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Risk factors for high levels of prescription drug misuse and illicit drug use among substance-using young men who have sex with men (YMSM)

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Abstract

Background: Limited research has focused on prescription drug misuse among young men who have sex with men (YMSM), or investigated risk factors contributing to misuse. This study aims to investigate the relationship between multiple psychosocial risk factors (i.e., childhood abuse, discrimination, mental health distress) and prescription drug misuse among YMSM who are current substance users.

Methods: YMSM ($N=191$) who reported prescription drug misuse in the past 6 months were recruited in Philadelphia between 2012 and 2013 to complete an anonymous survey assessing demographic information, substance use, and psychosocial factors.

Results: High levels of childhood physical abuse and perceived stress were associated with higher opioid misuse, while high levels of depression were associated with lower misuse of opioids. Those with higher levels of perceived stress were more likely to report higher tranquilizer misuse, while those with more experiences of social homophobia/racism and higher levels of depression and somatization reported higher stimulant misuse. Regarding demographic correlates, older participants were more likely than younger participants to report higher opioid misuse, while

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Contributors

Kecojevic and Lankenau developed implementation protocols and study design. Kecojevic conducted participant recruitment with help of research assistant. Kecojevic conducted literature review, conceptualized, conducted the statistical analysis, and wrote the initial draft of the manuscript. Authors Wong, Corliss, and Lankenau provided substantive expertise to the conceptualization, writing, and editing of the manuscript. All authors contributed to and have approved the final manuscript.

Conflict of interest

No conflicts of interest to be declared.

racial minorities were less likely than White participants to report higher misuse of tranquilizers, stimulants, and illicit drug use. Bisexual/heterosexual/other identified participants were more likely than gay identified participants to report higher misuse of all three classes of prescription drugs.

Conclusions: Associations of risk factors with substance use among YMSM are complex and offer opportunities for additional research. Our findings show that prevention efforts must address substance use among YMSM in sync with psychosocial stressors.

Keywords

Prescription drug misuse; Illicit drug use; YMSM; Childhood abuse; Minority stress; Mental health distress

1. Introduction

Prescription drug misuse (i.e., opioids, tranquilizers, stimulants), defined as use of prescription drugs when not prescribed by a health care provider or taken only for the feeling or effect caused, is a serious public health problem among young adults in the US, with 31.4% of individuals between ages 18 and 29 years reporting misuse at some point in their lifetime (Substance Abuse and Mental Health Services Administration (SAMHSA), 2010). Most of the research on prescription drug misuse among young adults has focused on students, or general populations of adolescents and young adults (Arria et al., 2008; Corliss et al., 2010; Teter et al., 2010). Recently, researchers have made attempts to understand patterns of prescription drug misuse among high-risk young adults such as homeless, injection drug users, club youth, or polydrug users (Daniulaityte et al., 2009; Kelly et al., 2013; Lankenau et al., 2012). While some of these studies included high-risk lesbian, gay, bisexual, and transgender (LGBT) individuals, and while there is emerging literature on prescription drug misuse among men who have sex with men (MSM; Kelly and Parsons, 2011), limited data exist on prescription drug misuse among high-risk (i.e., drug-using) young MSM (YMSM). This represents a significant gap in the public health literature because YMSM who use drugs are at increased risk for negative health outcomes, including substance dependence (Russell et al., 2002), violence and victimization (Wong et al., 2010), and HIV exposure (Centers for Disease Control and Prevention (CDC), 2010). Identifying factors contributing to prescription drug misuse among high-risk YMSM can shed light on complex relationship between substance use and negative health outcomes, making substance-using YMSM a focal point of public health research.

Although little is known about usage patterns, risk factors, or concomitant health concerns of YMSM who misuse prescription drugs, a substantial body of research on substance use among YMSM informs the current study. Past research has shown that exposure to childhood abuse (i.e., sexual, physical, emotional), discrimination, and stress increases risk of drug use and/or developing substance use disorders (Afifi et al., 2012; Dube et al., 2003; Marshal et al., 2008; Rosario et al., 2014). While YMSM likely misuse prescription drugs for many of the same reasons as other people do, these factors may be particularly relevant for prescription drug misuse in this population because of their increased likelihood of being exposed to these situations.

