, whereas heterosexism from same racial/ethnic communities was associated with greater odds of cigarette and cigar use • Although family support did not moderate these associations, it was still protective against substance use
O'Cleirigh et al, 2015 n=1309	Male, sexual minority	Multiple races	US (Boston)	Cross-sectional	Sexual minority stress/traumas, HIV status	Smoking status	• sexual minority specific trauma history may represent a vulnerability for smoking among gay/bisexual men. • more sexual minority stress and traumas were each associated with a greater likelihood of ever smoking, former smoking, or current smoking in a community health sample of sexual minority men. • possible that sexual minority stress and traumas may exert their influence on smoking through the development of subsequent mental health issues, such as posttraumatic stress or other anxiety disorders. • Findings provide some additional support for Meyer's Sexual Minority Stress Model; sexual minority specific stressors, combined with more general stressors, together place sexual minority men at risk for negative health outcomes such as smoking • Across gay and bisexual men sexual stressors/traumas significantly predicts smoking status irrespective of HIV status.
Pachankis et al, 2016 n=63	Gay, bisexual young men, avg age 26 SD of 4	Multiple races (no Asian, 1 Pacific Islander)	US	RCT	Transdiagnostic CBT to improve depression, anxiety, and co-occurring health risks (i.e., alcohol use, sexual compulsivity, condomless sex)	AUDIT, CESD, ODSIS, OASIS, SCS, SSSE, TFLB; minority stress process	• Treatment significantly reduced depressive symptoms • Participation in CBT program significantly reduced depressive symptoms, alcohol use problems, sexual compulsivity, and condomless anal sex with casual partners, and improved condom use self-efficacy. Depressive symptoms, alcohol use, and sexual compulsivity showed clinically significant improvement using established clinical cutoffs.
Pachankis et al, 2014 n=119	SMM 18-25 at large universities	Multiple races	US	Cross-sectional	Stigma at the individual level (gay-related rejection sensitivity), structural stigma	Daily tobacco & alcohol use	• Past rejection sensitivity interacted with past structural stigma to predict higher rates of alcohol use, no effect on smoking • Interaction between current structural stigma and rejection sensitivity showed a marginally significant effect in predicting higher rates of smoking • Rejection-sensitive gay men who live in social contexts that confirm expectations of rejection through laws, policies, and negative attitudes affecting sexual minorities may be particularly likely to experience stress. Substance use may serve as one way to cope with these joint forms of stress, including both structural stigma and psychological expectations of stigma. • Rejection-sensitive young gay and bisexual men might have initiated alcohol use before tobacco use as a way to cope with perceived rejection may explain our finding that rejection sensitivity heightened the influence of past exposure to structural stigma on alcohol use while it marginally heightened the influence of college exposure to structural stigma on tobacco use. For rejection-sensitive young sexual minority men, the timing of

							exposure to structural stigma seems to be important in determining whether tobacco or alcohol is used ● Rejection sensitivity did not function as a statistically significant mediator through which structural stigma predicted substance use
Ristuccia et al, 2019 n=426	YMSM, ~age 21	Multiple races	US (New York City)	Cross-sectional	Drinking motivations, race, SES, Kinsey scale	Alcohol use to intoxication	● When all three drinking contexts were included in a combined model, only convivial drinking was significantly associated with any days intoxicated: significant association between alcohol use to intoxication and convivial drinking is important to consider in YMSM populations who are beginning to attend social drinking settings, such as bars and clubs, which may be associated with more frequent alcohol use, but may not have the same negative consequences as intimate and sexual contexts ● YMSM are primarily motivated to drink in social contexts, and not as a negative coping mechanism or sexual risk factor,
Rogers et al, 2018 n=389	MSM, 18-34	Multiple races	US	Cross-sectional	Sexual orientation-specific discrimination; Anxiety, depression	HIV high-risk behavior (anal sex w/o condom, HIV+ or unknown status sexual partner, using sex to cope with negative emotions, illicit drug use, hazardous EtOH use)	● No significant direct effect of gay related minority stress on frequency of sex without a condom, frequency of engaging in anal sex with HIV+ or unknown partner, hazardous alcohol consumption, past month drug use ● Anxiety symptoms partially explain the relationship between gay-related minority stress and illicit drug use, average alcohol use, and using sex to cope with negative emotions
Santos et al, 2018 n= 252	MSM	Multiple races, majority were people of color	US	Cross-sectional	race/ethnicity, education, # of sexual partners, syphilis status, relationship status	Heavy alcohol use	● Heavy drinking patterns were common and independently associated with greater number of male sexual partners and sexually transmitted infections. Significant racial/ethnic and socioeconomic disparities related to heavy alcohol use were observed and race/ethnicity modified the effect of the risk factors associated with these outcomes. ● Many participants reported that their current goal regarding their alcohol use was “to use alcohol in a controlled manner” ● significant interaction effects between race/ethnicity and interest in reducing alcohol use, past receipt of treatment for alcohol use, use of ecstasy, and reporting a recent diagnosis of syphilis ● Identifying as Hispanic/Latino or mixed/other race; being moderately or extremely interested in reducing alcohol use; ever receiving alcohol treatment; using ecstasy; reporting syphilis diagnosis; and having more than 5 male partners were independently associated with hazardous alcohol consumption ● Less hazardous consumption was associated with having a bachelor's degree or completing post-graduate studies; and not being in a relationship.
Sheinfil et al, 2022 n=22	HIV + MSM, 18-65	Multiple races	US (San Francisco, Syracuse)	Prospective cohort	Alcohol use	ART adherence	● Consuming any amount of alcohol was associated with increased odds of ART non-adherence on the same day. This association remained significant even after adjusting for age, time since HIV diagnosis, weekend versus weekday, average levels of alcohol consumption, and baseline levels of ART adherence. These findings extend the broader event-level literature by establishing a prospective within-person effect of alcohol consumption on ART adherence to a non-treatment seeking MSM sample