1.1. Childhood abuse

Several notable studies have documented higher rates of childhood abuse among lesbian, gay, bisexual and transgender (LGBT) individuals relative to heterosexuals (Austin et al., 2008; Corliss et al., 2002; Friedman et al., 2011; Kecojevic et al., 2012; Schneeberger et al., 2014). Childhood abuse has potentially serious negative effects on psychosocial and behavioral functioning in adulthood. For example, the YMSM literature documents the association of childhood abuse with adverse adult mental health outcomes including depression, anxiety, and increased stress (Balsam et al., 2010; Huebner et al., 2004; McLaughlin et al., 2012). Moreover, in previous studies of general young adult populations, experiences of sexual victimization (Young et al., 2011) and witnessing violence (McCauley et al., 2013) have been identified as important risk factors for subsequent prescription drug misuse. The results of multiple studies present an emerging picture in which YMSM who report childhood maltreatment are more likely to report high risk behaviors, including substance use and disorders (Brennan et al., 2007; Kalichman et al., 2001). Based on these findings, it is reasonable to suggest that greater childhood abuse experiences would be linked to higher mental health distress, which together would be associated with greater misuse of prescription drugs in a sample of high-risk YMSM.

1.2. Minority status

Minority Stress Theory (Meyer, 2003) posits that mental health disparities among members of stigmatized minority groups such as YMSM may be explained by the chronic stress produced by living in social environments characterized by discrimination directed toward sexual minorities. Indeed, many YMSM report discrimination experiences such as homophobia and racism, social disapproval, and rejection (Bontempo and D'Augelli, 2002; Friedman et al., 2011; Wong et al., 2010). However, YMSM are a very diverse group and some are at even greater risk for victimization and social marginalization. For example, YMSM who are racial/ethnic minorities are subjected to additional stressors, including prejudice and discrimination directed at their race/ethnicity within gay community (Cochran and Mays, 1994; Diaz et al., 2001). Additionally, many YMSM may internalize society's negative attitudes toward gay people; this phenomenon referred to as internalized homophobia (IH), represents an internal form of stress (Meyer and Dean, 1998). Experiences of discrimination and victimization have been found to be significantly associated with poor mental health (Meyer, 2003; Ross et al., 2008). In addition, past experiences of prejudice, stigma or rejection have been linked with mental health distress (Courtenay-Quirk et al., 2006; Preston et al., 2007). Even though the Minority Stress Theory does not directly stipulate how experiences of adverse childhood experiences, minority stress, mental health distress, and general stress appraisals directly impact substance use, it is reasonable to expect that greater experiences of different types of stressors and higher mental distress would also lead to increases in prescription drug misuse and illicit drug use. Multiple experiences of discrimination and IH are of particular concern among substance-using YMSM, who may be exposed to more difficult life circumstances than the general YMSM population. Researchers have found that multiple minority status contributes to substance use, with higher rates of substance use reported among YMSM experiencing minority-related discrimination (Goldbach et al., 2015; Marshal et al., 2008; McCabe et al.,

2010; Ross et al., 2001; Wong et al., 2010). However, less is understood as to how these minority stressors are associated with prescription drug misuse among YMSM.

1.3. Mental health distress and perceived stress

In addition to childhood abuse and minority stress experiences, poorer mental health is closely related to, and is an additional risk factor for substance use among YMSM (Rosario et al., 1996, 2006a). Ample research has documented that sexual minority youth are at elevated risk for depression (Cochran, 2001; Fergusson et al., 2005), anxiety (Fergusson et al., 1999; Lock and Steiner, 1999) and suicidality (Cochran and Mays, 2000) compared to their heterosexual peers. YMSM suffering from mental health distress have been found to self-medicate with alcohol or drugs (Ford and Schroeder, 2009; Sullivan et al., 2006). Furthermore, mental health distress can impact self-esteem, and self-protective behaviors contributing to elevated substance use among YMSM (Salomon et al., 2009; Perdue et al., 2003). YMSM are also likely to face other interrelated life challenges (i.e., housing, work, family) which further can contribute to increased levels of stress and subsequent substance use. Prescription drugs, in particular, may have appeal among YMSM as a means of self-medication or self-treatment in stressful situation, due to their perceived safety and psychopharmacological specificity (Cicero and Inciardi, 2005; McCabe et al., 2009; Quintero, 2009).

1.4. Current study

Our cross-sectional study was conducted with a higher-risk population of YMSM. While prior research suggests a relationship between experiences of childhood abuse, social discrimination, mental health distress and substance use among sexual minority males, studies examining how these factors contribute to different levels of prescription drug misuse among substance-using YMSM are lacking. The current investigation had two primary aims. First, we sought to determine the associations between childhood abuse, experiences of minority stress (e.g., racism, homophobia, social discrimination, internalized homophobia), and current mental distress. We also examined how general stress appraisals are associated with these psychosocial stressors and mental health factors. We hypothesized that YMSM who report high levels of childhood abuse and minority stress would report increased levels of mental health distress and higher appraisal of general stress in their lives. Second, building on previous conceptualizations of multiple stressors influencing behaviors of YMSM (Meyer, 2003; Rosario et al., 2002; Wong et al., 2010) our study examines the influence of these stressors on levels of prescription drug misuse, and on illicit drug use.

2. Methods

2.1. Sample

Participants for this study were recruited in Philadelphia, PA from November, 2012 to July, 2013. Eligible participants were between the ages of 18 and 29 years; misused a prescription drug (i.e., opioid, tranquilizer, stimulant) in the last 6 months; had sex (oral or anal) with a male partner during the past 6 months; were English speaking; and resided in Philadelphia area. "Misuse" was defined as taking prescription drugs "when they were not pre-scribed for you or that you took only for the experience or feeling it caused" (SAMHSA, 2010).

The recruitment strategy used techniques (i.e., targeted, chain-referral sampling) for reaching hidden population in a variety of settings (Biernacki and Waldorf, 1981; Watters and Biernacki, 1989). Sampling was stratified by age (three age ranges: 18–21, 22–25, 26–29) in order to ensure equal representation of different age groups. Major efforts were undertaken to maximize the diversity of the sample. Of 191 participants, 52 (27.2%) were recruited on the streets and in parks across the city; 40 (20.9%) called the study office after seeing advertisements in the community; 50 (26.2%) were identified through LGBT community based organizations (CBO); 16 (8.5%) in gay bars and/or clubs; 14 (7.3%) at university campuses across Philadelphia; 10 (5.2%) were referred by other participants; and 9 (4.7%) responded to advertisements placed in electronic media. A brief screening tool was used to determine eligibility in person or over the phone. Those found to meet the study criteria were given a detailed description of the study, and those who expressed interest provided a verbal informed consent. To protect participant confidentiality no identifying information was collected, and a federal certificate of confidentiality was obtained. Participants were compensated \$25 cash for their participation. Additional descriptions of recruitment strategy and sampling methods are reported elsewhere (Kecojevic et al., 2014).

A cross-sectional survey was developed using iSurvey Software (Contact Software Ltd., Wellington, New Zealand) and loaded onto iPads. The instrument was administered during face-to-face interviews by either the first author or a research assistant. Interviews were conducted in a private office at Drexel University, or in natural settings (i.e., fast food restaurants, cafes, parks) and lasted approximately 60 min. Participants were provided with cards containing response options to facilitate standardization on some interview questions. Referral information, such as resources for HIV testing, was offered to participants following the interview. The institutional review board at Drexel University approved the research protocol.

2.2. Measures

2.2.1. Demographics.—Demographic characteristics included age (recoded as age categories), race/ethnicity (recoded dichotomously as 0 = “White/Caucasian” or 1 = “non-White/racial/ethnic minorities”), and sexual orientation (dichotomized into 0 = “gay identified” and 1 = “non-gay identified, i.e., bisexual, heterosexual, other”).

2.2.2. Childhood abuse.—Questions defining emotional, physical, and sexual abuse were adopted from the Childhood Trauma Questionnaire (CTQ) (Bernstein et al., 1994). Fifteen items assessed abuse during childhood. Participants were asked to indicate how often they were abused when growing up (e.g., “When I was growing up ... someone tried to make me do sexual things or watch sexual things”). Responses were scored on a Likert-type scale that ranged from 1 = “never” to 5 = “very often”. Cronbach’s alpha for the overall scale was 0.93 ($\alpha = 0.90, 0.88, 0.93$ for the emotional, physical, and sexual subscales, respectively). In order to examine the presence and impact of threshold levels of abuse, and as recommended by prior reports (Simon et al., 2009), we utilized cut points previously established by Walker et al. (1999) for CTQ subscales with the following scores marking the threshold for the presence of abuse: emotional abuse 10, physical abuse 8, and sexual abuse 8.

2.2.3. Discrimination.—Items that measured lifetime experiences of racism, homophobia, and social racism/homophobia, were adapted from Diaz et al. (2001) and Wong et al. (2014). Higher scores indicate greater experiences of discrimination.