Shuper et al, 2020 n=141	18+, GBMSM	Multiple races	Canada	Cross-sectional	Severity of EtOH use, concurrent substance use (cocaine), concurrent depression	PrEP adherence	• 1 out of 5 participants missed 1+ PrEP doses over the past 4 days • Increasingly problematic levels of EtOH consumption associated w/ significantly increased likelihood of PrEP nonadherence, depression not • Participants with the most pronounced alcohol problems (i.e., harmful drinkers) were over 6 times more likely to be nonadherent to PrEP • Perceptions surrounding interactive toxicities between alcohol and PrEP lead to conscious decisions to miss PrEP doses
Shuper et al, 2022 n= 35	18+, GBMSM	Multiple races	Canada	Qualitative	NA	NA	• Interaction between hazardous/harmful drinking and moderate/high risk cocaine use was not significant; these two factors did not work in a synergistic, multiplicative manner in relation to PrEP nonadherence • Prep adherence can be maintained even when partaking in substance use, but substance use can cause dose-skipping depending on the context • Severity of mental health may have a detrimental impact on PrEP adherence among individuals experiencing a severe mental health episode • Motivation to adhere when experiencing mental health issues–experiencing poor mental health (e.g., depression) could lead to a lower sex drive and fewer sexual encounters, and may or may not increase PrEP dose skipping • Generalized increase in condomless sex when intoxicated, regardless of taking PrEP; and relying on PrEP as a means of protection when intoxicated. Participants shared that they take PrEP as a 'safety net' for times where they are in a state of depression or apathy and consequently are not as concerned about potentially riskier sexual practices.
Souleymanov et al, 2020 n=369	18+, GB men of color	Multiple races (Black/African/Caribbean, Latino/Latin American, South Asian, East and Southeast Asian)	Canada (Toronto)	Cross-sectional	Experiences of racism and sexual objectification	Alcohol use disorder	• An association between self-reported racism, sexual objectification experiences, and a measure for alcohol use disorder among an ethnoracially diverse sample of gay and bisexual men, after controlling for demographics • No significant interactions between race/ethnicity and experiences of racism in relation to alcohol use • No significant interactions between race/ethnicity, experiences of racism, and sexual objectification in relation to alcohol use
Swann et al, 2019 n = 450	GBMSM, 16-20 at baseline	Multiple races	US (Chicago)	Prospective	Victimization, age	Substance abuse, mental health	• More experiences of victimization were associated with higher internalizing and externalizing symptoms, and higher alcohol and marijuana use. • A decrease in both internalizing and externalizing symptoms as YSMM moved into young adulthood was partially explained by the decrease in experiences of victimization over time. • Victimization mediates the association between age and both mental health and substance use outcomes, such that as participants transitioned from late adolescence into young adulthood, they would experience less victimization and as a result have fewer symptoms of mental health problems and substance use behaviors associated with victimization
Trocki &	18-40, any	Multiple	US (San	Cross-	Sexual identity,	Frequency of bar	• Bar patrons regardless of gender or sexual identity