2.2.3.1. Racism: The composite measure of racism was a four-item Likert-type scale ($\alpha = 0.74$), ranging from 0 = “never” to 3 = “many times”, describing lifetime experience of verbal harassment, verbal threats, physical attack, and police harassment due to race or ethnicity (e.g., “How often in your lifetime have you been verbally threatened because of your race or ethnicity?”).

2.2.3.2. Homophobia: The measure of experienced homophobia was a four-item scale ($\alpha = 0.77$), ranging from 0 = “never” to 3 = “many times”, describing lifetime experience of verbal harassment and threats, physical attack, police harassment because of sexual orientation, how frequently their friends and family had made fun of gay people around them, and if a participant had ever needed to move in order to avoid harassment or attacks due to their sexual orientation (e.g., “How often in your lifetime have you been physically threatened or attacked because of your sexual orientation?”).

2.2.3.3. Social racism/homophobia: The composite measure of socio-sexual racism was a four-item scale ($\alpha = 0.74$) that assessed whether respondents felt uncomfortable in gay-identified spaces, or on-line due to their race or ethnicity, whether they were ever rejected for sex, or felt objectified by sexual partners because of their race or ethnicity (e.g., “I have been turned down for sex because of my race or ethnicity”). These experiences were assessed with a four-item Likert-type scale ranging from 0 = “strongly disagree” to 3 = “strongly agree”.

2.2.4. Internalized homophobia (IH).—IH was measured using a short version of Ross and Rosser’s (1996) instrument, rated on a four-item Likert’s scale ($\alpha = 0.92$) ranging from 0 = “strongly disagree” to 3 = “strongly agree”. This short scale has been previously used in a similar population by Wong et al. (2014). The items assessed the extent to which participants indicated disliking themselves for being sexually attracted to men, wished they were not sexually attracted to men, felt guilty for having sex with men, and felt stress or conflict as a result of having sex with men (e.g., “Sometimes I feel guilty about having sex with men”).

2.2.5. Mental health distress.—The Brief Symptom Inventory, BSI-18 (Derogatis, 2000) was used to assess levels of depression, anxiety and somatization. The BSI is a self-reported measure of psychological distress in the prior week, and it has been previously used in YMSM (Mustanski et al., 2010). Participants were asked to indicate how much something has distressed or bothered them in the past 7 days (e.g., “In the past 7 days, how much were you distressed by feeling lonely?”) on a 5-point scale that ranges from 1 = “not at all” to 5 = “extremely”. Following the BSI-18 scoring instructions, raw scores were converted to *T* scores using gender specific community norms. Higher scores indicate more depression, anxiety, or distress arising from perceptions of bodily dysfunctions, i.e., somatization. Because the BSI clinical case cutoff likely has a low positive predictive value in this population (Mustanski et al., 2010), we are not reporting on prevalence of psychological

distress in our sample. Cronbach's alpha for the overall scale was 0.93 ($\alpha = 0.88, 0.82, 0.84$ for the depression, anxiety, and somatization subscales, respectively).

2.2.6. General stress appraisal.—General stress appraisal was assessed using the Perceived Stress Scale (PSS), a 10-item self-report questionnaire with strong reliability and validity (Cohen et al., 1983). Respondents were asked to indicate how often they have felt or thought a certain way in the past month (e.g., “In the last month, how often have you been upset because of something that happened unexpectedly?”) on a 5-point scale ranging from 0 = “never” to 4 = “very often”. Some of the items were scored in reverse. Responses are then summed to indicate the level of perceived stress. The PSS is not a diagnostic instrument and there are no score cut-offs. However, higher scores indicate more perceived stress. Cronbach's alpha was 0.86.

2.2.7. Drug use outcomes.—The study focused on the misuse of three most commonly misused classes of prescription drugs, by young adults: opioids, tranquilizers, and stimulants (SAMHSA, 2010). Participants were asked to respond to a Yes/No question asking if they misused opioids, tranquilizers, and stimulants in the past 6 months. Participants were read a list of the prescription drugs for each of drug classes, and Yes/No question was asked for each drug on the list. The list included the following types of drugs: opioids such as Vicodin, Loritab, OxyContin, etc.; tranquilizers-benzodiazepines such as Ativan, Xanax, Klonopin, etc., and stimulants such as Adderall, Ritalin, Desoxyn, etc. To assess the severity of current misuse for each drug class, participants were then asked, “Approximately, how many pills (opioids/tranquilizers/stimulants) did you use in the past 6 months, that were not prescribed to you, or that you took only for the experience or feeling it caused?”. Answers were self-reported in continuous fashion. Because the majority of prescription drug misusers have also been found to have high rates of illicit drug use (Lankenau et al., 2012) we also assessed illicit drug use in the past 6 months by asking participants whether they used ecstasy, mushrooms, μ -hydroxybutyric acid (GHB), lysergic acid diethylamide (LSD), heroin, cocaine, crack, PCP/angel dust, crystal methamphetamine, or ketamine. If they answered “Yes” to any, they were coded as 1 = “Yes” to illicit drug use, and if they answered “No” to all of them, they were coded as 0 = “No”. We excluded marijuana from our illicit drug use category since it is readily available and commonly used within the general population of young adults.

2.3. Data analysis

Statistical analyses were conducted using the STATA 13.1 (StataCorp., College Station, TX, 2013). Descriptive analyses examined the distribution of demographics, risk factors, and substance use outcomes. Correlation analyses examined associations of risk factors with each other. To adjust for the effects of all variables of interest, multivariable regression analyses were conducted to evaluate the predictive nature of each risk factor on different classes of prescription drug misuse and on illicit drug use, while controlling for the potentially confounding effects of variables in models. We ran a negative binomial regression to examine predictors of past 6-month quantity of use (a number of pills) separately for opioids, tranquilizers and stimulants. Poisson regression models were used because the outcome variable constitutes a count variable and Poisson models are most

appropriate (Coxe et al., 2009). Since initial Poisson analyses indicated significant overdispersion, a negative binomial regression model was calculated using maximum likelihood estimation with robust error estimators to estimate the dispersion parameter (Coxe et al., 2009; Long, 1997). Logistic regression model was used to examine association of risk factors with illicit drug use. All independent continuous variables were mean-centered (Kraemer and Blasey, 2004). Incidence rate ratios (IRR), odds ratios (ORs), and 95% confidence intervals (CIs) were calculated.

3. Results

3.1. Descriptive findings

As summarized in Table 1, the average age was 23.7 (standard deviation, SD = 3.3), with approximately equal number of participants in three age categories. The sample was one-third White, and two-thirds non-White. Over half of the sample self-identified as gay/homosexual. Substantial proportions of participants reported experiences of different forms of childhood abuse above standardized thresholds (emotional 65.4%, physical 54.5%, and sexual 37.8%). While the participants reported lower levels of experiences of discrimination and IH, as indicated by the ranges, there was considerable variability around the mean, as indicated by the SDs. Levels of depression, anxiety, somatization, and perceived stress experienced by participants were relatively high compared to previous reports in general YMSM populations. The most commonly misused prescription drug classes in the past 6 months were tranquilizers (80.6%, range 0–1800 pills) and opioids (78.5%, range 0–2980 pills), while slightly over half of the sample misused stimulants (52.4%, range 0–850 pills). Marijuana was used by 76.5%, and illicit drugs by 56.5% of participants.

3.2. Bivariate associations

Table 2 presents associations between experiences of childhood abuse, minority identity related stressors, mental health burden, and perceived stress. Associations among various psychosocial variables were consistently significant and positive. For instance, higher levels of childhood abuse were significantly associated with increased mental health distress.

3.3. Multivariable associations

In Table 3, we present estimates for the adjusted IRR and OR for outcomes of interest. Among demographic variables, older compared to younger age categories were significantly correlated with higher opioid misuse. Parameter estimates also indicated that those who identified as racial/ethnic minority reported lower misuse of tranquilizers, stimulants, and illicit drug use compared to White YMSM. Finally, parameter estimates indicated that participants who self-identified as bisexual/heterosexual/other report higher misuse of opioids, tranquilizers, and stimulants compared to participants identifying as gay.

Parameter estimates indicated that childhood physical abuse and higher levels of perceived stress remained significant correlates of higher opioid misuse. Those reporting higher levels of depression reported lower quantities of opioid misuse. Regarding tranquilizer misuse, participants with higher levels of perceived stress were more likely to report higher misuse. In addition, greater experiences of social homophobia/racism, depression, and in particular,

somatization were significantly associated with higher misuse of stimulants. Illicit drug use remained more likely among those who were exposed to higher levels of racism and somatization.