Drabble, 2008 n=1,043	sexuality; large majority was heterosexual due to convenience sampling	races	Francisco, Alameda and Contra Costa Counties)	sectional	gender, age group; motivations for attending bar	patronage, avg quantity of EtOH consumed per bar/tavern/cocktail lounge visit, alcohol life effects	are at much higher risk of excessive consumption and related problems and consequences ● Men tended to have higher levels of consumption and problems than women, but did not usually differ between sexual identity categories ● Presumed causal pathway of stress leading to bar patronage, which leads to drinking among lesbian, gay and bisexual populations is not entirely supported by the data ● Previous assumption that the LGB populations drink more heavily or have more problems has limited support. Gay men are particularly frequent bar patrons but are less likely to drink or have alcohol-related problems ● Sensation seeking and mood change motives were predictive of heavier drinking and alcohol-related problems ● Social motives did not predict problems
Valera et al, 2021 n=25	18-34, queer (not heterosexual or cisgender) M/F/nonbinary	Multiple races	US	Qualitative	COVID-19 pandemic	(How it changed) Tobacco and e-cigarette use	● Major transition in individuals' lives with much uncertainty caused stress and anxiety and led to more cigarettes smoked, more urgency to smoke ● Lack of familiarity with smoking cessation outside of HIV care ● Vaping and smoking used to relieve stress and anxiety (e.g., during sex work, work stress) is heightened by COVID-19
Wray et al, 2023 n = 83	Heavy drinking, MSM HIV-, 21-50	Multiple races	US (Providence, Boston)	RCT	alcohol-related deficits in inhibitory control and attention bias toward sexual cues	increases in sexual risk intentions after drinking	● Little evidence that changes in inhibitory control or attention bias to sexual cues explained why intoxication increases HIV-risk behavior in the MSM sample ● Little evidence that either inhibitory control or attention bias moderated the effects of alcohol on sexual risk behavior among participants
Wray et al, 2016 n=183	MSM HIV+, MSM HIV-, 21-50	Multiple races	US	Cross-sectional	Perceived discrimination	Tendency to report drinking for coping, enhancement, social, or sexual motives	● Heavy drinking, HIV- MSM who report more discrimination experiences based on their sexual orientation also report drinking more often for multiple reasons: to enhance their mood, to facilitate sex, and to cope with negative emotions. In turn, those who reported more frequent drinking to cope with negative emotions were directly at risk for experiencing alcohol-related problems, over-and-above their level of alcohol use ● Participants reporting more discrimination also reported more frequently drinking to enhance a positive mood; pathway was not significantly associated with heavier drinking patterns or more alcohol-related problems ● Experiencing more sexual orientation-based discrimination was not associated with drinking more frequently to facilitate social interactions ● Drinking for social and sexual reasons was not associated with heavier patterns of drinking nor alcohol problems, either directly or through use ● For HIV- MSM, drinking to cope with negative emotions may be one pathway whereby experiencing discrimination based on sexual orientation could lead to alcohol-related problems. Drinking to enhance positive mood, on the other hand, may result in heavier levels of use which results in increased risk for problems irrespective of discrimination experiences. ● Among heavy drinking MSM, experiencing more discrimination on the basis of sexual orientation or HIV-status (among those living with HIV) was generally associated with reporting more alcohol-

							related problems, suggesting that discrimination may be an important risk factor for problem drinking among these individuals.
Zelaya et al, 2022 n=180	Cisgender MSM with HIV, 20-88	Multiple races	US	Cross-sectional	SES, discrimination, cognitive appraisal	Mental health concerns	• MSM living with HIV are at risk for increased substance use and mental health concerns; this risk is compounded among racial/ethnic minorities • Although racial minority individuals were found to have lower lifetime prevalence of mental disorders than White individuals, sexual minority individuals who were Black or Latinx reported a higher risk of suicide than their White sexual minority counterparts, as well as the general population of Black and Latinx individuals

Legend

NA = not available
SM = sexual minorities
L = lesbian
G = gay
B = bisexual
T = transgender
TW = transgender women

MSM = men who have sex with men
YMSM = young men who have sex with men
SGM = sexual and gender minority
SOGIE = sexual orientation, gender identity, and expression
AUD = alcohol use disorder
TUD = tobacco use disorder