4. Discussion

Despite the fact that high levels of substance use is significantly associated with numerous negative consequences, little is known about the psychosocial and mental health risk factors associated with prescription drug and illicit drug misuse among drug-using YMSM, who represent an under-researched population in need of services and interventions. The current study examines the role of experiences of childhood abuse, lifetime discrimination related to racial and sexual orientation status, and current mental health distress on levels of misuse of three classes of prescription drugs in the past 6 months. While many of our participants misused prescription drugs infrequently, the range of use varied considerably, with some misusing prescription drugs (in particular opioids and tranquilizers) rather heavily. Consistent with previous research (Fields et al., 2008; Meyer, 2003; Wong et al., 2010), experiences of childhood abuse and discrimination were significantly correlated with each other and participants' levels of mental health distress and general stress appraisal. In the present study, we found significantly elevated rates of all three forms of childhood abuse. Previous research suggested that high rates of childhood abuse among YMSM could be attributed to insufficient family and peer support during sexual identity development (Relf, 2001), and related to family's discontent with gender nonconformity (Harry, 1989). In addition, previous studies of YMSM linked childhood abuse to depression, suicide attempts, gay-related victimization, and high-risk sexual activity (Bontempo and D'Augelli, 2002; Rosario et al., 2006b).

Results indicate that participants who experienced childhood abuse reported higher prevalence of substance use compared to those who have not been victimized which is consistent with previous findings (Friedman et al., 2011). Notably, our results indicate that those who experienced physical childhood abuse are more likely to indicate heavy misuse of opioids, providing additional evidence that some forms of childhood abuse can be powerful antecedents of higher risk behaviors. Opioid misuse can serve as a means to cope with, or dissociate from the pain, anxiety, and negative feelings that may accompany past experiences of childhood physical abuse (Bensley et al., 1999; Dube et al., 2003). Our findings are also consistent with prior research showing that experiences of discrimination can lead to discomfort with one's sexual identity and may act as a significant psychosocial stressor linked to substance use disorders (McCabe et al., 2010; Mizuno et al., 2012). Study findings indicate that greater experiences of social discrimination were related to higher stimulant use, while greater experiences of racism were related to illicit drug use. These findings confirm some previous studies that found associations between gay-related stressful experiences and increased use of some types of drugs (Rosario et al., 1996), in particular stimulants (Colfax et al., 2005). The experience of discrimination and stigma from heterosexual and within gay communities may lead to elevated stimulant misuse, which may be conceived of as an avoidant coping strategy among YMSM. Similarly, race/ethnicity-related discrimination may increase the odds of substance use, particularly among YMSM who endorse substance use as coping mechanism (Gerrard et al., 2012). Our results point to

the need for more research on the role that the different aspects of minority stress may play in substance use among high-risk YMSM.

Consistent with our hypothesis, mental health stressors also played a significant role in levels of prescription drug misuse among high-risk YMSM. Higher levels of perceived stress were significantly associated with increased levels of opioid and tranquilizer misuse. Individuals may use opioids and tranquilizers to self-medicate physical or mental pain (Sullivan et al., 2006), or to escape from a current stressful state since opioids provide general calming and normalizing effects (Khantzian, 1997). Higher level of distress arising from perceptions of bodily dysfunctions, i.e. somatization, was significantly associated with increased stimulant misuse, and with illicit drug use. However, it should be noted that some of the problematic bodily processes assessed by the somatization scale can also be side effects of stimulant use, and thus, could be consequences rather than predictors of stimulant misuse. In addition, our results suggest that there are differentiated effects of depression, with increased levels of depression being associated with higher stimulant misuse but with less opioid misuse. While this finding necessitates further investigation, this may not be as surprising given different pharmacological properties of stimulants and opioids. Stimulants are known to be used to enhance cognitive performance and feelings of well-being (Lakhan and Kirchgessner, 2012), while opioids are known to increase the risk for development of depression (Scherrer et al., 2014). Therefore, it is possible that YMSM may use drugs strategically, to produce, enhance or avoid specific effects of these drugs.

Some important demographic associations deserve mention. In multivariable models, older YMSM were more likely to engage in higher opioid misuse, while no age difference was observed for other drugs. Possible explanations include that older YMSM have an easier access to settings where opioids are available. Relative to gay/homosexual YMSM, those who identified as bisexual/heterosexual/other were at considerable risk for high misuse of all three classes of prescription drugs. For these youth, having sex with men may be at odds with their sexual identities (Gwadz et al., 2004). Hence, high prescription drug misuse may represent a maladaptive coping mechanism for managing negative feelings about sexual identity. Racial minority YMSM were significantly less likely than White YMSM to misuse higher quantities of tranquilizers and stimulants or to use illicit drugs confirming some of the previous findings that racial minority YMSM have lower prevalence of drug use than White YMSM (Bavarian et al., 2013; Kipke et al., 2007).

Our findings have implications for future research and interventions aimed at reducing health risks in substance-using YMSM. For researchers, prescription drug misuse is another important factor to consider when investigating substance use in this population. Additional research with other YMSM communities and longitudinal studies are needed to investigate causal paths and stability of these findings over the time. It is likely that there are other risk factors to be considered beyond those investigated here. For example, substance use behaviors have been found to be associated with impulsivity (Semple et al., 2000), and sensation seeking (Newcomb et al., 2011). In addition, qualitative studies involving YMSM may offer more contextual insights into phenomena of prescription drug misuse. For practitioners, our findings emphasize the importance of recognizing the patterns of interrelated risk factors that contribute to substance use among YMSM. For example, our

data suggest a relatively high incidence of childhood abuse in substance-using YMSM, and suggest that screening for childhood abuse is clinically prudent in treatment with these individuals. Besides promoting personal skills such as behavioral self-management, inclusion of strategies for coping with negative life experiences merits a strong consideration in the development and delivery of risk reduction interventions for substance-using YMSM. Gaining a better understanding of the nuances of relationships among abuse, discrimination, distress and prescription drug misuse could enable clinicians and public health researchers to provide more refined harm reduction efforts in this population.

We acknowledge several study limitations. Although self-reported data on risky behaviors and substance use are generally considered valid (Ford, 2008), limitations include recall bias, and social desirability. Despite the use of validated assessments, our findings are limited by the retrospective and subjective nature of self-report measures used to assess predictors and outcome variables. Use of computer assisted interview technology may have minimized the bias of socially desirable responding. While findings from this study provide some insight into risk factors for prescription drug misuse, the cross-sectional analysis does not allow for inference about causality. These results may not generalize to YMSM who do not engage in substance use behaviors, or are not from Philadelphia. This analysis does not adjust for other potential covariates possibly associated with substance use such as peer influence (Stein et al., 2005), or social network characteristics (Kapadia et al., 2013).

In conclusion, our findings corroborate other studies that link contextual stress with substance use among YMSM (Wong et al., 2010). YMSM who are exposed to adverse childhood experiences, discrimination, or who experience higher levels of mental health distress may be at particular risk for prescription drug misuse as a means of avoidance or alleviation of these experiences. The strength of this analysis is that we found differential effects of different risk factors between subtypes of prescription drug misuse. With a host of negative consequences associated with prescription drug misuse and substance use in general, further research is needed to address additional risk factors that are associated with misuse among YMSM. Nevertheless, our findings suggest that clinicians and service providers need to consider YMSM's broader psychosocial history and current mental health as one of the important ways to intervene with and reduce risk-taking among this high-risk population.

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Table 1

Descriptive statistics for demographics, observed indicators of risk factors, prescription drug misuse, and illicit drug use ($N = 191$).

Variable Demographics	Categories	N (%)
Age group	18–21 years	60 (31.4)
	22–25 years	66 (34.6)
	26–29 years	65 (34.0)
Race	White/Caucasian	64 (33.5)
	Non-Whites/racial/ethnic minorities:	127 (66.5)
	Black/African American	71 (37.2)
	Multiracial	35 (18.3)
	Other (incl. Hispanic)	17 (8.9)
	Asian/Pacific Islander Native American	2 (1.0) 2 (1.0)
Sexual identity	Gay/homosexual	109 (57.1)
	Bisexual/heterosexual/other	82 (42.9)
Risk factors		Mean (SD)
<i>Childhood abuse (CTQ)</i>	Emotional	13.1 (6.1)
	Above threshold (N ; %)	125 (65.5)
	Physical ($n = 189$)	10.0 (5.2)
	Above threshold (N ; %)	103 (54.5)
	Sexual ($n = 188$)	8.6 (5.2)
	Above threshold (N ; %)	71 (37.8)
<i>Discrimination</i>	Experience of homophobia ($n = 189$)	7.5 (4.3)
	Experience of racism ($n = 189$)	2.9 (2.9)
	Experience of social racism/homophobia	2.5 (2.9)
<i>Internalized homophobia</i> ($n = 183$)		5.3 (5.3)
<i>Mental health distress (BSI)</i>	Depression	66.8 (12.2)
	Anxiety	66.5 (12.5)
	Somatization	59.9 (12.3)
<i>General stress appraisal</i>		20.9 (7.5)
Substance use in past 6 months		N (%)
Opioids (range of misused pills: 0–2890)		150 (78.5)
Tranquilizers (range of misused pills: 0–1800)		154 (80.6)
Stimulants (range of misused pills: 0–850)		100 (52.4)
Illicit drugs		108 (56.5)
Marijuana		146 (76.5)

Notes: CTQ – Childhood Trauma Questionnaire; BSI – Brief Symptoms Inventory 18, values represent T scores based on gender specific community norms.

Associations between childhood abuse, discrimination, internalized homophobia, mental health distress, and general stress appraisal.

Table 2

	1	2	3	4	5	6	7	8	9	10	11
1. Emotional abuse	1.00	0.68***	0.52***	0.47***	0.31***	0.36***	0.31***	0.42***	0.37***	0.37***	0.39***
2. Physical abuse		1.00	0.52***	0.42***	0.39***	0.36***	0.28***	0.38***	0.30***	0.37***	0.39***
3. Sexual abuse			1.00	0.47***	0.31***	0.31***	0.17*	0.30***	0.25***	0.26***	0.26***
4. Racism				1.00	0.29***	0.36***	0.21**	0.25***	0.26***	0.23***	0.29***
5. Homophobia					1.00	0.45***	0.15*	0.25***	0.22***	0.28***	0.18*
6. Social homophobia/racism						1.00	0.26***	0.29***	0.24***	0.15*	0.21**
7. Internalized homophobia							1.00	0.39***	0.33***	0.21**	0.42***
8. Depression								1.00	0.76***	0.53***	0.69*
9. Anxiety									1.00	0.56***	0.62***
10. Somatization										1.00	0.46***
11. General stress appraisal											1.00

* <0.05.

** <0.01.

*** <0.001.

Table 3
Multivariable regression analyses of risk factors for increased prescription drug misuse and illicit drug use.

	Rx opioids (IRR, 95% CI)	Rx tranquilizers (IRR, 95% CI)	Rx stimulants (IRR, 95% CI)	Illicit drugs use (OR, 95% CI)
Demographics				
Age ^a	1.90 (1.26–2.89) **	1.38 (0.92–2.06)	1.27 (0.83–1.94)	1.42 (0.91–2.21)
Race – non-White	0.72 (0.34–1.55)	0.46 (0.22–0.99) *	0.35 (0.24–0.94) *	0.38 (0.17–0.85) *
Sex identity – non-Gay	2.69 (1.21–5.98) **	2.91 (1.33–6.35) **	3.04 (1.16–7.92) *	1.18 (0.53–2.65)
Risk factors				
<i>Childhood Abuse</i>				
Emotional abuse	0.97 (0.36–2.62)	0.67 (0.27–1.67)	1.19 (0.45–3.15)	1.43 (0.60–3.42)
Physical abuse	2.60 (1.07–6.28) *	1.94 (0.86–4.39)	0.68 (0.20–1.69)	0.65 (0.27–1.55)
Sexual abuse	1.07 (0.49–2.33)	0.99 (0.43–2.24)	0.95 (0.38–2.37)	1.06 (0.41–2.73)
<i>Discrimination</i>				
Racism	0.99 (0.89–1.10)	0.89 (0.79–1.01)	1.01 (0.85–1.22)	1.15 (1.00–1.32) *
Homophobia	1.06 (0.97–1.15)	1.07 (0.97–1.18)	1.09 (0.98–1.22)	0.98 (0.89–1.07)
Social homophobia/racism	0.96 (0.83–1.11)	1.11 (0.96–1.28)	1.16 (1.00–1.34) *	1.01 (0.86–1.18)
<i>Internalized homophobia</i>	0.97 (0.92–1.03)	0.95 (0.89–1.01)	0.95 (0.87–1.04)	1.03 (0.95–1.11)
<i>Mental health distress</i>				
Depression	0.96 (0.92–1.00) *	1.00 (0.96–1.05)	1.04 (1.00–1.09) *	1.03 (0.98–1.08)
Anxiety	1.02 (0.99–1.06)	1.00 (0.98–1.03)	0.96 (0.91–1.01)	0.97 (0.92–1.01)
Somatization	1.01 (0.98–1.04)	1.02 (0.99–1.05)	1.08 (1.03–1.12) ***	1.05 (1.01–1.09) *
<i>General stress appraisal</i>	1.09 (1.02–1.17) **	1.07 (1.00–1.14) *	0.95 (0.88–1.02)	1.00 (0.94–1.07)

Bolded values denote statistical significance.

^a Age represents the increase in likelihood of the outcome for each age category.

* 0.05.

** 0.01.

*** 0.001.